NATURAL RESOURCES DATA BANK

THIRUVANANTHAPURAM

KERALA STATE LAND USE BOARD

VIKAS BHAVAN, THIRUVANANTHAPURAM - 33

2013

M. NANDAKUMAR IAS
Commissioner, Commissionerate of Rural Development,
& Commissioner, Kerala State Land Use Board

KERALA STATE LAND USE BOARD
Vikas Bhavan, Thiruvananthapuram-695 033
e-mail : tvm.nandakumar@gmail.com
Ph: +91 471 2307833 (P), 2302231,2307830
Fax : +91 471 2307838

PREFACE

Only through proper study of natural resources like land, water, biomass etc., land can be effectively used for various purposes. To study these matters, basic information on natural resources; spatial and nonspatial - is absolutely essential and then only scientific planning will be fulfilled. Planning reveals the scope of resources and how they can be meaningfully used in future. This publication, "Natural Resources Data Bank" will help a better understanding of the resources of the district to this extent, especially in the context of decentralized planning process.

Though many gaps might be there in this publication, I hope it would serve as an effective tool for planning at microlevel.

Thiruvananthapuram
14-02-2013

M. NANDAKUMAR I.A.S
Land Use Commissioner

CONTENTS

N.B:- Related Maps are provided in each Chapter.

GENERAL INFORMATION

Thiruvananthapuram the Southernmost district of the coastal State of Kerala in South India came into existence on 1st November 1956. The city gets its name from the word "Thiru-anantha-puram" meaning the "Abode of Lord Anantha". Being capital of Kerala often known as "God's own country", Thiruvananthapuram is also called "God's own capital". The district has an area of 2192 sq.km consisting of 11 blocks, 4 municipalities and one corporation. The district is part of South Kerala coast and is divided into three submicroregions. Geographically district can be divided as highland, midland and lowland regions. Thiruvananthapuram lies between North Latitude $8^0$17' and $8^0$51' and East Longitude $76^0$41' and $77^0$17'. District has a sea coast which is about 75kms long and also suited for backwater fishing due to the presence of continuous stretch of lakes and backwaters. The largest forest reserves favourably affect the climate and include more rain in the district. The part "Agasthyarkoodam" mountain which is the second highest peak in the Western Ghats lies in the district.

Agriculture has been the primary occupation of the district and stands in the second position in tapioca cultivation. The soil of the district is generally classified as alluvial, peaty and laterite. This is the first city along the path of the South-West monsoon. Humidity is huge and rises to about 90% during the South West monsoon. Animal health has been taken care of by the department by establishing a network of veterinary institution at different level. Various industrial promotional agencies plays an important role. City houses several central and State Government Offices and Organisations. Apart from being the political nerve centre of Kerala it is also major academic hub and is home to several educational institutions. Thiruvananthapuram is also a tourist hot spot for both domestic and international tourists. The main rivers in the district are Neyyar, Karamana and Vamanapuram. All the revenue villages and towns are electrified and power is there almost every nook and corner of the district.

HISTORY

The name, Thiruvananthapuram, means the abode of the sacred snake god Ananthan, on whom Vishnu, the god of Preservation, is believed to be reclining. The old name, Trivandrum, is an anglicised form of the word - Thiruvananthapuram.

Thiruvananthapuram, the capital of Kerala State and the District head quarters came into existence as a result of linguistic Reorganisation of States on the 1st November, 1956.

The history of the District is intertwined with the history of the princely State of Travancore. Trivandrum remained as the Capital of this princely State for over two centuries. There is little knowledge about the pre-history of the District. Though no Paleolithic (Old Stone Age) man lived in this region, some pre-historical antiquities of the Neolithic (new stone age) culture and megalithic monuments have been discovered in the District. The archaeological remains of the pre-historic period which comprises of natural or artificial caves were discovered when the Varkala Tunnel was bored. There are a number of archaeological antiquities particularly inscriptions in the District. Almost all the inscriptions and sculptures are found in the various temples located in the District. As in the case of other Coastal Districts, the District had also commercial contacts with many parts of the world. The famous book of 'Periplus of Erythrean Sea' mention about Varkala Hills.

Upto the beginning of the 10th Century A.D., the Ays were the leading political power in the area. The disappearance of the Ays as a major political power in the 10th Century A.D. synchronized with the emergence of the rulers of Venad. In 1684, during the regency of Umayamma Rani, the English East India Company obtained a sandy pit of land at Anjengo (Anchuthengu) on the sea coast about 31 kms. North of Thiruvananthapuram with a view to erect a factory and to fortify it. The place had earlier been frequented by the Portuguese and later by the Dutch. It was from here that the English gradually extended their domain to the other parts of Travancore.

The modern history begins with Marthanda Varma who is generally known as the 'Maker of Modern Travancore' (1729-1758A.D). Thiruvananthapuram was known as a great centre of intellectual and artistic activities in those days. The accession of Maharaja Swathi Thirunal (1829-1847 A.D) ushered in an epoch of cultural progress and economic prosperity. The beginning of English education was made in 1834 by opening an English School at Thiruvananthapuram. In 1836, an observatory and a charity hospital were established at Thiruvananthapuram. During the reign of Ayilyam Thirunal (1860-1880 A.D), a fully equipped Arts College was started at Thiruvananthapuram besides several English, Malayalam and Tamil Schools for boys and girls all over the

State. A large Civil Hospital and a Lunatic Asylum were also established. In 1873, the present University College of Thiruvananthapuram was opened. During the period of Sree Moolam Thirunal (1885-1924 A.D) a Sanskrit College, an Ayurveda College, a Law College and a Second Grade College for women were opened at Thiruvananthapuram. A department for the preservation and publication of oriental manuscripts was also established. One of the significant measures associated with his reign was the inauguration of the Legislative Council in 1888. In 1904, the Sree Moolam Assembly came into being.

The activities of the Indian National Congress echoed in Thiruvananthapuram and other parts of Kerala during the reign of Sree Moolam Thirunal. In 1938, a political conference of the Congress was held in the city under the presidency of Dr.Pattabhi Sitaramaiah.

The period, since the Maharaja Sree Chithira Thirunal Bala Rama Varma took the reign of administration in 1931, witnessed multifaceted progress. The promulgation of the Temple Entry Proclamation (1936) was worth mentioning. In 1937, a separate University for Travancore was started. This was later re-designated as University of Kerala, following the formation of Kerala State in 1956.

With the accession of Travancore to the Indian Union after independence, the policy of the State Government underwent radical changes. The first popular Ministry headed by Sree Pattom Thanu Pillai was installed in office on March 24, 1948. Consequent on the recommendation of the State Reorganization Commission, the four Southern Taluks of Thovala, Agastheeswaram, Kalkulam and Vilavancode were merged with Tamil Nadu. The Kerala State came into being on the 1st November, 1956.

Source:- Census of India, 2001.

KERALA AT A GLANCE

Location	:	North Latitude between $8^0$18' and $12^0$48' East Longitude between 74^0 52' and $77^0$22'
Area	:	38863 sq.km.
Forests	:	11309.42 sq.km.
Wetlands	:	1941 sq.km.
Percentage of area to the area of Indian Union	:	1.18
Length of Coastal Line	:	580 km.
Highest Peak	:	Anamudi (2694 metres)
Longest River	:	Periyar (244 km.)
Rivers		
West flowing	:	41 Nos.
East flowing	:	3 Nos.
Administration		
Districts	:	14 Nos.
Taluks	:	63 Nos.
Revenue Villages	:	1478 Nos.
Village Panchayats	:	978 Nos.
Corporations	:	5 Nos.
Municipalities	:	60 Nos.
Cantonments	:	1 No.
Community Development Blocks	:	152 Nos.
Average Annual Rainfall	:	2900 m.m.
Cultivated Area	:	2.292 m.ha.
Per capita land	:	0.13 ha.
Per capita cultivated land	:	0.10 ha.
Per capita production food grain	:	37 kg/annum
Members in State Legislature		
Elected	:	140 Nos.
Nominated	:	1 No.
Members of Parliament from the State		
Lok Sabha	:	20 Nos.
Rajya Sabha	:	9 Nos.

Table: 1.1

Population	1991 Census	2001 Census	2011 Census
Total population (lakhs)	290.99	318.41	333.88
Male population (lakhs)	142.89	154.69	160.21
Female Population (lakhs)	148.10	163.73	173.66
Density per sq.km.	749	819	859
Sex ratio (Females per 1000 males)	1036	1058	1084
Literacy (%)	89.81	90.86	93.91
Male Literacy	93.62	94.24	96.02
Female Literacy	86.17	87.72	91.98
Rural population (lakhs)	214.18	235.75	174.56
Urban population (lakhs)	78.80	82.67	159.32
Increase of population (%)	13.88	9.43	4.86
Life Expectancy (Years)	68		74
Infant Mortality (per 1000)	22	16	12
Birth Rate (per 1000)	19.8	18.3	14.7

THIRUVANANTHAPURAM AT A GLANCE

Table: 1.2

ADMINISTRATIVE SET UP

Sl. No.	Particulars	Thiruvananthapuram	State
1	No. of Revenue Divisions	1	21
2	No. of Taluks	4	63
3	No. of Revenue Villages	121	1478
4	No. of Corporations	1	5
5	No. of Municipalities	4	60
6	No. of Municipality Wards	147	2216
7	No. of Block Panchayat	11	152
8	No. of Block Panchayat Wards	155	2095
9	No. of Grama Panchayat	73	978
10	No. of Grama Panchayat Wards	1299	16680
11	No. of Assembly Constituencies	14	140
12	No. of Parliament Constituencies	2	20
13	No. of District Panchayat Wards	26	332

Table: 1.3

GEOGRAPHICAL PARTICULARS

Sl. No.	Area Categorization	Thiruvananthapuram	State
1	Total Area (Ha)	218781	3886287
2	Forest Area (Ha)	49861	1081509
3	Length of Coastal Line (Kms)	78	590

Table: 1.4

AGRICULTURE

Sl. No.	Land Utilization Pattern (Ha)	Thiruvananthapuram	State
1	Total Geographical Area	218781	3886287
2	Forest Area	49861	1081509
3	Land put to non agricultural use	26949	384174
4	Barren & Uncultivable land	243	19573
5	Permanent pastures and other grazing land	0	153
6	Land under misc. tree crops	39	3690
7	Cultivable Waste	365	91665
8	Fallow other than current fallow	335	51943
9	Current fallow	2935	76028
10	Net area sown	133559	2071507
11	Area sown more than once	20551	575954
12	Total cropped area	154110	2647461

Table: 1.5

ANIMAL HUSBANDRY

Sl. No.	Livestock Population	Thiruvananthapuram	State
1	Cattle	148385	1740117
2	Buffaloes	2755	58145
3	Goats	188612	1729127
4	Pigs	1528	59017
5	Sheep	0	965
6	Ducks	30056	865331
7	Fowls	1194190	11820376

Table: 1.6

FISHERIES

Sl. No.	Particulars	Thiruvananthapuram	State
1	Fisher Folk Population		
	a. Marine		
	Population	188102	887276
	Active Fishermen	52511	188132
	b. Inland		
	Population	1590	265026
	Active Fishermen	0	48281
2	Annual Fish Production		
	a. Marine		
	Quantity (In Tonnes)	45121	560398
	Value (In Rs. Lakhs)	22324	328168
	b. Inland		
	Quantity (In Tonnes)	1974	121215
	Value (In Rs. Lakhs)	1137	102124
3	No. of Fishing Villages		
	Marine	42	222
	Inland	4	113
4	No. of Brackish Water Area (Ha)	1423.98	65212.96

Table: 1.7

INDUSTRIES

Sl. No.	Industrial Units	Thiruvananthapuram	State
1	Number of Factories	1005	18525
2	Number of SSI units registered	26821	194908
3	Number of Coir Societies	94	841
4	Number of Women SSI units	621	49688
5	Number of SC/ST SSI units	1900	26821

Table: 1.8

COMMUNICATION

Sl. No.	Communication Divisions	Thiruvananthapuram	State
1	Total number of Post offices	414	5053
a)	Number of Head Post office	4	51
b)	Number of Sub office	143	1455
c)	Number of Branch office	267	3559
d)	Number of ED Sub office	0	2
2	Total number of Telephone exchanges	96	1245

Table: 1.9

HEALTH

Sl. No.	Institutions	Thiruvananthapuram	State
1	General Hospitals	1	11
2	Women & Children Hospital	1	6
3	District Hospital	2	15
4	Taluk H.Q Hospital	3	80
5	Government Hospitals (Allopathic)	1	5
6	Primary Health Centre (both 24x7 & Not 24x7 PHC)	69	835
7	Leprosy control unit/Hospitals	0	3
8	TB Centre/Clinic	2	20
9	Mental Health Centre	1	3
10	Number of Ayurvedic Hospitals	1	119
11	Number of Homoeopathic Hospitals	4	30

Table: 1.10

EDUCATION

Sl. No.	Institutions	Thiruvananthapuram	State
1	Lower Primary Schools	506	6784
2	Upper Primary Schools	226	2986
3	High Schools	257	2874
4	Vocational Higher Secondary Schools	41	389
5	Teachers Training Institute	7	222
6	Schools for Disabled	14	44
7	Kendriya Vidyalaya	5	32
8	Jawahar Navodaya Vidyalaya	1	14
9	CBSE School	67	797
10	ICSE School	13	108
11	ITIs	7	36
12	Engineering Colleges	25	142
13	Medical Colleges (Govt)	1	5
14	Government Polytechnic Colleges	5	49

Table: 1.11

DRINKING WATER FACILITIES

Sl. No.	Water Supply Connections	Thiruvananthapuram	State
1	Number of public wells	Not Available	603
2	Number of public tanks/ponds	263	1777
3	Number of public taps	16837	209141
4	Number of tube wells	5	19716

Table: 1.12

WATER RESOURCES

River	Neyyar
	Karamana
	Vamanapuram
Brackish Water	Poovar
	Poonthura
	Veli
	Kadinamkulam
	Anchuthengu
	Edava

Table: 1.13

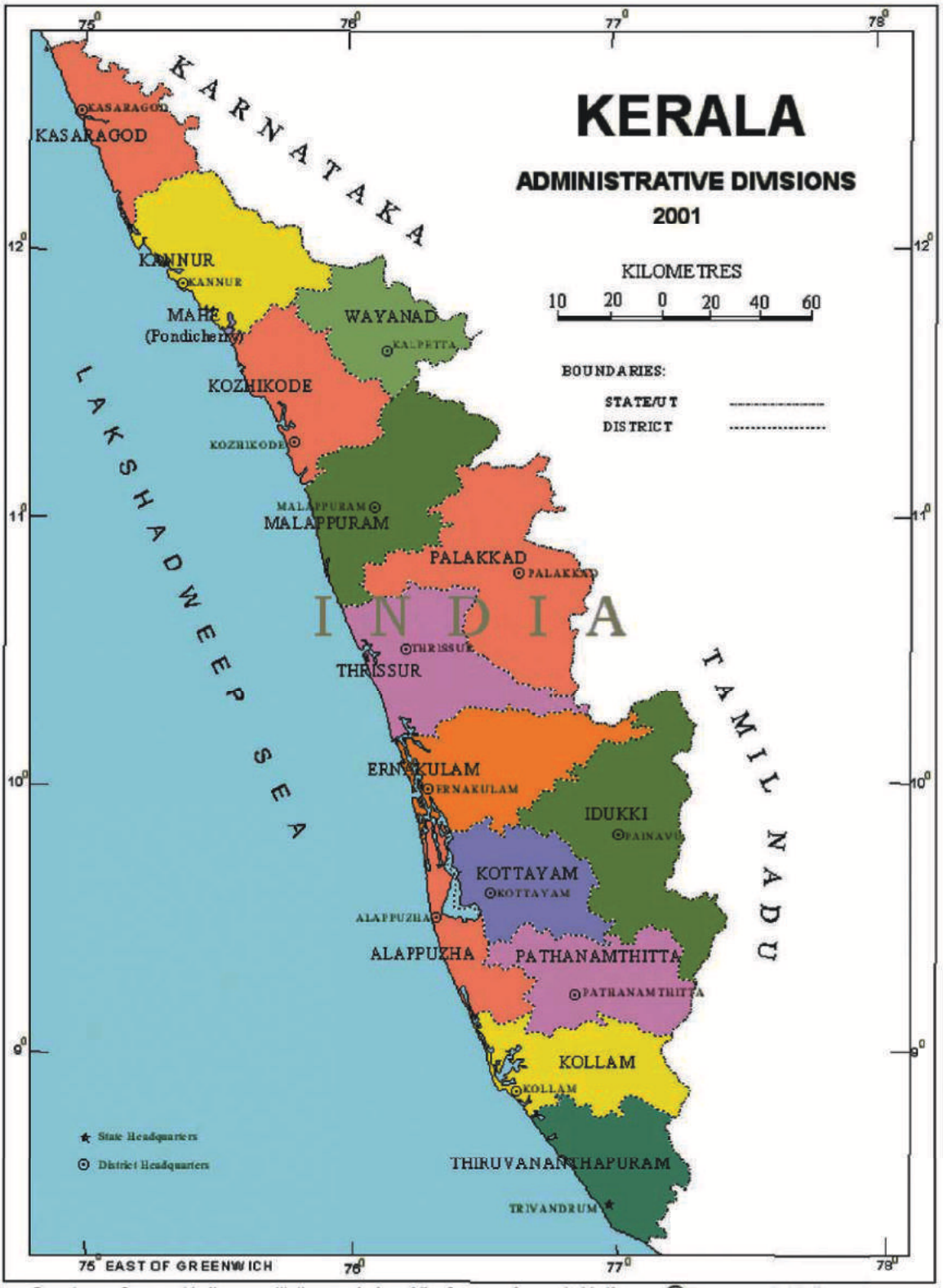
POWER

Sl. No.	Particulars	State
1	No. of Pumpsets Energised	524568
2	No. of Streetlight Energised	1202988
3	No. of Transformers	58104

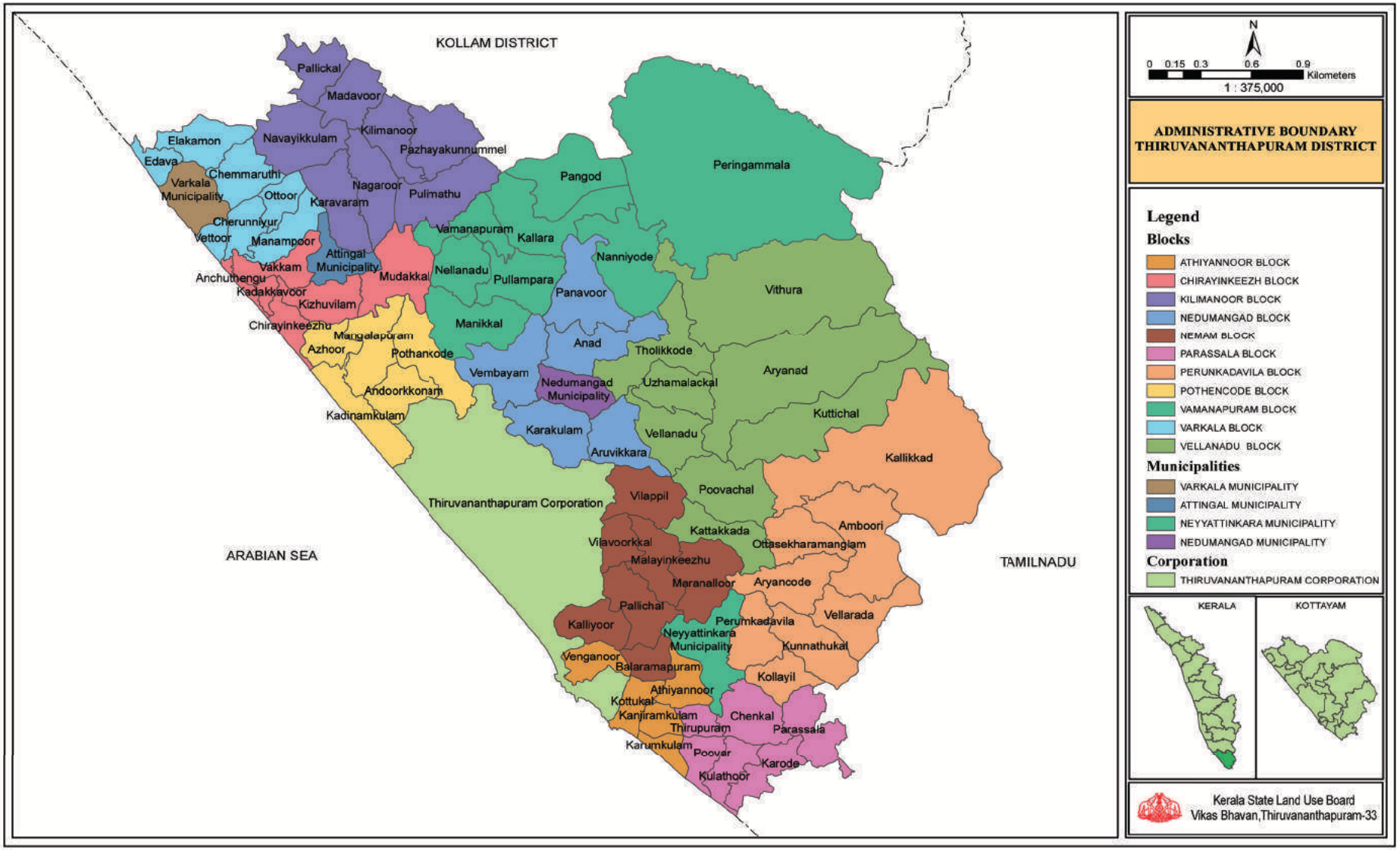
Table: 1.14

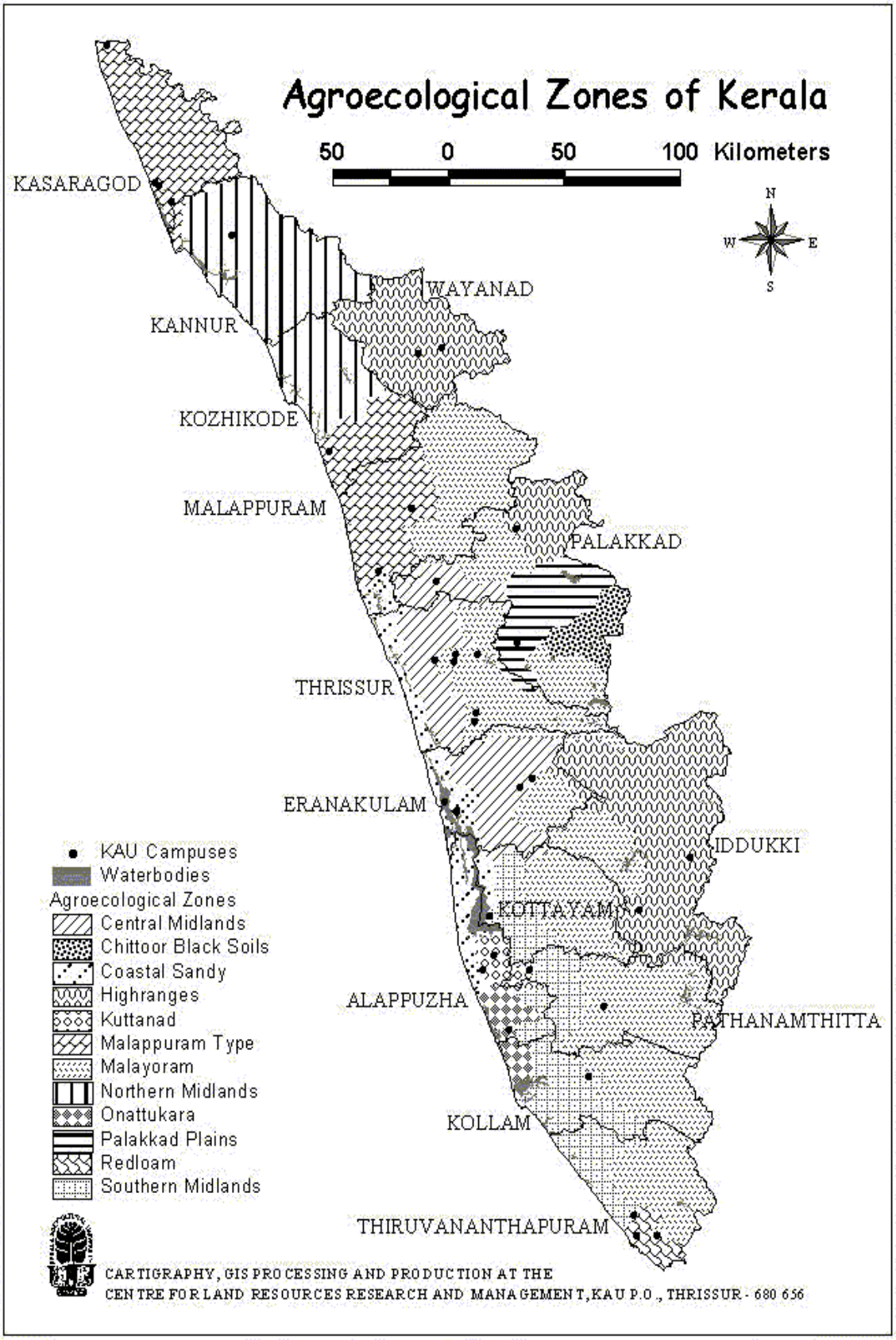
MAJOR TOURIST SPOTS IN THIRUVANANTHAPURAM

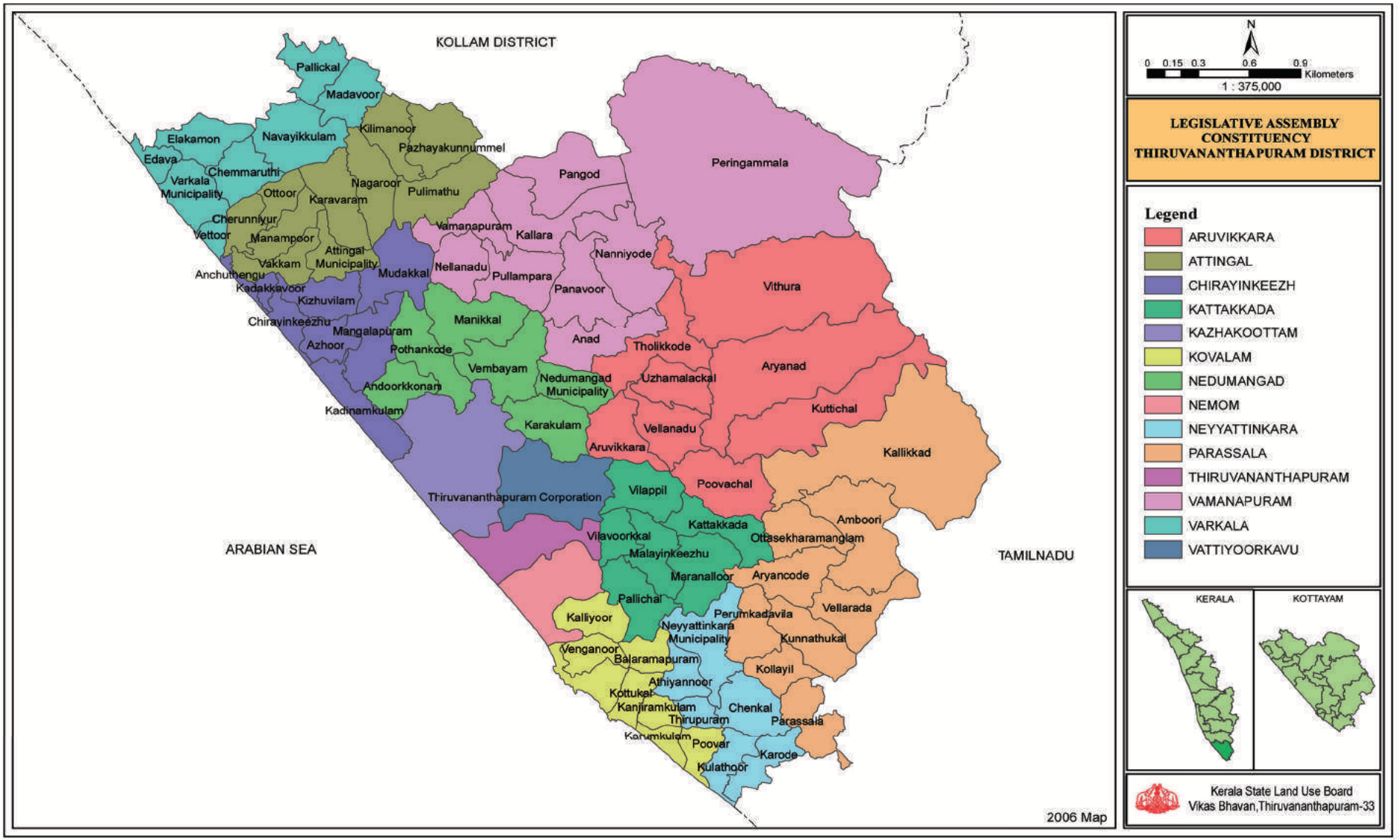
Sl. No.	Name	Main Focus
1	Agasthyarkoodam	Highest peak (Abundant Ayurvedic herbs & Medicinal plants
2	Akkulam	Boat club, Lake
3	Aruvikkara	Reservoir
4	Meenmutti	Waterfalls
5	Neyyar dam	Waterfalls (Lion safari park & crocodile rearing centre
6	Peppara	Wild life sanctuary
7	Ponmudi	Idyllic hill resort
8	Poovar	Back water beach island
9	Varkala	Pilgrim centre
10	Vizhinjam	Harbour
11	Kovalam	International beach
12	Shanghumugham	Beach
13	Veli	Tourist village & boat club



Based upon Survey of India map with the permission of the Surveyor General of India. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.


KOLLAM DISTRICT
ARABIAN SEA
TAMILNADU
Pallickal
Madavoor
Elakamon
Navayikkulam
Kilimanoor
Pazhayakunnummel
Edava
Chemmaruthi
Varkala Municipality
Ottoor
Nagaroor
Pulimathu
Karavaram
Cherunniyur
Vettoor
Manampoor
Attingal Municipality
Vakkam
Anchuthengu
Kadakkavoor
Kizhuvilam
Mudakkal
Chirayinkeezhu
Mangalapuram
Azhoor
Pothencode
Andoorkkonam
Kadinamkulam
Vamanapuram
Kallara
Nellanadu
Pullampara
Manikkal
Vembayam
Nedumangad Municipality
Karakulam
Aruvikkara
Thiruvananthapuram Corporation
Pangod
Peringammala
Nanniyode
Panavoor
Anad
Tholikkode
Uzhamalackal
Vellanadu
Vithura
Aryanad
Kuttichal
Kallikkad
Poovachal
Vilappil
Kattakkada
Amboori
Vilavoorkkal
Ottasekharamangalam
Malayinkeezhu
Maranalloor
Aryancode
Pallichal
Kalliyoor
Perumkadavila
Vellarada
Neyyattinkara Municipality
Kunnathukal
Venganoor
Balaramapuram
Kollayil
Athiyannoor
Kottukal
Kanjiramkulam
Chenkal
Thirupuram
Parassala
Karumkulam
Poovar
Karode
Kulathoor
N
0 0.15 0.3 0.6 0.9 Kilometers
1 : 375,000
ADMINISTRATIVE BOUNDARY
THIRUVANANTHAPURAM DISTRICT
Legend
Blocks
ATHIYANNOOR BLOCK
CHIRAYINKEEZH BLOCK
KILIMANOOR BLOCK
NEDUMANGAD BLOCK
NEMAM BLOCK
PARASSALA BLOCK
PERUNKADAVILA BLOCK
POTHENCODE BLOCK
VAMANAPURAM BLOCK
VARKALA BLOCK
VELLANADU BLOCK
Municipalities
VARKALA MUNICIPALITY
ATTINGAL MUNICIPALITY
NEYYATTINKARA MUNICIPALITY
NEDUMANGAD MUNICIPALITY
Corporation
THIRUVANANTHAPURAM CORPORATION
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33


Agroecological Zones of Kerala
50 0 50 100 Kilometers
N
W
E
S
KASARAGOD
KANNUR
WAYANAD
KOZHIKODE
MALAPPURAM
PALAKKAD
THRISSUR
ERANAKULAM
IDDUKKI
KOTTAYAM
ALAPPUZHA
PATHANAMTHITTA
KOLLAM
THIRUVANANTHAPURAM
KAU Campuses
Waterbodies
Agroecological Zones
Central Midlands
Chittoor Black Soils
Coastal Sandy
Highranges
Kuttanad
Malappuram Type
Malayoram
Northern Midlands
Onattukara
Palakkad Plains
Redloam
Southern Midlands
CARTIGRAPHY, GIS PROCESSING AND PRODUCTION AT THE
CENTRE FOR LAND RESOURCES RESEARCH AND MANAGEMENT, KAU P.O., THRISSUR - 680 656


KOLLAM DISTRICT
Pallickal
Madavoor
Kilimanoor
Elakamon
Navayikkulam
Pazhayakunnummel
Edava
Chemmaruthi
Varkala Municipality
Ottoor
Nagaroor
Pulimathu
Karavaram
Cherunniyur
Vettoor
Manampoor
Attingal Municipality
Vakkam
Anchuthengu
Kadakkavoor
Mudakkal
Kizhuvilam
Chiravinkeezhu
Mangalapuram
Azhoor
Pothankode
Andoorkkonam
Kadinamkulam
Vamanapuram
Kallara
Nellanadu
Pullampara
Manikkal
Vembayam
Nedumangad Municipality
Karakulam
Aruvikkara
Pangod
Peringammala
Nanniyode
Panavoor
Anad
Tholikkode
Uzhamalackal
Vellanadu
Vithura
Aryanad
Kuttichal
Kallikkad
Poovachal
Thiruvananthapuram Corporation
Vilappil
Kattakkada
Vilavoorkkal
Malayinkeezhu
Maranalloor
Pallichal
Kalliyoor
Venganoor
Balaramapuram
Athiyannoor
Kottukal
Kanjiramkulam
Thirupuram
Karumkulam
Poovar
Kulathoor
Amboori
Ottasekharamangalam
Aryancode
Perumkadavila
Neyyattinkara Municipality
Kollayil
Chenkal
Parassala
Karode
Vellarada
Kunnathukal
ARABIAN SEA
TAMILNADU
2006 Map
N
0 0.15 0.3 0.6 0.9 Kilometers
1 : 375,000
LEGISLATIVE ASSEMBLY CONSTITUENCY THIRUVANANTHAPURAM DISTRICT
Legend
ARUVIKKARA
ATTINGAL
CHIRAYINKEEZH
KATTAKKADA
KAZHAKOOTTAM
KOVALAM
NEDUMANGAD
NEMOM
NEYYATTINKARA
PARASSALA
THIRUVANANTHAPURAM
VAMANAPURAM
VARKALA
VATTIYOORKAVU
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

DEMOGRAPHY

INDIA'S POPULATION – CENSUS 2011

Table: 4.1

Current Population of India in 2011	1,210,193,422 (1.21 billion)
Total Male Population in India	623,700,000 (623.7 million)
Total Female Population in India	586,500,000 (586.5 million)
Sex Ratio	940 females per 1,000 males
Age structure	
0 to 25 years	50% of India's current population
Currently, there are about 51 births in India in a minute.	
India's Population in 2001	1.02 billion
Population of India in 1947	350 million

KEY FINDINGS OF THE CENSUS

- Population grows to 1.21 billion
- 181 million people added during 2001-11
- Growth declines to 17.64% from 21.15% during 1991-2001
- There are 623.7 million males and 586.5 million females
- India accounts for 17.5% of the world's population, China 19.4%
- First decade (with exception of 1911-1921) which saw addition of lesser people than the previous decade.
- Child sex ratio — 914 females against 1,000 males — lowest since independence
- Overall sex ratio rises by seven points — 940 females per 1,000 males
- Literacy rate goes up from 64.83% to 74.04%
- 74% people aged seven and above are literate
- 82.14% male literacy, 65.46% female literacy
- In 2001, male literacy was 75.26%, female literacy was 53.67%
- Delhi (11,297 people per square km) has the highest population density, followed by Chandigarh (9,252)
- Uttar Pradesh is the most populous state with 199 million people while Lakshadweep is the least populated at 64,429

Source: Census Report 2011

Table: 4.2

CENSUS OF INDIA 2011- PROVISIONAL POPULATION TOTALS
INDIA, KERALA STATE AND DISTRICTS

India/State/ District	Area in sq.km.	Total Population			Population in age group 0-6			Number of Literates		
		Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
INDIA	31,66,285	1,21,01,93,422	62,37,24,248	58,64,69,174	15,87,89,287	8,29,52,135	7,58,37,152	77,84,54,120	444,203,762	334,250,358
KERALA	38,863	3,33,87,677	1,60,21,290	1,73,66,387	33,22,247	16,95,935	16,26,312	2,82,34,227	1,37,55,888	1,44,78,339
Kasaragod	1,992	13,02,600	6,26,617	6,75,983	1,49,280	76,149	73,131	10,36,289	5,17,031	5,19,258
Kannur	2,966	25,25,637	11,84,012	13,41,625	2,65,276	1,35,189	1,30,087	21,56,575	10,22,972	11,33,603
Wayanad	2,131	8,16,558	4,01,314	4,15,244	89,720	45,776	43,944	6,49,186	3,30,093	3,19,093
Kozhikode	2,344	30,89,543	14,73,028	16,16,515	3,23,511	1,64,800	1,58,711	26,34,493	12,76,384	13,58,109
Malappuram	3,550	41,10,956	19,61,014	21,49,942	5,52,771	2,81,958	2,70,813	33,28,658	16,08,229	17,20,429
Palakkad	4,480	28,10,892	13,60,067	14,50,825	2,88,366	1,46,947	1,41,419	22,32,190	11,19,360	11,12,830
Thrissur	3,032	31,10,327	14,74,665	16,35,562	2,89,126	1,48,428	1,40,698	26,89,229	12,86,141	14,03,088
Ernakulam	3,068	32,79,860	16,17,602	16,62,258	2,89,281	1,48,047	1,41,234	28,61,509	14,27,572	14,33,937
Idukki	4,358	11,07,453	5,51,944	5,55,509	1,00,107	51,132	48,975	9,28,774	4,74,988	4,53,786
Kottayam	2,208	19,79,384	9,70,140	10,09,244	1,68,563	86,113	82,450	17,45,694	8,59,038	8,86,656
Alappuzha	1,414	21,21,943	10,10,252	11,11,691	1,86,022	95,565	90,466	18,63,558	8,95,476	9,68,082
Pathanam thitta	2,637	11,95,537	5,61,620	6,33,917	91,501	46,582	44,919	10,70,120	5,03,171	5,66,949
Kollam	2,491	26,29,703	12,44,815	13,84,888	2,38,062	1,21,484	1,16,581	22,42,757	10,76,509	11,66,248
Thiruvananthapuram	**2,192**	**33,07,284**	**15,84,200**	**17,23,084**	**2,90,661**	**1,47,777**	**1,42,884**	**27,95,195**	**13,58,924**	**14,36,271**

Table Continued……..

India/State/ District	Literacy rate (in Percentage)			Percentage decadal growth rate of population	Sex Ratio (Number of Females per 1000 Males)	Sex Ratio 0-6 population
	Persons	Males	Females	2001-11	2011	2011
1	**12**	**13**	**14**	**15**	**16**	**17**
INDIA	74.04	82.14	65.46	17.64	940	914
KERALA	93.91	96.02	91.98	4.86	1084	959
Kasaragod	89.95	93.93	86.13	8.18	1079	960
Kannur	95.41	97.54	93.57	4.84	1133	962
Wayanad	89.32	92.84	85.94	4.6	1035	960
Kozhikode	95.24	97.57	93.16	7.31	1097	963
Malappuram	93.55	95.78	91.55	13.39	1096	960
Palakkad	88.49	92.27	84.99	7.39	1067	962
Thrissur	95.32	96.98	9385	4.58	1109	948
Ernakulam	95.68	97.14	94.27	5.6	1028	954
Idukki	92.2	94.84	89.59	1.93	1006	958
Kottayam	96.4	97.14	95.67	1.32	1040	957
Alappuzha	96.26	97.9	94.8	0.61	1100	947
Pathanam thitta	96.93	97.7	96.26	3.12	1129	964
Kollam	93.77	95.83	91.95	1.72	1113	960
Thiruvananthapuram	**92.66**	**94.6**	**90.89**	**2.25**	**1088**	**967**

Source : Census Report 2011

Table: 4.3

POPULATION

BLOCK/PANCHAYAT WISE DEMOGRAPHIC PARTICULARS BASED ON 2001 CENSUS REPORT

Sl. No.	Block	No.of Panchayat/ Municipalities/ Corporations	Area (in Sq.Km)	No. of Wards (as on 2006)	No. of House holds	Density of population (Sq.Km.)	Sex Ratio (Female/ 1000 Males)	Effective Literacy Rate		
								Male	Female	Total
1	Athiyannoor	6	60.13	105	42241	3069	1005	86.74	82.02	84.37
2	Chirayinkeezhu	7	84.34	114	36396	2216	1150	90.71	82.48	86.26
3	Kazhakkuttom	6	114.35	116	49394	1916	1054	93.12	86.10	89.49
4	Kilimanoor	8	179.77	128	48807	1158	1118	93.34	85.30	89.06
5	Nedumangad	5	123.51	93	39768	1340	1052	92.50	84.51	88.38
6	Nemom	7	122.41	135	59298	2025	1030	92.92	86.59	89.69
7	Parassala	6	82.21	106	44874	2314	1018	90.22	84.01	87.08
8	Perunkadavila	8	285.38	124	48992	699	1036	90.41	83.59	86.92
9	Tvpm Rural	2	18.3	43	19259	4375	1049	95.91	91.03	93.40
10	Vamanapuram	8	421.15	132	53656	523	1095	92.82	84.46	88.42
11	Varkala	7	86.71	102	34475	1815	1162	93.00	85.96	89.17
12	Vellanadu	8	372.12	134	55792	612	1063	90.60	82.59	86.45
	Block Total	**78**	**1950.38**	**1332**	**532952**	**1173**	**1067**	**91.68**	**84.61**	**88.00**
	Municipality	**4**	**93.59**	**135**	**46269**	**2159**	**1077**	**94.07**	**88.13**	**90.97**
	Corporation	**1**	**148.03**	**86**	**174670**	**5033**	**1034**	**95.12**	**90.30**	**92.66**
	District Total	**83**	**2192**	**1553**	**753891**	**1476**	**1060**	**92.64**	**86.14**	**89.28**

Table Continued……..

B. PANCHAYAT

Sl. No.	Name of Panchayat	Grade	Area (in Sq.Km)	No. of Wards (as on 2006)	No. of House holds	Density of population (Sq.Km.)	Sex Ratio (Female/ 1000 Males)	Effective Literacy Rate		
								Male	Female	Total
1	Athiyannoor	Special	12.44	16	6427	2086	1048	93.15	87.95	90.47
2	Kanjiramkulam	II	10.36	13	4435	1764	998	90.83	86.43	88.61
3	Karumkulam	I	2.43	17	6340	11508	986	80.37	78.26	79.31
4	Kottukal	Special	12.16	18	7561	2617	1015	85.18	78.98	82.04
5	Venganoor	Special	10.12	19	8205	3298	1028	93.57	87.96	90.71
6	Vizhinjam	Special	12.62	22	9273	3738	972	81.7	76.71	79.23
	Athiyannur		**60.13**	**105**	**42241**	**3069**	**1005**	**86.74**	**82.02**	**84.37**
1	Anjuthengu	I	3.36	13	3694	5363	1011	76.57	73.59	75.06
2	Azhoor	Special	12.46	17	6439	2314	1188	88.94	76.42	82.07
3	Chirayinkeezhu	Special	10.87	18	6710	2806	1158	89.68	80.66	84.8
4	Kadakkavoor		10.39	15		2336	1197	93.26	85.04	88.74
5	Kizhuvalam	Special	14.74	19	7294	2220	1149	94.15	85.99	89.73
6	Mudakkal		27.46	19	8144	1253	1125	93.76	86.09	89.67
7	Vakkom	Special	5.06	13	4115	3576	1218	94.93	86.7	90.34
	Chirayinkeezhu		**84.34**	**114**	**36396**	**2216**	**1150**	**90.71**	**82.48**	**86.26**
1	Andoorkonam	Special	13.96	17	6052	2044	988	94.78	86.11	90.47
2	Kadinamkulam	Special	17.68	22	9635	2541	1066	84.14	77.99	80.93
3	Kazhakkoottam	Special	19.47	19	7755	1753	1028	95.41	88.35	91.82
4	Mangalapuram	Special	21.66	19	7720	1602	1119	94.16	85.58	89.57
5	Pothencode	Special	20.85	17	6438	1325	1082	95.46	87.57	91.33
6	Sreekariyam	Special	20.73	22	11794	2371	1040	96.49	91.44	93.89
	Kazhakkuttom		**114.35**	**116**	**49394**	**1916**	**1054**	**93.12**	**86.1**	**89.49**
1	Karavaram	I	22.07	17	6734	1347	1097	94.28	87.04	90.46
2	Kilimanoor		19.04	14	4881	1053	1106	93.68	86.34	89.79
3	Madavoor	I	18.53	14	4731	1125	1100	92.68	84.09	88.14
4	Nagaroor	I	23.3	16	6349	1146	1131	94.09	85.81	89.66
5	Navaikulam	Special	28.23	21	8631	1354	1126	91.72	83.84	87.5

Table Continued……..

6	Pallickal	I	16.36	12	3794	1007	1107	94.5	85.84	89.91
7	Pazhayakunnummel	Special	25.31	16	6091	988	1131	92.72	83.67	87.9
8	Pulimath	Special	26.93	18	7596	1159	1132	93.87	86.13	89.73
	Kilimannor		**179.77**	**128**	**48807**	**1158**	**1118**	**93.34**	**85.3**	**89.06**
1	Anad	I	24.15	18	7372	1263	1063	93.11	85.02	88.92
2	Aruvikkara	I	21.86	19	7968	1504	1046	90.73	83.02	86.77
3	Karakulam	Special	25.01	22	11196	1867	1031	93.77	87.21	90.43
4	Panavoor	I	21.9	14	4782	914	1070	92.02	83.46	87.57
5	Vembayam	Special	30.59	20	8450	1157	1067	92.16	82.51	87.15
	Nedumangad		**123.51**	**93**	**39768**	**1340**	**1052**	**92.5**	**84.51**	**88.38**
1	Balaramapuram	Special	10.53	19	7868	3310	1021	91.43	83.32	87.32
2	Kalliyoor	Special	17.23	20	9007	2138	1027	93.31	87.07	90.14
3	Malayinkeezhu	I	16.38	19	8121	2065	1035	94.31	88.25	91.22
4	Maranalloor	Special	25.13	20	8880	1419	1034	91.95	86.33	89.08
5	Pallichal	Special	21.7	22	10807	2079	1028	92.33	86.05	89.14
6	Vilappil	Special	19.42	19	8174	1755	1036	92.87	86.25	89.49
7	Vilavoorkkal		12.02	16	6441	2287	1032	94.85	89.59	92.17
	Nemom		**122.41**	**135**	**59298**	**2025**	**1030**	**92.92**	**86.59**	**89.69**
1	Chenkal	Special	19.37	20	8334	1842	1019	92.49	85.97	89.19
2	Karode	Special	15.67	18	7719	2020	1015	90.09	81.48	85.73
3	Kulathoor	I	11.24	19	7961	2948	1001	83.43	78.44	80.92
4	Parassala	Special	20.02	22	11632	2553	1022	93.02	86.53	89.73
5	Poovar	I	7.34	14	4649	2732	1040	86.53	81.53	83.97
6	Thirupuram	I	8.57	13	4579	2168	1016	94.28	90.02	92.13
	Parassala		**82.21**	**106**	**44874**	**2314**	**1018**	**90.22**	**84.01**	**87.08**
1	Amboori		49.47	12	4160	347	1041	89.39	82.16	85.68
2	Aryancode	I	21.78	15	5969	1090	1035	90.38	83.85	87.05
3	Kallikkad	I	106.27	12	3277	123	1028	92.75	85.6	89.11
4	Kollayil	Special	13.73	15	5903	1798	1043	92.54	86.42	89.41
5	Kunnathukal	I	26.85	20	9112	1394	1045	90.89	84.66	87.68
6	Ottasekharamangalam	I	18.14	13	4778	1068	1049	89.19	81.16	85.06
7	Perumkadavila	I	17.54	15	5863	1312	1021	92.12	86.3	89.17
8	Kattakkada	Special	22.54	20	9035	1662	1034	92.12	85.78	88.87
9	Vellarada	Special	31.6	22	9930	1301	1025	88	80.3	84.09

Table Continued……..

	Perunkadavila		**307.92**	**144**	**58027**	**699**	**1036**	**90.41**	**83.59**	**86.92**
1	Kudappanakunnu	Special	7.69	21	9263	4964	1048	97.01	92.52	94.71
2	Vattiyoorkavu	Special	10.61	22	9996	3948	1050	94.9	89.66	92.21
	Tvpm Rural		**18.3**	**43**	**19259**	**4375**	**1049**	**95.91**	**91.03**	**93.4**
1	Kallara	Special	39.48	16	6354	653	1134	94.91	87.18	90.79
2	Manikkal	I	33.34	20	8562	1088	1066	93.35	84.74	88.88
3	Nanniyode	Special	38.85	17	7262	725	1102	91.93	83.89	87.67
4	Nellanad	Special	18.46	15	5820	1332	1094	94.46	87.04	90.55
5	Pangode		23.31	18	7330	1297	1092	91.31	82.93	86.89
6	Peringamala	I	217.94	18	7702	143	1075	90.33	81.61	85.77
7	Pullampara	I	25.9	14	5247	867	1092	91.68	81.32	86.23
8	Vamanapuram	I	23.87	14	5379	910	1124	95.68	87.84	91.51
	Vamanapuram		**421.15**	**132**	**53656**	**523**	**1095**	**92.82**	**84.46**	**88.42**
1	Chemmaruthy	I	17.54	18	7057	1763	1137	94.43	87.33	90.62
2	Cherunniyoor	I	10.87	13	4069	1648	1187	92.16	83.63	87.49
3	Edava	Special	9.14	16	5145	2943	1189	93.75	88.05	90.62
4	Elakamon	I	17.79	15	5645	1371	1151	92.83	86.52	89.43
5	Manamboor	I	15.08	15	4959	1496	1157	93.08	84.54	88.44
6	Ottoor	I	9.47	12	3707	1622	1183	94.69	87.88	90.94
7	Vettoor	Special	6.82	13	3893	2830	1146	89.19	82.35	85.48
	Varkala		**86.71**	**102**	**34475**	**1815**	**1162**	**93**	**85.96**	**89.17**
1	Aryanad	I	104.92	17	6880	262	1101	89.41	78.32	83.56
2	Kuttichal	I	19.74	13	4398	926	1061	86.79	78.87	82.69
3	Poovachal	Special	30.06	22	10366	1418	1047	90.48	84.04	87.17

Table Continued……..

4	Tholicode		22.37	15	5810	1110	1097	92.73	83.78	88.01
5	Uzhamalackal	I	18.74	14	5103	1128	1060	90.63	82.4	86.37
6	Vellanadu	I	22.19	17	7225	1302	1049	92.16	85.1	88.53
7	Vithura	Special	131.56	16	6975	205	1083	88.82	79.2	83.81
	Vellanadu		**349.58**	**114**	**39782**	**612**	**1063**	**90.6**	**82.59**	**86.45**
C	**Municipalities & Corporation**									
1	Varkala (M)	III	15.42	30	8376	2641	1120	93.38	88.15	90.60
2	Attingal(M)	II	16.87	28	8309	2116	1136	96.57	92.11	94.17
3	Nedumangad(M)	III	32.52	36	13291	1726	1060	93.45	85.61	89.39
4	Neyyattinkara(M)	II	28.78	41	16293	2414	1038	93.73	88.02	90.81
	Municipality Total		**93.59**	**135**	**46269**	**2159**	**1077**	**94.07**	**88.13**	**90.97**
1	Thiruvananthapuram (M Corp)		148.03	86	174670	5033	1034	95.12	90.3	92.66
	Corporation		**148.03**	86	**174670**	**5033**	**1034**	**95.12**	**90.3**	**92.66**
	District total		**2192**	**1553**	**753891**	**1476**	**1060**	**92.64**	**86.14**	**89.28**

Source:- Census Report 2001

NB: - Administrative boundaries of Thiruvananthapuram district revised after 2001 census and the latest demographic details are not available.

Some Concepts and Definitions

What is census?

Population census is the total process of collecting, compiling, analyzing or otherwise disseminating demographic, economic and social data pertairing, at a specific time, to all persons in a country or a well defined part of a country. As such, the census provides a snapshot of the country's population and housing at a given point of time.

Classification of Area:
For Census purposes total geographical area is broadly classified into Rural and Urban.

Urban: Constituents of urban areas are Statutory Towns, Census Towns and Outgrowths.

Statutory Town (ST): All places with a municipality, corporation, cantonment board or notified town area committee etc.
No. of STs in Kerala: 59*

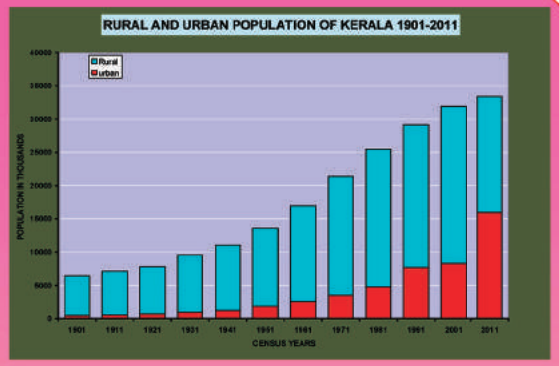
Census Town (CT): Places that satisfy the following criteria are termed as Census Towns (CTs). (a) A minimum population of 5000 (b) At least 75% of the male main working population engaged in non-agricultural pursuits (c) A density of population of at least 400 per sq.km
No. of CTs in Kerala: 461 *

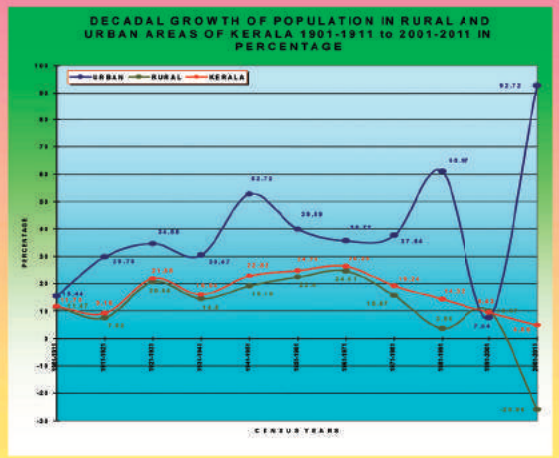
Out Growth (OG): Out Growth should be a viable unit such as a village or part of a village contiguous to a statutory town and possess the urban features in terms of infrastructure and amenities such as pucca roads, electricity, taps, drainage system, education institutions, post offices, medical facilities, banks, etc. Examples of OGs are Railway colonies, University campuses, Port areas, that may come up near a city or statutory towns outside its statutory limits but within the revenue limit of a village or villages contiguous to the town or city.
No. of OGs in Kerala: 16 *

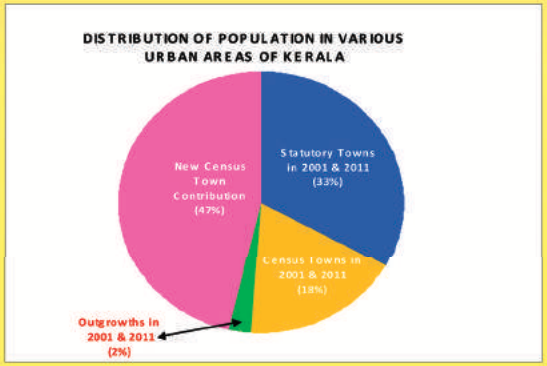
Urban Agglomeration (UA): It is a continuous urban spread constituting a town and its adjoining urban outgrowths (OGs) or two or more physically contiguous towns together and any adjoining urban out- growths of such towns.
No. of UAs in Kerala: 19 *

Rural: All areas other than urban are rural. The basic unit for rural areas is the revenue village.
No. of Villages in Kerala: 1018 *

* All administrative units are as on 31.12.2009, the date of freezing of administrative boundaries for Census.







CENSUS OF INDIA 2011

SUMMARY OF PROVISIONAL POPULATION FIGURES KERALA

RURAL – URBAN DISTRIBUTION

Census of India, 2011 is the second Census of the 21st century and 7th Census after Independence. The provisional results of 2011 show that Population of Kerala as on 1st March 2011 is 3,33,87,677 with 1,74,55,506 in Rural and 1,59,32,171 in Urban.

2011

Our Census, Our Future

Directorate of Census Operations, Kerala
C.G.O. Complex, Poonkulam, Vellayani(P.O)
Thiruvananthapuram-695 522
Phone: 0471-2481859, 2481861 Fax: 0471 2481860
E-mail: dco-ker.rgi@censusindia.gov.in

CENSUS OF INDIA 2011-PROVISIONAL POPULATION TOTALS- RURAL AND URBAN DISTRIBUTION (INDIA, KERALA, DISTRICTS)

INDIA/ STATE/ DISTRICT	Total / Rural/ Urban	Population			Percentage of decadal growth 2001-2011	Percentage of child population in the age-group 0-6			Literacy Rate			Sex ratio of total population	Sex ratio of child population in the age-group 0-6	Percentage share of urban population
		Persons	Males#	Females		Persons	Males#	Females	Persons	Males#	Females			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
INDIA	T	1,21,01,93,422	62,37,24,248	58,64,69,174	17.64	13.12	13.30	12.93	74.04	82.14	65.46	940	914	31.16
	R	83,30,87,662	42,79,17,052	40,51,70,610	17.19	14.11	14.32	13.90	68.91	78.57	58.75	947	919	
	U	37,71,05,760	19,58,07,196	18,12,98,564	18.12	10.93	11.07	10.78	84.98	89.67	79.92	926	902	
KERALA	T	3,33,87,677	1,60,21,290	1,73,66,387	4.86	9.95	10.59	9.36	93.91	96.02	91.98	1084	959	47.72
	R	1,74,55,506	84,03,706	90,51,800	-25.96	10.01	10.61	9.45	92.92	95.29	90.74	1077	960	
	U	1,59,32,171	76,17,584	83,14,587	92.72	9.88	10.56	9.27	94.99	96.83	93.33	1091	958	
Kasaragod District	T	13,02,600	6,26,617	6,75,983	8.18	11.46	12.15	10.82	89.85	93.93	86.13	1079	960	38.78
	R	7,97,424	3,87,324	4,10,100	-17.82	11.07	11.61	10.56	88.71	93.11	84.61	1059	964	
	U	5,05,176	2,39,293	2,65,883	116.16	12.07	13.03	11.21	91.67	95.27	88.49	1111	956	
Kannur District	T	25,25,637	11,84,012	13,41,625	4.84	10.50	11.42	9.70	95.41	97.54	93.57	1133	962	65.05
	R	8,82,745	4,26,243	4,56,502	-26.20	10.46	11.07	9.89	93.88	96.50	91.48	1071	956	
	U	16,42,892	7,57,769	8,85,123	35.45	10.53	11.61	9.60	96.23	98.12	94.64	1168	965	
Wayanad District	T	8,16,558	4,01,314	4,15,244	4.60	10.99	11.41	10.58	89.32	92.84	85.94	1035	960	3.87
	R	7,84,981	3,85,922	3,99,059	4.52	10.99	11.40	10.59	89.22	92.77	85.82	1034	960	
	U	31,577	15,392	16,185	6.64	11.03	11.58	10.52	91.63	94.58	88.87	1052	955	
Kozhikode District	T	30,89,543	14,73,028	16,16,515	7.31	10.47	11.19	9.82	95.24	97.57	93.16	1097	963	67.15
	R	10,14,765	4,85,654	5,29,111	-42.93	10.91	11.63	10.25	94.79	97.42	92.41	1089	961	
	U	20,74,778	9,87,374	10,87,404	88.42	10.26	10.97	9.61	95.47	97.64	93.52	1101	964	
Malappuram District	T	41,10,956	19,61,014	21,49,942	13.39	13.45	14.38	12.60	93.55	95.78	91.55	1096	960	44.19
	R	22,94,473	10,95,465	11,99,008	-29.82	13.40	14.31	12.56	92.67	94.97	90.61	1095	961	
	U	18,16,483	8,65,549	9,50,934	410.00	13.51	14.47	12.64	94.66	96.81	92.74	1099	959	
Palakkad District	T	28,10,892	13,60,067	14,50,825	7.39	10.26	10.80	9.75	88.49	92.27	84.99	1067	962	24.09
	R	21,33,699	10,31,940	11,01,759	-5.63	10.39	10.94	9.88	87.23	91.27	83.49	1068	964	
	U	6,77,193	3,28,127	3,49,066	89.92	9.84	10.37	9.34	92.45	95.41	89.70	1064	958	
Thrissur District	T	31,10,327	14,74,665	16,35,662	4.58	9.30	10.07	8.60	95.32	96.98	93.85	1109	948	67.19
	R	10,20,537	4,85,875	5,34,662	-52.20	9.43	10.13	8.79	93.99	96.09	92.11	1100	955	
	U	20,89,790	9,88,790	11,01,000	148.95	9.23	10.03	8.51	95.97	97.41	94.70	1113	944	
Ernakulam District	T	32,79,860	16,17,602	16,62,258	5.60	8.82	9.15	8.50	95.68	97.14	94.27	1028	954	68.07
	R	10,47,296	5,18,040	5,29,256	-35.70	8.44	8.74	8.16	94.34	95.96	92.76	1022	954	
	U	22,32,564	10,99,562	11,33,002	51.15	9.00	9.35	8.65	96.32	97.70	94.98	1030	954	
Idukki District	T	11,07,453	5,51,944	5,55,509	-1.93	9.04	9.26	8.82	92.20	94.84	89.59	1006	958	4.70
	R	10,55,428	5,26,420	5,29,008	-1.51	9.02	9.24	8.80	92.03	94.73	89.34	1005	957	
	U	52,025	25,524	26,501	-9.67	9.49	9.83	9.16	95.74	97.10	94.45	1038	968	
Kottayam District	T	19,79,384	9,70,140	10,09,244	1.32	8.52	8.88	8.17	96.40	97.17	95.67	1040	957	28.58
	R	14,13,773	6,94,308	7,19,465	-14.52	8.56	8.91	8.23	97.17	97.97	96.40	1036	957	
	U	5,65,611	2,75,832	2,89,779	88.66	8.41	8.80	8.03	94.49	95.16	93.86	1051	958	
Alappuzha District	T	21,21,943	10,10,252	11,11,691	0.61	8.77	9.46	8.14	96.26	97.90	94.80	1100	947	54.06
	R	9,74,916	4,62,571	5,12,345	-34.47	9.08	9.82	8.42	96.72	98.24	95.38	1108	950	
	U	11,47,027	5,47,681	5,99,346	84.57	8.50	9.16	7.90	95.87	97.62	94.30	1094	944	
Pathanamthitta District	T	11,95,537	5,61,620	6,33,917	-3.12	7.65	8.29	7.09	96.93	97.70	96.26	1129	964	11.00
	R	10,64,076	4,99,745	5,64,331	-4.16	7.65	8.29	7.08	96.87	97.64	96.19	1129	964	
	U	1,31,461	61,875	69,586	6.19	7.70	8.32	7.15	97.42	98.15	96.79	1125	967	
Kollam District	T	26,29,703	12,44,815	13,84,888	1.72	9.05	9.76	8.42	93.77	95.83	91.95	1113	960	45.11
	R	14,43,363	6,78,969	7,64,394	-31.89	9.02	9.78	8.35	94.10	96.15	92.30	1126	961	
	U	11,86,340	5,65,846	6,20,494	154.59	9.09	9.73	8.50	93.38	95.46	91.52	1097	958	
Thiruvananthapuram District	T	33,07,284	15,84,200	17,23,084	2.25	8.79	9.33	8.29	92.66	94.60	90.89	1088	967	53.80
	R	15,28,030	7,25,230	8,02,800	-28.69	9.15	9.82	8.55	91.98	94.27	89.95	1107	963	
	U	17,79,254	8,58,970	9,20,284	62.99	8.48	8.91	8.07	93.24	94.89	91.71	1071	970	

Males include both males and others

ADMINISTRATIVE UNITS-KERALA

	2001	2011	Percentage of urban population	
No. of Districts	14	14	2001	2011
No. of Sub-Districts (Taluks)	63	63		
No. of Towns	159	520	25.96	47.72
No. of Villages	1,364	1,018		

NUMBER OF TOWNS AND URBAN POPULATION IN KERALA

Census Year	No. of towns	Urban population
1901	21	4,54,499
1911	27	5,24,661
1921	44	6,80,900
1931	53	9,16,330
1941	62	11,95,550
1951	94	18,25,832
1961	92	25,54,141
1971	88	34,66,449
1981	106	47,71,275
1991	197	76,80,294
2001	159	82,66,925
2011	520	1,59,32,171

GROWTH IN NO. OF TOWNS (KERALA)

Towns	2001	2011	% Growth (Rounded to next digit)
STs	60	59	-2%
CTs	99	461	366%
Total	159	520	227 %

METEOROLOGY

Meteorology is the interdisciplinary scientific study of the atmosphere. Studies in the field stretch back millennia, though significant progress in meteorology did not occur until the 18th century. The 19th century saw breakthroughs occur after observing networks developed across several countries. Meteorology, climatology, atmospheric physics and atmospheric chemistry are sub-disciplines of the atmospheric sciences. Meteorology and hydrology compose the interdisciplinary field of hydrometeorology. Interactions between Earth's atmosphere and the oceans are part of coupled ocean-atmosphere studies. Meteorology has application in many diverse fields such as the military, energy production, transport, agriculture and construction. Meteorology, climatology, atmospheric physics and atmospheric chemistry are sub-disciplines of the atmospheric sciences. Meteorology and hydrology compose the interdisciplinary field of hydrometeorology. Interactions between Earth's atmosphere and the oceans are part of coupled ocean-atmosphere studies. Meteorology has application in many diverse fields such as the military, energy production, transport, agriculture and construction.

Thiruvananthapuram the southern most district of Kerala State is situated between North latitudes $8^0$17' and 8^0 51' and East longitudes $76^0$41' and $77^0$17'. The largest forest reserves favourably affect the climate and induce more rain in the district. The climate of Thiruvananthapuram district is generally hot tropical. Cold weather is experienced in the mountain ranges, whereas lower down, the weather is bracing and is generally hot in the coastal regions. The mean maximum temperature is 35^0 C and the mean minimum temperature is 20^0 C. As the district stretches from north to south with the Arabian Sea in the west side, the relative humidity is generally high. It rises up to about 95% during the South-West monsoon. The total annual average rainfall in the district is about 1,500 mm per annum. The southwest monsoon, from June to September is the principal rainy season. The district receives most of its annual rainfall in this season. The second rainy season is the Northeast monsoon. It is from October to November. The district also gets thunderstorm rains in the pre-monsoon months of April and May. December to February is the coolest months. The average temperature goes down to 20^0 C in these months. It is generally considered as the winter season. The summer season starts in February and continues until May. The average temperature goes up to 35^0 C in these months.

Table: 5.1

RAINFALL DISTRIBUTION OF KERALA FOR THE YEAR 2010-11

(Rainfall in mm)

Year	Jul	Aug	Sep	Oct	Nov	Dec
2010	234.9	118.7	114.1	414.4	326.0	188.3
State (Average)	631.0	361.1	271.7	441.7	336.8	47.3

Year	Jan	Feb	Mar	Apr	May	Jun
2011	43.6	73.6	15.0	157.1	92.9	272.0
State (Average)	20.8	45.4	24.8	168.0	120.6	789.9

Year	Actual	Normal	Departure %
2010-11	2050.6	1866.4	9.9
State (Average)	3259.8	3016.8	8.1

Source: Agricultural Statistics, DES

Table: 5.2

MONTHLY RAINFALL DISTRIBUTION 2010-2011

Monthly Rainfall in m.m.									
2010									
District	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Thiruvananthapuram	109	217	237	235	119	114	414	326	188

Monthly Rainfall in m.m.				
2011				
District	Jan	Feb	Mar	Total
Thiruvananthapuram	44	74	15	2092

Table: 5.3

SEASONAL RAINFALL, N.R AND PERCENTAGE OF DEPARTURE IN 2010-11

District	Summer			S.W. Monsoon Season		
	2010			2010		
	Apr + May	Normal	% Dep	Jun to Sep	Normal	% Dep
Thiruvananthapuram	326	356	-8	705	973	-28

District	N.E. Monsoon Season			Winter Season		
	2010			2011		
	Oct to Dec	Normal	% Dep	Jan to Mar	Normal	% Dep
Thiruvananthapuram	929	513	81	133	98	3

Table: 5.4

SEASONAL RAINFALL DISTRIBUTION AND PERCENTAGE TO ANNUAL RAINFALL (2010-11)

District	Summer Season		S.W. Monsoon Season	
	Apr to may 2010		Jun to Sep 2010	
	Rainfall	%	Rainfall	%
Thiruvananthapuram	326	16	705	34

District	N.E Monsoon		Winter Season		Annual Rainfall in m.m
	Oct to Dec 2010		Jan to Mar 2011		
	Rainfall	%	Rainfall	%	
Thiruvananthapuram	929	44	133	6	2092

Table: 5.5

COMPARISON OF SEASONAL RAINFALLS IN THE YEAR 2010-11 WITH PREVIOUS YEAR

District	Summer Season			S.W Monsoon Season		
	Apr & May (2009)	Apr & May (2010)	% Dep.	Jun to Sep (2009)	Jun to Sep (2010)	% Dep
Thiruvananthapuram	252	326	-23	657	705	-7

District	N.E Monsoon Season			Winter Season		
	Oct to Dec (2009)	Oct to Dec (2010)	% Dep.	Jan to Mar (2009)	Jan to Mar (2010)	% Dep
Thiruvananthapuram	508	929	-45	185	133	39

Source: Central Ground Water Department

Table: 5.6

MONTHLY MEAN MAXIMUM AND MINIMUM TEMPERATURE (^{0}C) year: 2010

Station	Temperature (^{0}C)	Jan	Feb	Mar	Apr	May	Jun
Thiruvananthapuram City	Maximum	32.5	33.6	35.0	33.9	33.0	31.6
	Minimum	22.4	23.5	24.7	25.6	25.5	24.2

Station	Temperature (^{0}C)	Jul	Aug	Sep	Oct	Nov	Dec
Thiruvananthapuram City	Maximum	30.5	30.3	31.2	30.8	31.0	30.8
	Minimum	23.4	23.5	23.9	23.9	23.5	22.7

Station	Temperature (^{0}C)	Jan	Feb	Mar	Apr	May	Jun
Thiruvananthapuram Air Port	Maximum	31.4	32.2	33.5	33.6	32.7	30.9
	Minimum	22.7	23.8	25.3	26.2	25.9	24.3

Station	Temperature (^{0}C)	Jul	Aug	Sep	Oct	Nov	Dec
Thiruvananthapuram Air Port	Maximum	29.8	29.3	30.1	30.4	30.6	30.2
	Minimum	23.3	23.5	23.9	23.7	23.5	23.2

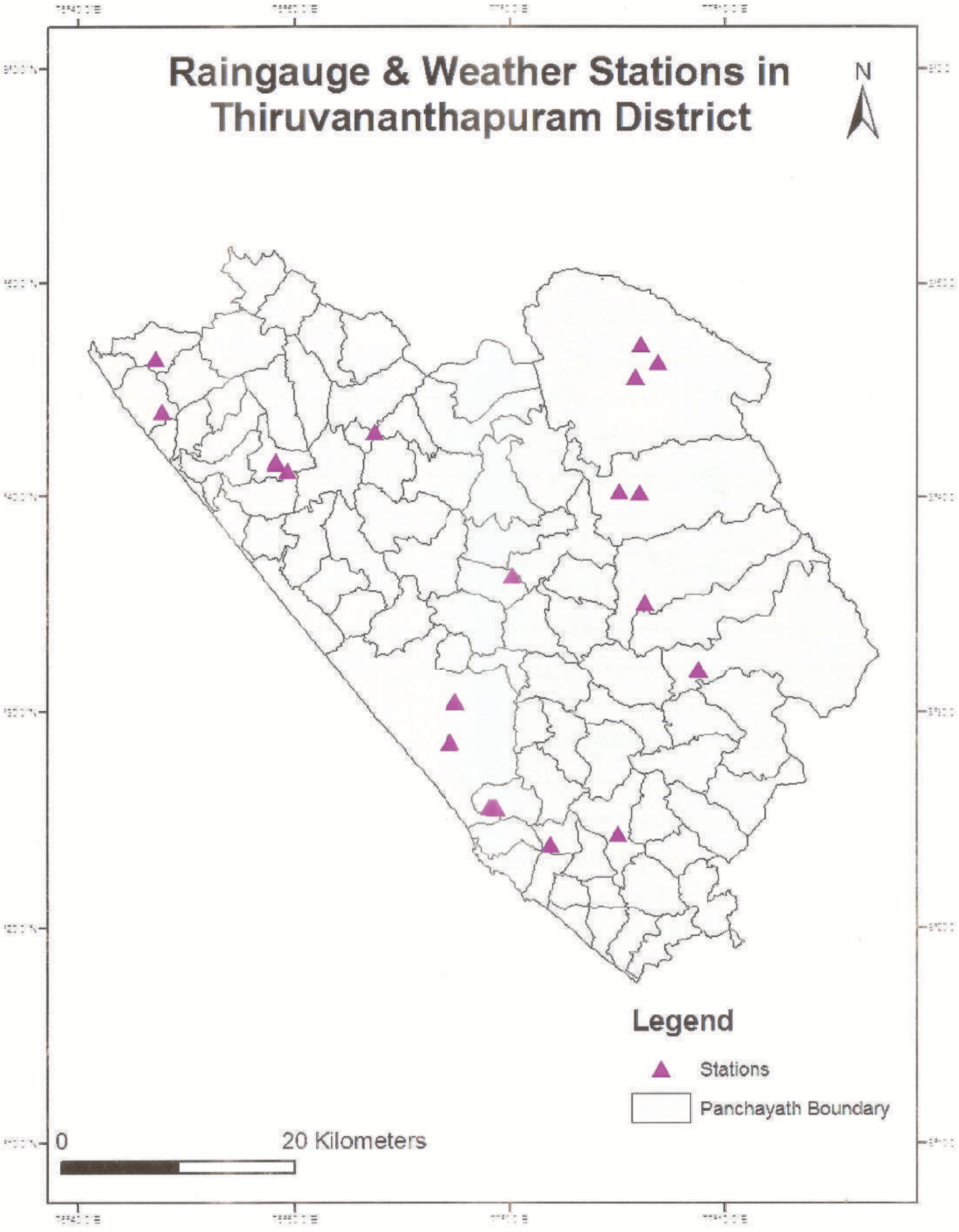
Source: Farm Guide

Table: 5.7

DISTRICT WISE ACTUAL RAINFALL, NORMAL RAINFALL AND PERCENTAGE OF DEPARTURE FOR 2011

Sl. No.	District	Pre-Monsoon Rainfall (March to May)			South West Monsoon Rainfall (June to September)			North East Monsoon Rainfall (October to December)		
		Actual Rainfall (mm)	Normal Rainfall (mm)	Percen tage departure	Actual Rainfall (mm)	Normal Rainfall (mm)	Percen tage departure	Actual Rainfall (mm)	Normal Rainfall (mm)	Percen tage departure
1	Alappuzha	470.1	477.3	-1	1584.3	1745.9	-9	469.2	571.7	-18.0
2	Kannur	137.7	300.4	-54	3030.4	2669.0	13	305.2	344.8	-11.0
3	Ernakulam	425.3	443.7	-4	2636	2065.0	28	315.5	489.1	-35.0
4	Idukki	370.7	426.6	-13	2637.6	2276.3	16	581.8	564.5	3.0
5	Kasargod	253.5	272.5	-7	3227.6	3007.1	7	376.0	337.4	11.0
6	Kollam	372.3	469.3	-21	1162.1	1332.1	-13	603.0	638.9	-6.0
7	Kottayam	502.4	460.1	9	2231.3	1897.9	18	456.7	535.4	-15.0
8	Kozhikode	223.0	352.9	-37	3324.8	2602.8	28	424.9	422.1	1.0
9	Malappuram	214.4	320.6	-33	2279.6	2060.7	11	422.9	448.2	-6.0
10	Palakkad	212.1	279.5	-24	1874	1572.0	19	462.5	427.5	8.0
11	Pathanamthitta	541.3	553.1	-2	1517.4	1715.0	-11	475.0	623.7	-24.0
12	**Thiruvananthapuram**	**265.0**	**368.8**	**-28**	**585.5**	**871.4**	**-33**	**550.6**	**522.6**	**5.0**
13	Thrissur	260.1	385.2	-33	2427.5	2197.5	11	424.4	469.5	-10.0
14	Wayanad	306.6	275.1	11	1967	2631.9	-25	323.3	331.5	-3.0
	Kerala	**313.3**	**379.7**	**-17**	**2215.8**	**2039.6**	**9**	**450.8**	**480.7**	**-6**

Source: Economic Review 2011.



Prepared by Kerala State Remote Sensing and Environment Centre

GEOLOGY & GEOMORPHOLOGY

Geology of Thiruvananthapuram

Thiruvananthapuram district has a total area of 2192 sq.km which forms 5.64 % of the total area of the state. The large part of the district is made up of Archean gneisses. The main rock type are the charnockites, pyroxene granulate, granite-biotite gneisses, granite-silliminate gneisses, quart-feldspar gneisses with or without granite, calc-granulates and quartzites. All the above rock types are traversed by dykes of doloritic and gabboric composition. Swarms of thin, impersistent quartz and pegmatite veins also traverse the gneisses. The Warkallis are made up of kaolin bearing sandstones, pebble beds and ferruginous grits. Both the crystalline rocks and the sedimentary are highly laterised. Quaternary sediments which includes and dunes, soils, teris, black mud, alluvium filling river banks and mouths are also met with. The crystalline in the district in general strike in a more or less northwest, southeast direction. Regional dips are easterly, but local opposing dips are also noticed. The dip caries from 25^0 to almost vertical. The pattern of dip indicates a doubly plunging asymmetrical anticline between Vellanad and Nedumangad.

The graphic occurrences in the district are well known. They are at Changa, Vellanad, Kuttichal, Karuppur, Puliyarakonam, Chengallur, Karanamkod, Venganoor, Amaravila, Veli and Kilattingal. The laterite capped areas of lowland and western margin of midland contain bauxite patches. The major deposits are at Mangalapuram-Cilampil, Sasthavattom, Ambalam and Attipra. The bauxites are high in silica (8-12%) and moderate in Iron (11-15%) and Al_2O_3 is around 50%. The ores are at or near ground surface within maximum depth of 4 to 8 meters from surface.

Both china clay as well as sedimentary clay are known to occur in the district. The china clay is associated with crystallines. The main deposit known is at Aakulam which is being mined by English India Clays Ltd. The china clay is white, soft and free from iron and titanium. The sedimentary clays viz. ball clay and fine clay are associated with Warkalli beds. The river plains and mouths have silt or black clay in large quantity, which are being worked in different parts of the district for brick making.

The occurrence of chysoberyl, a semi-precious gemstone in the district and its mining is known since long time. There is a zone of gem bearing pegmatites between Attingal and Parassala in NW-SE direction. The main centers are around Neyyatinkara, Vellanad, Nedumangad and Venjaramood. Gems are also won from pebble bed as in Pothencode and from present day river gravels as in Karamana, the Vamanapuram and Killi river courses. Concentration of sillimanite, garnet, quartz, rutile and monazite in beach sands are found at Vizhinjam, Kovalam and Veli. The main stretch of glass sands occurring as detached patches along the coast line is that between Shangumugam and Veli. Attingal-Neyyatinkara undulating upland has narrow streeps of Quilon and Warkala beds from the north to the south along with laterite-khondalite beds. In Andoorkonam

village areas of Azhoor village of Chirayinkeezhu taluk and Marthandankuzhi the detailed investigation for establishing China clay reserves was continued.

GEOMORPHOLOGY

Geomorphology is the scientific study of landforms and the processes that shape them. Geomorphologists seek to understand why landscapes currently look the way they do, to understand landform history and dynamics, and to predict future changes through a combination of field observations, physical experiments, and numerical modeling. Geomorphology is practiced within physical geography, geology, geodesy, engineering geology, archaeology, and geotechnical engineering, and this broad base of interest contributes to a wide variety of research styles and interests within the field.

The surface of Earth is modified by a combination of surface processes that sculpt landscapes, and geologic processes that cause tectonic uplift and subsidence. Surface processes comprise the action of water, wind, ice, fire, and living things on the surface of the Earth, along with chemical reactions that form soils and alter material properties, the stability and rate of change of topography under the force of gravity, and other factors, such as (in the very recent past) human alteration of the landscape. Many of these factors are strongly mediated by climate. Geologic processes include the uplift of mountain ranges, the growth of volcanoes, isostatic changes in land surface elevation (sometimes in response to surface processes), and the formation of deep sedimentary basins where the surface of Earth drops and is filled with material eroded from other parts of the landscape. The Earth surface and its topography therefore are an intersection of climatic, hydrologic, and biologic action with geologic processes.

Ancient geomorphology

The first theory of geomorphology was arguably devised by the polymath Chinese scientist and statesman Shen Kuo (1031-1095 AD). This was based on his observation of marine fossil shells in a geological stratum of a mountain hundreds of miles from the Pacific Ocean.

Early modern geomorphology

The first use of the word geomorphology was likely to be in the German language when it appeared in Laumann's 1858 work. Keith Tinkler has suggested that the word came into general use in English, German and French after John Wesley Powell and W. J. McGee used it in the International Geological Conference of 1891.

An early popular geomorphic model was the *geographical cycle* or the *cycle of erosion*, developed by William Morris Davis between 1884 and 1899. The cycle was inspired by theories of uniformitarianism first formulated by James Hutton (1726–1797). Concerning valley forms, uniformitarianism depicted the cycle as a sequence in which a river cuts a valley more and more deeply, but then erosion of side valleys eventually flattens the terrain again, to a lower elevation. Tectonic uplift could start the cycle over. Many studies in geomorphology in the decades following Davis' development of his

theories sought to fit their ideas into this framework for broad scale landscape evolution, and are often today termed "Davisian". Davis' ideas have largely been superseded today, mainly due to their lack of predictive power and qualitative nature, but he remains an extremely important figure in the history of the subject.

Contemporary geomorphology

Today, the field of geomorphology encompasses a very wide range of different approaches and interests. Modern researchers aim to draw out quantitative "laws" that govern Earth surface processes, but equally, recognize the uniqueness of each landscape and environment in which these processes operate. Particularly important realizations in contemporary geomorphology include:

1) That not all landscapes can be considered as either "stable" or "perturbed", where this perturbed state is a temporary displacement away from some ideal target form. Instead, dynamic changes of the landscape are now seen as an essential part of their nature.

2) That many geomorphic systems are best understood in terms of the stochasticity of the processes occurring in them, that is, the probability distributions of event magnitudes and return times. This in turn has indicated the importance of chaotic determinism to landscapes, and that landscape properties are best considered statistically. The same processes in the same landscapes do not always lead to the same end results.

Processes

Modern geomorphology focuses on the quantitative analysis of interconnected processes. Modern advances in geochronology, in particular cosmogenic radionuclide dating, optically stimulated luminescence dating and low-temperature thermochronology have enabled us for the first time to measure the rates at which geomorphic processes occur on geological timescales. At the same time, the use of more precise physical measurement techniques, including differential GPS, remotely sensed digital terrain models and laser scanning techniques, have allowed quantification and study of these processes as they happen. Computer simulation and modeling may then be used to test our understanding of how these processes work together and through time.

Geomorphically relevant processes generally fall into (1) the production of regolith by weathering and erosion, (2) the transport of that material, and (3) its eventual deposition. Although there is a general movement of material from uplands to lowlands, erosion, transport, and deposition often occur in closely spaced tandem all across the landscape.

The nature of the processes investigated by geomorphologists is strongly dependent on the landscape or landform under investigation and the time and length scales of interest. However, the following non-exhaustive list provides a flavor of the landscape elements associated with some of these.

Primary surface processes responsible for most topographic features include wind, waves, chemical dissolution, mass wasting, groundwater movement, surface water flow, glacial action, tectonism, and volcanism. Other more exotic geomorphic processes might include periglacial (freeze-thaw) processes, salt-mediated action, or extraterrestrial impact.

Scales in geomorphology

Different geomorphologic processes dominate at different spatial and temporal scales. Moreover, scales on which processes occur may determine the reactivity or otherwise of landscapes to changes in driving forces such as climate or tectonics. These ideas are key to the study of geomorphology today.

To help categorize landscape scales some geomorphologists might use the following taxonomy:

- 1st - Continent, ocean basin, climatic zone (~10,000,000 km^2)
- 2nd - Shield, e.g. Baltic Shield, or mountain range (~1,000,000 km^2)
- 3rd - Isolated sea, Sahel (~100,000 km^2)
- 4th - Massif, e.g. Massif Central or Group of related landforms, e.g., Weald (~10,000 km^2)
- 5th - River valley, Cotswolds (~1,000 km^2)
- 6th - Individual mountain or volcano, small valleys (~100 km^2)
- 7th - Hillslopes, stream channels, estuary (~10 km^2)
- 8th - gully, barchannel (~1 km^2)
- 9th - Meter-sized features

Overlap with other fields

There is a considerable overlap between geomorphology and other fields. Deposition of material is extremely important in sedimentology. Weathering is the chemical and physical disruption of earth materials in place on exposure to atmospheric or near surface agents, and is typically studied by soil scientists and environmental chemists, but is an essential component of geomorphology because it is what provides the material that can be moved in the first place. Civil and environmental engineers are concerned with erosion and sediment transport, especially related to canals, slope stability (and natural hazards), water quality, coastal environmental management, transport of contaminants, and stream restoration. Glaciers can cause extensive erosion and deposition in a short period of time, making them extremely important entities in the high latitudes and meaning that they set the conditions in the headwaters of mountain-born streams; glaciology therefore is important in geomorphology.

GEOMORPHOLOGY - THIRUVANANTHAPURAM

The antiquity of Trivandrum district is an undisputed fact. The name Trivandrum is derived from Thiruvananthapuram, meaning the abode of the sacred snake-god Ananthan, on whom Vishnu the God of preservation is believed to be reclining. The Mahabharata testifies to the great antiquity of Varkala, another important place in the district.

Thiruvananthapuram district is the southernmost district of the coastal State of Kerala. It came into existence in the year 1957. The headquarters is the city of Trivandrum which is also the capital city of Kerala.

The district has an area of 2192 km^2 and a population of 33,07,284 (as per the 2011 census). The second most populous district in Kerala after Malappuram district. It is the densest district in Kerala with 1,509 people per sq.km. It is divided into four taluks, Thiruvananthapuram, Chirayinkeezhu, Neyyattinkara and Nedumangadu. The urban bodies in the district are the Thiruvanathapuram Corporation, Varkala, Neyyattinkara, Attingal and Nedumangad municipalities.

Thiruvananthapuram district is situated between north latitude $8^0$17' and $8^0$51' and east longitudes $76^0$41' and $77^0$17'. The southern most extremity, Parassala is just 54 km away from the southern peninsular tip of India, Cape Comorin (Kanyakumari). The district stretches 78 kms along the shores of the Arabian Sea on the west, Kollam district lies on the north with Tirunelveli and Kanyakumari districts of Tamilnadu on the east and south respectively.

Unlike the flat portion of the Kerala coast at the northern coastal region of the district cliffs are found adjacent to the Arabian Sea at Varkala. It is the only part in southern Kerala where cliffs were found. These tertiary sedimentary formation cliffs are considered as a unique geological feature. It is known among geologists as the "Varkala Formation" and a geological monument as declared by the Geological Survey of India.

The district can be divided into three geographical regions: highlands, midlands and lowlands. Out of the total area of the district lowland is covers 114 km^2 (5.22%), midland 1497.7km^2 (68.51%) and the high land 574.3km^2 (26.27%). The Chirayinkeezhu and Thiruvananthapuram taluks are located in the midland and lowland regions while the Nedumangad taluk lies in the midland and highland regions. The Neyyattinkara taluk stretches over all the three regions.

The highland regions on the east and the north-east comprise the Western Ghats and this area is ideal for major cash crops like rubber, tea, cardamom and other spices. Timber trees like teak and rosewood are grown in this region. The Ghats maintain an average elevation of 814 meters. The part Agasthyarkoodam which is the second-highest peak in the Western Ghats (1869 meters above sea level) lies in the district. The

forests in the tail end of Western Ghats form the most diverse and unknown ecosystem in Peninsular India.

The midland regions lying between the Western Ghats and lowlands is made up of small and tiny hills and valleys. This is an area of intense agricultural activities. This region is rich such as paddy, tapioca, rubber, eucalyptus, spices and cashews. The lowlands are comparatively narrow consisting of rivers, deltas and seashore. This area is densely covered with coconut trees. Water bodies cover about 55.25 km^2 while forest area is estimated to be 498.61km^2.

Among the three rivers in the district, the Neyyar (56km^2), the southern most river of the Kerala State has its origin in the Agasthyamala, the second-highest peak in the Western Ghats. The Karamana River (67km^2) originates from Vayuvanthol (Vazhuvanthol) another mountain in Western Ghats and the Vamanapuram River has its origin from Chemunji Motti of the Western Ghats. There are 10 major back waters in the district. The major lakes are Veli, Kadinamkulam, Anchuthengu, Kappil, Akathumuri and the Edava-Nadayara. Besides there is a fresh water lake at Vellayani in Thiruvananthapuram taluk which has the potential to become the major water source of Thiruvananthapuram city in future.

The climate of Thiruvananthapuram district is generally hot tropical. The large forest reserves favourably affect the climate and induce rains. Cold weather is experienced in the mountain ranges whereas lower down the weather is bracing and is generally hot in the coastal regions. The mean maximum temperature is 35^0c and the mean minimum temperature is 20^0c. As the district stretches from north to south with the Arabian Sea in the west side the relative humidity is generally high. It rises up to about 95% during the south-west monsoon.

The total annual average rainfall in the district is about 1,500mm per annum. The south-west monsoon, from June to September is the principal rainy season. The district receives most of its annual rainfall in this season. The second rainy season is the north east monsoon. It is from October to November. The district also gets Thunderstorm rains in the pre-monsoon months of April and May. December to February is the coolest months. The average temperature goes down to 20^0c in these months. It is generally considered as the winter season. The summer season starts in February and continues until May. The average temperature goes up to 35^0c in these months.

GEOLOGY DETAILS

Table: 6.1

ATHIYANNOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Athiyannoor	Kanjiramkulam	Karumkulam	Kottukal	Venganoor
1	Basic rocks	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	0.00	0.00	0.00	0.00	250.29
3	Khondalite group of rocks	599.06	0.00	59.84	0.00	0.00
4	Laterite	0.00	0.00	0.00	185.94	0.00
5	Migmatite complex	0.00	0.00	0.00	0.00	0.00
6	Sand and Silt	83.55	0.00	0.00	0.00	25.89
7	Sand stone and clay with lignite interc	504.64	747.66	594.73	826.72	852.73
8	Tank/WB/River	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1187.25**	**747.66**	**654.57**	**1012.66**	**1128.91**
	Block Total	**4731.04**				

Table: 6.2

NEDUMANGADU BLOCK

(Area in Ha)

Sl. No.	Rock Type	Anad	Aruvikkara	Karakulam	Panavoor	Vembayam
1	Basic rocks	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	124.43	325.89	100.22	140.31	46.61
3	Khondalite group of rocks	1503.77	1511.87	1911.87	1924.74	2193.43
4	Laterite	0.00	0.00	0.00	0.00	0.00
5	Migmatite complex	924.74	239.27	388.36	878.54	725.59
6	Sand and Silt	0.00	0.00	0.00	0.00	0.00
7	Sand stone and clay with lignite interc	0.00	0.00	0.00	0.00	0.00
8	Tank/WB/River	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2552.94**	**2077.03**	**2400.45**	**2943.59**	**2965.63**
	Block Total	**12939.64**				

Table: 6.3

CHIRAYINKEEZHU BLOCK

(Area in Ha)

Sl. No.	Rock Type	Anchuthengu	Chirayin keezhu	Kadakkavoor	Kizhuvilam	Mudakkal	Vakkam
1	Basic rocks	0.00	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	0.00	0.00	0.00	0.00	71.31	5.49
3	Khondalite group of rocks	0.00	0.00	0.00	1217.14	1968.57	715.29
4	Laterite	0.00	0.00	0.00	60.98	45.10	0.00
5	Migmatite complex	0.00	0.00	0.00	192.99	583.98	89.09
6	Sand and Silt	194.34	660.83	203.95	24.96	0.00	18.72
7	Sand stone and clay with lignite interc	99.63	211.99	133.25	220.48	0.00	609.58
8	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**293.97**	**872.82**	**337.20**	**1716.54**	**2668.97**	**1438.16**
	Block Total	**7327.65**					

Table: 6.4

PARASSALA BLOCK

(Area in Ha)

Sl. No.	Rock Type	Chenkal	Karode	Kulathoor	Parassala	Poovar	Thirupuram
1	Basic rocks	0.00	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	79.23	26.28	129.74	278.54	23.85	0.00
3	Khondalite group of rocks	1894.74	744.39	195.47	1713.67	79.16	0.00
4	Laterite	0.00	33.51	0.00	0.00	0.00	0.00
5	Migmatite complex	0.00	0.00	0.00	0.00	0.00	0.00
6	Sand and Silt	88.06	168.84	801.15	0.00	369.07	185.00
7	Sand stone and clay with lignite interc	0.00	521.86	101.42	0.00	542.29	515.53
8	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2062.02**	**1494.88**	**1227.78**	**1992.21**	**1014.37**	**700.52**
	Block Total	**8491.78**					

Table: 6.5

KILIMANOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Karavaram	Kilimanoor	Madavoor	Nagaroor	Navayi kkulam	Pallickal	Pazhaya kunnummel	Pulimathu
1	Basic rocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.36
2	Charnockite group of rocks	72.14	3.35	105.38	117.38	55.65	158.41	0.00	143.63
3	Khondalite group of rocks	1819.74	1334.06	941.89	0.00	1829.65	752.01	986.65	1996.02
4	Laterite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Migmatite complex	437.78	507.80	752.44	1484.02	1074.76	757.04	1439.45	707.79
6	Sand and Silt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Sand stone and clay with lignite interc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Tank/WB/River	0.00	0.00	0.00	635.44	0.00	0.00	0.00	0.00
	Panchayath Total	**2329.66**	**1845.21**	**1799.70**	**2236.83**	**2960.06**	**1667.46**	**2426.10**	**2853.80**
	Block Total	**18118.84**							

Table: 6.6

PERUNKADAVILA BLOCK

(Area in Ha)

Sl. No.	Rock Type	Amboori	Aryancode	Kallikkad	Kollayil	Kunna thukal	Ottasekhara mangalam	Perunkada vila	Vellarada
1	Basic rocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	0.00	48.56	596.08	76.32	155.82	38.57	273.71	91.84
3	Khondalite group of rocks	3350.44	1941.95	10283.81	1223.46	1659.59	1777.15	1188.90	2022.92
4	Laterite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Migmatite complex	883.78	444.35	730.51	47.72	509.91	141.08	299.29	381.01
6	Sand and Silt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Sand stone and clay with lignite interc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Tank/WB/River	170.39	0.00	432.96	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**4404.61**	**2434.86**	**12043.37**	**1347.50**	**2325.31**	**1956.79**	**1761.91**	**2495.77**
	Block Total	**28770.12**							

Table: 6.5

KILIMANOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Karavaram	Kilimanoor	Madavoor	Nagaroor	Navayi kkulam	Pallickal	Pazhaya kunnummel	Pulimathu
1	Basic rocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.36
2	Charnockite group of rocks	72.14	3.35	105.38	117.38	55.65	158.41	0.00	143.63
3	Khondalite group of rocks	1819.74	1334.06	941.89	0.00	1829.65	752.01	986.65	1996.02
4	Laterite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Migmatite complex	437.78	507.80	752.44	1484.02	1074.76	757.04	1439.45	707.79
6	Sand and Silt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Sand stone and clay with lignite interc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Tank/WB/River	0.00	0.00	0.00	635.44	0.00	0.00	0.00	0.00
	Panchayath Total	**2329.66**	**1845.21**	**1799.70**	**2236.83**	**2960.06**	**1667.46**	**2426.10**	**2853.80**
	Block Total	**18118.84**							

Table: 6.6

PERUNKADAVILA BLOCK

(Area in Ha)

Sl. No.	Rock Type	Amboori	Aryancode	Kallikkad	Kollayil	Kunna thukal	Ottasekhara mangalam	Perunkada vila	Vellarada
1	Basic rocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	0.00	48.56	596.08	76.32	155.82	38.57	273.71	91.84
3	Khondalite group of rocks	3350.44	1941.95	10283.81	1223.46	1659.59	1777.15	1188.90	2022.92
4	Laterite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Migmatite complex	883.78	444.35	730.51	47.72	509.91	141.08	299.29	381.01
6	Sand and Silt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Sand stone and clay with lignite interc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Tank/WB/River	170.39	0.00	432.96	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**4404.61**	**2434.86**	**12043.37**	**1347.50**	**2325.31**	**1956.79**	**1761.91**	**2495.77**
	Block Total	**28770.12**							

Table: 6.9

VAMANAPURAM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Kallara	Manikkal	Nanniyode	Nellanadu	Pangode	Peringa mmala	Pullampara	Vamana puram
1	Basic rocks	74.25	0.00	0.00	0.00	0.00	0.00	0.22	42.72
2	Charnockite group of rocks	85.69	59.88	437.16	172.34	80.74	4849.59	0.00	284.49
3	Khondalite group of rocks	2495.75	1716.15	2566.76	336.21	1220.83	16297.00	854.79	1229.79
4	Laterite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Migmatite complex	743.78	1290.00	821.08	1297.06	1945.63	1640.79	1580.17	143.25
6	Sand and Silt	0.00	32.73	0.00	0.00	0.00	0.00	0.00	0.00
7	Sand stone and clay with lignite interc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3399.46**	**3098.77**	**3825.01**	**1805.61**	**3247.20**	**22787.38**	**2435.18**	**1700.25**
	Block Total	**42298.85**							

Table: 6.10

VELLANADU BLOCK

(Area in Ha)

Sl. No.	Rock Type	Aryanad	Kattakkada	Kuttichal	Poovachal	Tholikkode	Uzhamala ckal	Vellanadu	Vithura
1	Basic rocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	52.80	0.00	209.71	27.80	177.35	457.38	538.83	63.00
3	Khondalite group of rocks	6709.25	1722.57	4395.89	2277.20	2232.79	964.56	1484.15	10072.69
4	Laterite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Migmatite complex	2034.14	376.63	998.14	755.69	625.74	451.40	196.26	972.96
6	Sand and Silt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Sand stone and clay with lignite interc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**8796.19**	**2099.20**	**5603.74**	**3060.70**	**3035.88**	**1873.34**	**2219.24**	**11108.66**
	Block Total	**37796.95**							

Table: 6.11

POTHENCODE BLOCK

(Area in Ha)

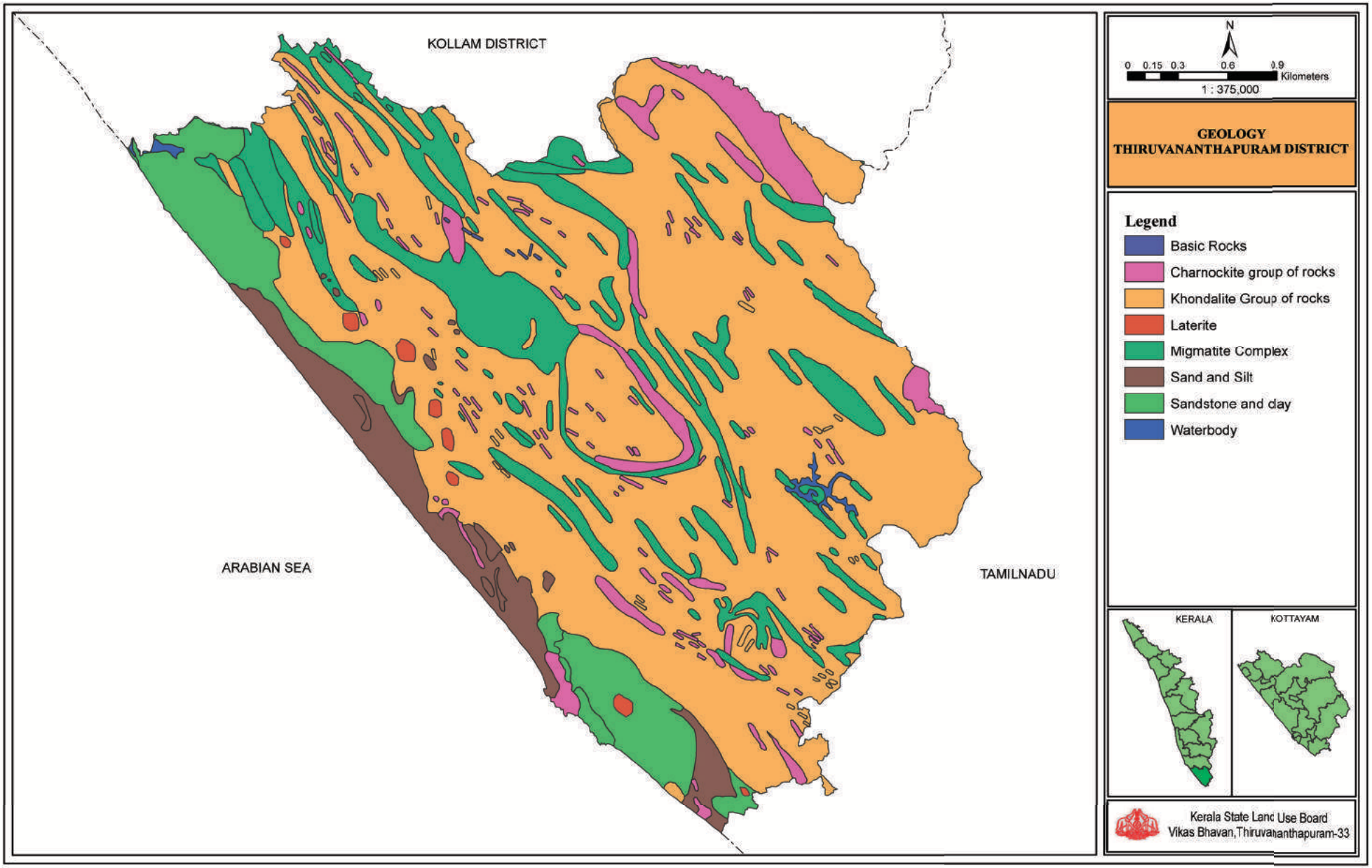
Sl. No.	Rock Type	Andoorkonam	Azhoor	Kadinam kulam	Mangalapuram	Pothencode
1	Basic rocks	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	0.00	0.00	0.00	31.09	33.30
3	Khondalite group of rocks	326.05	177.21	0.00	738.86	1979.41
4	Laterite	2.02	0.00	0.00	62.78	281.57
5	Migmatite complex	0.00	0.00	0.00	0.00	38.34
6	Sand and Silt	549.51	411.95	1999.20	349.08	67.72
7	Sand stone and clay with lignite interc	662.84	663.55	16.32	1023.75	79.78
8	Tank/WB/River	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1540.42**	**1252.71**	**2015.52**	**2205.57**	**2480.13**
	Block Total	**9494.35**				

Table: 6.12

MUNICIPALITY/CORPORATION

(Area in Ha)

Sl. No.	Rock Type	Attingal Municipality	Nedumangad Municipality	Neyyattinkara Municipality	Varkala Municipality	Thiruvananthapuram Corporation
1	Basic rocks	0.00	0.00	0.00	0.00	0.00
2	Charnockite group of rocks	1.68	51.31	166.41	0.00	699.72
3	Khondalite group of rocks	702.42	1326.70	2400.07	0.00	11069.88
4	Laterite	0.00	0.00	0.00	0.00	274.88
5	Migmatite complex	714.99	194.78	140.09	0.00	1576.61
6	Sand and Silt	21.55	0.00	21.91	0.00	5442.11
7	Sand stone and clay with lignite interc	0.00	0.00	0.00	1854.89	1616.95
8	Tank/WB/River	0.00	0.00	0.00	0.00	0.00
	Total	**1440.65**	**1572.78**	**2728.48**	**1854.89**	**20680.15**


KOLLAM DISTRICT
ARABIAN SEA
TAMILNADU
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 375,000
GEOLOGY
THIRUVANANTHAPURAM DISTRICT
Legend
Basic Rocks
Charnockite group of rocks
Khondalite Group of rocks
Laterite
Migmatite Complex
Sand and Silt
Sandstone and clay
Waterbody
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

GEOMORPHOLOGY DETAILS

Table: 6.13

ATHIYANNOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Athiyannoor	Kanjiramkulam	Karumkulam	Kottukal	Venganoor
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	145.18	27.73	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00
6	Lower Plateau (Lateritic)-Dissected	989.54	746.56	505.19	882.56	853.21
7	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	0.00	0.00	0.00	0.00	0.00
13	Residual Mount	0.00	0.00	0.00	0.00	10.10
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
15	Valley Fill	192.77	0.00	0.00	100.50	257.38
16	Water Body	4.94	1.10	4.20	1.86	8.21
	Panchayath Total	**1187.25**	**747.66**	**654.57**	**1012.66**	**1128.91**
	Block Total	**4731.04**				

Table: 6.14

CHIRAYINKEEZHU BLOCK

(Area in Ha)

Sl. No.	Rock Type	Anchuthengu	Chirayinkeezhu	Kadakkavoor	Kizhuvilam	Mudakkal	Vakkam
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	203.68	496.54	159.51	0.00	0.00	210.41
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00	0.00
6	Lower Plateau (Lateritic)-Dissected	56.63	149.58	147.34	1305.87	2303.00	1011.72
7	Mud Flat (Coastal Plain)	0.00	25.28	0.00	0.00	0.00	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	0.00	0.00	0.00	0.00	0.00	0.00
13	Residual Mount	0.00	0.00	0.00	0.00	9.73	0.00
14	Swale (Coastal Plain)	0.00	8.70	0.00	0.00	0.00	0.00
15	Valley Fill	0.00	64.06	7.72	377.01	347.23	82.57
16	Water Body	33.66	128.65	22.63	33.68	9.01	133.48
	Panchayath Total	**293.97**	**872.82**	**337.20**	**1716.56**	**2668.97**	**1438.16**
	Block Total	**7327.67**					

Table: 6.15

KILIMANOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Karavaram	Kilimanoor	Madavoor	Nagaroor	Navayi kkulam	Pallickal	Pazhaya kunnummel	Pulimathu
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	19.58	63.96	0.00	1.91	0.00	31.38	0.00
6	Lower Plateau (Lateritic)-Dissected	2190.90	1592.75	1579.35	2044.03	2634.21	56.97	2000.67	2523.34
7	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	1413.47	0.00	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	0.00	0.00	17.72	0.00	0.00	0.00	84.65	26.19
13	Residual Mount	23.83	88.59	48.46	1.33	38.50	42.54	181.24	132.93
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley Fill	108.93	144.30	90.22	180.96	285.43	140.77	128.16	140.70
16	Water Body	6.00	0.00	0.00	10.53	0.00	13.71	0.00	30.64
	Panchayath Total	**2329.66**	**1845.21**	**1799.70**	**2236.83**	**2960.06**	**1667.46**	**2426.10**	**2853.80**
	Block Total	**18118.84**							

Table: 6.16

NEDUMANGADU BLOCK

(Area in Ha)

Sl. No.	Rock Type	Anad	Aruvikkara	Karakulam	Panavoor	Vembayam
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	0.00	0.00	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	126.59	30.43	61.31	59.96
6	Lower Plateau (Lateritic)-Dissected	2146.03	1606.58	2123.16	2427.46	2446.63
7	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	184.16	9.19	0.00	22.08	165.47
13	Residual Mount	146.13	180.55	176.86	197.94	185.07
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
15	Valley Fill	76.62	101.38	70.00	223.34	108.50
16	Water Body	0.00	52.75	0.00	11.45	0.00
	Panchayath Total	**2552.94**	**2077.03**	**2400.45**	**2943.59**	**2965.63**
	Block Total	**12939.64**				

Table: 6.17

NEMOM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Balaramapuam	Kalliyoor	Malayinkeezhu	Maranalloor	Pallichal	Vilappil	Vilavoorkkal
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	35.03	0.00	38.95	0.00
6	Lower Plateau (Lateritic)-Dissected	864.34	1019.11	1524.88	2160.79	1591.83	1809.37	899.80
7	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	2.14
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	0.00	0.00	2.23	0.00	175.47	130.19	0.00
13	Residual Mount	0.00	0.00	30.49	9.40	34.24	104.73	0.00
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley Fill	125.15	494.27	243.03	272.21	304.10	64.52	119.33
16	Water Body	4.94	54.17	0.00	9.30	3.01	20.56	23.03
	Panchayath Total	**994.43**	**1567.55**	**1800.63**	**2486.73**	**2108.66**	**2168.33**	**1044.29**
	Block Total	**12170.62**						

Table: 6.18

PARASSALA BLOCK

(Area in Ha)

Sl. No.	Rock Type	Chenkal	Karode	Kulathoor	Parassala	Poovar	Thirupuram
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	52.85	0.00	55.71	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.72	0.00
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00	0.00
6	Lower Plateau (Lateritic) - Dissected	1563.93	1264.79	881.36	1769.66	783.08	648.87
7	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
10	Rock Exposure	0.00	0.00	2.18	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	0.00	0.00	0.00	0.00	0.00	0.00
13	Residual Mount	0.00	0.00	8.69	0.00	0.00	0.00
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley Fill	462.27	214.45	185.46	215.65	117.96	40.86
16	Water Body	35.82	15.64	97.25	6.90	56.89	10.80
	Panchayath Total	**2062.02**	**1494.88**	**1227.78**	**1992.21**	**1014.37**	**700.52**
	Block Total	**8491.78**					

Table: 6.19

PERUNKADAVILA BLOCK

(Area in Ha)

Sl. No.	Rock Type	Amboori	Aryancode	Kallikkad	Kollayil	Kunnathukal	Ottasekhara mangalam	Perunkada vila	Vellarada
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Hills	555.57	0.00	0.00	0.00	0.00	58.87	0.00	96.45
5	Denudational Structural Hills	497.54	0.00	9308.99	0.00	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	0.00	151.42	43.84	0.00	24.60	0.00	42.76	54.29
7	Lower Plateau (Lateritic)-Dissected	935.16	1851.51	944.36	1139.83	2046.02	1440.53	1436.11	2067.18
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	1566.80	0.00	966.87	0.00	0.00	189.51	0.00	61.34
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Rock Exposure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Mount (Pediment)	193.34	0.00	12.80	0.00	0.00	35.97	0.00	0.00
13	Residual Hill	207.21	4.38	90.76	0.00	99.34	0.00	0.00	0.00
14	Residual Mount	185.45	203.27	70.51	0.00	115.28	135.54	35.63	205.10
15	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Valley Fill	98.82	209.12	20.41	199.45	38.32	78.68	240.69	11.40
17	Water Body	164.72	15.17	584.83	8.23	1.75	17.68	6.71	0.00
	Panchayath Total	**4404.61**	**2434.86**	**12043.37**	**1347.50**	**2325.31**	**1956.79**	**1761.91**	**2495.77**
	Block Total	**28770.12**							

Table: 6.20

POTHENCODE BLOCK

(Area in Ha)

Sl. No.	Rock Type	Andoorkonam	Azhoor	Kadinam kulam	Mangala puram	Pothencode
1	Beach (Coastal Plain)	0.00	0.00	0.01	0.00	0.00
2	Coastal Plain	181.20	206.14	1556.97	148.25	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00
6	Lower Plateau (Lateritic)-Dissected	1062.06	797.92	5.89	1792.09	2263.04
7	Mud Flat (Coastal Plain)	5.95	61.28	16.70	12.46	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	0.00	0.00	0.00	0.00	0.00
13	Residual Mount	0.00	0.00	0.00	0.00	65.82
14	Swale (Coastal Plain)	27.81	10.15	138.85	0.00	0.00
15	Valley Fill	256.72	102.29	1.00	195.94	151.27
16	Water Body	6.68	74.92	296.11	56.83	0.00
	Panchayath Total	**1540.42**	**1252.71**	**2015.52**	**2205.57**	**2480.13**
	Block Total	**9494.35**				

Table: 6.21

VAMANAPURAM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Kallara	Manikkal	Nanniyode	Nellanadu	Pangode	Peringa mmala	Pullampara	Vamana puram
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Hills	0.00	0.00	0.00	0.00	724.18	28.42	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	16029.97	0.00	0.00
6	Linear Ridge (Lower Plateau)	21.33	0.00	40.10	0.00	0.00	0.00	0.00	0.00
7	Lower Plateau (Lateritic)-Dissected	2539.07	2621.53	3007.65	1412.23	1627.59	3367.87	1976.85	1421.76
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	292.67	0.00	123.55	0.00	561.52	2563.96	0.00	0.00
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Rock Exposure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Mount (Pediment)	42.49	0.00	15.62	0.00	14.91	23.39	0.00	0.00
13	Residual Hill	0.00	7.97	68.60	122.48	0.00	98.58	21.08	0.00
14	Residual Mount	218.60	144.18	289.07	49.54	98.29	91.83	175.44	77.60
15	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Valley Fill	279.19	325.09	240.49	219.64	220.71	490.17	232.43	176.32
17	Water Body	6.12	0.00	39.93	1.73	0.00	93.44	29.38	24.57
	Panchayath Total	**3399.46**	**3098.77**	**3825.01**	**1805.61**	**3247.20**	**22787.62**	**2435.18**	**1700.25**
	Block Total	**42299.09**							

Table: 6.22

VARKALA BLOCK

(Area in Ha)

Sl. No.	Rock Type	Chemmaruthi	Cherunniyur	Edava	Elakamon	Manampoor	Ottoor	Vettoor
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	643.30	3.71	0.46	0.00	17.56
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Lower Plateau (Lateritic)-Dissected	1617.57	966.08	15.08	1386.88	1026.28	903.00	429.60
7	Mud Flat (Coastal Plain)	32.77	0.00	29.79	66.46	0.00	0.00	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Residual Mount	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley Fill	102.64	104.66	0.00	155.85	181.19	72.42	58.36
16	Water Body	0.00	19.66	26.29	173.86	305.78	0.43	16.02
	Panchayath Total	**1752.99**	**1090.40**	**714.46**	**1786.75**	**1513.71**	**975.85**	**521.54**
	Block Total	**8355.70**						

Table: 6.23

VELLANADU BLOCK

(Area in Ha)

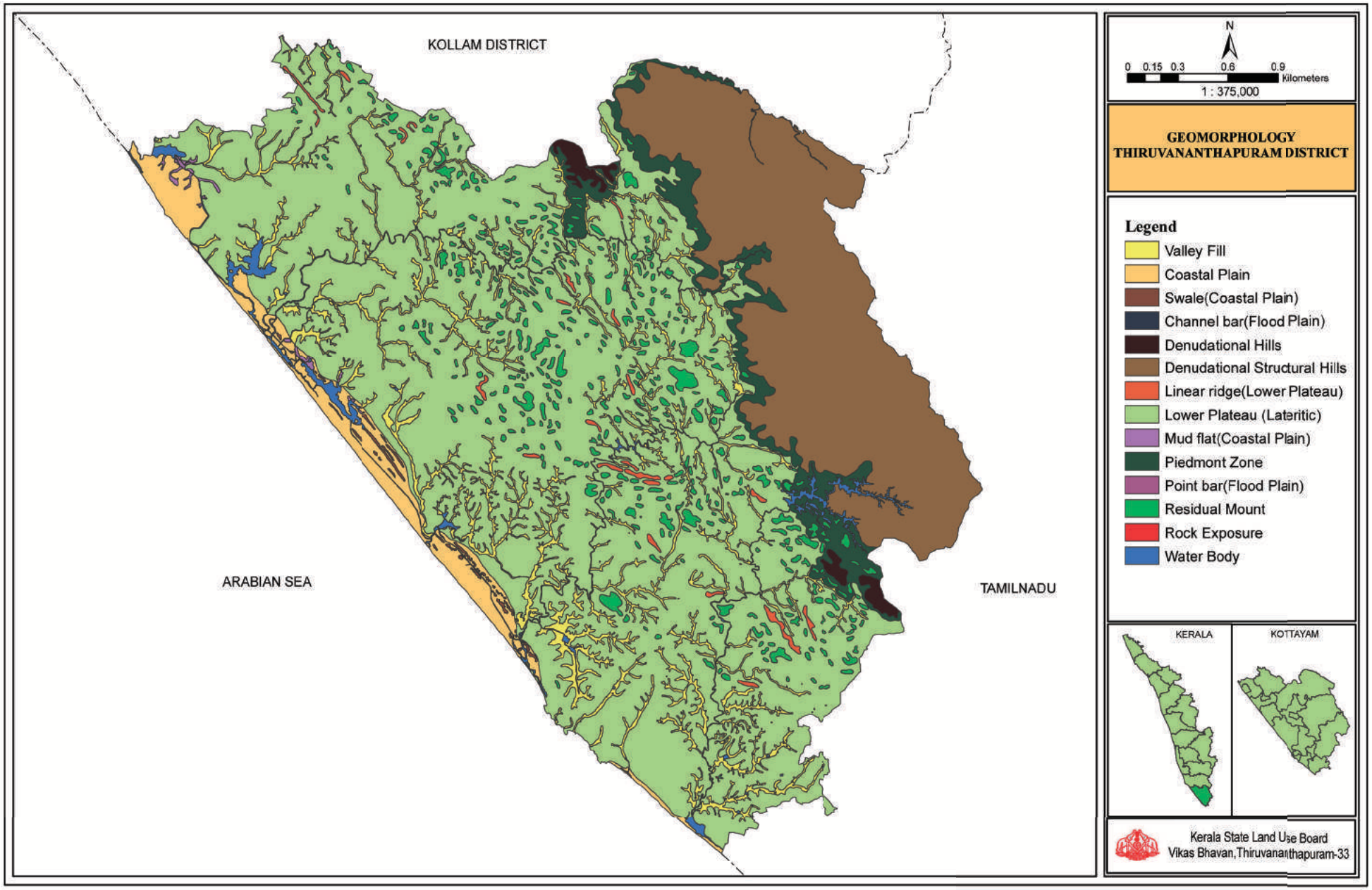
Sl. No.	Rock Type	Aryanad	Kattakkada	Kuttichal	Poovachal	Tholikkode	Uzhamalackal	Vellanadu	Vithura
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Structural Hills	5502.82	0.00	3515.35	0.00	0.00	0.00	0.00	6536.08
5	Linear Ridge (Lower Plateau)	0.00	7.04	0.00	0.00	39.08	2.54	107.27	0.00
6	Lower Plateau (Lateritic)-Dissected	2142.33	1842.19	1396.74	2456.19	2315.37	1427.75	1691.95	2818.05
7	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Piedmont Zone	617.97	0.00	383.14	0.00	0.00	0.00	0.00	1103.72
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	4.83	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	1.10	15.81	0.00	106.90	258.03	30.33	19.02	145.20
13	Residual Mount	207.13	26.26	123.34	192.79	162.65	170.71	78.95	125.35
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley Fill	304.23	193.58	179.13	304.81	260.74	226.35	267.66	335.95
16	Water Body	20.61	14.32	1.21	0.01	0.00	15.68	54.38	44.30
	Panchayath Total	**8796.19**	**2099.20**	**5603.74**	**3060.70**	**3035.88**	**1873.34**	**2219.24**	**11108.66**
	Block Total	**37796.95**							

Table: 6.24

MUNICIPALITY/CORPORATION

(Area in Ha)

Sl. No.	Rock Type	Attingal Municipality	Nedumangad Municipality	Neyyattinkara Municipality	Varkala Municipality	Thiruvananthapuram Corporation
1	Beach (Coastal Plain)	0.00	0.00	0.00	0.00	0.02
2	Coastal Plain	0.00	0.00	0.00	1215.85	2758.02
3	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	4.29
4	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00
5	Linear Ridge (Lower Plateau)	0.00	25.54	0.00	0.00	0.00
6	Lower Plateau (Lateritic)-Dissected	1367.14	1354.00	2201.25	504.17	14633.51
7	Mud Flat (Coastal Plain)	0.00	0.00	0.00	94.20	0.00
8	Piedmont Zone	0.00	0.00	0.00	0.00	0.00
9	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	2.61
10	Rock Exposure	0.00	0.00	0.00	0.00	0.00
11	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00
12	Residual Hill	0.00	52.85	0.00	0.00	64.27
13	Residual Mount	0.00	125.24	54.78	0.00	31.73
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	221.84
15	Valley Fill	32.64	15.16	414.26	0.00	2663.64
16	Water Body	40.86	0.00	58.19	40.67	300.21
	Total	**1440.65**	**1572.78**	**2728.48**	**1854.89**	**20680.15**


KOLLAM DISTRICT
ARABIAN SEA
TAMILNADU
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 375,000
GEOMORPHOLOGY
THIRUVANANTHAPURAM DISTRICT
Legend
Valley Fill
Coastal Plain
Swale(Coastal Plain)
Channel bar(Flood Plain)
Denudational Hills
Denudational Structural Hills
Linear ridge(Lower Plateau)
Lower Plateau (Lateritic)
Mud flat(Coastal Plain)
Piedmont Zone
Point bar(Flood Plain)
Residual Mount
Rock Exposure
Water Body
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

PHYSIOGRAPHY

Thiruvananthapuram district lies between North latitude $8^0$17' and $8^0$51' and East longitudes 76^0 41' and 77^0 17'. Based on physical features the district can be divided into three regions highlands, midlands and lowlands. Chirayinkeezhu and Thiruvananthapuram taluks lie in midland and lowland region; while Nedumangad taluk lies in midland and highland regions and Neyyattinkara taluk stretches through all the three regions.

Thiruvananthapuram coastal region is bounded by Quilon coast in the North, Attingal-Neyyattinkara Undulating Upland in the East, Tamil Nadu in the South and the Lakshadweep Sea in the West. This coastal plain gradually slopes towards the west. Attingal Neyyattinkara Undulating Upland region lies parallel to the coastal region and makes its boundaries with Kottarakkara Undulating Upland in the North, Ponmudi-Agasthyar forested hill in the East, Tamilnadu in the South and Thiruvananthapuram coast in the West. This region has more ups and downs mostly over its central portion. Ponmudi-Agasthyar forested hills lies in the eastern section of the district and is bounded by Kulathupuzha forested hills in the North, Tamilnadu in the East and South Attingal-Neyyattinkara undulating upland in the West. This region has hilly tract and it slopes gently towards the West. The main rivers in the district are Neyyar river, Karamana river and Vamanapuram river.

Table: 7.1

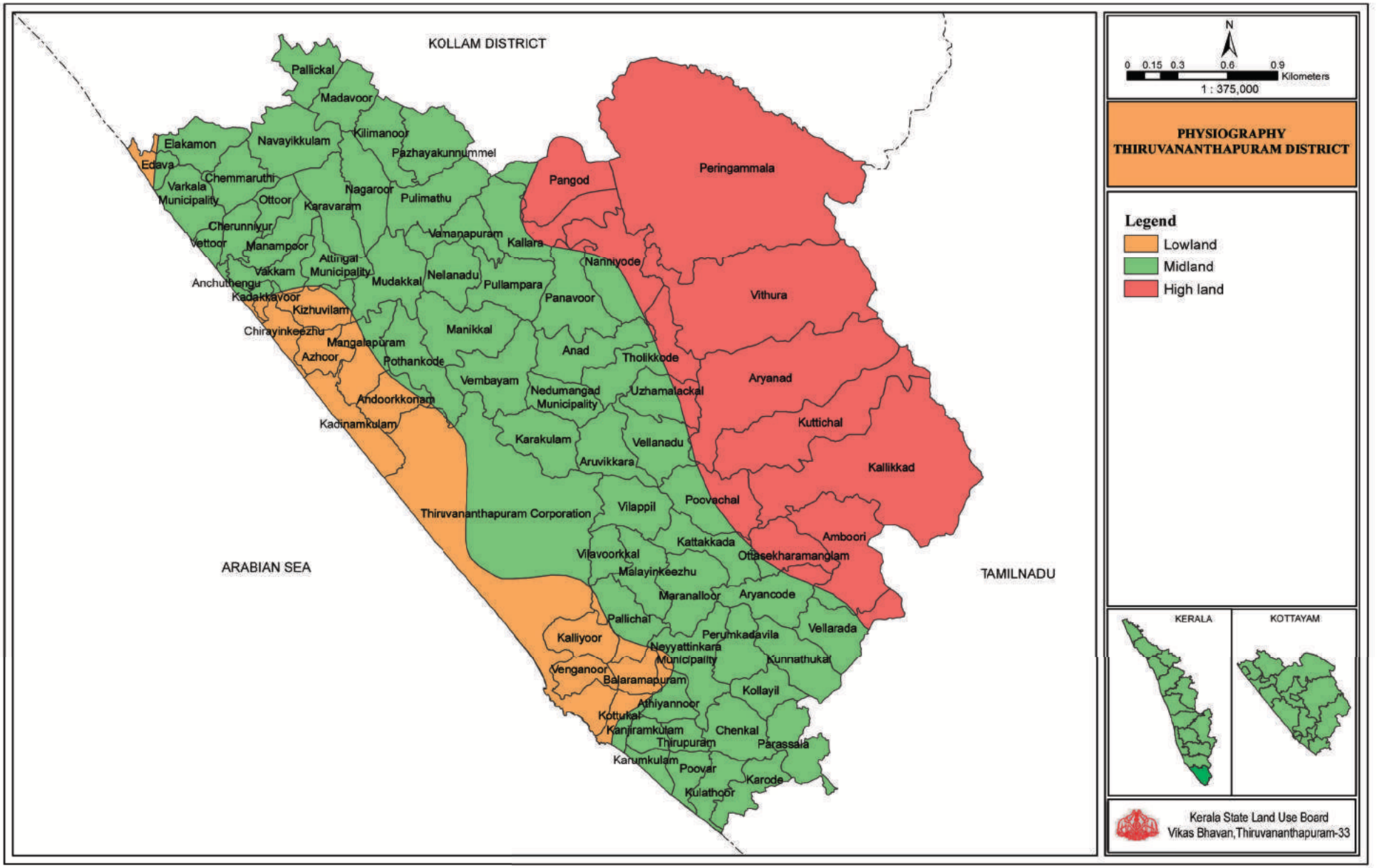
NATURAL REGIONS OF THIRUVANANTHAPURAM - DETAILS OF TALUKS/VILLAGES WITH AREA BY REGIONS

(Area in ha)

Sl.No.	Taluks/Villages	Lowland	Midland	Highland
Chirayinkeezhu Taluk				
1	Kadakkavoor	1155	-	-
2	Sarkara- Chirayinkeezhu	1087	-	-
3	Azhoor	1246	-	-
4	Pallickal	-	1618	-
5	Madavoor	-	1871	-
6	Navaikulam	-	2823	-
7	Ayiroor	-	1775	-
8	Edava	-	914	-
9	Chemmaruthy	-	1754	-
10	Ottur	-	947	-
11	Karavanam	-	1333	-
12	Vellaloor	-	1133	-
13	Kilimanoor	-	1904	-
14	Pazhayakunnummel	-	2531	-
15	Pulimath	-	1885	-
16	Koduvazhannur	-	808	-
17	Nagarur	-	1197	-
18	Alamkodu	-	874	-
19	Manampoor	-	1507	`-
20	Vettoor-Cheruniyoor	-	1769	-
21	Keezhattingal	-	756	-
22	Attingal	-	58	-
23	Avanavancherry	-	195	-
24	Elamba	-	528	-
25	Kuzhuvilakom	-	1416	-
26	Varkala(M)	-	1542	-
27	Attingal(M)	-	1418	-
28	Mudakkal	-	1169	-
29	Edakkode	-	855	-
Total		**3488**	**34580**	**-**
Nedumangad Taluk				
1	Vamanapuaram A	-	2743	-
2	Kallara	-	4949	-
3	Pullampara	-	3564	-
4	Nellanad	-	1846	-
5	Manickal	-	3334	-
6	Vembayam	-	3058	-
7	Anad B	-	2190	-
8	Palode A	-	3872	-
9	Palode B	-	4305	-
10	Tholicode	-	2874	-
11	Anad	-	2415	-

Sl.No.	Taluks/Villages	Lowland	Midland	Highland
12	Nedumangad(M)	-	3316	-
13	Karakulam	-	3137	-
14	Vellanad	-	2830	-
15	Uzhamalackal	-	1875	-
16	Veeranakavu	-	1819	-
17	Perumkulam	-	2126	-
18	Vithura	-	-	2883
19	Aryanad	-	-	2292
20	Kulathupuzha range	-	-	1974
21	Palode Range & Paruthypally Range	-	-	35276
Total		**-**	**50253**	**42425**
Thiruvananthapuam Taluk				
1	kadinamkulam	1123	-	-
2	Pallipuram	931	-	-
3	Kazhakuttam-Meenamkulam	1673	-	-
4	Attipra	536	-	-
5	Thiruvallom	2581	-	-
6	Velloor	-	1308	-
7	Methonnakkal	-	1226	-
8	Keezhethonnakkal	-	958	-
9	Andoorkonam	-	914	-
10	Iroopara	-	1235	-
11	Uliyazhathara	-	1486	-
12	Pangappara	-	887	-
13	Kadakampalli(T)	-	813	-
14	Cheruvakkal(P)	-	870	-
15	Ulloor(P)	-	797	-
16	Chettivilakom(P)	-	769	-
17	Randamada(P)	-	719	-
18	Anchamada(P)	-	343	-
19	Muttathara(P)	-	91	-
20	Thiruvananthapuram Corporation	-	7493	-
21	Nemom	-	2941	-
22	Thumba	1067	-	-
Total		**7911**	**22850**	**-**
Neyyattinkara Taluk				
1	Vilappil	-	3144	-
2	Kulathummal	-	2254	-
3	Vellarada	-	5087	-
4	Keezharoor	-	2178	-
5	Maranallur	-	2513	-
6	Marukil	-	1639	-
7	Pallichal	-	1995	-
8	Athiyannur(P)	-	1754	-
9	Neyyatinkara(P)	-	1891	-
10	Perumkadavila	-	1754	-
11	Kunnathukal	-	3145	-

Sl.No.	Taluks/Villages	Lowland	Midland	Highland
12	Kollayil(P)	-	1373	-
13	Parassala	-	2002	-
14	Chenkal(P)	-	1937	-
15	Kulathoor	-	2691	-
16	Thirupuram	-	1591	-
17	Karumkulam	-	1279	-
18	Kottukal(P)	-	2896	-
19	Neyyatinkara(M)	-	970	-
20	Ottasekharamangalm	-	-	1815
21	Kallikkad (Paruthypally range, outside village)	-	-	11184 2003
	Total	-	**42093**	**15002**


KOLLAM DISTRICT
Pallickal
Madavoor
Kilimanoor
Elakamon
Navayikkulam
Pazhayakunnummel
Edava
Chemmaruthi
Varkala Municipality
Ottoor
Nagaroor
Pulimathu
Karavaram
Cherunniyur
Vettoor
Manampoor
Vamanapuram
Kallara
Attingal Municipality
Vakkam
Anchuthengu
Mudakkal
Nellanadu
Pullampara
Kadakkavoor
Kizhuvilam
Panavoor
Chirayinkeezhu
Manikkal
Mangalapuram
Azhoor
Pothankode
Anad
Vembayam
Nedumangad Municipality
Andoorkkonam
Kadinamkulam
Karakulam
Aruvikkara
Thiruvananthapuram Corporation
Vilappil
ARABIAN SEA
Vilavoorkkal
Malayinkeezhu
Maranalloor
Pallichal
Kalliyoor
Venganoor
Balaramapuram
Kottukal
Kanjiramkulam
Karumkulam
Poovar
Kulathoor
Pangod
Peringammala
Nanniyode
Vithura
Tholikkode
Uzhamalackal
Aryanad
Vellanadu
Kuttichal
Kallikkad
Poovachal
Kattakkada
Amboori
Ottasekharamangalam
Aryancode
Perumkadavila
Vellarada
Neyyattinkara Municipality
Kunnathukal
Kollayil
Athiyannoor
Chenkal
Thirupuram
Parassala
Karode
TAMILNADU
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 375,000
PHYSIOGRAPHY
THIRUVANANTHAPURAM DISTRICT
Legend
Lowland
Midland
High land
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

SOIL

Soil is an important natural resource, from it we obtain everything directly or indirectly. Its thickness varies from a few centimeters to a few meters on earth's surface, but it takes millions of years for its formation. Formation is a very slow process as 21/2 cm of soil is formed in one thousand years. Soil is one of the major resources of land which determines the use of potential. Formation of soil is formed due to weathering by chemical, mechanical and biological forces. Factors upon which formation of soil depend are (i) the parent rock (ii) topography or relief - soil cover is thin in hilly areas than on the plains (iii) climate - it is the most important soil forming factor; weathering, i.e., breaking or disintegration of rocks depends upon the elements of climate, i.e., heat (hot/cold), rain, wind, etc. (iv) vegetation. Soil is a natural body consisting of layers (soil horizons) that are primarily composed of minerals which differ from their parent materials in their texture, structure, consistency, colour, chemical, biological and other characteristics. The result soil is the end product of the influence of the climate (temperature, precipitation), relief (slope), organisms (flora and fauna), parent materials (original minerals), temperature, and time. In engineering, soil is referred to as regolith, or loose rock material. Strictly speaking, soil is the depth of regolith that influences and has been influenced by plant roots and may range in depth from centimeters to many meters.

The low land soils are imperfectly drained hydromorphic soils, which are developed from riverine and lacustine sediments and alluvia-colluvial deposits. The depth varies from 75 cm to more than 150 cm. Soils are very dark grayish brown to black with silty clay loam to clay texture. The mid land soils are well drained laterite soils have a depth of less than 100 cm having dark reddish brown to red with gravelly clay loam to gravelly clay texture. The mid land soils are well drained with depth more than 75 cm developed from gneissic rock. Soils are yellowish red to reddish brown with gravelly loam to gravelly clay loam texture. Upland soils are well drained with depth less than 75 cm developed from gneissic rock. Soils are black to dark reddish brown with sandy clay loam to clay loam texture. Rock out crops is common feature. The soils in the high land region are well drained with depth more than 150 cm, developed from gneissic rock. Soils are very dark brown to strong brown with gravelly sandy loam to gravelly clay loam texture. Thiruvananthapuram cost has alluvial and sandy soil. In its Southern tip, there is a small area under red loam soil. Soils are technically classified as pcamments-orthents and ustalf-orthents. Ponmudi-Agasthiar forested hills have a forest loam and laterite soils.

Table: 8.1

SOILS OF THIRUVANANTHAPURAM DISTRICT (COMPREHENSIVE LEGEND)

Soil Mapping Units	Description Major Soil	Classification	
		Major soils	Inclusions
K-02	Very deep, somewhat excessively drained, sandy soils with moderately deep water table on very gently sloping beaches, with slight erosion; Associated with very deep, moderately well drained, sandy soils with moderately shallow water table	Mixed, Typic Ustipsamments Mixed, Typic ustipsamments	Coarse-loamy,Mixed Aquic ustorthents Fine, Mixed, Aeric Tropaquepts
K-05	Very deep, imperfectly drained, clayey soils with shallow water table on level lands with valleys, with slight erosion	Fine, Mixed, Typic Dystropepts Fine, Mixed, Aeric Tropaquepts	Fine, Mixed, Typic Tropaquets Fine-loamy, Mixed, Ustic Kanhaplohumults
K-07	Very deep, well drained, gravelly clay soils on gently sloping coastal laterites, with moderate erosion; Associated with very deep, welldrained, gravelly clay soils with moderate surface gravelliness.	Clayey-skeletal, kaolintic, Typic kandiustults Clayey-skeletal, Kaolinitic, Typic Kanhaplustults	Loamy-skeletal, Mixed, Ustoxic Dystropepts Clayey, Kaolinitic, Typic Kandiustults

Table Continued …….

K-09	Very deep, well drained, gravelly clay soils with moderate surface gravelliness on moderately steeply sloping laterite mounds, with moderate erosion; Associated with deep, well drained, gravelly clay soils on gentle slopes.	Clayey-skeletal, Kaolintic, Oxic Humitropepts Clayey-skeletal, Kaolintic, Ustic Haplohumults	Clayey- skeletal, Kaolintic, Ustic Kandihumults Fine-loamy, Mixed, Typic Kandihumults
K-12	Very deep, well drained, gravelly clay soils with moderate surface gravelliness on gently sloping midland laterites with valleys of southern kerala, with moderate erosion; Associated with very deep, well drained, clayey soils.	Clayey–skeletal, Kaolintic, Ustic Kanhaplohumults Clayey, kaolintic, Typic Kandiustults	Fine-loamy, Mixed, Aquic Ustifluvents Clayey-skeletal, Kaolintic, Typic Kanhaplustults
K-31	Very deep, well drained, gravelly loam soils on steeply sloping medium hills with thick vegetation, with moderate erosion; Associated with very deep, well drained, clayey soils on moderate slopes.	Fine-loamy, Mixed, Ustic Humitropepts Clayey, Mixed, Ustic Palehumults	Rock land Clayey, Mixed, Ustic Haplohumults
K-32	Deep, well drained, loamy soils on gently slopping low hills with isolated hill rocks, with moderate erosion; Associated with deep, well drained, loamy soils with coherent material at 100 to 150 cm on moderate slopes, severely eroded.	Fine-loamy, Mixed, Ustic Humitropepts Fine-loamy,Mixed, Ustic Haplohumults	Fine, Mixed, Ustic Humitropepts Clayey-skeletal, Mixed, Ustic Humitropepts

Table Continued …….

k-35	Deep, well drained, gravelly clay soils with coherent material at100 to 150 cm on moderately sloping isolated hillocks, with severe erosion; Associated with moderately shallow, well drained, gravelly loam soils with coherent material at 50 to 75 cm on very gentle slopes, moderately eroded.	Clayey-skeletal, Kaolintic, Oxic Humitropepts Fine-loamy, Mixed, Oxic Humitropepts	Clayey-skeletal, Mixed, Ustic Humitropepts Clayey, Mixed, Ustic Haplohumults
K-36	Very deep, well drained, clayey soils on moderately steeply sloping high hills with thick vegetation, with moderate erosion; Associated with deep, well drained, gravelly loam soils on gentle slopes.	Clayey, Mixed, Ustic Haplohumults Fine-loamy, Mixed, Oxic Humitropepts	Fine , Mixed, Ustic Humitropepts Rockland
K-38	Very deep, well drained, clayey soils on moderately steeply sloping hills with thin vegetation , with moderate erosion; Associated with rock outcrops.	Clayey, Mixed, Ustic Palehumults Rockland	Fine, Mixed, Ustic Humitropepts Fine-loamy,Mixed, Ustic Humitropepts

Soils of the Lowland **- K02, K05, K07**

Soils of the Midland **- K09, K12**

Soils of the Nilgiris **- K35, K36**

Soils of the South Sahyadri **- K31, K32, K38**

Table: 8.2

LEGEND FOR THE SOIL MAP OF THIRUVANANTHAPURAM DISTRICT

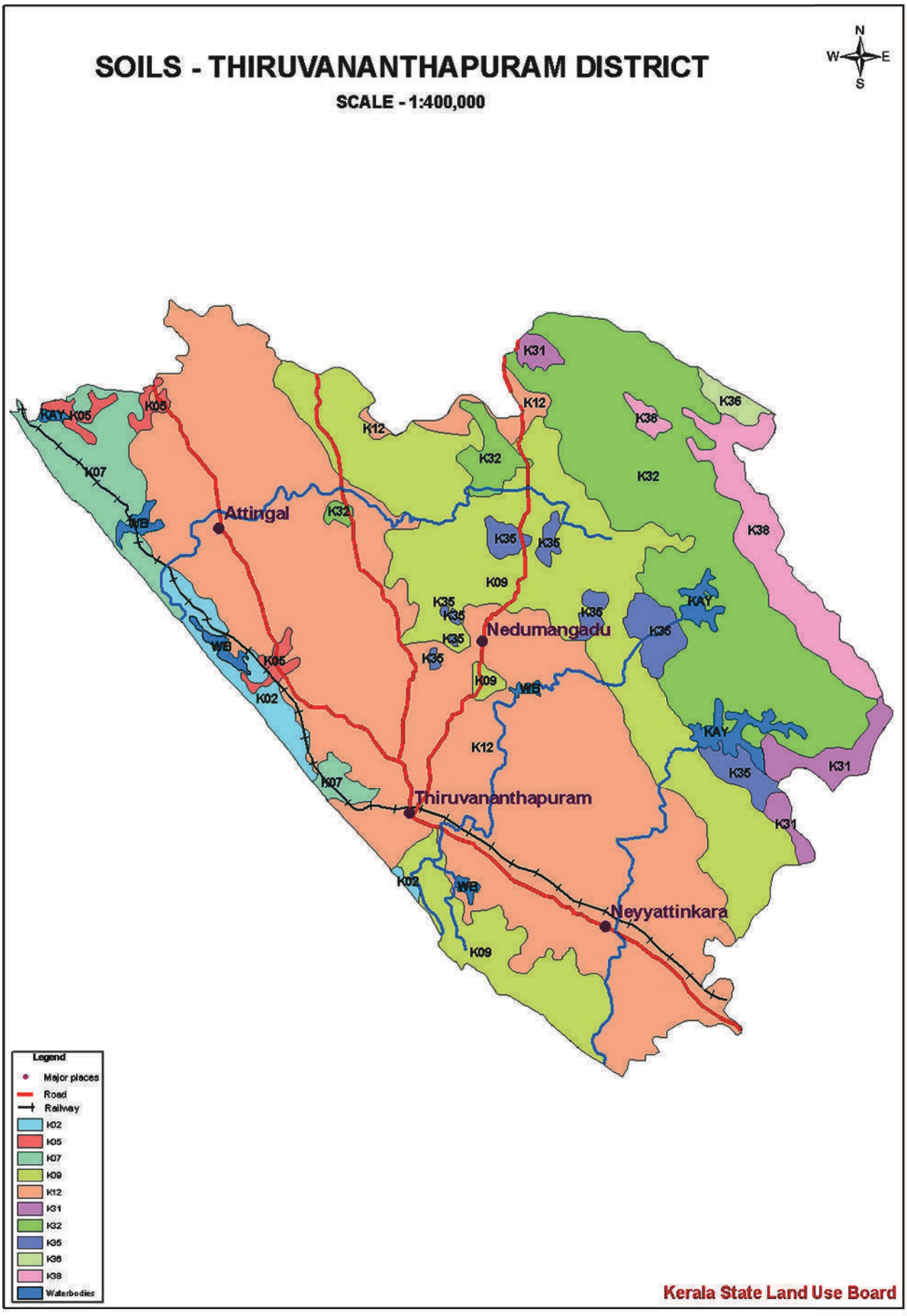
S1. No.	Map symbol	Depth	Texture	Slope	Drainage
1	K02	vd	s	vg	e
2	K05	vd	c	vg	i
3	K07	vd	gc	g	w
4	K09	vd	gc	ms	w
5	K12	vd	gc	g	w
6	K31	vd	gl	s	w
7	K32	d	l	g	w
8	K35	d	gc	m	w
9	K36	vd	c	ms	w
10	K38	vd	c	ms	w

	Depth	
1	d	deep
2	vd	very deep

	Slope	
1	g	gentle
2	vg	very gentle
3	m	moderate
4	s	steep
5	ms	moderately Steep

	Texture	
1	s	sandy
2	gc	gravelly clay
3	c	clay
4	l	loam
5	gl	gravelly loam

	Drainage	
1	w	well
2	e	excessive
3	i	imperfectly


SOILS - THIRUVANANTHAPURAM DISTRICT
SCALE - 1:400,000
N
W
E
S
Attingal
Nedumangadu
Thiruvananthapuram
Neyyattinkara
K31
K12
K36
K38
K32
K07
K05
KAY
WB
K35
K09
K02
Legend
Major places
Road
Railway
K02
K05
K07
K09
K12
K31
K32
K35
K36
K38
Waterbodies
Kerala State Land Use Board

WATER RESOURCES

In most developing countries, agriculture is the dominant user of water, accounting for more than 85% of all water use. Use of water in agriculture raises significant issues for water resources management like issues dealing with water scarcity, competing demands from other sectors, irrigation service delivery and system management, water use efficiencies are so forth. The primary objective in coming years will be to balance water supply and demand among users to ensure adequate water for agriculture and sustainable irrigation system management while satisfying other needs. Investments in irrigation are changing globally in response to changes in environment and experience with previous projects. In 1970's and 1980's investment typically involved large irrigation and drainage projects with considerable infrastructure development. In 1990's investment often supported system rehabilitation and management and more recently to small irrigation schemes. Increased water scarcity has shifted the focus from exploitation of water resources and building infrastructure to improvement of water use efficiency.

The basic premise of water resource management is that manage and develop the river basins as an integrated approach. This is always legally and politically complex due to the challenges of allocation between users and uses. In many cases the need of river infrastructure such as weirs, dykes, regulators and other storage structures are primary drivers for adopting institutional solutions. The investment in storage structures is essential to optimize water use as well as to address the growing number of water conflicts. The surface irrigation consists of major chunk of irrigation infrastructure in the state. There are 18 dams in the state intended for irrigation. Out of this, 14 have storages and remaining are barrages.

Live storage capacities of irrigation Reservoirs

The live storage position of the reservoirs during the beginning and end of the monsoon period for 2008 to 2011 are given in the following table.

Table: 9.1

(Mm^3)

Sl.No.	Item	2008	2009	2010	2011
1	Storage at the beginning of the Monsoon	452	392	531	525
2	Storage at the end of the Monsoon	1156	1180	1213	1274
3	Increase due to Monsoon	704	788	682	749
4	Average for 10 years(2002 – 2011)				
	(I) at the beginning of the monsoon				430.48
	(ii) at the end of the monsoon				1133.16
	(iii) increase in monsoon storage				702.68

The awareness among the public about the importance of the ground water has increased during the recent years. The need for ground water being felt by all sectors because of the shortage of surface water sources to mitigate the growing needs of the society. Recently the problems of decline in water table, contamination of ground water, sea water intrusion etc are being reported at many places. The shortage of rainfall in recent years and the increased utilization of ground water caused concern among the public that water may become scarce commodity in future. In order to assess the real situation of ground water conditions, it is very essential to monitor the ground water level and water quality over time and space. Central Ground Water Board monitoring water level and quality through a network of Ground Water Monitoring Wells distributed through out State. The monitoring started from the year 1969 for the nine monitoring wells and the number of monitoring wells was increased during the subsequent years and became 224 by the year 1979 and the number became 460 by the year 1988. Presently the total number of Ground Water Monitoring Wells (GWMWs) through out the Kerala State is 941. Water level is being monitored four times a year during January, April, August and November months and water quality is being monitored from the water samples collected from GWMWs during April.

Kerala State is a narrow stretch of land covering 38863 sq.km areas bordering the Lakshadweep Sea on the western side and Tamil Nadu and Karnataka States on the eastern side. 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 $8^0$18' and $12^0$48' East longitudes $74^0$52' and $77^0$22'.

The total number of GWMWs as on 31.3.2010 is 941. Out of these, 662 are dug wells tapping phreatic aquifers and 279 are bore wells / tube wells tapping deeper aquifers of confined/semi-confined nature. These GWMWs are spread over all the physiographic divisions of the State. About 62% of the GWMWs fall in the midland region, 18% in coastal plains, 15% in highlands and 5% in plateau region. Among the GWMWs tapping phreatic acquire, 65% are tapping laterite, 17% tapping weathers and fractured crystalline, 15% tapping coastal alluvium and 3% tapping reverie alluvium. The data of these GWMWs were analyzed to understand the depth to water level scenario in the State, annual fluctuation in the water levels due to the monsoon recharge, long term trend in water levels and the nature of the quality of ground water and the salient features are brought out in this report.

RIVERS

There are 41 west flowing rivers, most of them having their source in the Western Ghats and draining into the Arabian Sea. Some of these rivers have a portion of their catchments in the adjoining States of Karnataka and Tamil Nadu. In addition, there are three rivers which also originate from the Western Ghats, but they flow eastwards into the states of Karnataka and Tamil Nadu. The important rivers in the district are Neyyar, Karamana and Vamanapuram.

The Neyyar River

It is the southernmost river of Kerala State. It starts from Agastya Hills at about +1860m above M.S.L. The important tributaries are the Kallar and the Karavali Aar. The important streams are the Vandichira Thodu, the Kulathur Valiyathodu, the Maruthur Thodu, the Athiyanur Thodu, the Thalayil Thodu, The Kottukal Channel and the Venganur Thodu. The length of the river is 56km. The total drainage area of the basin is 497sq.km. During its course it passes through the villages of Ottsekharamangalam, Kulathummel, Maranalloor, Perunkadavila, Neyyattinkara, Chenkal and Kulathur. .

The Karamana River

The Karamana river has its origin in the Chemmunji Mottai and Agastyamalai of the Nedumangad Hills. The river is formed by the confluence of the Kavi Aar, the Atti Aar, the Vaiyapadi Aar and the Todai Aar. The Killi Aar which joins the Karamana river near Nadakara is its main tributary. The length of the river is 68km. It has a catchment area of 702sq.km lying entirely within the State. Thiruvananthapuram city, the capital of the State, lie in the basin.

The Vamanapuram River

It originates from the Chemunji Motai at about +1860m above M.S.L. The river has a length of 88km. with a drainage area of 687sq.km.which lies entirely within the State.

Source: ER, CGWD, PWD.

Table: 9.2

GROUND WATER STATISTICS THIRUVANANTHAPURAM 2008-09

Sl. No.	Assessment Unit	Command/ Non-Command/ Total	Recharge from rainfall during monsoon season	Recharge from other sources during monsoon season	Recharge from rainfall during non-monsoon season	Recharge from other sources during non-monsoon season	Total Annual Ground Water Recharge [(4)+(5)+(6)+(7)]	Provision for Natural Discharges	Net Annual Ground Water Availability [(8)-(9)]
1	2	3	4	5	6	7	8	9	10
1	Athiyannur	Non-command	1375.90	36.51	350.60	83.00	1846.02	184.60	1661.41
2	Chirayinkeezh	Non-command	1330.39	6.68	369.76	340.00	2046.82	102.34	1944.48
3	Kazhakkoottam	Non-command	1588.73	28.92	453.20	234.00	2304.85	115.24	2189.60
4	Kilimanoor	Non-command	1760.07	13.57	599.83	400.00	2773.47	138.67	2634.80
5	Nedumangad	Non-command	1301.64	8.07	497.52	123.00	1930.23	193.02	1737.20
6	Nemom	Non-command	1663.08	12.88	423.78	100.00	2199.74	219.97	1979.77
7	Parassala	Non-command	1317.57	45.31	335.74	152.55	1851.17	185.12	1666.05
8	Perumkadavila	Non-command	2294.69	26.39	877.09	850.00	4048.16	404.82	3643.35
9	Thiruvananthapuram Rural	Non-command	1826.04	15.80	581.42	75.20	2498.46	124.92	2373.53
10	Vamanapuram	Non-command	3562.95	26.06	1361.85	300.00	5250.85	525.09	4725.77
11	Varkala	Non-command	1371.82	16.95	367.11	200.00	1955.88	97.79	1858.09
12	Vellanad	Non-command	3147.24	37.56	1202.95	123.27	4511.03	451.10	4059.92
	Total (Ha.m)	**Non-command**	**22540.11**	**274.70**	**7420.85**	**2981.03**	**33216.68**	**2742.69**	**30473.99**
	Total (MCM)	**Non-command**	**225.40**	**2.75**	**74.21**	**29.81**	**332.17**	**27.43**	**304.74**

Table Continued……

Sl. No.	Assessment Unit	Command/ Non-Command/ Total	Existing Gross Ground Water Draft for irrigation	Existing Gross Ground Water Draft for domestic and industrial water supply	Existing Gross Ground Water Draft for All uses (11+12)	Provision for domestic and industrial requirement supply in 2025	Net Ground Water Availability for future irrigation development (10-11-14)	Stage of Ground Water Development [(13/10)* 100] (%)
1	2	3	11	12	13	14	15	16
1	Athiyannur	Non-command	464.86	974.93	1439.78	1092.78	103.78	86.66
2	Chirayinkeezh	Non-command	184.45	1051.34	1235.79	1178.36	581.67	63.55
3	Kazhakkoottam	Non-command	390.47	1036.88	1427.36	1159.83	639.30	65.19
4	Kilimanoor	Non-command	219.11	1106.57	1325.68	1240.37	1175.31	50.31
5	Nedumangad	Non-command	172.66	1046.76	1219.42	1173.34	391.21	70.19
6	Nemom	Non-command	198.78	1317.20	1515.97	1476.48	304.52	76.57
7	Parassala	Non-command	566.28	842.32	1408.61	944.18	155.59	84.55
8	Perumkadavila	Non-command	361.81	1259.75	1621.56	1412.08	1869.46	44.51
9	Thiruvananthapuram Rural	Non-command	329.74	1595.97	1925.72	1788.96	254.83	81.13
10	Vamanapuram	Non-command	364.72	1050.24	1414.96	1177.23	3183.82	29.94
11	Varkala	Non-command	236.65	935.56	1172.21	1048.69	572.75	63.09
12	Vellanad	Non-command	495.47	898.44	1393.91	1007.08	2557.38	34.33
	Total (Ha.m)	**Non-command**	**3984.99**	**13115.97**	**17100.97**	**14699.38**	**11789.61**	**56.12**
	Total (MCM)	**Non-command**	**39.85**	**131.16**	**171.01**	**146.99**	**117.90**	**56.12**

Source: Central Ground Water

Table: 9.3

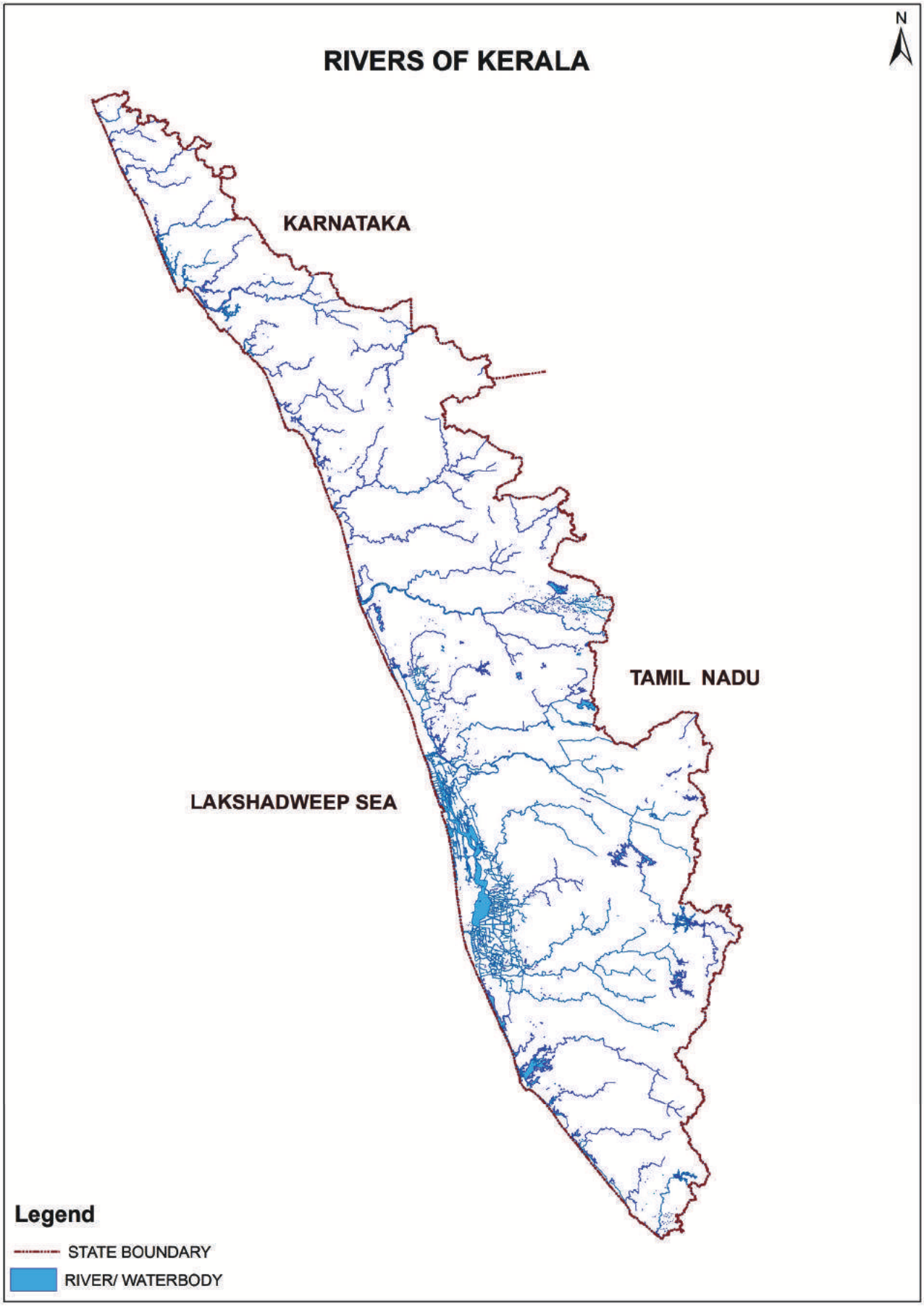
CHEMICAL ANALYSIS DATA OF WATER SAMPLES COLLECTED FROM GROUND WATER MONITORING WELLS DURING APRIL 2008

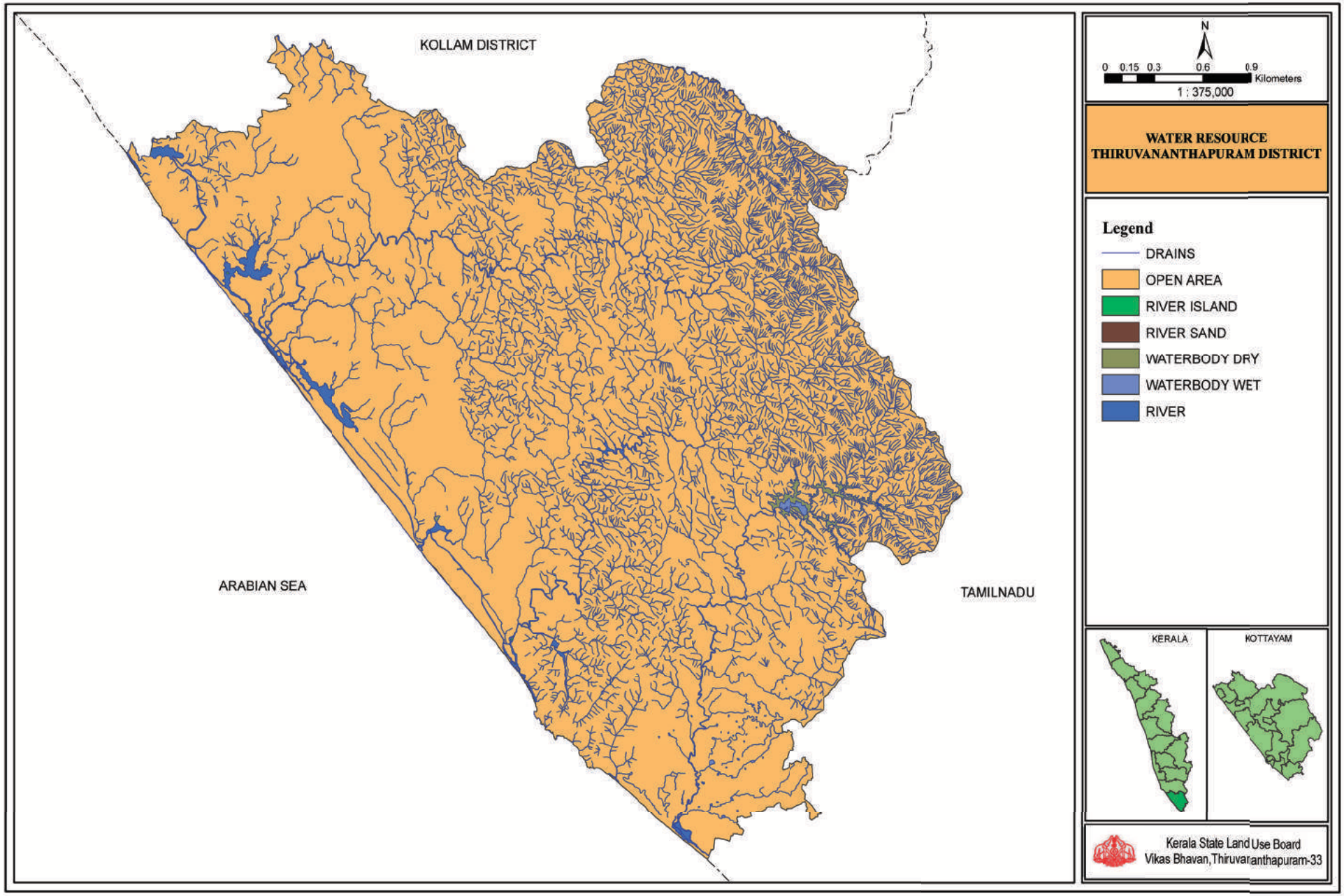
Sl. No	Location	pH	Ec in us/cm	TH as	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	NO_3
			25^0 C	Ca CO_3										
				……Conc. In mg/L……										
1	Amboori	8.04	102	14	4.8	0.49	12	0.9	0	15	0.91	16	0.16	16
2	Anjengo	-	165	30	12	0	14	0.9	-	-	18	16	0.28	3.8
3	Aruvikkara	8.17	90	18	4.8	1.5	7.4	2.6	0	20	4.1	17	0.19	1.1
4	Athazhamangalam	-	98	10	3.2	0.49	12	1.1	-	-	0.04	16	0.31	5.4
5	Attingal	-	327	46	15	1.9	40	1.4	-	-	3.9	74	0.26	6.2
6	Balaramapuram	-	776	105	30	7.2	60	56	-	-	58	146	0.34	43
7	Chirayankeezh	7.9	277	20	4	2.4	45	0.8	0	44	0.51	68	0.1	3.1
8	Chittagod	8.42	286	34	8.8	2.9	34	8.2	Tr	44	7.9	50	0.38	15
9	Edavai	7.83	501	50	16	2.4	69	5.2	0	30	8	96	0.35	68
10	Kadakkavur	7.91	427	108	26	11	27	3.7	0	34	49	64	0.3	26
11	Kallambalam	-	502	45	14	2.4	62	15	-	-	1.9	110	0.55	55
12	Kallar	8.02	58	14	4	1	4	1.4	0	20	1	7.1	0.12	1
13	Kallikkad	-	285	16	4	1.5	32	16	-	-	5.9	62	0.33	7.7
14	Kattakkada	-	369	64	18	4.9	34	14	-	-	0.15	68	0.31	26
15	Kazhakoottam	-	440	86	26	5.4	36	11	-	-	49	43	0.33	52
16	Kilimanoor	8.24	187	38	10	2.9	16	2.4	Tr	41	2.7	27	0.26	20
17	Kochuveli	7.01	395	148	54	2.9	9	2.5	0	17	134	13	0.27	3.5
18	Korani	-	173	22	8	0.5	13	2.3	-	-	4.5	26	0.14	6
19	Kulathur	8.33	111	26	8.8	1	10	1.2	Tr	41	2.4	11	0.15	Tr
20	Madavoor	8.28	88	6	1.6	0.5	9.2	5.2	Tr	15	0.18	14	0.19	7.7
21	Mannanthala	7.2	174	12	1.6	1.9	23	7	0	7.3	0.29	33	0.21	25
22	Maruthamala	-	120	22	5.6	1.9	10	5.8	-	-	3.5	16	0.17	12
23	Murukkumpuzha	8.77	167	48	14	3.4	11	2.5	4.8	61	11	13	0.21	2.5
24	Nagapuram	7.9	89	14	2.4	1.9	11	0.7	0	15	0.07	18	0.02	2.2
25	Nedumangad	-	152	10	3.2	0.49	19	5.9	-	-	0.18	28	0.35	1.6
26	Neyyattinkara	8.08	195	20	5.6	1.5	26	3.3	0	15	0	36	0.1	30

Table Continued……

27	Palode	7.56	165	24	7.2	1.5	14	7.4	0	15	4.6	20	0.16	29
28	Panavoor	-	95	20	5.6	1.5	8.7	4.2	-	-	2.8	14	0.1	5.2
29	Pangode	-	313	46	12	3.9	30	9.2	-	-	1.1	47	0.12	44
30	Parassala	8.38	991	160	38	16	114	30	12	159	26	199	0.22	5.4
31	Perumathura	8.67	370	98	28	6.8	23	6.1	48	52	-	48	-	2.9
32	Perumgur	7.52	178	8	1.6	1	24	9.3	0	17	3.8	40	0.23	7
33	Perumkadavila	8.27	73	8	1.6	1	8.1	3.4	0	17	0	11	0.39	3.2
34	Perumkuzhi	8.49	239	62	21	2.4	16	0.7	2.4	59	29	24	0.1	1.1
35	Pirappankod	7.46	59	4	1.6	0	6.9	3.8	0	9.8	0.11	8.5	0.26	8.1
36	Ponmudi	7.45	66	16	3.2	1.9	3.1	2.6	0	9.8	0	8.5	0.19	11
37	Poonthura	-	295	52	19	1	23	9.1	-	-	23	33	0.43	21
38	Poovar I (School)	9.02	240	100	22	11	102	16	6	73	32	149	0.26	27
39	Poovar II (H.C)	8.38	421	48	9.6	5.8	58	2.7	Tr	24	0.15	80	0.27	48
40	Pothenkod	6.7	119	16	4	1.5	13	2.6	0	9.8	0	18	0.11	24
41	Pozhiyoor	9.01	1768	240	28	41	288	39	18	122	124	427	0.46	12
42	Pudukuruchi	8.43	329	64	20	3.4	25	3.9	2.4	61	16	48	0.22	6.3
43	Sasthanthala	7.8	105	16	4	1.5	11	4.2	0	12	2.6	17	0.1	14
44	Thonnakkal	7.39	130	20	4.8	1.9	13	1	0	4.9	0.29	20	0.23	28
45	Trivandrum Club	8.09	235	30	7.2	2.9	26	4.5	0	20	1.9	36	0.23	31
46	Vamanapuram	8.61	318	54	16	3.4	22	17	4.8	63	18	41	0.22	7
47	Varkala	5.25	154	20	4.8	1.9	16	2.2	0	4.9	2.1	30	0.23	21
48	Veiynoor	7.86	325	14	4.8	0.49	45	0.3	0	17	1	57	0.19	55
49	Vellanad	7.36	46	12	3.2	1	3.1	1.2	0	12	0.15	2.7	012	3.3
50	Vellarada	8.19	467	72	22	3.9	45	19	0	34	18	72	0.26	56
51	Vellayani	-	96	10	3.2	0.5	12	2.1	-	-	0	20	0.18	4.3
52	Venpakal	-	131	32	10	1.5	11	3.3	-	-	0.15	8.5	0.62	1.6
53	Vidura	6.88	145	30	8.8	1.9	11	2.1	0	9.8	2.9	16	0.17	39

Source: Central Ground Water Department


RIVERS OF KERALA
N
KARNATAKA
TAMIL NADU
LAKSHADWEEP SEA
Legend
STATE BOUNDARY
RIVER/ WATERBODY


KOLLAM DISTRICT
ARABIAN SEA
TAMILNADU
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 375,000
WATER RESOURCE
THIRUVANANTHAPURAM DISTRICT
Legend
DRAINS
OPEN AREA
RIVER ISLAND
RIVER SAND
WATERBODY DRY
WATERBODY WET
RIVER
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

MINERALS

The availability of minerals determines the pace of economic development of a State to a great extent. Minerals are basically natural resources. Kerala State is endowed with a number of occurrences/deposits of minerals such as Heavy Mineral Sands (llmenite, Rutile, Zircon, Monazite, Sillimanite), Gold, Iron Ore, Bauxite, Graphite, China Clay, Fire Clay, Tile and Brick Clay, Silica Sand, Lignite, Limestone, Limeshell, Dimension Stone (Granite), Gemstones, Magnesite and Steatite etc. However mining activities on large scale are confined mainly to a few minerals-Heavy Mineral Sands, China Clay and to a lesser extent Limestone/Limeshell, Silica Sand and Granite. In fact, Heavy Mineral Sand and China Clay contribute more than 90% of the total value of mineral production in the State.

Kerala is rich and well known for its scenic beauty, but the land is relatively poor in natural resources. Though Kerala has a variety of mineral deposits, they are not plenteous. The sandy beaches of Kerala contain Ilmenite, the main ore of titanium and rutile (titanium oxide). There are extensive deposits of white clay and commercially valuable deposits of graphite, lignite (brown coal), limestone and mica in Kerala. Kerala's monazite, magnetite, sillimanite and zircon deposits are largely undeveloped. Apart from this the beach sand of Kerala is rich in radio active elements. Various places of Thiruvananthapuram district have rich deposits of white clay. In Andoorkonam village, areas of Azhoor village of Chirayinkeezhu taluk and Marthandamkuzhi the detailed investigation for establishing china clay reserves was continued. Thiruvananthapuram district have abundant deposits of graphite. Being a multipurpose mineral, graphite is used in making a variety of products.

Bauxite occurs in close association with laterite all along the west coast of the State. Traces of bauxite are seen in almost all laterite cappings. But bauxite deposits of economic significance in south Kerala are a few and are located at Mangalapuram, Chilambil, Sasthavattom and Attipra areas of Thiruvananthapuram district. China clay (kaolin) consisting dominantly of kaolinite is one of the most sophisticated industrial minerals with a host of applications, viz, in ceramics, refractories, paper coating, filler for rubber, insecticides, cement, paint, textiles, fertilizers and others including abrasives,

asbestos products, fiberglass, chemicals, cosmetics, pharmaceuticals, electrical ware, foundry and glass.

The flake type of graphite is extensive in occurrence in Thiruvananthapuram, district which has been studied by Geological Survey of India and is quite akin to the celebrated flaky graphite mined in the Malagasy Republic. Graphite occurs in nature in the form of vein, dissemination (flaky) and amorphous variety. The graphite occurs as thin flakes distributed more or less evenly in the rock constituting on an average about 5-10% of the bulk of the rock. A number of industries in Kerala dependant on the available minerals for their production. Products of these industries include aluminium, cement, ceramics, chemicals, electrical equipment, glass, pencil etc.

Table: 10.1

INVENTORY OF THE MINERAL RESOURCES OF THE STATE

Sl. No.	Name of Mineral	Location	Est. reserves (in Million Tonnes)	Remarks
1	Mineral Sand	Chavara-Kayamkulam Sector, Kollam Dist. North of Kayamkulam Pozhi-Thottappalli, Alappuzha Dist.	127.00* 17.00	Total Heavy mineral Estimated Reserve
2	Gold Primary Gold	Maruda, Nilambur, Malappuram Dist., Kappil, Nilambur, Malappuram Dist., Pattumala, Attapady, Kottathara, Palakkad Dist.	0.55 0.0613 0.08 0.0067	4 g/t 4.1 g/t 12.98 g/t 14.99 g/t
3	Placer Gold	Punnapuzha and Chaliyarpuzha, Nilambur, Malappuram Dist.	30 m cu.m. 2.5 m cu.m.	0.07 g/m^3 0.1 g/m^3
4	Iron ore	Kozhikode & Malappuram Dists.	84.00	Magnetite Oxidised: 39.0 MMT Unoxidised 45.0 MMT Fe 32.0 - 41.0%
5	**Bauxite**	Kannur & Kasargod Dists. Kollam & Thiruvananthapuram Dists.	10.16 2.65*	Metallurgical grade 5.2 MMT
6	**Graphite**	Thiruvananthapuram, Kollam, Kottayam & Ernakulam Dists.	2.81	5% to 25 % Fixed Carbon
7	**China Clay**	Thiruvananthapuram, Kollam, Kannur & Kasargod Dists.	172.00*	Probable : 80 Possible : 92
8	**Ball Clay**	Thiruvananthapuram, Kollam, Kannur & Kasargod Dists.	5.67	Inferred Reserve

Table Continued…….

Sl. No.	Name of Mineral	Location	Est. reserves (in Million Tonnes)	Remarks
9	Fire Clay	Kollam, Alappuzha, Ernakulam, Thrissur & Kannur Dists.	11.50	Inferred Reserve
10	Silica Sand	Cherthala, Alappuzha Dists.	28.40	Mineable Resources Glass Sands - High SiO_2 Recently assessed
11	Lignite	Madayi, Kannur Dist., Nileswaram, Kadamkottumala & Kayyur, Kasargod Dist.	5.60 2.50 1.00 0.55	
12	Limestone	Pandarathu, Walayar, Palakkad Dist.	24.00*	15-20% only available now
13	Lime Shell	Vembanad lake & adjacent areas Alappuzha & Kottayam Dists. Coastal tracts of Kannur, Kasaragod Dist.& Estuaries of Periyar and Kadalundi puzha Kozhikode Dist.	4.05	Chemical grade
14	Magnesite	Salayoor, Mulli, Palakkad Dist.	0.037*	
15	Talc/Steatite	Kozhikode & Kannur Dists.	7.94	Inferred Reserve

*These are the estimated reserves as mining is in progress for the minerals since a time it is required to arrive at present availability.

Source: - Department of Mining & Geology.

Table: 10.2

NUMBER OF QUARRYING PERMITS IN FORCE AS ON 31.3.2004

Sl. No.	District	Granite Building Stone	Late rite	Brick Clay	River Sand	Ordinary Sand	Lime Shell	Total
1	**Thiruvananthapuram**	**81**	**2**			**2**		**85**
2	Kollam	94		17		2		113
3	Alappuzha			8	13		4	25
4	Pathanamthitta	113	2	6		3		124
5	Kottayam	77	6	1		193		277
6	Idukki	93				7		100
7	Ernakulam	92	2	41	6			141
8	Thrissur	36	8		7			51
9	Palakkad	167	14	1		6		188
10	Malappuram	317						317
11	Kozhikode	88	25	3		1		117
12	Kannur	106	139		1			246
13	Wayanad	108		33		7		148
14	Kasargod	81	137		6	35		259
	Total	**1453**	**335**	**110**	**33**	**256**	**4**	**2191**

Table: 10.3

QUARRYING LEASES FOR 2003-2004 AS ON 31.3.2004

Sl. No.	District	Granite Building Stone	Lime shell	Sea shell	Granite Dimension Stone	Brick Clay	Total
1	**Thiruvananthapuram**	**55**			**35**		**90**
2	Kollam	3					3
3	Alappuzha		1	1			2
4	Pathanamthitta	31					31
5	Kottayam	28	1				29
6	Idukki	13					13
7	Ernakulam	38					38
8	Thrissur	24					24
9	Palakkad	17			2		19
10	Malappuram	26					26
11	Kozhikode	35					35
12	Kannur	14					14
13	Wayanad	6					6
14	Kasargod	1					1
	Total	**291**	**2**	**1**	**37**		**331**

Source : State Mining &Geology Department

Table: 10.4

NUMBER OF MINING LEASES IN THE DISTRICTS OF KERALA AS ON 31.3.2004

Sl. No	Name of Minerals	**Thiruvananthapuram**	Kollam	Pathanamthitta	Alappuzha	Kottayam	Idukki	Ernakulam	Thrissur	Palakkad	Malappuram	Kozhikode	Wayanad	Kannur	Kasargod	Total
1	Bauxite		3													3
2	China Clay	**34**	5											2	1	**42**
3	China Clay, Ball Clay, Fire Clay		1													1
4	Limeshell				6	2										8
5	Limestone									1						1
6	Graphite	**1**														1
7	Mineral Sands		3													3
8	Silica Sands				21											21
9	Quartz												4			4
10	Laterite													1		1
	Total	**35**	**12**		**27**	**2**				**1**			**4**	**3**	**1**	**85**

Source : State Mining &Geology Department

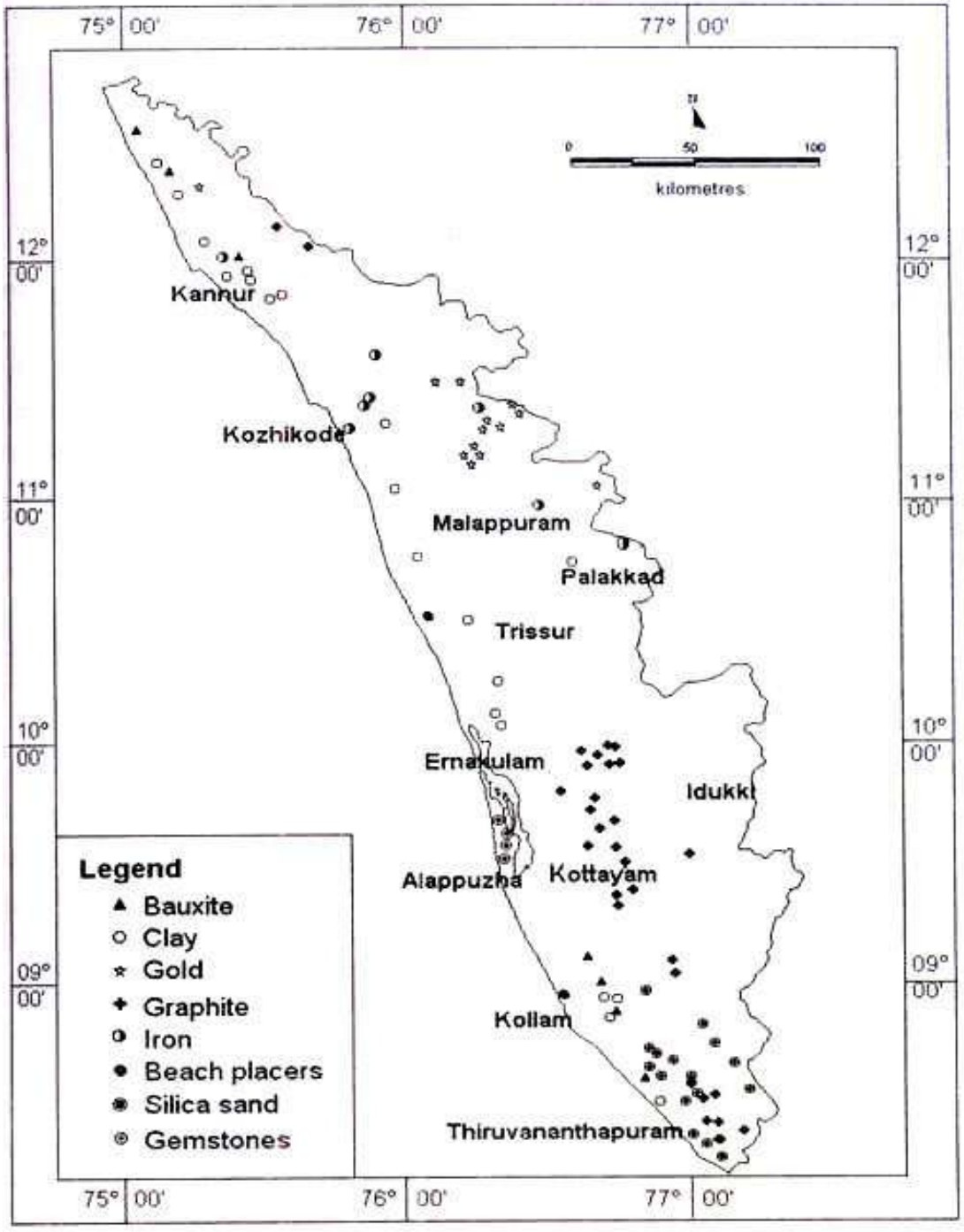
Table: 10.5

MINERAL PRODUCTION IN KERALA, 2008-09 TO 2010-11 (Excluding Atomic Minerals)

District	Unit	2008-09			2009-10			2010-11		
		Mine	Quantity	Value	Mine	Quantity	Value	Mine	Quantity	Value
All Minerals		32		9539218	30		12114392	28		12055832
Kaolin	t	16	587222	258656	15	698915	214303	15	672438	182660
Kannur	t	2	7653	18283	2	7523	26078	2	8098	15790
Kasargode	t	1	769	1538	1	1290	4767	1	822	1644
Kollam	t	1	88676	108924	2	14078	2494	2	28650	4701
Thiruvananthapuram	**t**	**12**	**490124**	**129911**	**10**	**676024**	**180964**	**10**	**634868**	**160525**
Sillimanite	t	1	10423	91504	1	7939	75460	1	8315	89989
Kollam	t	1	10423	91504	1	7939	75460	1	8315	89989
Laterite	t	4	77327	21410	4	69171	15322	3	89665	28466
Alappuzha	t	1	12200	2293	1	15650	2942	1	22000	7034
Kannur	t	2	10950	1745	2	9142	1372	1	10294	3037
Kasargode	t	1	53275	17101	1	43447	10775	1	57082	18324
Thiruvananthapuram	**t**	**-**	**902**	**271**	**-**	**932**	**233**	**-**	**289**	**71**
Limestone	'000t	1	535	165864	1	533	169645	1	529	128354
Palakkad	'000t	1	535	165864	1	533	169645	1	529	128354
Limeshell	t	2	40079	41834	2	22335	25511	2	18468	21439
Kottayam	t	2	40079	41834	2	22335	25511	2	18468	21439
Silica Sand	t	8	46965	17112	7	33988	20220	6	14215	10993
Alappuzha	t	8	46965	17112	7	33988	20220	6	14215	10993
Minor Minerals		-	-	8942838	-	-	11593931	-	-	11593931
All Districts		-	-	8942838	-	-	11593931	-	-	11593931

Source: Indian Bureau of Mines, Nagpore

Mineral reserves (2000-01)



Mineral map of Kerala (After Dept. of Mining and Geology, 2005)

Source: www. Kerenvis.nic.in

LAND USE

The spatial information on land use/land cover and their pattern of change is essential for planning, utilization and management of the country's land resources. Land use/land cover inventories are assuming increasing importance in various resource sectors like agriculture planning, settlement and cadastral surveys, environmental studies and operational planning based on agro-climatic zones. Information on land use/ land cover permits a better understanding of the land utilization aspects on cropping pattern, fallow land, forest and grazing land, wasteland, surface water bodies etc., which is very vital for developmental planning. Further the draft outline of the National land Use Policy having strongly re-iterated the main thrust and strategy on "Optimum Land Use Planning" for sustained efforts and economic returns, up to date information on the nature, distribution and extent of land use/land cover will be of great relevance. Space remote sensing with its wider scope, rapid and repetitive coverage capabilities, can provide highly reliable and accurate estimate on the various resources.

Realising its importance, land use mapping on 1:250,000 scales was envisaged for the entire country using satellite data by Department of Space in 1986 as a part of Remote Sensing Application Mission Project. The study enabled to arrive at a Nationwide Land use/Land cover classification system.

Subsequently, the Government of Kerala felt the need for having up to date information for the whole State on agriculture and other land use categories and their estimate for agro-climate zone planning in 1:50,000 scale. The work undertaken by the Board, involves preparation of land use maps on 1:50,000 scale for 14 districts through digital techniques.

The Kerala State Land Use Board was entrusted with the task of preparing the Land use/land cover maps of State, by interpretation of satellite imagery. Standard False Color Composite (FCC) generated on 1:12,500 scale of IRS (LISS-IV) was interpreted for identification of different Land use/Land cover classes, based on the image characteristics like tone, size, shape, pattern, texture, location, association etc. by developing a detailed interpretation key for each district.

Multi-date imaginary was essentially interpreted to identify and map the details of crop land in Viruppu and Mundakan seasons the area under double crop, fallow lands and for better boundary delineation of boundaries of the other land use/land cover classes. Ancillary data like topographical maps and other thematic maps of the district was also used for the interpretation.

METHODOLOGY

The methodology is essentially digital interpretation of IRS-1C (LISS - IV) geo-coded image (FCC) for identification of different categories of land use/land cover using standard visual image interpretation techniques which is based on interpretation elements such as tone, texture, shape, size, etc. supplemented by the local knowledge of the interpreter. Other ancillary data like topographical maps and

any other available information will be used for identification and mapping of land use/land cover. The interpreted details are to be verified on the ground in order to rectify the doubtful areas, and based on the ground verification, the wasteland boundaries (interpreted details) are to be finalized.

The geographical area under different land use/land cover categories was then computed and expressed as simple percentage to the total geographical area of each district.

Land Use/Land Cover Categories and their Spatial Distribution of Thiruvananthapuram

Land use refers to man's activities and the various use which are carried on land. Land cover refers to, "natural vegetation, water bodies, rock/soil, artificial cover and others resulting due to land transformations".

A brief description of the major land use/land cover categories observed in the Thiruvananthapuram district and their spatial distribution is given below:

i) Built up Land

It is defined as an area of human habitation developed due to non-agricultural use and that which has a cover of buildings, transport, and communication, utilities in association with water, vegetation and vacant lands. An area 18571 ha accounting for 8.48 per cent of the total geographical area is estimated under this category.

ii) Agricultural Land

It is defined as the land primarily used for farming and for production of food, fibre and other commercial and horticultural crops. It includes land under crops (irrigated and unirrigated), fallow land and plantation area under agricultural tree crops planted adopting certain agricultural management techniques. This is the major category occupying an area of 145146 ha. accounting for 66.25 per cent of the total geographical area. Of these, the paddy area covers an area of 3696 ha. Nearly 5722 ha of paddy area has been converted to other land uses. The coconut dominant mixed crop which covers an area of 79392 ha is the major land use identified under this category.

iii) Forest

It is an area bearing an association predominantly of trees and other vegetation types capable of producing timber and other forest produce. It includes notified forests, private forests and vested forests, of which only the notified forests possess territorial boundaries. The other categories do not have any demarcation in the ground as well as in the concerned toposheets. This category includes Evergreen/Semi-evergreen and Deciduous forests, degraded forests where the vegetative (crown) density is less than 20% of the canopy cover, forest blanks described as openings amidst forests without any tree cover and forest plantations of trees of forestry importance and raised on forest lands. This category accounts for 43272 ha, which is 19.75 per cent of the total geographical area.

iv) Waste lands

It is described as degraded land which can be brought under vegetative cover with reasonable efforts and which is currently under utilized and land which is deteriorating due to lack of appropriate water and soil management or on account of natural causes. The three major classes in the category are; a) Land with or without scrub which occupy higher topography like uplands or high grounds with or without scrub, generally prone to degradation or erosion b) underutilized / degraded notified forest – scrub dominated and c) barren rocky/ stony waste/ sheet rock area which are rock exposures of varying lithology and devoid of soil cover and vegetation. They occur amidst hill forests as opening or scattered as isolated exporures or loose fragments of boulders or as sheet rocks on plateau and plains. The waste lands occupy an area of 8485 ha accounting for 3.87 percent of the total geographical area.

v) Water bodies

It is an area of impounded water, area in extent and often with a regulated flow of water. It includes manmade reservoirs/lakes/tanks/canals, besides natural lakes, rivers/streams and creeks. The water bodies mapped occupy an area of 3609 ha accounting for 1.65 percent of the total geographical area.

The land use/land cover categories identified and mapped in the district is furnished in the table below:

Table: 11.1

LAND USE / LAND COVER CATEGORIES-THIRUVANANTHAPURAM

Sl. No.	Category	Area (Sq.Km.)	Percentage
1	Built up land (urban) -residential	8.12	0.37
2	Built up land (urban) - commercial	35.63	1.63
3	Built up land (urban) - beaches	4.96	0.23
4	Built up land (urban) - mixed builtup	21.55	0.98
5	Built up land (rural) - residential	60.23	2.75
6	Built up land (rural) - mixed builtup	55.22	2.52
7	Paddy - viruppu + mundakan	36.96	1.69
8	Paddy reclaimed coconut	42.92	1.96
9	Paddy reclaimed mixed crop	1.12	0.05
10	Paddy reclaimed banana	11.46	0.52
11	Paddy reclaimed residential area	1.72	0.08
12	Tea	5.23	0.24
13	Rubber	127.84	5.84

14	Coconut	28.6	1.31
15	Teak	9.53	0.43
16	Mixed crop	386.95	17.66
17	Coconut dominant mixed crop	793.92	36.24
18	Agriculture farm	0.57	0.03
19	Agriculture farm (orchards)	2.83	0.13
20	Banana	1.81	0.08
21	Semi evergreen/Evergreen - Dense mixed forest	345.61	15.78
22	Semi evergreen/Evergreen - Dense mixed forest (Reserve Forest)	4.02	0.18
23	Semi evergreen/Evergreen - Open mixed forest mainly bamboo (Reserve Forest)	0.68	0.03
24	Deciduous - Dense mixed forest mainly rubber	0.22	0.01
25	Deciduous - Open mixed forest	0.57	0.03
26	Deciduous - Scrub forest	66.44	3.03
27	Forest plantation - Eucalyptus	11.28	0.51
28	Forest plantation - Eucalyptus (Reserve Forest)	3.33	0.15
29	Forest plantation - Rubber (Reserve Forest)	0.27	0.01
30	Grass land	0.3	0.01
31	Land with scrub	16.08	0.73
32	Land without scrub	0.57	0.03
33	Mining/Industrial wastelands	0.77	0.04
34	Barren rocky/sheet rock area	15.77	0.72
35	Degraded land under plantation crop (Tea)	6.19	0.28
36	Degraded land under plantation crop (Teak)	0.53	0.02
37	Degraded land under plantation crop (Rubber)	12.52	0.57
38	Degraded land under plantation crop (Cashew)	0.27	0.01
39	Degraded land under plantation crop (Eucalyptus)	4.93	0.23
40	Underutilised/degraded notified forest	16.89	0.77
41	Flood plain	0.02	0
42	Coastal sand	10.2	0.47
43	Sands/riverine	0.11	0.01
44	Water bodies	36.09	1.65
	Total	**2190.83**	**100**

Table:11.2

ATHIYANOOR BLOCK

(Area in Ha)

Sl. No.	Land Use	Athiyannoor	Kanjiramkulam	Karumkulam	Kottukal	Venganoor
1	Agriculture plantation (Rubber)	1058.05	0.00	0.00	0.00	0.00
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	0.00	717.12	650.14	957.39	1027.72
9	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.06
10	Built-up(Cities/Town/Villages)	0.00	10.11	0.23	0.00	6.23
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	126.35	19.33	0.00	45.51	29.71
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	0.00	0.00	0.00	0.00	0.00
20	River/waterbodies	2.86	1.10	4.20	1.86	65.19
21	Grass land	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	7.89	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1187.25**	**747.66**	**654.57**	**1012.66**	**1128.91**
	Block Total	**4731.04**				

Table:11.3

CHIRAYINKEEZHU BLOCK

(Area in Ha)

Sl. No.	Land Use	Anchuthengu	Chirayinkeezhu	Kadakkavoor	Kizhuvilam	Mudakkal	Vakkam
1	Agriculture plantation (Rubber)	0.00	0.00	0.00	0.00	223.90	0.00
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	70.50	94.33	0.00	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	188.19	543.49	297.19	1436.38	2312.03	1174.30
9	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.65	0.00
10	Built-up(Cities/Town/Villages)	0.00	28.77	21.86	0.00	0.00	0.00
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.28	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	0.00	15.78	0.00	245.01	121.94	126.63
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	0.00	0.00	0.00	0.00	1.44	0.00
20	River/waterbodies	33.66	149.97	17.72	35.16	9.01	133.48
21	Grass land	1.62	40.47	0.40	0.00	0.00	3.76
22	Sandy area	0.00	0.00	0.00	0.00	0.00	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**293.97**	**872.82**	**337.45**	**1716.56**	**2668.97**	**1438.16**
	Block Total	**7327.92**					

Table: 11.4

KILIMANOOR BLOCK

(Area in Ha.)

Sl. No.	Land Use	Karavaram	Kilimanoor	Madavoor	Nagaroor	Navayikkulam	Pallickal	Pazhaya kunnummel	Pulimathu
1	Agriculture plantation (Rubber)	60.78	42.74	215.18	70.22	0.00	8.07	83.69	165.04
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	2054.95	1651.25	1474.38	1978.53	2738.82	1505.71	2196.07	2457.57
9	Barrenrock/Stonywaste/Sheetrock	0.00	1.85	0.00	0.00	0.00	2.97	0.00	0.00
10	Built-up(Cities/Town/Villages)	0.00	11.62	0.00	0.00	0.00	0.00	0.00	0.00
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	207.93	119.71	106.20	175.84	220.78	136.06	59.99	133.41
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.28
19	Land without scrub	0.00	17.30	0.00	0.00	0.00	0.00	86.35	43.87
20	River/waterbodies	6.00	0.74	3.93	12.25	0.46	14.66	0.00	30.64
21	Grass land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2329.66**	**1845.22**	**1799.70**	**2236.83**	**2960.06**	**1667.46**	**2426.10**	**2853.80**
	Block Total	**18118.84**							

Table: 11.5

NEDUMANGADU BLOCK

(Area in Ha)

Sl. No.	Land Use	Anad	Aruvikkara	Karakulam	Panavoor	Vembayam
1	Agriculture plantation (Rubber)	519.25	221.56	135.68	709.13	507.70
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	1955.40	1682.65	2188.76	2214.02	2374.98
9	Barrenrock/Stonywaste/Sheetrock	3.74	4.19	0.00	1.53	0.00
10	Built-up(Cities/Town/Villages)	0.00	0.00	19.77	0.00	13.99
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	64.93	16.99	23.08	0.00	6.38
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	1.49	0.00
18	Land with scrub	0.00	26.55	0.00	0.00	0.00
19	Land without scrub	9.62	72.34	33.16	5.98	62.57
20	River/waterbodies	0.00	52.75	0.00	11.45	0.00
21	Grass land	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2552.94**	**2077.03**	**2400.45**	**2943.59**	**2965.63**
	Block Total	**12939.64**				

Table: 11.6

NEMOM BLOCK

(Area in Ha)

Sl. No.	Land Use	Balaramapuram	Kalliyoor	Malayinkeezhu	Maranalloor	Pallichal	Vilappil	Vilavoorkkal
1	Agriculture plantation (Rubber)	0.00	0.00	18.46	0.00	250.19	261.05	0.00
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	949.90	1264.54	1779.75	2350.26	1830.56	1823.93	1019.82
9	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	118.22	3.27	7.81	0.00
10	Built-up(Cities/Town/Villages)	19.72	47.38	0.00	0.00	0.00	0.00	0.00
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	22.15	52.14	0.00	0.00	23.75	54.80	0.00
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	0.00	0.00	0.00	1.96	0.00	0.18	0.00
20	River/waterbodies	2.67	203.49	2.45	16.29	0.89	20.56	22.33
21	Grass land	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00	0.00	2.15
23	Sewage farm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**994.43**	**1567.55**	**1800.65**	**2486.73**	**2108.66**	**2168.33**	**1044.29**
	Block Total	**12170.64**						

Table: 11.7

PARASSALA BLOCK

(Area in Ha)

Sl. No.	Land Use	Chenkal	Karode	Kulathoor	Parassala	Poovar	Thripuram
1	Agriculture plantation (Rubber)	53.56	13.96	0.00	35.93	0.00	0.00
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	1692.65	1370.82	1022.37	1667.61	828.69	665.96
9	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.00	0.00
10	Built-up(Cities/Town/Villages)	0.00	0.00	0.00	35.54	75.30	0.00
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	19.43	0.00	0.02	0.00	0.00
13	Doublecrop(Kharif+Rabi)	280.42	79.41	121.04	244.43	55.05	26.40
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	0.00	0.00	0.00	0.00	0.00	0.00
20	River/waterbodies	35.39	11.27	84.37	8.68	54.60	8.16
21	Grass land	0.00	0.00	0.00	0.00	0.72	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2062.02**	**1494.88**	**1227.78**	**1992.21**	**1014.37**	**700.52**
	Block Total	**8491.78**					

Table: 11.8

PERUNKADAVILA BLOCK

(Area in Ha)

Sl. No.	Land Use	Amboori	Aryancode	Kallikkad	Kollayil	Kunnathukal	Ottasekhara mangalam	Perunkada vila	Vellarada
1	Agriculture plantation (Rubber)	318.36	245.32	409.60	23.86	163.85	158.38	200.05	279.20
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	39.02	0.00	30.27	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	2884.91	2113.41	670.74	1184.60	2067.98	1698.66	1451.44	2147.86
9	Barrenrock/Stonywaste/Sheetrock	21.14	38.28	14.71	0.00	23.78	0.15	9.65	0.00
10	Built-up(Cities/Town/Villages)	37.52	17.65	71.82	0.00	0.00	30.33	0.00	36.53
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	25.79	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	0.00	4.02	0.00	133.76	35.94	3.10	76.89	0.00
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	558.11	0.00	9989.67	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	15.68	0.00	105.84	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	363.27	0.00	140.09	0.00	32.61	48.49	17.83	32.18
20	River/waterbodies	166.60	16.19	584.83	5.29	1.14	17.69	6.04	0.00
21	Grass land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**4404.61**	**2434.86**	**12043.37**	**1347.50**	**2325.31**	**1956.79**	**1761.91**	**2495.77**
	Block Total	**28770.12**							

Table: 11.9

POTHENCODE BLOCK

(Area in Ha)

Sl. No.	Land Use	Andoorkkonam	Azhoor	Kadinamkulam	Mangalapuram	Pothencode
1	Agriculture plantation (Rubber)	127.02	0.00	0.00	81.91	65.78
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	1.67	1259.31	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	1260.59	1163.31	393.87	1993.55	2270.81
9	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.00
10	Built-up(Cities/Town/Villages)	0.00	0.00	0.00	0.00	61.38
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	118.65	11.69	45.71	52.53	2.05
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	12.96
16	Forest Evergreen(Open)	0.00	0.00	0.00	20.66	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	33.39	0.00	0.00	0.00	67.15
20	River/waterbodies	0.78	76.04	316.64	56.91	0.00
21	Grass land	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1540.42**	**1252.71**	**2015.52**	**2205.57**	**2480.13**
	Block Total	**9494.35**				

Table: 11.10

VAMANAPURAM BLOCK

(Area in Ha.)

Sl. No.	Land Use	Kallara	Manikkal	Nanniyode	Nellanadu	Pangode	Peringammala	Pullampara	Vamana puram
1	Agriculture plantation (Rubber)	112.72	347.15	633.27	116.84	200.87	366.57	516.23	85.29
2	Agriculture plantation (Banana)	0.11	0.00	0.00	0.00	0.00	725.39	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	44.18	24.94	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	1404.66	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	3192.38	2697.23	2702.81	1567.78	2869.91	2781.22	1838.99	1541.04
9	Barrenrock/Stonywaste/Sheetrock	0.00	3.62	0.00	0.27	0.00	7.76	3.40	21.68
10	Built-up(Cities/Town/Villages)	0.00	0.00	0.00	40.36	18.17	47.83	12.40	0.00
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	88.13	44.43	0.00	35.37	105.40	0.25	0.00	27.67
14	Forest Deciduous(Dense)	0.00	0.00	222.88	0.00	0.00	110.99	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	15969.96	0.00	0.00
17	Forest plantations	0.00	0.00	226.12	0.00	0.00	387.59	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	6.10	426.94	0.00	0.00
19	Land without scrub	0.00	6.35	0.00	43.25	2.56	75.32	34.77	0.00
20	River/waterbodies	6.12	0.00	399.25	1.73	0.00	100.03	29.38	24.57
21	Grass land	0.00	0.00	0.00	0.00	0.00	358.17	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3399.46**	**3098.77**	**4184.34**	**1805.61**	**3247.20**	**22787.62**	**2435.18**	**1700.25**
	Block Total	**42658.42**							

Table: 11.11

VARKALA BLOCK

(Area in Ha.)

Sl. No.	Land Use	Chemmaruthi	Cherunniyur	Edava	Elakamon	Manampoor	Ottoor	Vettoor
1	Agriculture plantation (Rubber)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	2.08	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	2.05	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	1607.77	1008.28	651.84	1517.62	1166.12	899.72	495.65
9	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Built-up(Cities/Town/Villages)	0.00	0.00	36.29	1.44	0.00	0.00	0.00
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	144.27	62.46	0.04	84.69	41.81	75.71	0.00
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.43	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	0.95	0.00	0.00	5.01	0.00	0.00	0.00
20	River/waterbodies	0.00	19.66	26.29	173.86	305.78	0.00	25.89
21	Grass land	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1752.99**	**1090.40**	**714.46**	**1786.75**	**1513.71**	**975.85**	**521.55**
	Block Total	**8355.70**						

Table: 11.12

VELLANADU BLOCK

(Area in Ha.)

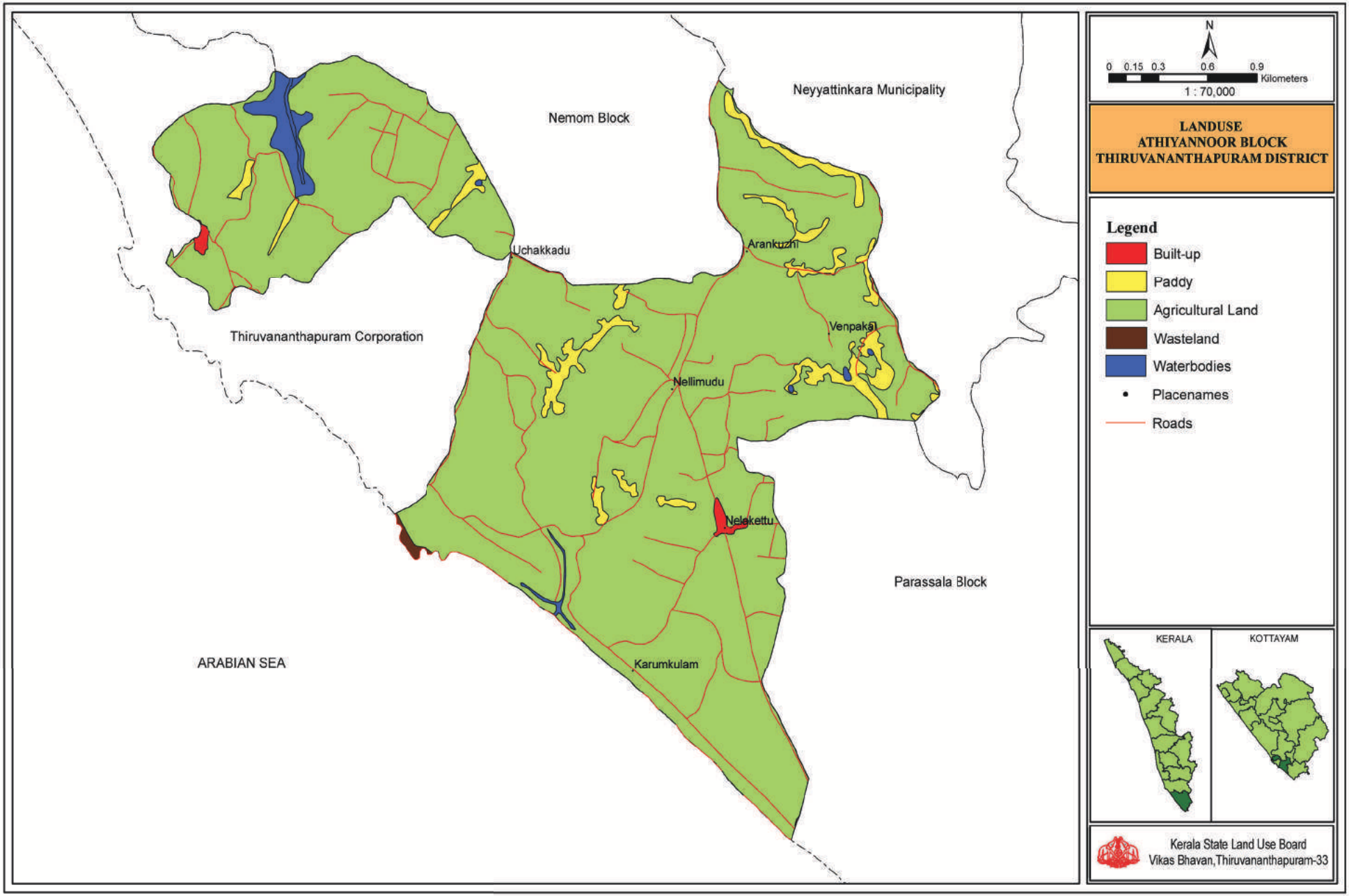
Sl. No.	Land Use	Aryanad	Kattakada	Kuttichal	Poovachal	Tholi kkode	Uzhamala ckal	Vellanadu	Vithura
1	Agriculture plantation (Rubber)	181.38	129.35	415.88	489.36	138.74	10.73	43.54	870.81
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Tea)	1.70	0.00	0.00	0.00	0.00	0.00	0.00	521.82
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Mixed)	2035.20	1954.91	1442.97	2530.14	2383.00	1783.48	2041.56	2523.34
9	Barrenrock/Stonywaste/Sheetrock	16.09	0.00	11.43	0.90	0.00	46.51	22.47	9.83
10	Built-up(Cities/Town/Villages)	112.92	0.00	115.10	0.00	0.00	0.00	0.00	72.50
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	5.59	0.00	0.00	14.72	26.96	4.89	33.33	29.83
14	Forest Deciduous(Dense)	29.80	0.00	0.00	0.00	487.18	12.02	0.00	378.11
15	Forest Evergreen(Dense)	5523.33	0.00	3617.15	0.00	0.00	0.00	0.00	6580.42
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	287.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	0.00	0.00	0.00	23.31	0.00	0.00	23.36	0.00
20	River/waterbodies	603.08	14.94	1.21	2.25	0.00	15.70	54.49	122.01
21	Grass land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00
23	Sewage farm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**8796.19**	**2099.20**	**5603.74**	**3060.70**	**3035.88**	**1873.34**	**2219.24**	**11108.66**
	Block Total	**37796.95**							

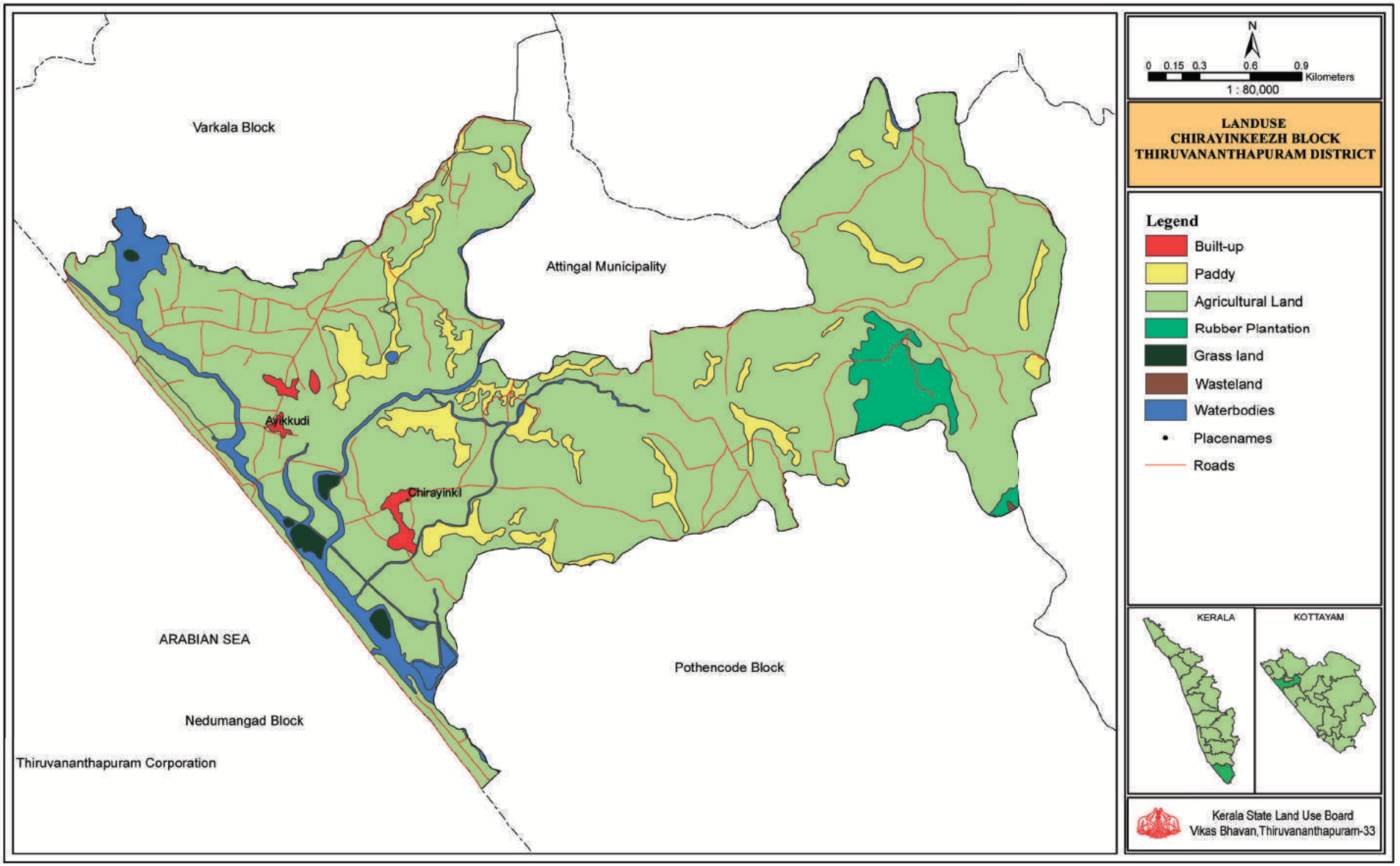
Table: 11.13

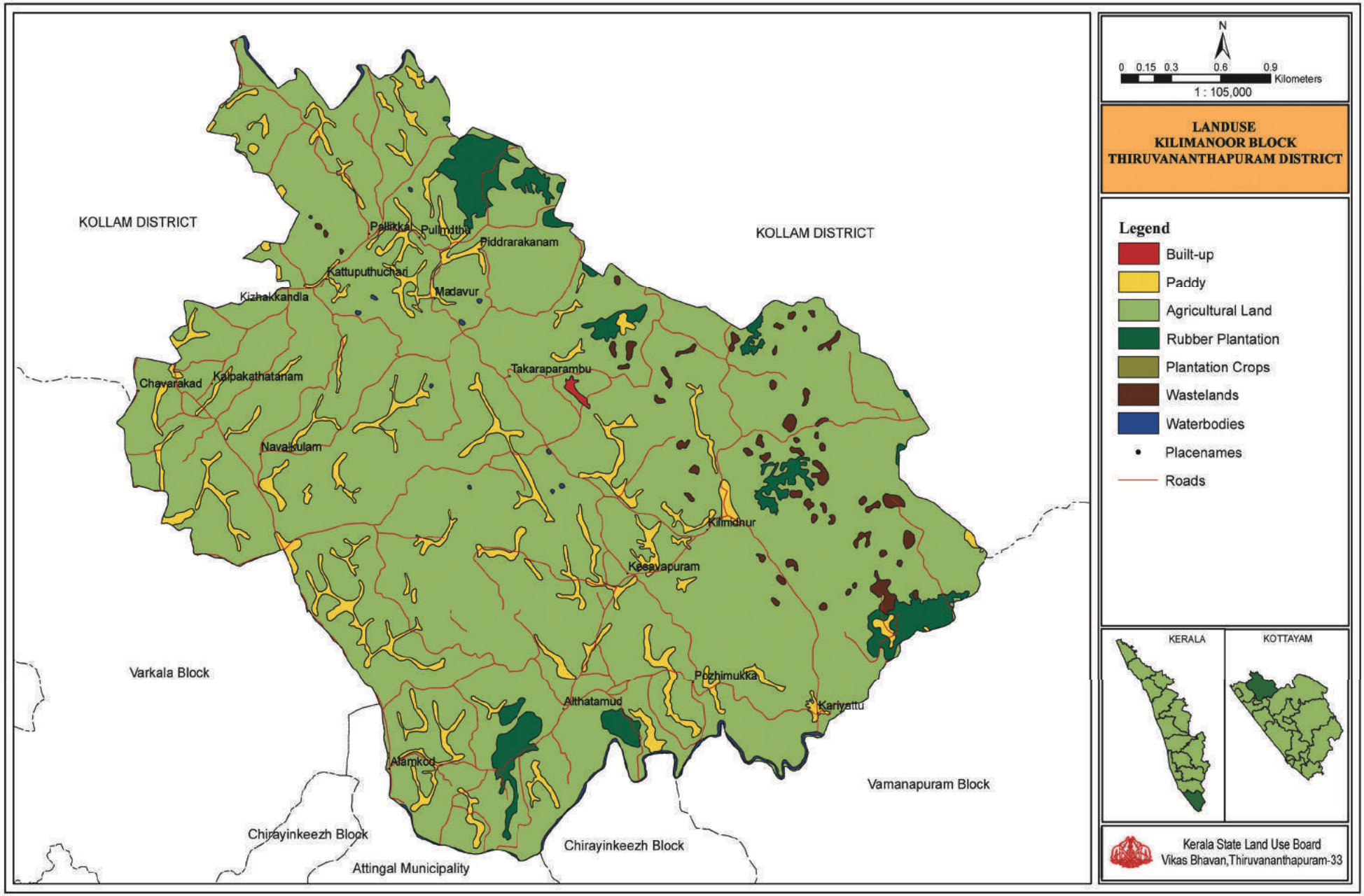
MUNICIPALITY/CORPORATION

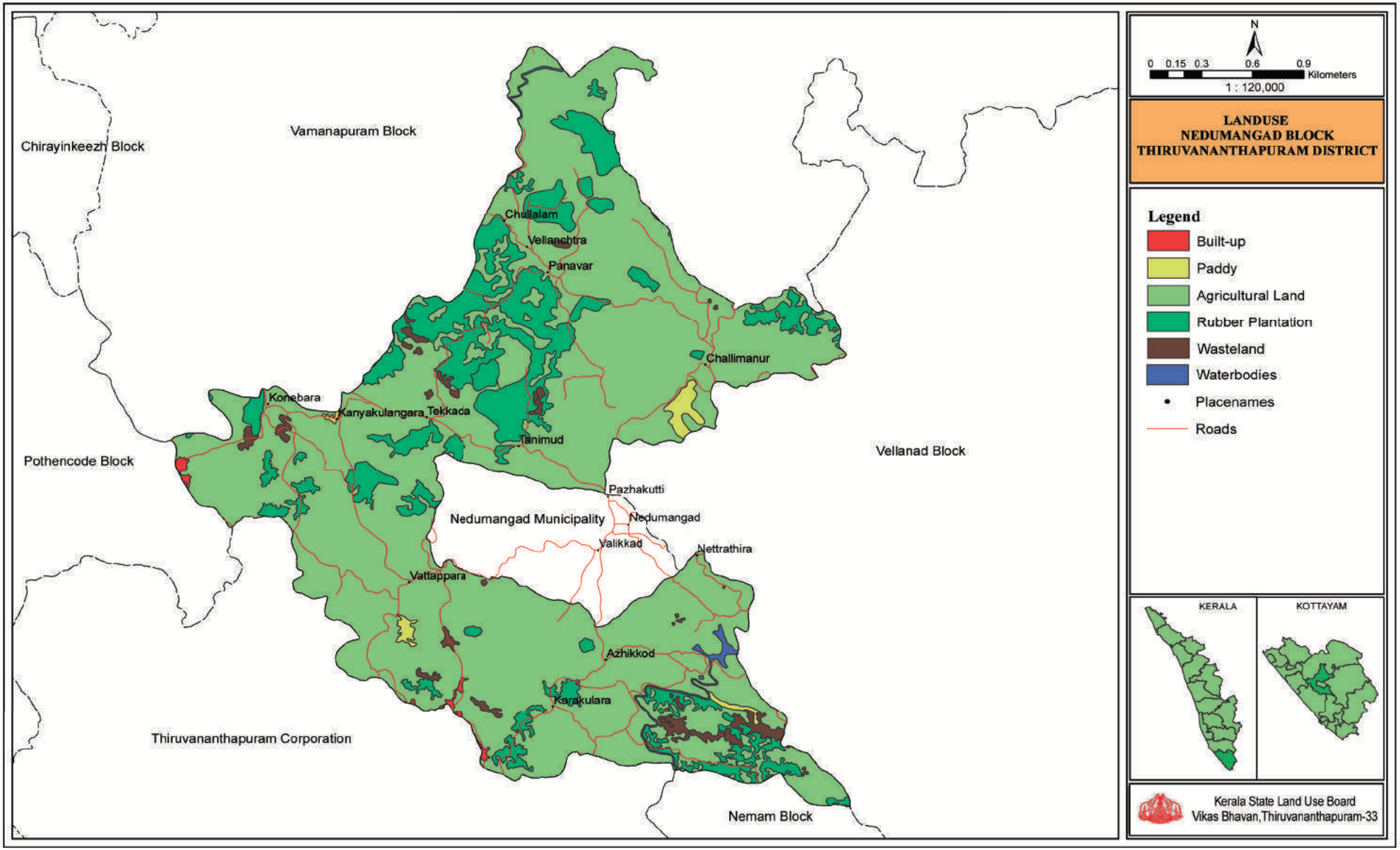
(Area in Ha)

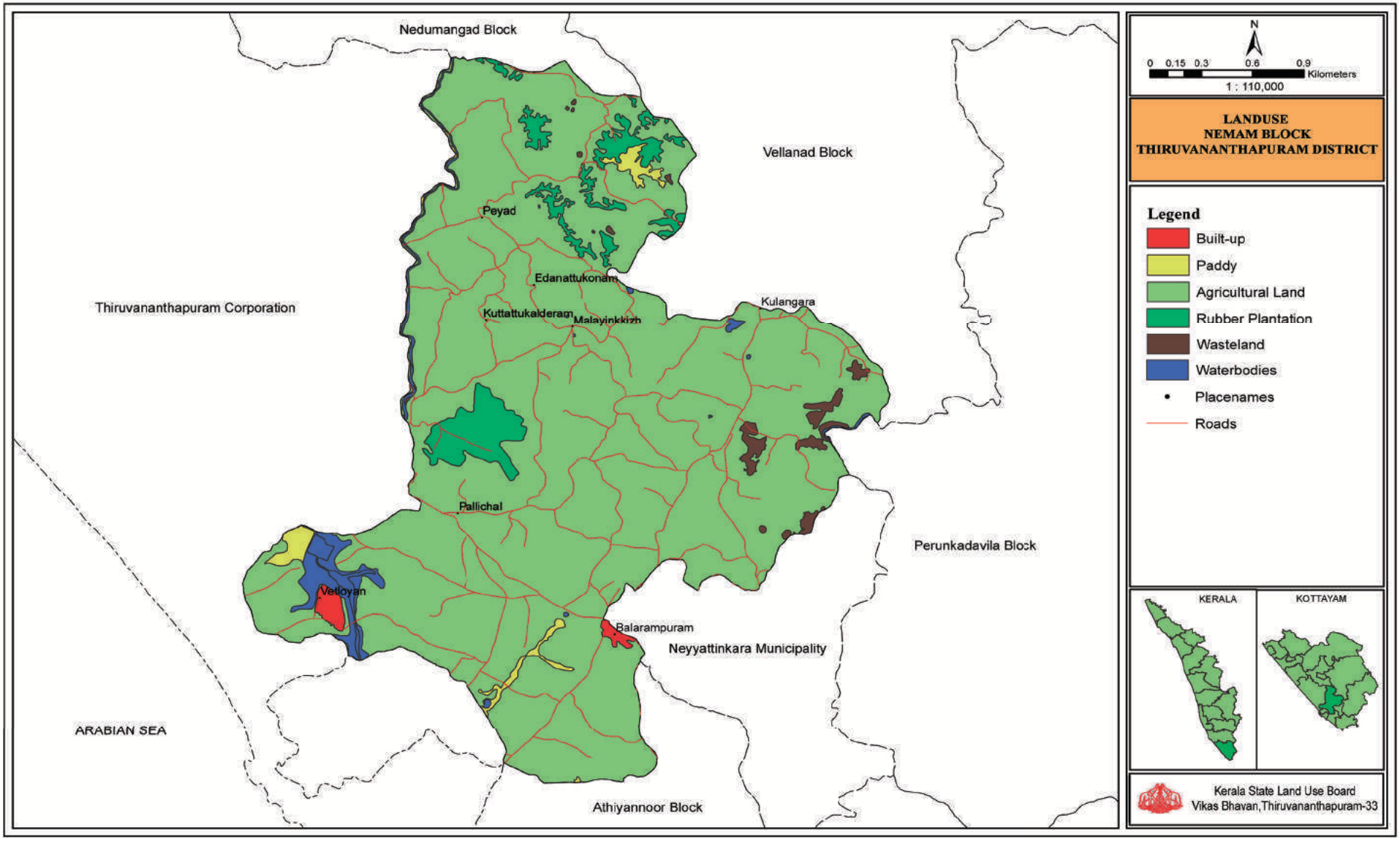
Sl. No.	Land Use	Attingal Municipality	Nedumangad Municipality	Neyyattinkara Municipality	Varkala Municipality	Thiruvananthapuram Corporation
1	Agriculture plantation (Rubber)	0.00	51.42	2.15	0.00	157.51
2	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	1614.13
4	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Arecanut)	0.00	0.00	0.00	10.48	0.00
6	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00
7	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	1.26
8	Agriculture plantation (Mixed)	1191.50	1445.86	2365.45	1690.29	12932.55
9	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	38.99	0.00	60.45
10	Built-up(Cities/Town/Villages)	54.68	33.63	156.01	69.32	4637.53
11	Cropland(Kharif)	0.00	0.00	0.00	0.00	1.65
12	Cropland(Rabi)	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	152.81	0.00	87.95	44.12	804.12
14	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00
15	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00
17	Forest plantations	0.00	0.00	0.00	0.00	0.00
18	Land with scrub	0.00	0.00	0.00	0.00	0.00
19	Land without scrub	0.00	41.86	25.21	0.00	23.92
20	River/waterbodies	41.65	0.00	52.73	40.67	314.48
21	Grass land	0.00	0.00	0.00	0.00	0.00
22	Sandy area	0.00	0.00	0.00	0.00	78.10
23	Sewage farm	0.00	0.00	0.00	0.00	54.46
	Total	**1440.65**	**1572.78**	**2728.48**	**1854.89**	**20680.15**

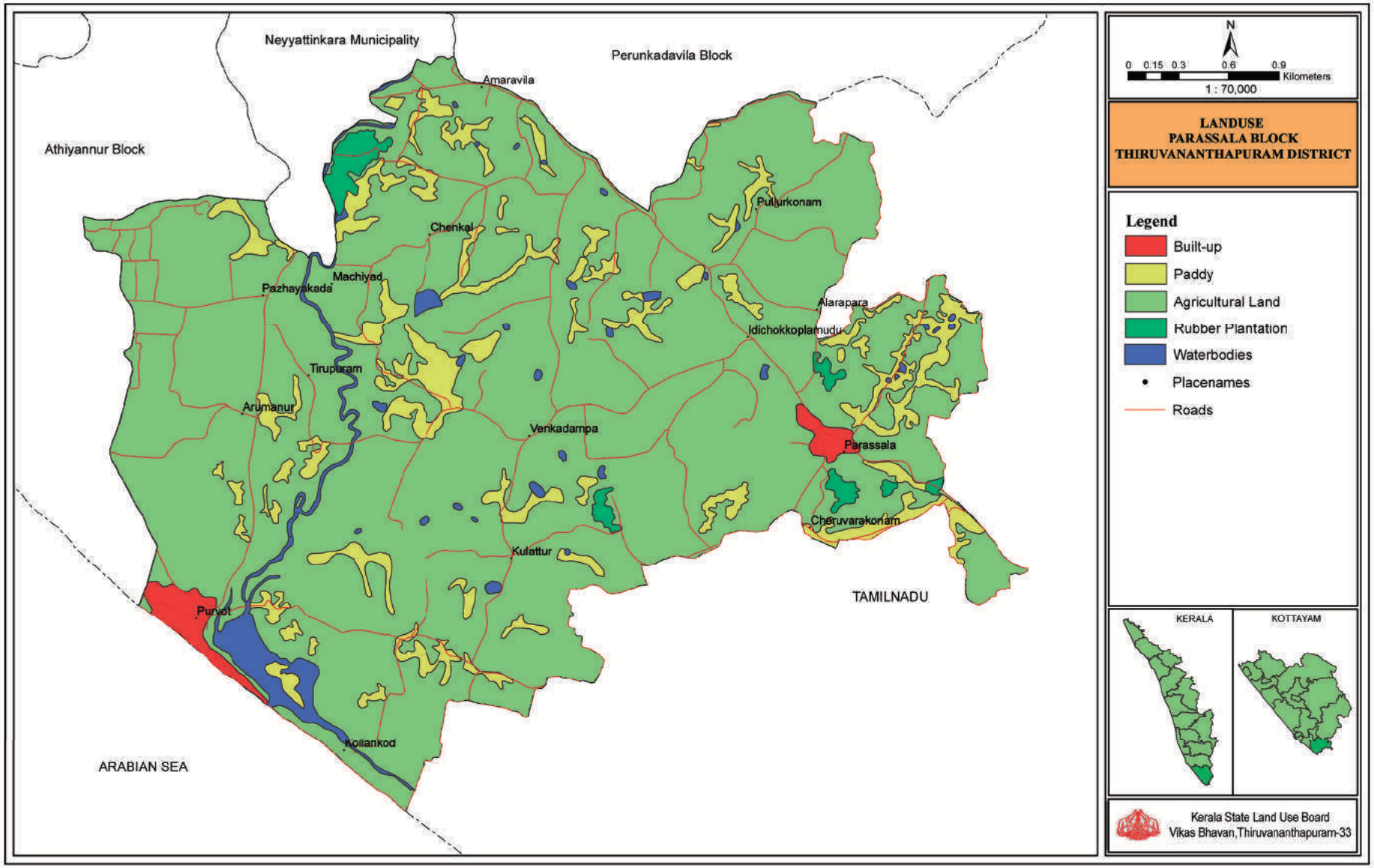

Nemom Block
Neyyattinkara Municipality
Uchakkadu
Arankuzhi
Venpakal
Thiruvananthapuram Corporation
Nellimudu
Nelakettu
Parassala Block
ARABIAN SEA
Karumkulam
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 70,000
LANDUSE
ATHIYANNOOR BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Wasteland
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

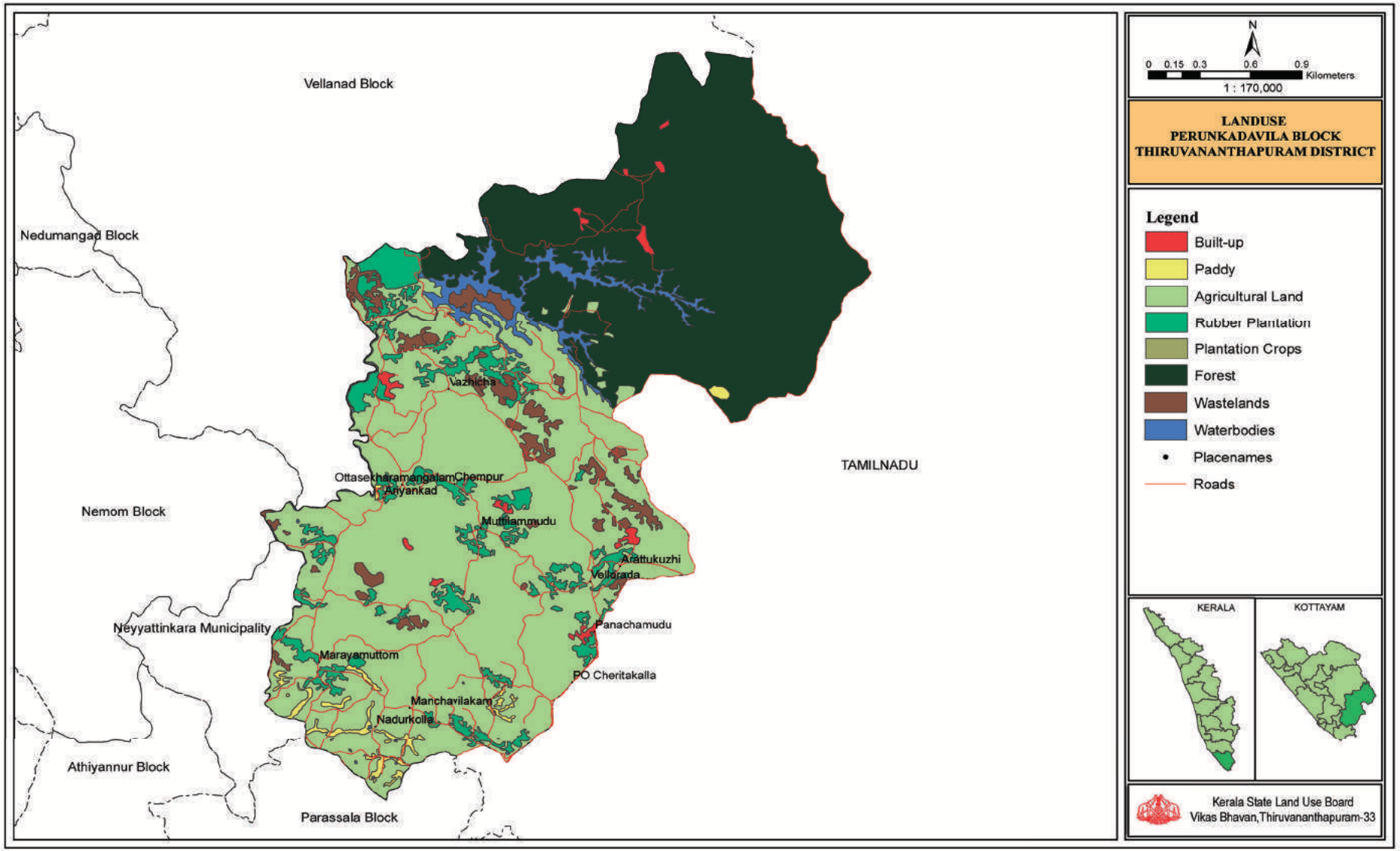

Varkala Block
Attingal Municipality
Ayikkudi
Chirayinkil
ARABIAN SEA
Pothencode Block
Nedumangad Block
Thiruvananthapuram Corporation
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 80,000
LANDUSE
CHIRAYINKEEZH BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Grass land
Wasteland
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

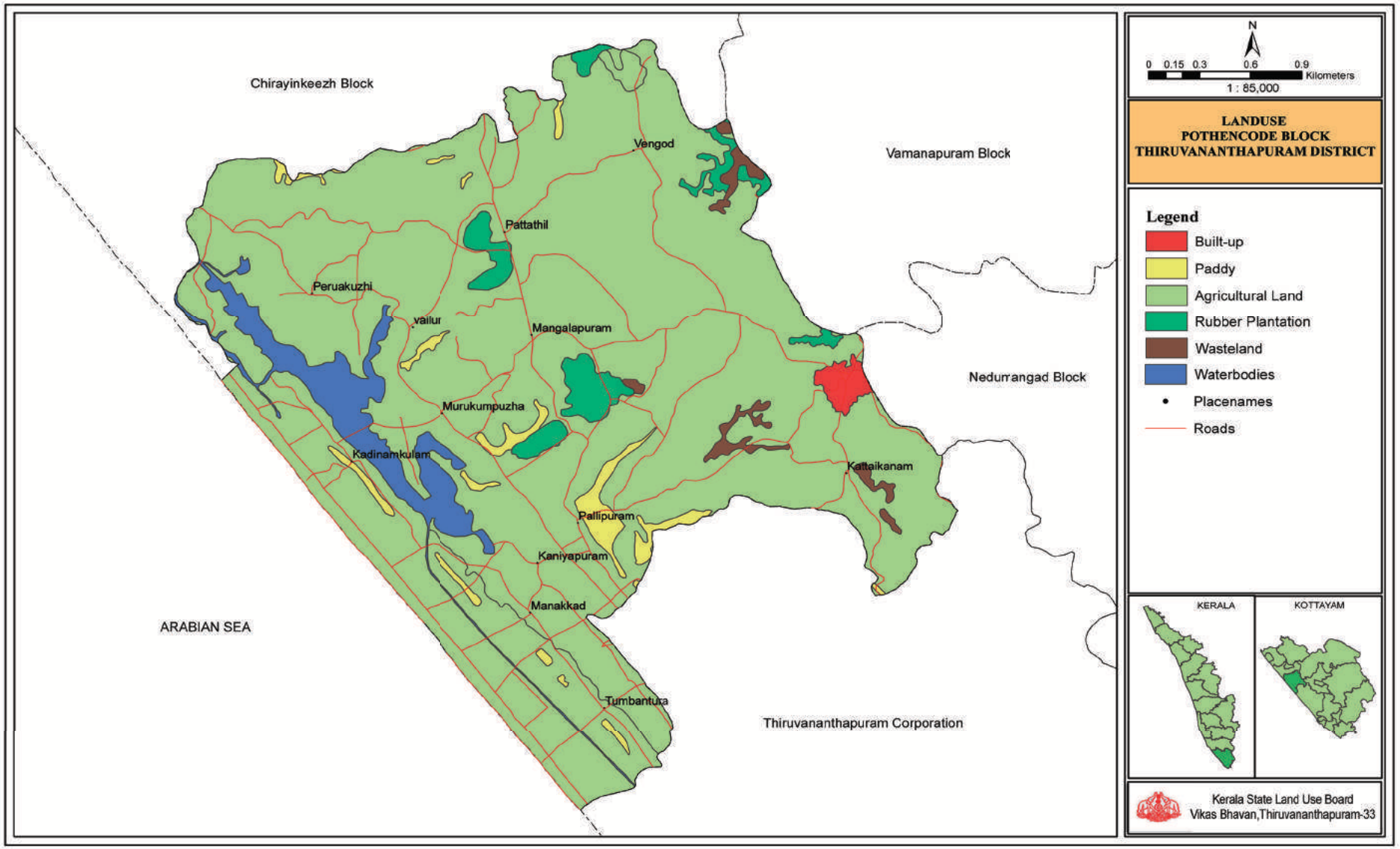

N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 105,000
LANDUSE
KILIMANOOR BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Plantation Crops
Wastelands
Waterbodies
Placenames
Roads
KOLLAM DISTRICT
KOLLAM DISTRICT
Pallikkal
Pullimuthu
Piddrarakanam
Kattuputhuchari
Madavur
Kizhakkandia
Takaraparambu
Chavarakad
Kalpakathatanam
Navaikulam
Kilimidhur
Keesavapuram
Varkala Block
Pozhimukka
Althatamud
Kariyattu
Alamkod
Vamanapuram Block
Chirayinkeezh Block
Chirayinkeezh Block
Attingal Municipality
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

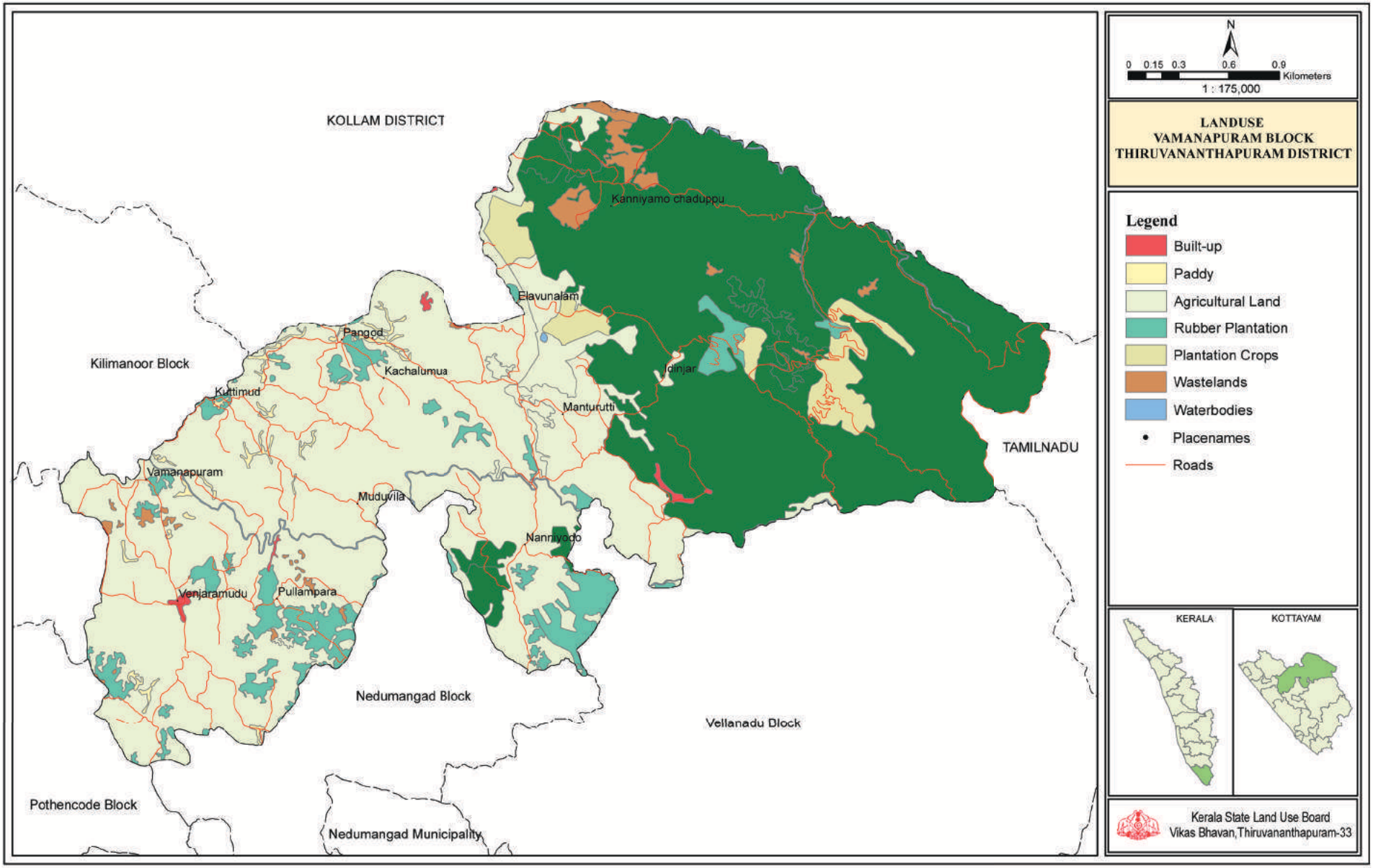

Chirayinkeezh Block
Vamanapuram Block
Chullalam
Vellanchtra
Panavar
Challimanur
Konebara
Kanyakulangara
Tekkada
Tanimud
Pothencode Block
Vellanad Block
Pazhakutti
Nedumangad Municipality
Nedumangad
Valikkad
Nettrathira
Vattappara
Azhikkod
Karakulara
Thiruvananthapuram Corporation
Nemam Block
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 120,000
LANDUSE
NEDUMANGAD BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Wasteland
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

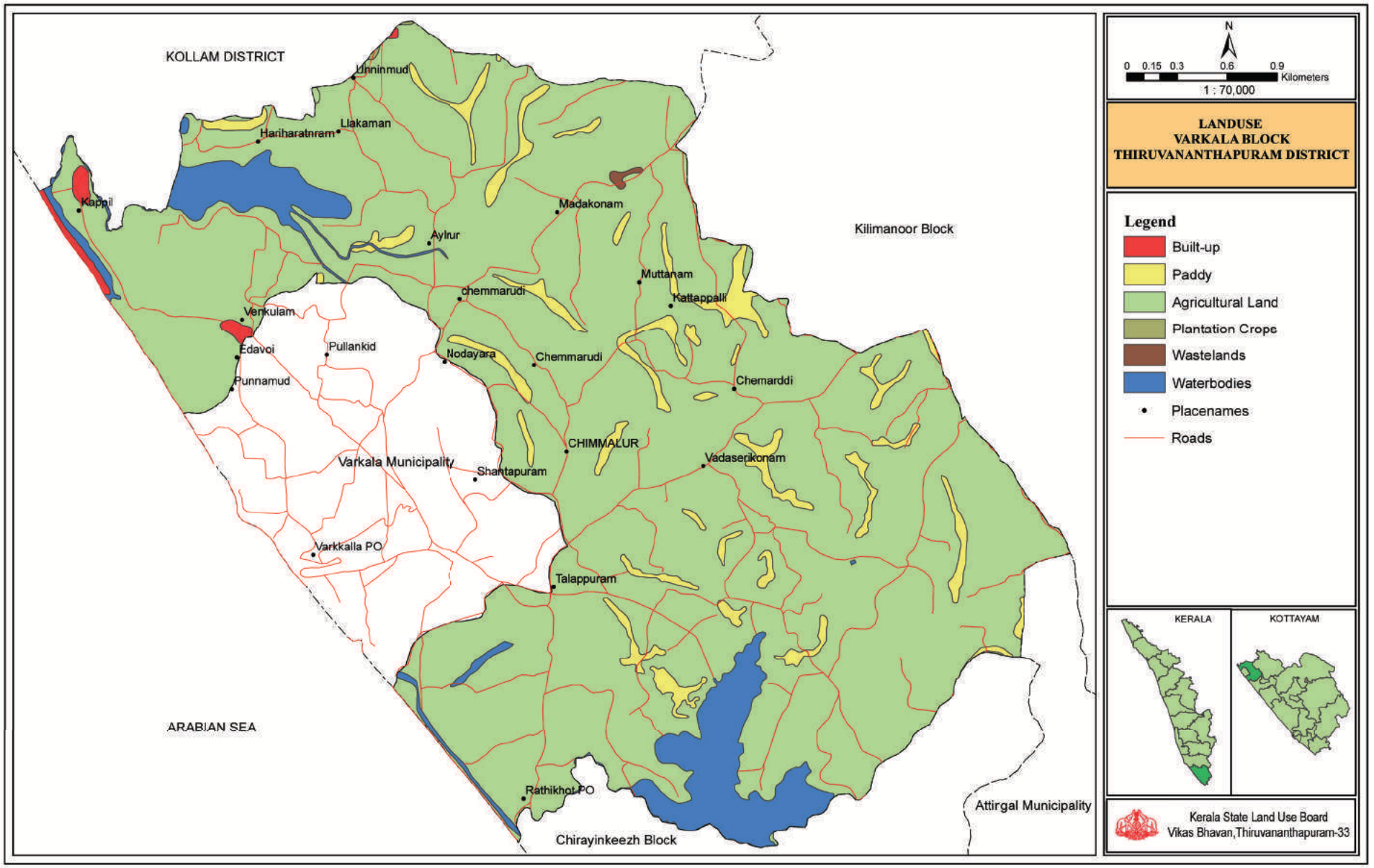

Nedumangad Block
Vellanad Block
Thiruvananthapuram Corporation
Kulangara
Perunkadavila Block
Neyyattinkara Municipality
Athiyannoor Block
ARABIAN SEA
Peyad
Edanattukonam
Kuttattukalderam
Malayinkkizh
Pallichal
Vellayan
Balarampuram
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 110,000
LANDUSE
NEMAM BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Wasteland
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

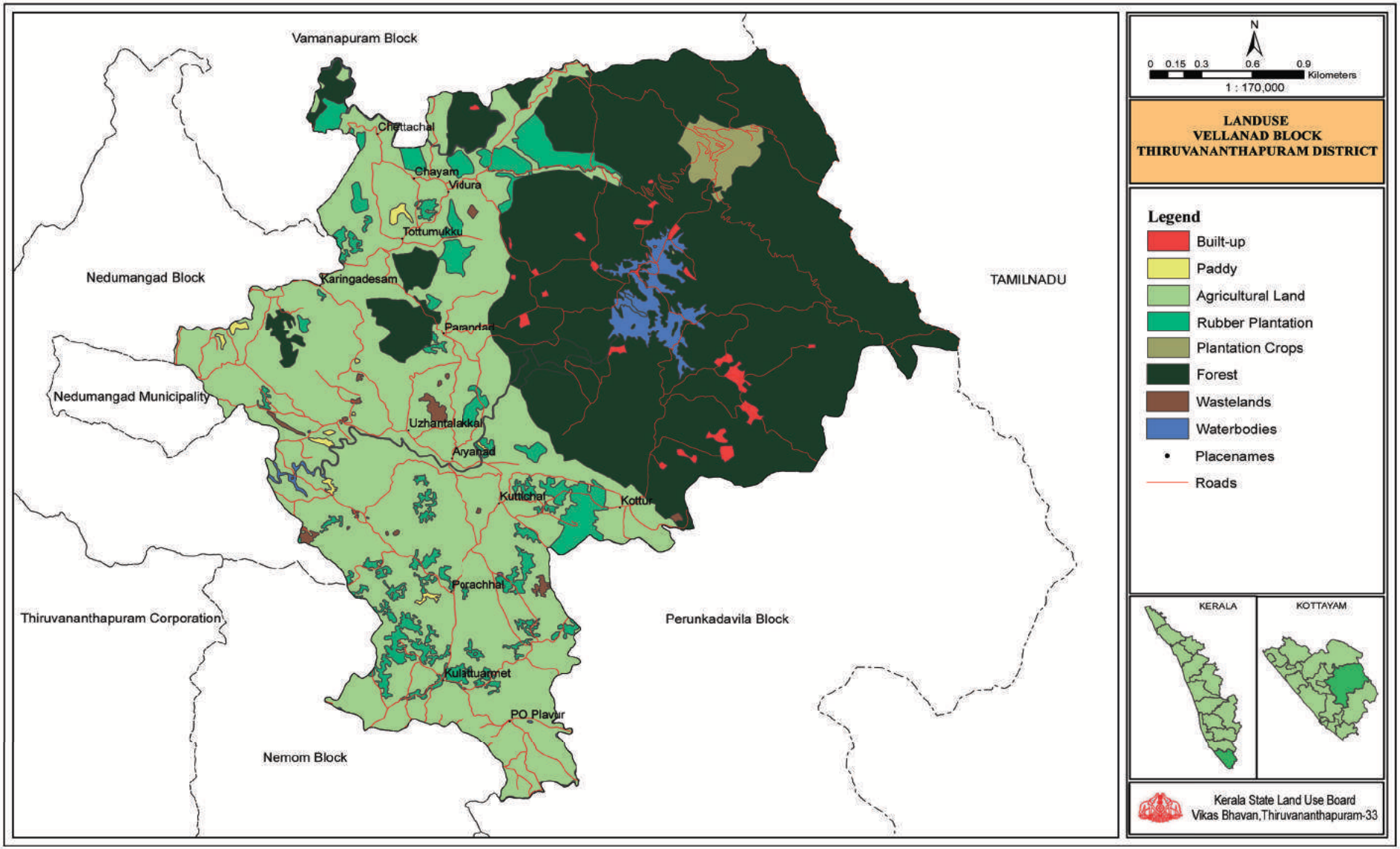

Neyyattinkara Municipality
Perunkadavila Block
Athiyannur Block
Amaravila
Chenkal
Pullurkonam
Machiyad
Pazhayakada
Alarapara
Idichokkoplamudu
Tiruputam
Arumanur
Venkadampa
Parassala
Cheruvarakonam
Kulattur
TAMILNADU
Purvot
Kollankod
ARABIAN SEA
N
0 0.15 0.3 0.6 0.9 Kilometers
1 : 70,000
LANDUSE
PARASSALA BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

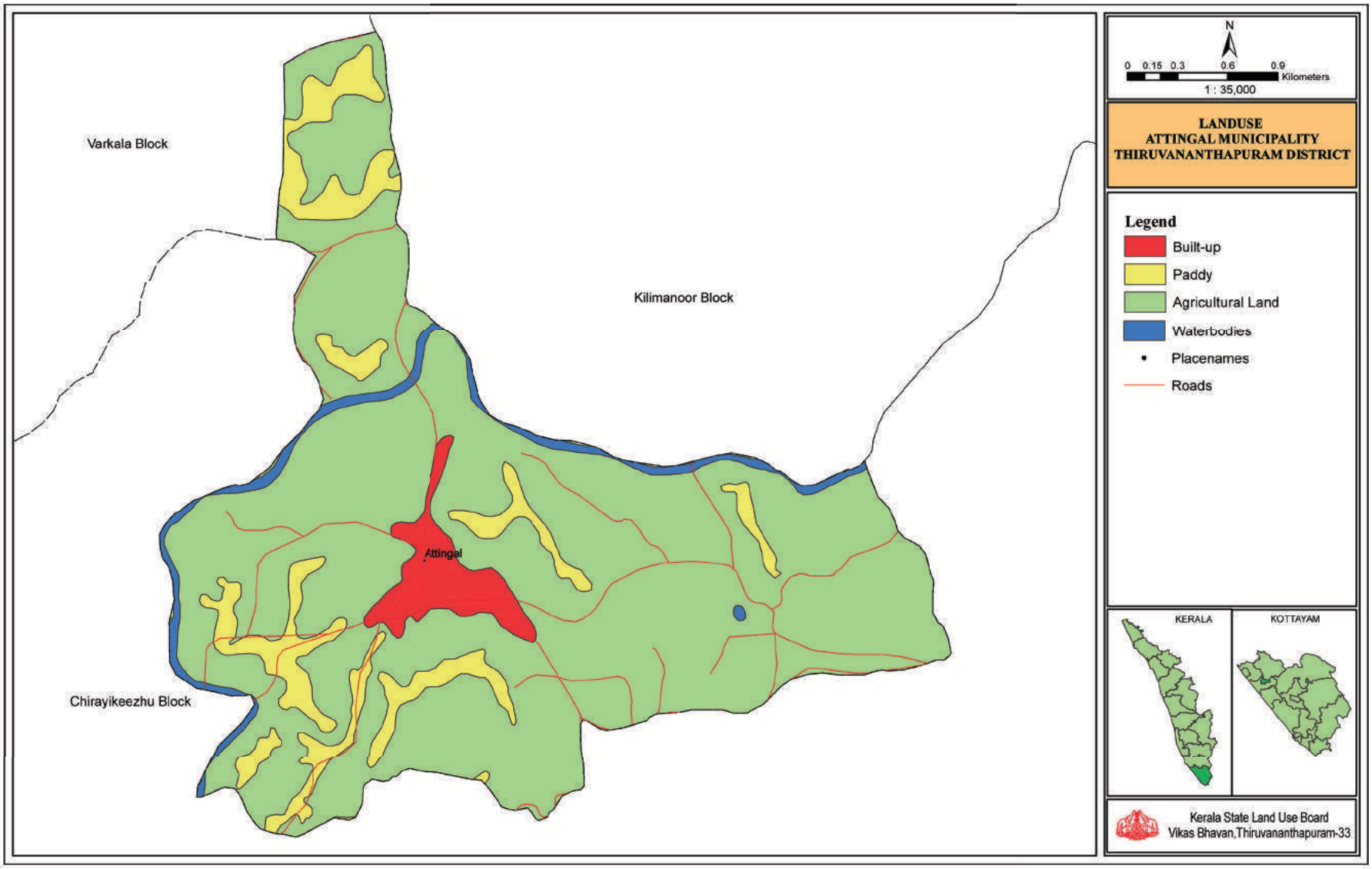

Vellanad Block
Nedumangad Block
Nemom Block
Neyyattinkara Municipality
Athiyannur Block
Parassala Block
TAMILNADU
Vazhicha
Ottasekharamangalam
Chempur
Ariyankad
Muttilammudu
Arattukuzhi
Vellorada
Panachamudu
PO Cheritakalla
Marayamuttom
Manchavilakam
Nadurkolla
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 170,000
LANDUSE
PERUNKADAVILA BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Plantation Crops
Forest
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

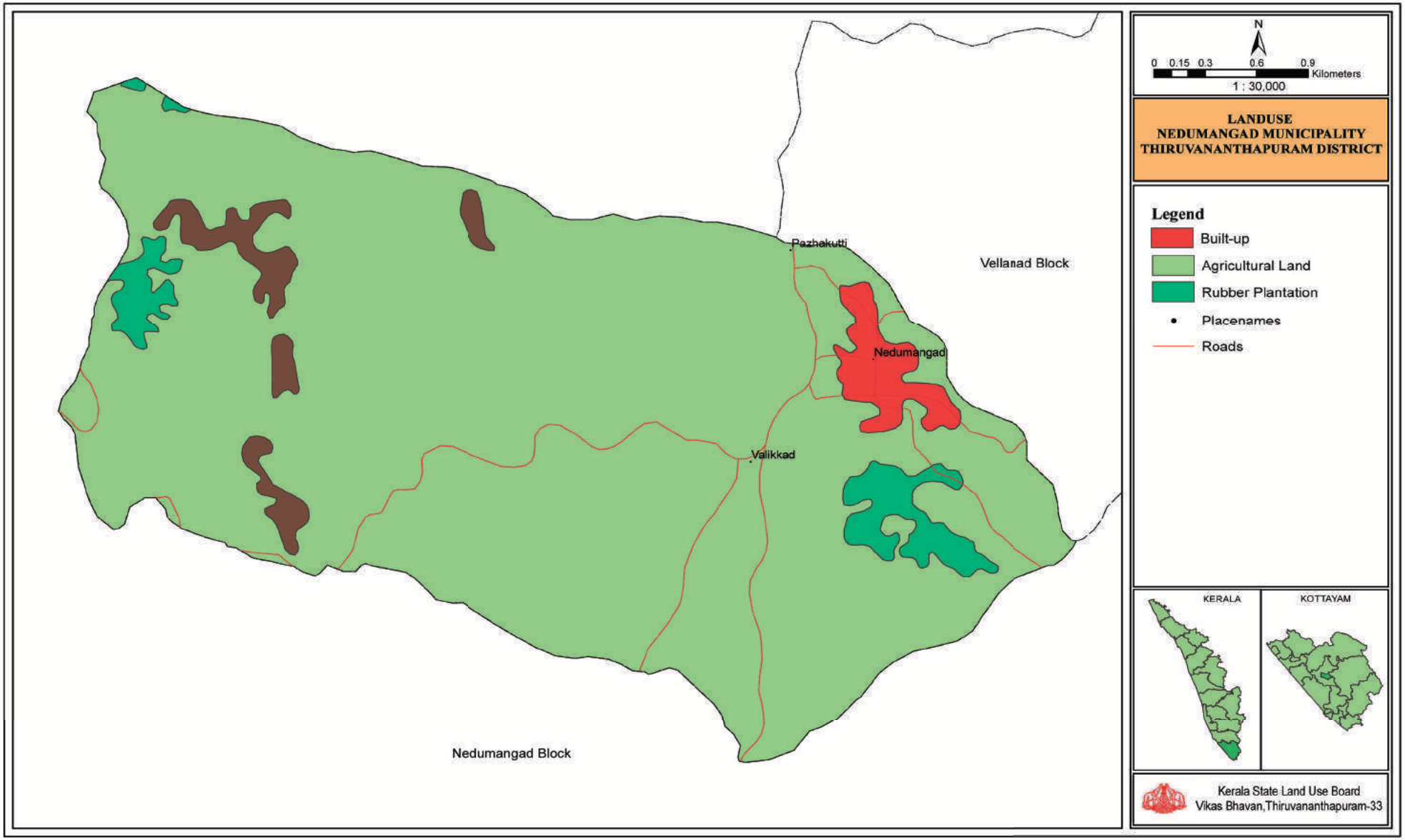

Chirayinkeezh Block
Vengod
Vamanapuram Block
Pattathil
Peruakuzhi
vailur
Mangalapuram
Nedumangad Block
Murukumpuzha
Kadinamkulam
Kattaikanam
Pallipuram
Kaniyapuram
Manakkad
ARABIAN SEA
Tumbantura
Thiruvananthapuram Corporation
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 85,000
LANDUSE
POTHENCODE BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Wasteland
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

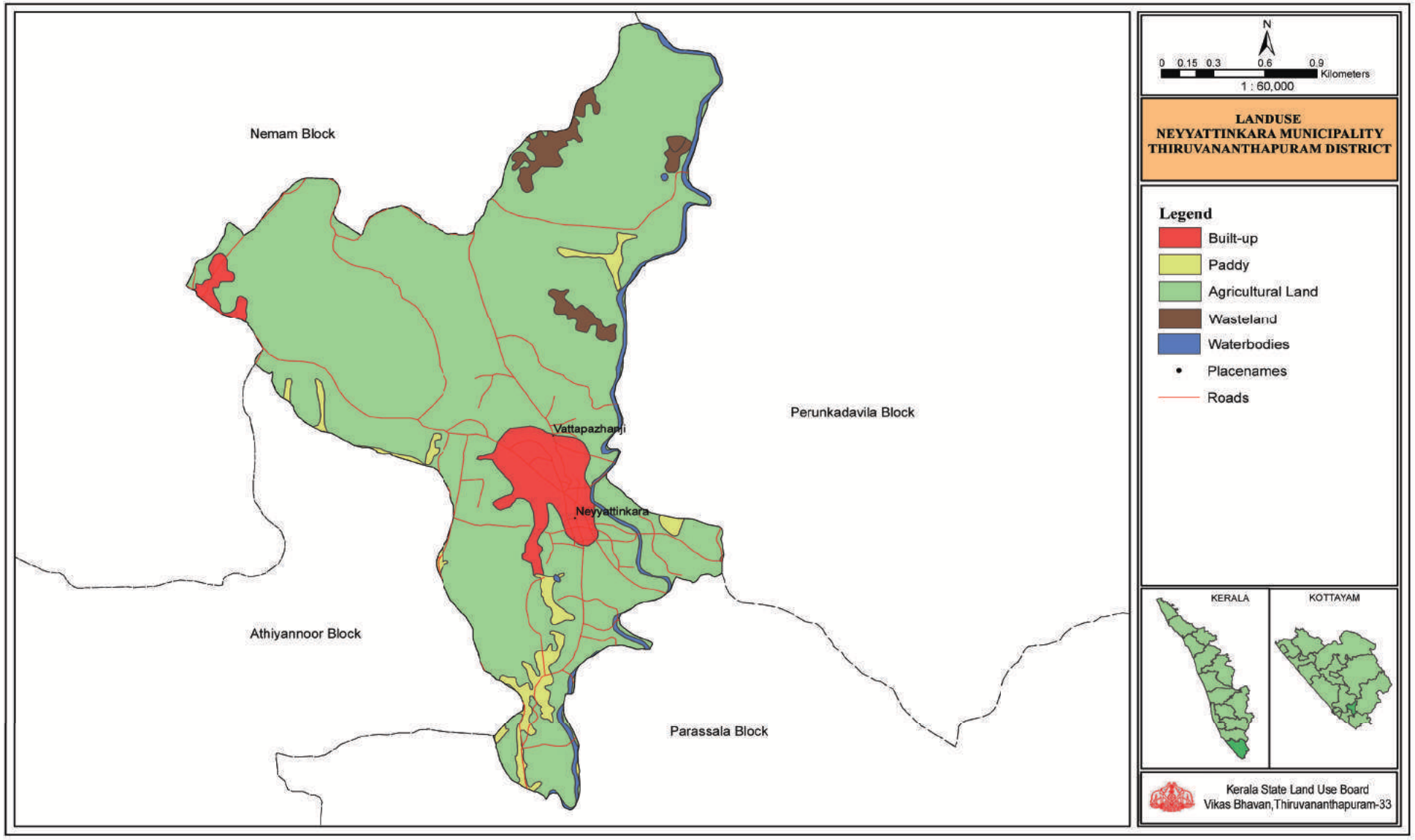

KOLLAM DISTRICT
Kanniyamo chaduppu
Elavunalam
Pangod
Kachalumua
Kilimanoor Block
Kuttimud
Manturutti
Idinjar
TAMILNADU
Vamanapuram
Muduvila
Nanniyodo
Venjaramudu
Pullampara
Nedumangad Block
Vellanadu Block
Pothencode Block
Nedumangad Municipality
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 175,000
LANDUSE
VAMANAPURAM BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Plantation Crops
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

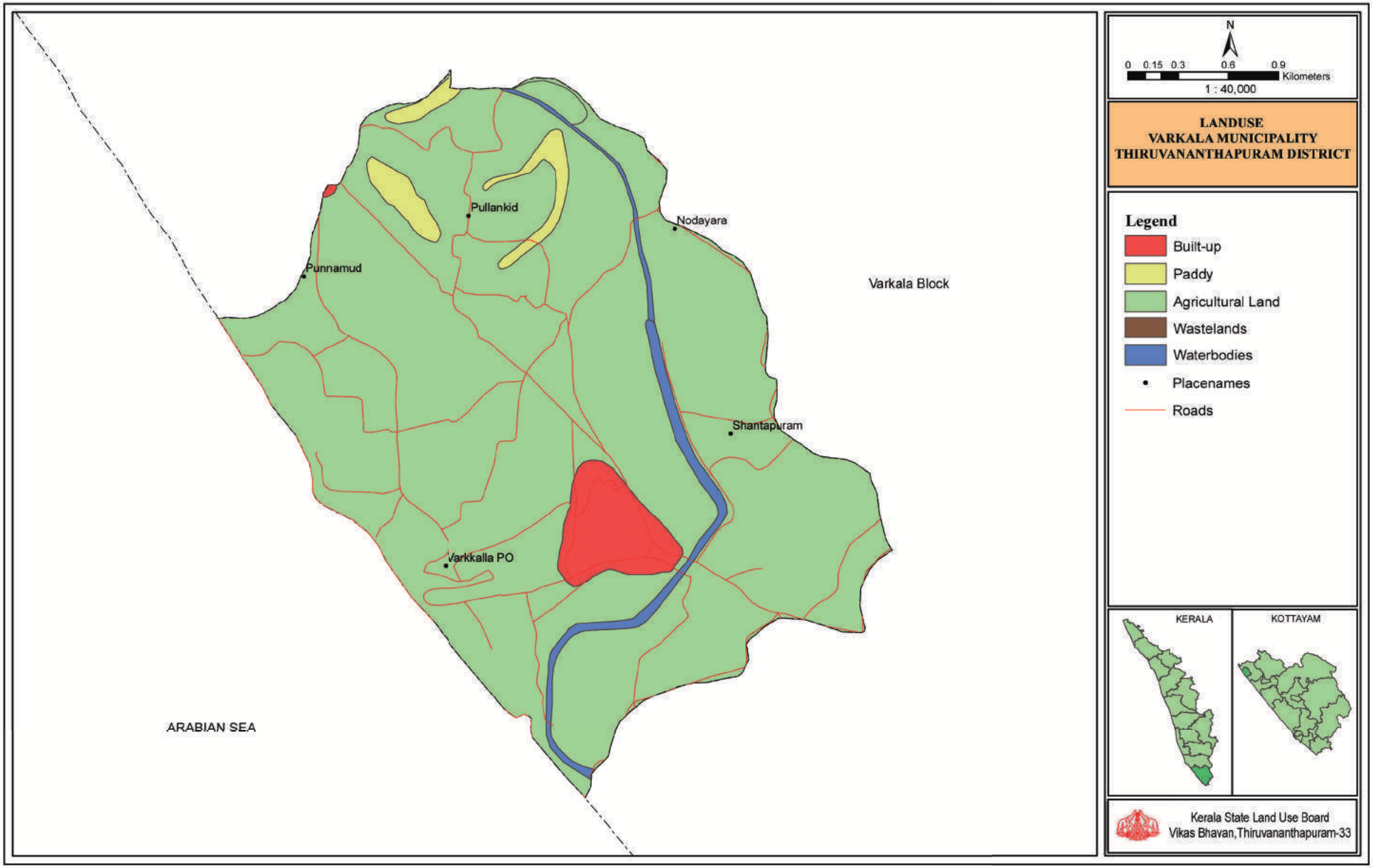

KOLLAM DISTRICT
Unninmud
Hariharatnram
Llakaman
Kappil
Madakonam
Aylur
Kilimanoor Block
Muttanam
chemmarudi
Kattappalli
Venkulam
Edavoi
Pullankid
Nodayara
Chemmarudi
Chemarddi
Punnamud
CHIMMALUR
Varkala Municipality
Shantapuram
Vadasenkonam
Varkkalla PO
Talappuram
ARABIAN SEA
Rathikhot PO
Attirgal Municipality
Chirayinkeezh Block
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 70,000
LANDUSE
VARKALA BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Plantation Crops
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

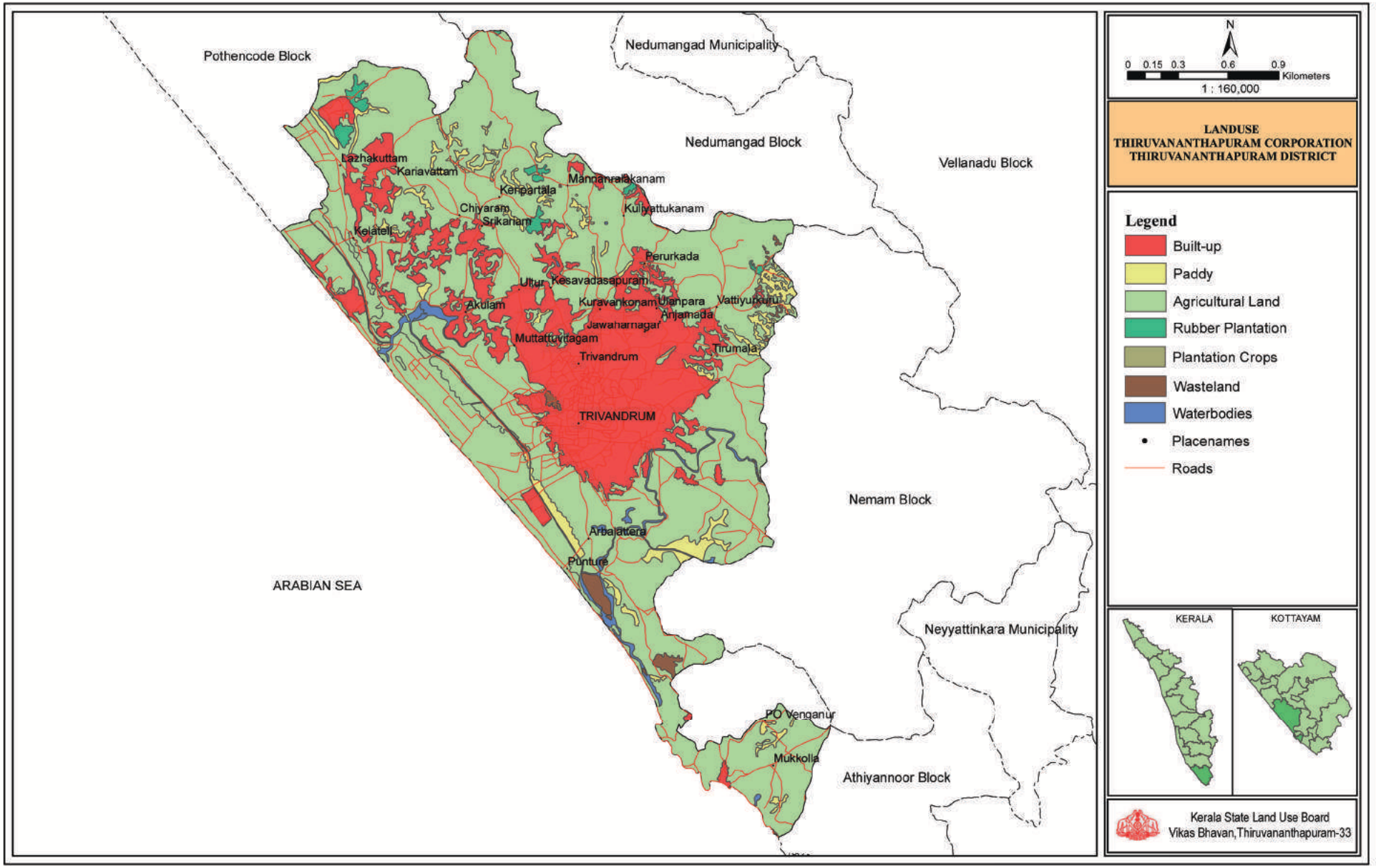

Vamanapuram Block
Chettachal
Chayam
Vidura
Tottumukku
Nedumangad Block
Karingadesam
TAMILNADU
Parandar
Nedumangad Municipality
Uzhantalakkal
Aryanad
Kuttichal
Kottur
Porachhat
Thiruvananthapuram Corporation
Perunkadavila Block
Kulattuamet
PO.Plavur
Nemom Block
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 170,000
LANDUSE
VELLANAD BLOCK
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Plantation Crops
Forest
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33


Varkala Block
Kilimanoor Block
Attingal
Chirayikeezhu Block
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 35,000
LANDUSE
ATTINGAL MUNICIPALITY
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33


N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 30,000
LANDUSE
NEDUMANGAD MUNICIPALITY
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Agricultural Land
Rubber Plantation
Placenames
Roads
Pazhakutti
Vellanad Block
Nedumangad
Valikkad
Nedumangad Block
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33


Nemam Block
Perunkadavila Block
Vattapazhanji
Neyyattinkara
Athiyannoor Block
Parassala Block
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 60,000
LANDUSE
NEYYATTINKARA MUNICIPALITY
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Wasteland
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33


N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 40,000
LANDUSE
VARKALA MUNICIPALITY
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Wastelands
Waterbodies
Placenames
Roads
Pullankid
Nodayara
Punnamud
Varkala Block
Shantapuram
Varkkalla PO
ARABIAN SEA
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33


Pothencode Block
Nedumangad Municipality
Nedumangad Block
Vellanadu Block
Nemam Block
Neyyattinkara Municipality
Athiyannoor Block
ARABIAN SEA
Lazhakuttam
Kariavattam
Kempartala
Mannanralakanam
Kuliyattukanam
Chiyaram
Srikariam
Kelatel
Perurkada
Ulur
Kesavadasapuram
Akulam
Kuravankonam
Ulanpara
Vattiyurkavu
Anjamada
Jawaharnagar
Muttattuvittagam
Trivandrum
Tirumala
TRIVANDRUM
Arbalatcera
Punture
PO Venganur
Mukkolla
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 160,000
LANDUSE
THIRUVANANTHAPURAM CORPORATION
THIRUVANANTHAPURAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Plantation Crops
Wasteland
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

BIODIVERSITY

Biodiversity refers to the variety and variability of life on earth. It is the variety of all living organisms including all species. Biodiversity is expressed at three levels on earth genetic diversity, species diversity and ecosystem diversity. Its direct and indirect services are crucial for the subsistence of life on earth. Biodiversity ensures food, fuel, shelter, medicines and other resources vital for our survival. Most of the crop pests are controlled by a variety of other organisms including insects, birds and fungi. Genetic diversity is the variety of genetic information contained in all individual plants, animals and micro organisms. Species diversity is the variety species on earth. Species diversity is usually a measure of the number of species and their relative abundances for a given area at a given point in time. Ecosystem diversity is the variety of habitats, biotic communities and ecological processes.

Much of Kerala's notable biodiversity is concentrated and protected in Western Ghats. Almost a fourth of India's 10,000 plant species are found in the state. Among the 4,000 flowering plant species (1,272 of which are endemic to Kerala and 159 threatened) almost 900 species are of medicinal plants. Its 9,400 km² of forests include tropical wet evergreen and semi-evergreen forests (lower and middle elevations-3,470 km²), tropical moist and dry deciduous forests (mid-elevations-4,100 km² and 100 km², respectively) and montane subtropical and temperate (*shola*) forests (highest elevations-100 km²). Altogether, 29% of Kerala is forested. Two of the world's Ramsar convension listed wetland lake-Sasthamcotta and the Vembanad-Kol wetlands are in Kerala, as well as 1455.4 km² of the vast Nilgiri Biosphere Reserve.

Thiruvananthapuram district has a geographical area of 2,192 km^2, of which 18.39% is under forest cover. However, 56% of the actual forest area of 403 km^2 are considered to be under various stages of degradation. The district has two protected areas viz., Peppara and Neyyar which together accounts for 181 km^2 of forests. The natural vegetation in the district could be broadly classified as West Coast Tropical Evergreen, West Coast semi-evergreen, South Indian Moist Deciduous and grasslands.

The following table depicted the biodiversity statistics in Kerala.

Table: 12.1

PLANT DIVERSITY

Sl.No.	Items	Number
1	Flowering Plants	4000
2	Grass species	350
3	Bamboo species	15
4	Reeds species	9
5	Orchid species	214
6	Gymnosperms	4
7	Ferns and Fern allies	200
8	Liverworts	200
9	Algae	231
10	Fungi	1044
11	Lichens	800

Table: 12.2

ANIMAL DIVERSITY

Sl.No.	Items	Number
1	Large and medium sized mammals	48
2	Birds species	475
3	Water Birds	101
4	Reptiles Genera	60
5	Lizard (endemic) species	30
6	Snake (endemic) species	57
7	Amphibian (endemic) species	87
8	Fresh water fish (endemic) species	84
9	Butterflies	313

Source: Economic Review.

Table: 12.3

FLORISTIC DIVERSITY IN THIRUVANANTHAPURAM DISTRICT

Category	No. of families	No. of Genera	No. of Species	No. of Endemic species	No. of RET # species
Angiosperms	180	1052	2407	621	226
Gymnosperms	5	5	6	---*	---*
Pteridophytes	27	66	151	---*	---*
Fungi	---*	154	463	---*	---*

*Data not available; #Rare Endangered and Threatened

Source: KFRI

FOREST

Forest represents all actually forested area as the lands classed or administered as forest under any legal enactment dealing with forest. Kerala State is endowed with rich natural resources. Tropical climate favours forests with rich biodiversity and endemism. Kerala has a total recorded forest cover of 11309.47 Sq.Km which is 29.09% of the total geographical area of the State (38863 Sq.Km). This is greater than the national coverage of 19.50%. The 11309.42 Sq.Km of forest cover includes 9107.20 Sq.Km reserve forest 364.47 Sq.Km proposed reserve and 1837.79 Sq.Km vested forest and EFL (Ecologically Fragile Land).There are two groups of forests, viz., the natural forests and the man-made forests. The man-made forests mainly consist of Eucalyptus, Teak, Softwood, Rubber, Cashew and other plantations.

Table: 13.1

CLASSIFICATION OF FOREST AREA ACCORDING TO UTILIZATION AS ON 31.03.2010

Sl. No.	Mode of utilization	Area (Km^2)	Percentage to total
1	Dense Forests/Degraded Forest	8983.70	79.44
2	Plantation	1492.02	13.19
3	Area under lease	423.38	3.74
4	Forest land diverted under FCA	410.35	3.63
	Total	**11309.47**	**100**

The forests of the district may be classified broadly under three categories. These are Southern tropical wet evergreen forests, Southern tropical and semi evergreen forests and Southern tropical moist deciduous forests. These forests lie in the Eastern regions of Nedumangad and Neyyattinkara Taluks. The main forest produce is timber and the minor forest produces are bamboo, reeds, pulp, matchwood, rattan, etc. Other forest produces include black and white damer, cinnamon bark, honey and wax, medicinal roots and herbs, oil seeds, plantation leavea, koova leaves, wild turmeric, incha bark, etc. The main timber species found in these forests are Teak, Rosewood, Nangu, Vengai, Thembave, Maruthu, Anjili, Akil, Venthekku, Manjakadambu and Irul. The Thiruvananthapuram Wild Life Division and the Agasthyavanam Biological Park Special Division wholly lies in the district and are confined to Nedumangad and Neyyattinkara Taluks. Thiruvananthapuram Forest Division lays partly in the district and is located only in Nedumangad Taluk.

Table: 13.2

RANGE WISE AREA OF FORESTS AS ON 31.03.2010

Division/Range	Area (Km^2)
Kulathupuzha	219.68
Palode	107.50
Paruthippally	41.41
Total	**368.60**

Table:13.3

DIVISION-WISE AREA OF FOREST AS ON 31.03.2010 (Km^2)

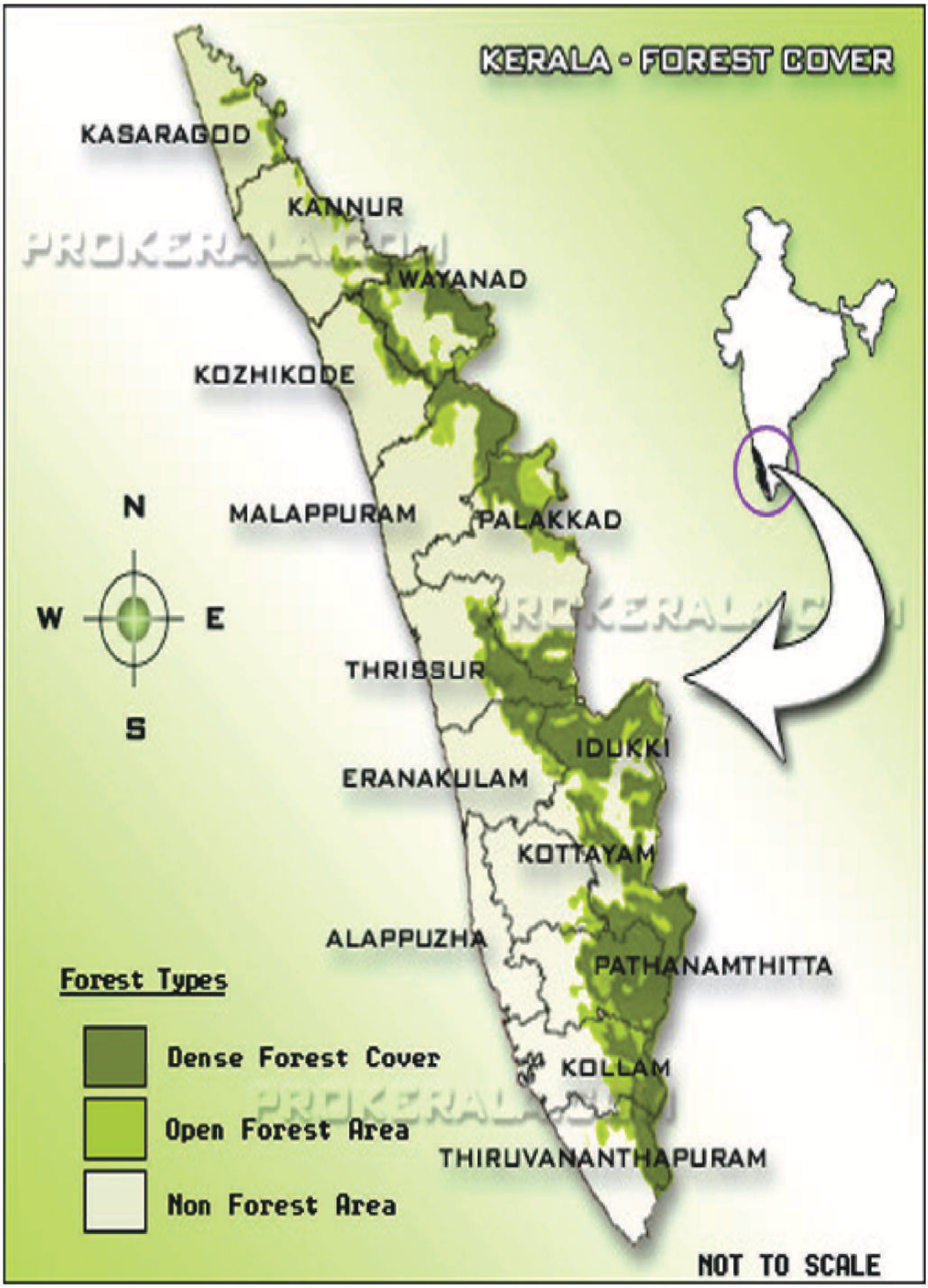
Sl. No.	Division	Reserve Forests	Proposed Reserve	Vested Forest +EFL	Total	Percentage to total
Southern Circle, Kollam						
1	Thiruvananthapuram	359.12	5.82	3.65	368.60	3.26
2	Thenmala	123.43	-	7.73	131.16	1.16
3	Achencoil	284.32	-	0.20	284.53	2.52
4	Ranni	1050.33	7.16	1.56	1,059.06	9.36
5	Punalur	280.05	-	0.16	280.22	2.48
6	Konni	320.64	11.02	-	331.66	2.93
Total		**2417.91**	**24.00**	**13.33**	**2455.25**	**21.71**

Table: 13.4

DISTRICT WISE FOREST AREA (APPROX) AS ON 31.03.2010

Sl.No.	District	Area (Km^2)
1	**Thiruvananthapuram**	**463.83**
2	Kollam	840.56
3	Pathanamthitta	1533.79
4	Kottayam	100.84
5	Ernakulam	823.83
6	Idukki	2713.72
7	Thrissur	1022.75
8	Palakkad	1527.35
9	Malappuram	723.91
10	Kozhikode	290.45
11	Wayanad	907.04
12	Kannur	241.45
13	Kasaragode	119.84
	Total	**11309.41**

Source: Forest statistics 2011, Forest Department.


KERALA - FOREST COVER
KASARAGOD
KANNUR
WAYANAD
KOZHIKODE
MALAPPURAM
PALAKKAD
THRISSUR
IDUKKI
ERANAKULAM
KOTTAYAM
ALAPPUZHA
PATHANAMTHITTA
KOLLAM
THIRUVANANTHAPURAM
N
W
E
S
Forest Types
Dense Forest Cover
Open Forest Area
Non Forest Area
NOT TO SCALE

AGRICULTURE

The agricultural sector is the important sub-sector of the primary sector in Kerala. Agriculture has been a way of life and continues to be the single most important livelihood of the masses. Stabilization and augmentation of productivity assume critical importance, given the limited scope for increasing area under cultivation of various crops. Agricultural policy focus in Kerala across decades has been on self-sufficiency and self reliance in food grains production. Increase in production would be possible mainly from improvements in productivity through the use of location, specific technology and modernization of agriculture. An integrated mixed cropping pattern is practiced in the State by majority of the farmers considering the land holding size. Agricultural crops in the State are broadly classified as food crops and non-food crops. Food crops are cereals & condiments, fresh fruits, vegetables etc. The major non-food crops are rubber, betel leaves, lemon grass etc. Another classification of crops is seasonal crops, annual crops and perennial crops which are based on their life time. The net area under cultivation during the year 2010-11 was 2071507 Ha, which occupies 53.30% of the total area in the State. The total cropped area is 2647461 Ha during the year 2010-2011.The area sown more than once during 2010-11 is 575954 Ha as against 589963 Ha in 2009-2010.

Paddy is the only wet crop cultivated in the wet lands and the area under this cultivation in the district is 2919 Ha during the agricultural year 2010-11. On comparing with the previous year area of paddy cultivation is decreased. Tapioca, Coconut, Betal, Pepper, Arecanut, Rubber, Banana, Jack, Cashew nut and Tea are the important crops of the district. Thiruvananthapuram District ranks second in regard to area and second in the production of tapioca among the Districts during 2010-2011. In 2010-11, tapioca was cultivated in 14261 Ha of land. Coconut, one of the most important crops of the district, is cultivated in an area of 69668 hectares and the annual production is about 499 million coconuts. Rubber cultivation is mainly confined to Nedumangad taluk and the annual production is estimated at 44930 tonnes. Newly introduced agricultural development schemes have opened new vistas in this field. Fresh schemes are introduced in every panchayat with a view to maximise yield per unit area by exploiting the production potential of paddy and vegetables. Cashew is grown in 1068 Ha of land and the

production is about 390 tonnes and Pepper cultivation covers an area of 4761 Ha and the yield is about 939 tonnes during 2010-11.

Table: 14.1

TRENDS IN AGRICULTURAL INCOME IN KERALA

(Base 2004-05)

Sl. No.	Year	Agricultural Income (Rs. In crores)	Rate of exchange over previous year	Agriculture and Allied Sectors (Rs. In crores)	Percentage
1	2006-2007	16567.85	-8.17	20507.67	14.48
2	2007-2008	16196.60	-2.24	20255.14	13.15
3	2008-2009	16533.94	2.08	20656.57	12.70
4	2009-2010	16236.47	-1.79	20534.52	11.59
5	2010-2011	16110.59	-0.78	20486.12	10.59

Table: 14.2

CLASSIFICATION OF AREA ON THE BASIS OF LAND UTILISATION (In Ha)

Year	Total Geographical area	Forest	Land put to non agricultural use	Barren and uncultivable land	Permanent pastures and other grazing land	Land under miscellaneous tree crops
1	2	3	4	5	6	7
2010-2011	218781	49861	26949	243	0	39
2009-2010	218781	49861	26651	224	0	30
2008-2009	218781	49861	28278	310	0	39

Year	Cultivable waste	Fallow other than current fallow	Current fallow	Marshy Land	Still Water	Water logged Area
1	8	9	10	11	12	13
2010-2011	365	335	2935	8	4340	91
2009-2010	418	336	2904	8	4340	91
2008-2009	339	719	2827	8	498	91

Year	Social Forestry	Net Area Sown	Area sown more than once	Total Cropped Area
1	14	15	16	17
2010-2011	56	133559	20551	154110
2009-2010	56	133862	20526	154388
2008-2009	56	135755	27530	163285

Source: Agricultural Statistics

Table: 14.3

DISTRICT WISE AREA OF CROPS (In Ha)

Year	Paddy			Total	Pulses including Tur							Total	Total food grains
	Autumn	Winter	Summer		Jower	Ragi	Other Cereals	Total cereals/ millets	Autumn	Winter	Summer		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
2010-2011	1493	1159	267	2919	0	0	0	2919	1	0	42	43	2962
2009-2010	1417	1360	163	2940	0	0	0	2940	3	1	61	65	3005
2008-2009	1350	1529	116	2995	0	0	0	2995	2	2	203	207	3202

Year	Sugar Crops			Spices And Condiments												
	Sugar cane	Palmyrah	Total	Pepper	Ginger	Turmeric	Carda mom	Areca nut	Tama rind	Vanilla	Clove	Nut meg	Cinna mon	Garlic	Total	Grand Total
1	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2010-2011	0	62	62	4761	70	51	0	922	761	5	31	70	2	0	6673	6735
2009-2010	0	52	52	4902	61	46	0	890	817	4	28	74	2	0	6824	6876
2008-2009	0	54	54	5683	95	58	0	999	1015	4	45	76	1	0	7976	8030

Year	Fresh Fruits								Dry Fruit	Total Fruits
	Jack	Mango	Banana	Plantain	Pineapple	Pappaya	Other fresh fruits	Total	Cashew	
1	31	32	33	34	35	36	37	38	39	40
2010-2011	5170	3377	2892	5640	201	1339	464	19083	1068	20184
2009-2010	4984	3069	2349	4979	195	1101	393	17070	1001	18071
2008-2009	5436	3604	2629	5638	313	1319	486	19485	1024	20509

Table Continued…….

Year	Tapioca			Total	Tubers					Total
	Autumn	Winter	Summer		Elephant Foot Yam	Colocasia	Yam (Kachil)	Sweet Potato	Other Tubers	
1	41	42	43	44	45	46	47	48	49	50
2010-2011	3711	3546	7004	14261	366	570	69	10	96	1111
2009-2010	4424	4330	7378	16132	405	502	100	19	145	1171
2008-2009	5247	5362	9679	20288	521	632	124	18	212	1507

Year	Vegetables												Total	Total Food Crops
	Drum stick	Amaran thus	Bitter Gourd	Snake Gourd	Ladies Finger	Brinjal	Green Chillies	Little Gourd (koval)	Ash Gourd (Kumbalam)	Pumpkin	Cucumber	Other Vegetables		
1	51	52	53	54	55	56	57	58	59	60	61	62	63	64
2010-2011	1942	153	58	82	43	45	92	34	2	11	84	9	2555	46707
2009-2010	1713	170	71	111	56	53	108	36	4	16	111	224	2673	47928
2008-2009	1771	204	87	116	73	64	60	36	3	19	154	259	2846	56382

Year	Non Food Crops															Grand Total
	Oil Seeds					Fibre Drugs and Narcotics					Plantation Crops					
	Ground nut	Sesa mum	Coconut	Others	Total	Cotton	Betel Leaves	Tobacco	Lemon Grass	Total	Tea	Coffee	Rubber	Cocoa	Total	
1	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
2010-2011	0	0	69668	15	69684	0	19	0	2	21	965	0	30970	66	32001	101706
2009-2010	1	0	71376	33	71410	0	19	0	1	20	966	0	30449	75	31490	102920
2008-2009	0	0	71675	30	71705	0	25	0	6	31	966	0	30010	69	31045	102781

Year	Non Food Crops					Total non food crops	Total Cropped Area
	Fodder Grass	Green Manure Crops	Other Crops and trees	Medicinal Plants	Total		
1	81	82	83	84	85	86	87
2010-2011	120	536	3363	31	4050	105756	154110
2009-2010	98	462	2958	22	3540	106460	154388
2008-2009	104	612	3392	14	4122	106903	163285

Source: Agricultural Statistics

Table: 14.4

BLOCK WISE AREA UNDER CROPS 2008-2009 (In Ha)

Sl. No.	Block	Paddy			Sugar cane	Pepper	Ginger	Turmeric
		Autumn	Winter	Summer				
1	2	3	4	5	6	7	8	9
1	Trivandrum Rural	4.32	3.75	0.56	0	25.58	0.04	0.12
2	Kazhakuttam	72.86	7.51	26.21	0	258.61	0.75	0.51
3	Nemom	40.13	38.44	19.92	0	444.24	2.17	0.58
4	Athiyannur	14.39	2.47	0	0	203.83	0.48	0.66
5	Chirayinkeezh	122.66	147.92	39.21	0	419.38	2.02	1.66
6	Kilimanoor	438.17	729.37	0	0	889.19	17.27	9.01
7	Varkala	237.90	274.30	0.43	0	438.80	2.80	3.81
8	Nedumangad	28.34	18.38	4.42	0	365.18	3.00	3.77
9	Vellanad	59.29	49.76	3.87	0	500.44	8.07	6.48
10	Vamanapuram	105.64	71.59	0.47	0	520.75	37.39	26.65
11	Parassala	180.03	156.64	7.06	0	235.44	4.13	0.39
12	Perumkadavila	13.33	6.53	8.48	0	1135.24	14.14	2.76
	Corporation & Municipalities	33.21	22.13	5.76	0	246.61	2.79	1.62
	District Total	**1350.27**	**1528.79**	**116.39**	**0**	**5683.29**	**95.05**	**58.02**

Sl. No.	Block	Arecanut	Nutmeg	Jack	Banana	Plantain	Pineapple	Pappaya
1	2	10	11	12	13	14	15	16
1	Trivandrum Rural	12.06	0.51	77.88	3.26	72.01	0.46	21.07
2	Kazhakuttam	27.74	1.83	405.43	30.58	181.70	3.21	99.70
3	Nemom	82.66	5.68	593.77	510.06	597.99	58.13	194.98
4	Athiyannur	21.31	1.57	348.22	124.82	286.07	11.02	94.19
5	Chirayinkeezh	53.64	6.89	368.40	21.77	350.52	6.00	113.23
6	Kilimanoor	167.54	3.35	834.13	79.26	728.57	13.26	165.21
7	Varkala	68.26	1.42	354.32	20.36	395.56	14.00	79.11
8	Nedumangad	77.63	7.75	274.73	89.88	264.90	25.44	44.69
9	Vellanad	110.97	5.34	328.45	158.46	469.24	41.81	48.19
10	Vamanapuram	108.20	12.50	480.87	147.96	400.70	50.01	39.63
11	Parassala	24.94	8.89	401.78	552.62	576.64	26.31	127.98
12	Perumkadavila	172.62	16.83	635.55	875.69	962.92	48.05	183.80
	Corporation & Municipalities	71.78	3.60	332.45	74.41	351.67	14.86	107.57
	District Total	**999.35**	**76.16**	**5435.98**	**2689.13**	**5638.49**	**312.56**	**1319.35**

Table Continued……..

Sl. No.	Block	Cashew	Tapioca	Drumstick	Sesa mum	Coconut	Betel Leaves	Cocoa
1	2	17	18	19	20	21	22	23
1	Trivandrum Rural	3.29	112.87	37.23	0	2473.37	0.10	0.59
2	Kazhakuttam	25.32	963.69	109.61	0	8599.65	0.21	1.94
3	Nemom	21.43	2609.20	251.99	0	6771.34	1.78	3.52
4	Athiyannur	20.37	1189.26	94.52	0	6759.83	0.90	2.19
5	Chirayinkeezh	81.76	1260.63	169.01	0	5052.97	1.30	1.46
6	Kilimanoor	424.89	3451.36	249.88	0	7235.04	5.51	2.95
7	Varkala	200.56	2151.49	166.80	0.01	6193.87	0	0.76
8	Nedumangad	30.34	896.64	54.19	0	4194.79	2.18	4.50
9	Vellanad	17.58	1217.87	53.97	0	4196.53	2.04	15.41
10	Vamanapuram	35.02	1917.46	101.56	0	3938.89	4.35	14.31
11	Parassala	35.23	1112.72	125.76	0	4696.80	2.25	2.08
12	Perumkadavila	97.34	2690.17	232.74	0	5657.50	4.00	14.49
	Corporation & Municipalities	31.29	715.13	124.16	0	5874.39	0.58	5.20
	District Total	**1024.42**	**20288.49**	**1771.42**	**0.01**	**71674.97**	**25.20**	**69.40**

Table: 14.5

BLOCK WISE AREA UNDER CROPS 2009-2010 (In Ha)

Sl. No.	Block	Paddy			Sugar cane	Pepper	Ginger	Turmeric
		Autumn	Winter	Summer				
1	2	3	4	5	6	7	8	9
1	Trivandrum Rural	18.01	18.01	0	0	27.84	0.36	0.17
2	Kazhakuttam	32.83	15.47	17.6	0	239.47	0.89	0.69
3	Nemom	39.66	36.30	85.68	0	348.01	1.55	0.71
4	Athiyannur	8.91	2.33	0.73	0.13	143.97	1.6	0.8
5	Chirayinkeezh	151.44	115.22	0	0	355.31	3.44	3.89
6	Kilimanoor	600.41	654.83	0	0	866.5	18.59	14.91
7	Varkala	266.53	319.95	0	0	441.29	3.09	2.89
8	Nedumangad	20.86	1.48	10.15	0.02	311.4	1.7	3.15
9	Vellanad	10.26	10.13	0.06	0	327.85	4.29	3.76
10	Vamanapuram	81.79	80.73	0	0	528.63	14.57	11.81
11	Parassala	136.05	91.54	28.06	0	189.1	4.74	1.02
12	Perumkadavila	10.58	3.50	12.37	0.16	862.45	5.38	1.13
	Corporation & Municipalities	40.15	10.65	8.13	0.03	260.1	1.46	1.04
	District Total	**1417.48**	**1360.14**	**162.78**	**0.34**	**4091.92**	**61.66**	**45.97**

Table Continued……..

Sl. No.	Block	Arecanut	Nutmeg	Jack	Banana	Plantain	Pine apple	Pappaya
1	2	10	11	12	13	14	15	16
1	Trivandrum Rural	10.08	0.64	110.15	2.99	56.47	0.45	33.28
2	Kazhakuttam	28.07	2.78	366.37	35.61	207.35	2.48	104.84
3	Nemom	53.75	4.47	491.89	478.27	516.65	17.33	117.93
4	Athiyannur	15.38	2.14	330.71	230.1	250.41	8.44	108.25
5	Chirayinkeezh	60.99	5.45	340.6	34.15	356.2	6.21	94.42
6	Kilimanoor	148.26	4.92	808.44	77.66	565.58	13.12	166.04
7	Varkala	58.83	1.57	343.03	14.99	311.55	13.68	62.04
8	Nedumangad	77.54	2.59	202.1	106.02	292.06	12	27.51
9	Vellanad	79.81	9.61	218.41	208.09	438.82	25.62	39.04
10	Vamanapuram	133.94	12.12	416.11	153.13	428.93	47.16	51.08
11	Parassala	21.04	5.36	389.67	724.42	503.72	20.47	113.37
12	Perumkadavila	137.77	15.83	590.24	222.56	648.07	16.04	107.59
	Corporation & Municipalities	64.13	6.07	376.71	61.14	402.96	12.35	75.47
	District Total	**889.59**	**73.55**	**4984.43**	**2349.13**	**4978.77**	**195.35**	**1100.86**

Sl. No.	Block	Cashew	Tapioca	Drumstick	Sesamum	Coconut	Betel Leaves	Cocoa
1	2	17	18	19	20	21	22	23
1	Trivandrum Rural	5.84	124.41	36.83	0	2312.79	0.14	0.45
2	Kazhakuttam	76.01	857.82	218.11	0	8602.46	0.36	2.03
3	Nemom	60.58	1500.1	174.35	0	7063.89	1.68	1.91
4	Athiyannur	14.13	782.07	126.99	0	6424.85	0.92	1.65
5	Chirayinkeezh	77.62	1241.33	157.76	0	4714.55	0.53	1.61
6	Kilimanoor	402.48	2865.81	255.88	0	6943.77	1.79	1.03
7	Varkala	182.29	1578.09	118.79	0	5934.45	0.09	0.68
8	Nedumangad	21.74	683.65	54.29	0	3583.76	3.47	3.65
9	Vellanad	19.77	1121.79	48.64	0	3874.27	1.33	21.97
10	Vamanapuram	30.04	1892.89	91.54	0	4003.13	3.52	22.85
11	Parassala	32.98	802.17	141.91	0	5382.98	1.98	1.46
12	Perumkadavila	40.59	2058.33	171.89	0	6087.01	1.96	10.12
	Corporation & Municipalities	37.04	624.62	116.26	0	6447.59	1.11	5.48
	District Total	**1001.11**	**16133.08**	**1713.24**	**0**	**71375.50**	**18.88**	**74.89**

Table: 14.6

BLOCK WISE AREA UNDER CROPS 2010-2011 (In Ha)

Sl. No.	Block	Paddy			Sugar cane	Pepper	Ginger	Turmeric
		Autumn	Winter	Summer				
1	2	3	4	5	6	7	8	9
1	Trivandrum Rural	0	4.00	0	0	32.37	0.30	0.14
2	Kazhakuttam	62.14	26.08	17.63	0	222.49	1.67	0.96
3	Nemom	32.56	10.96	17.85	0	289.84	4.55	0.47
4	Athiyannur	1.97	1.63	0.36	0	140.10	0.90	0.69
5	Chirayinkeezh	131.96	134.03	1.17	0	279.16	5.04	4.85
6	Kilimanoor	584.85	605.58	0	0	922.54	20.78	17.06
7	Varkala	196.36	193.91	0	0	456.67	3.27	2.91
8	Nedumangad	31.04	2.24	22.81	0	248.47	3.54	3.44
9	Vellanad	46.77	18.52	58.54	0	335.22	3.81	3.00
10	Vamanapuram	146.44	88.85	11.86	0.10	673.92	12.47	10.01
11	Parassala	189.98	43.10	109.51	0	270.20	1.58	0.80
12	Perumkadavila	26.85	2.32	5.85	0.08	627.60	9.85	5.54
	Corporation & Municipalities	41.88	27.29	21.91	0	262.24	1.97	1.47
	District Total	**1492.80**	**1158.51**	**267.49**	**0.18**	**4760.82**	**69.73**	**51.34**

Sl. No.	Block	Arecanut	Nutmeg	Jack	Banana	Plantain	Pine apple	Pappaya
1	2	10	11	12	13	14	15	16
1	Trivandrum Rural	8.80	1.46	114.44	2.07	57.06	0.43	40.71
2	Kazhakuttam	34.00	2.89	466.20	33.95	247.52	3.11	138.97
3	Nemom	59.16	4.70	437.86	432.80	660.58	12.81	103.88
4	Athiyannur	18.33	1.63	343.70	107.93	463.15	5.45	109.92
5	Chirayinkeezh	63.65	5.24	351.00	16.81	375.00	5.99	115.00
6	Kilimanoor	149.96	6.07	847.93	59.37	585.99	13.54	196.89
7	Varkala	61.50	2.10	380.73	16.67	324.23	13.25	77.71
8	Nedumangad	71.83	4.90	198.94	99.99	293.75	14.07	29.30
9	Vellanad	80.24	7.58	219.08	174.18	492.59	20.94	41.79
10	Vamanapuram	172.95	13.68	495.56	419.12	488.25	50.29	56.37
11	Parassala	39.71	4.12	387.17	1062.92	585.34	22.83	164.00
12	Perumkadavila	92.78	9.25	565.25	427.64	618.16	32.46	154.07
	Corporation & Municipalities	69.54	6.29	361.84	38.18	447.93	6.21	110.24
	District Total	**922.45**	**69.91**	**5169.70**	**2891.63**	**5639.55**	**201.38**	**1338.85**

Table Continued……..

Sl. No.	Block	Cashew	Tapioca	Drumstick	Sesamum	Coconut	Betel Leaves	Cocoa
1	2	17	18	19	20	21	22	23
1	Trivandrum Rural	4.55	107.12	42.51	0	2418.55	0.08	0.54
2	Kazhakuttam	63.09	1043.92	231.13	0	8083.42	0.60	2.31
3	Nemom	50.76	1228.37	126.75	0	6934.46	1.20	2.21
4	Athiyannur	7.30	543.13	109.14	0	5799.64	0.52	1.19
5	Chirayinkeezh	80.38	1315.26	217.86	0	5577.03	0.59	2.06
6	Kilimanoor	439.82	2747.30	298.79	0	7182.53	1.84	1.27
7	Varkala	204.48	1774.55	149.26	0	5893.64	0.11	0.86
8	Nedumangad	19.94	523.36	57.07	0	3723.24	2.59	4.69
9	Vellanad	17.91	874.66	48.30	0	3909.86	0.45	19.91
10	Vamanapuram	46.33	1291.64	126.12	0	4341.10	3.84	12.02
11	Parassala	35.10	717.28	192.55	0	4315.80	3.56	0.59
12	Perumkadavila	60.74	1404.53	167.22	0	5292.00	3.81	14.04
	Corporation & Municipalities	37.45	690.35	174.80	0	6197.17	0.68	4.04
	District Total	**1067.85**	**14261.47**	**1941.50**	**0**	**69668.44**	**19.24**	**65.83**

Table: 14.7

PRODUCTION OF IMPORTANT CROPS

(Production in Tonnes)

Year	Rice				Jowar	Ragi	Other Cereals	Sugar cane (cane gur)	Black Pepper	Green Chillies	Pulses including Tur	Cured Ginger	Cured Turmeric
	Autumn	Winter	Summer	Total									
1	2	3	4	5	6	7	8	9	10	11	12	13	14
2010-11	3593	2770	560	6923	0	0	0	0	939	83	31	180	87
2009-10	3942	3282	340	7564	0	0	0	0	1031	99	47	152	84
2008-09	3360	3608	306	7274	0	0	0	0	1201	54	149	291	124

Year	Ground nut	Areca nut	Tama rind	Mango	Jack (Million Nos)	Banana	Other Plantain	Pine apple	Tapioca	Sweet Potato	Pappaya	Drumstick	Sesamum
1	15	16	17	18	19	20	21	22	23	24	25	26	27
2010-11	1	556	2619	21521	25	16248	43637	1348	409253	113	11714	2190	0
2009-10	1	460	2492	19918	24	17250	44905	1313	424015	216	12875	2292	0
2008-09	0	601	3096	23390	26	18858	43342	2074	525897	204	7651	1997	0

Year	Coconut (Million Nos.)	Cotton (No. of bales of 170kg each)	Nut meg	Tobacco	Tea	Coffee	Rubber	Cocoa	Processed Cardamom	Raw cashew nuts	Betel leaves	Clove (dry)	Garlic
1	28	29	30	31	32	33	34	35	36	37	38	39	40
2010-11	499	0	36	0	0	0	44930	29	0	390	681	2	0
2009-10	591	0	40	0	0	0	42900	25	0	403	879	2	0
2008-09	600	0	45	0	0	0	45880	27	0	443	1063	2	0

Table: 14.8

BLOCK WISE PRODUCTION OF IMPORTANT CROPS 2010-2011

(Production in Tonnes)

Block	Rice			Sugarcane (Canegur)	Black pepper	Cured Ginger	Cured Turmeric	Arecanut	Tamarind	Jack (Million Nos.)	Banana
	Autumn	Winter	Summer								
1	2	3	4	5	6	7	8	9	10	11	12
Trivandrum Rural					6.76	0.98	0.37	4.13	17.57	0.72	17.49
Kazhakuttam	164.32	60.96	46.14	0	35.67	5.33	2.12	18.65	66.55	2.64	253.97
Nemom	83.94	26.77	28.80	0	33.30	15.06	0.94	34.08	451.60	2.22	2987.02
Athiyannur	4.02	3.97	0.48	0	14.29	2.39	1.56	10.81	181.02	1.75	834.73
Chirayinkeezh	343.67	348.97	2.95	0	50.82	6.90	4.68	32.94	86.14	2.19	84.75
Kilimanoor	1435.93	1523.97		0	213.81	30.60	16.85	79.36	245.54	4.36	252.78
Varkala	489.45	435.58		0	78.24	4.96	2.59	25.09	144.34	2.55	86.11
Nedumangad	65.32	5.24	53.48	0	66.72	13.48	9.15	48.37	26.72	0.98	958.74
Vellanad	94.91	40.98	99.49	0	107.81	15.35	8.53	62.98	35.45	1.02	1296.74
Vamanapuram	284.40	216.04	32.01	0	213.07	51.41	28.95	122.08	49.86	2.78	3348.08
Parassala	450.45	78.86	233.54	0	23.06	3.60	1.24	24.83	965.90	0.87	3022.28
Perumkadavila	64.00	5.39	15.31	0	55.47	26.67	7.44	62.45	278.70	1.75	2985.36
Corporation & Municipalities	112.62	23.39	47.29	0	39.74	4.46	2.09	30.00	69.44	0.95	119.78
District Total	**3593.07**	**2770.16**	**559.53**	**0**	**938.81**	**180.24**	**86.86**	**555.84**	**2618.88**	**24.78**	**16247.88**

Table Continued…….

Block	Other Plantain	Pine apple	Tapioca	Pappaya	Sesamum	Coconut (Million Nos)	Nutmeg	Cocoa	Raw cashew nuts	Betel Leaves
1	13	14	15	16	17	18	19	20	21	22
Trivandrum Rural	364.15	2.36	5824.65	532.44	0	23.66	2.13	0.18	1.13	1.84
Kazhakuttam	1941.79	25.09	27163.84	1555.63	0	84.61	4.19	0.56	26.40	17.40
Nemom	3803.94	67.08	31446.27	811.30	0	43.32	2.59	0.85	17.04	31.20
Athiyannur	3881.19	21.22	14630.83	1204.72	0	39.02	1.10		2.16	12.48
Chirayinkeezh	3351.00	53.00	40828.30	1000.38	0	32.86	0.85		32.75	37.76
Kilimanoor	4393.75	121.21	78820.28	1462.30	0	51.84	0.72	0.47	164.26	77.28
Varkala	3390.14	105.47	53683.16	470.14	0	42.68	0.39	0.29	75.30	5.94
Nedumangad	3112.28	107.97	11867.18	123.85	0	24.68	1.62	2.79	7.57	121.73
Vellanad	4442.17	171.79	23047.29	167.24	0	22.04	1.95	8.35	7.55	20.25
Vamanapuram	3825.92	352.73	28028.58	328.58	0	25.95	3.25	4.17	14.92	168.96
Parassala	3349.31	120.79	27682.70	1857.13	0	27.73	4.47		10.13	106.80
Perumkadavila	3840.62	153.27	47402.88	1325.77	0	34.66	8.68	10.09	16.82	69.96
Corporation & Municipalities	3941.04	46.17	18827.45	874.31	0	46.30	4.41	1.06	14.41	9.14
District Total	**43637.36**	**1348.19**	**409253.45**	**11713.83**	**0**	**499.40**	**36.41**	**28.83**	**390.49**	**680.74**

Table: 14.9

BLOCK WISE PRODUCTION OF IMPORTANT CROPS 2009-2010

(Production in Tonnes)

Block	Rice				Canegur	Black pepper	Cured Ginger	Cured Turmeric	Arecanut	Jack (Million Nos.)	Banana
	Autumn	Winter	Summer	Total							
1	2	3	4	5	6	7	8	9	10	11	12
Trivandrum Rural	0	0	0	0	0	1.70	0.85	0.18	5.31	0.89	26.40
Kazhakuttam	100.83	35.32	29.22	165.38	0	30.06	2.22	1.12	16.7	1.90	228.24
Nemom	111.77	95.44	202.14	409.36	0	24.35	4.76	1.16	34.05	2.05	3864.38
Athiyannur	27.10	4.85	0	31.96	0	12.88	4.60	2.01	8.48	1.23	1954.96
Chirayinkeezh	476.28	263.96	0	740.25	0	96.26	4.25	4.29	32.33	1.26	185.7
Kilimanoor	1725.80	1618.93	0	3344.73	0	216.58	27.86	15.89	87.59	3.69	304.32
Varkala	720.40	790.79	0	1511.20	0	134.64	5.75	3.40	33.8	1.99	94.92
Nedumangad	48.87	3.16	12.97	65.01	0	75.06	6.62	9.23	42.95	1.17	875.16
Vellanad	23.09	19.23	0.14	42.47	0	124.38	16.40	10.47	54.14	1.37	1777.05
Vamanapuram	200.38	210.88	0	411.26	0	170.65	51.76	31.56	54.80	2.78	1127.83
Parassala	375.23	210.91	54.79	640.94	0	10.92	12.51	1.13	7.95	1.30	4872.40
Perumkadavila	34.10	10.20	24.98	69.29	0	65.38	10.63	1.64	42.77	2.10	1524.24
Corporation & Municipalities	97.89	18.72	15.32	131.95	0	68.31	4.20	2.32	39.46	1.69	414.22
District Total	**3941.80**	**3282.46**	**339.58**	**7563.84**	**0**	**1031.23**	**152.47**	**84.44**	**460.39**	**23.48**	**17249.82**

Table Continued…….

Block	Other Plantain	Pineapple	Tapioca	Pappaya	Drum stick	Sesamum	Coconut (Million Nos)	Nutmeg	Cocoa	Raw cashew	Betel Leaves
1	13	14	15	16	17	18	19	20	21	22	23
Trivandrum Rural	639.12	2.72	2721.46	994.54	55.57	0	21.85	0.87	0.12	2.13	4.9
Kazhakuttam	1644.07	22.13	20989.99	1849.37	358.57	0	81.64	3.19	0.80	31.03	16.2
Nemom	3728.14	85.80	32627.17	1535.68	234.15	0	57.75	3.23	0.58	17.55	50.4
Athiyannur	2209.61	38.97	19918.54	1156.43	203.94	0	43.72	1.61	0.48	4.54	29.44
Chirayinkeezh	2513.70	51.02	35248.80	1185.91	191.04	0	44.53	1.81	1.3	33.34	30.21
Kilimanoor	4824.96	134.96	80959.13	1837.89	382.79	0	66.69	0.52	0.36	138.92	91.29
Varkala	3624.26	96.28	34495.46	415.29	52.62	0	59.68	0.36	0	92.49	4.59
Nedumangad	3410.09	105.10	13758.45	167.94	38.22	0	23.76	0.98	1.48	12.10	215.14
Vellanad	5963.12	190.07	30148.10	168.34	34.77	0	26.04	2.99	5.35	13.60	66.5
Vamanapuram	4070.97	351.20	52291.08	363.79	57.12	0	26.09	3.47	5.52	14.80	228.8
Parassala	3175.45	105.80	24892.13	1451.93	411.96	0	44.75	4.58	0.87	9.26	47.52
Perumkadavila	5562.38	61.96	60309.06	683.84	138.54	0	41.88	11.54	6.53	11.15	49
Corporation & Municipalities	3539.06	66.47	15655.09	1063.93	133.02	0	52.29	4.46	1.81	22.04	44.99
District Total	**44904.98**	**1312.53**	**424014.53**	**12874.93**	**2292.36**	**0**	**590.73**	**39.66**	**25.25**	**403.02**	**878.98**

Table: 14.10

ESTIMATED AREA AND PRODUCTION OF RICE (AUTUMN)

(Area in Ha & Production in Tonnes)

Year	High Yielding						Local Varities						Total	
	Irrigated		Unirrigated		Total		Irrigated		Unirrigated		Total		Area	Production
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production		
2010-11	5424	15978	40	87	5464	16065	0	0	0	0	0	0	5464	16065
2009-10	3929.48	11459.84	9.15	23.24	3938.63	11483.08	0.68	0.42	0	0	0.68	0.42	3939.31	11483.51
2008-09	3309	10016	1	1	3310	10017	18	46	3	2	21	48	3331	10065

Table: 14.11

ESTIMATED AREA AND PRODUCTION OF RICE (WINTER)

Year	High Yielding						Local Varities						Total	
	Irrigated		Unirrigated		Total		Irrigated		Unirrigated		Total		Area	Production
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production		
2010-11	1473	3343	1	2	1474	3345	62	124	0	0	62	124	1536	3469
2009-10	3113.88	7579.22	0	0	3113.88	7579.22	16.6	37.19	7.69	17.51	24.29	54.70	3138.17	7633.92
2008-09	2228	5750	0	0	2228	5750	51	92	0	0	51	92	2279	5842

Table: 14.12

ESTIMATED AREA AND PRODUCTION OF RICE (SUMMER)

Year	High Yielding						Local Varities						Total	
	Irrigated		Unirrigated		Total		Irrigated		Unirrigated		Total		Area	Production
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production		
2010-11	7775	21435	0	0	7775	21435	0	1	0	0	0	1	7775	21436
2009-10	8396.06	20294.70	0	0	8396.06	20294.70	0	0	0	0	0	0	8396.06	20294.70
2008-09	5340	16247	0	0	5340	16247	1	0	0	0	1	0	5341	16247

Source: Agricultural Statistics, 2010-11

SEED RATE FOR IMPORTANT CROPS OF KERALA

1. Rice	Transplanting	-	60-85kg/ha
	Broadcasting	-	80-100kg/ha
	Dibbling	-	80-90kg/ha
2. Maize		-	20kg/ha
3. Ragi	Direct sown	-	5kg/ha
	Transplanted crop	-	4-5kg/ha
4. Sorghum		-	12-15kg/ha
5. Black gram	Pure crop	-	20kg/ha
	Mixed crop	-	6kg/ha
6. Cowpea			
1. For vegetable type			
	a. Bush	-	20-25kg/ha
	b. Trailing	-	4-5kg/ha
2. For grain and dual purpose			
	a. Broadcasting	-	60-65kg\ha
	b. Dibbling	-	50-60kg/ha
7. Green gram			
	Pure crop	-	20-25kg/ha
	Mixed crop	-	6kg/ha
8. Green pea		-	60kg/ha
9. Horse gram		-	25-30kg/ha
10. Red gram			
	Pure crop	-	15-20kg/ha
	Mixed crop	-	6-7kg/ha
11. Amorphophallus		-	9-12tonnes/ha
12. Colocasia		-	800-1200kg/ha
13. Greater yam (Kachi)		-	3000-3700kg/ha
14. Lesser yam (Nanakizhangu)		-	1800-2700kg/ha
15. Sweet potato		-	80kg tubers/ha
16. Tapioca		-	2000 stems/ha
17. Rubber		-	450-500plants/ha
18. Ground nut			
	Pure crop	-	100kg kernels/ha
	Inter crop in coconut	-	80kg kernel/ha
	Inter crop in Tapioca	-	40-50kg kernel/ha
19. Sesamum		-	4-5kg/ha
20. Mango ginger		-	1500kg/ha
21. Ginger		-	1500kg/ha
22. Turmeric		-	2000-2500kg/ha
23. Betel vine		-	20000to25000cuttings/ha
24. Okra		-	7-8.5kg/ha
25. Bitter gourd		-	5-6kg/ha
26. Coleus		-	75-100kg/tubers/ha
27. Snake gourd		-	3-4kg/ha

28. Cucumber	-	0.5-0.75kg/ha
29. Watermelon	-	1-1.5kg/ha
30. Bottle gourd	-	3-4kg/ha
31. Pumpkin	-	1-1.5kg/ha
32. Ash gourd	-	0.75-1kg/ha
33. Brinjal	-	370-500g/ha
34. Chilli	-	1kg/ha
35. Tomato	-	400g/ha
36. Cabbage	-	500-750g/ha
37. Cauliflower	-	600-750g/ha
38. Carrot	-	5-6kg/ha
39. Beetroot	-	7-8kg/ha
40. Radish	-	7-8kg/ha
41. Potato	-	1000-2000kg seed tuber/ha
42. Garlic	-	500kg of cloves/ha
43. Winged bean	-	15-20kg/ha
44. Cluster bean	-	10-12kg/ha
45. Clove bean	-	6-7kg/ha
46. Smooth gourd	-	2.5-3kg/ha
47. Ridge gourd	-	2.5-3kg/ha
48. Bell pepper	-	400-600g/ha

CONVERSION RATES BETWEEN RAW MATERIALS AND PROCESSED PRODUCTS

Paddy	Rice	Cleaned 2/3 by weight of paddy
Groundnut	Kernels to nuts in shell	70 percent
	Oil to nuts in shell	28 percent
	Oil to Kernels crushed	40 percent
	Cake to Kernels crushed	60 percent
Sesamum	Oil to seeds crushed	40 percent
	Cake to seeds crushed	60 percent
Coconut	Copra to nuts	6,773 nuts gives one tone of copra (average), presently it is 7250-7500 nuts due to mite attack
	Cake to copra	38 percent
Pepper	Green to dry	21-39 percent by weight
Sugarcane	Gur from cane	10 percent
	Crystal sugar from gur	62.4 percent
	Crystal sugar from cane	9.9 percent
	Molasses from cane	3.5 percent
Cashew	Cashew Kernel	25 percent of nuts
Arecanut	Husked Champan to unhusked	35 percent by weight
Supari	(Processed tender nut to Unhusked champan)	12 percent
Tapioca	Starch	28-30 percent on the weight of fresh tubers

Turmeric	Cured to raw	
	(Dry 17-25% of the raw stuff)	16-20 percent of the weight
Ginger	Dry Ginger	21-30 percent by weight
Cocoa	Pod to wet beans	40 percent by weight
	Wet beans to dried beans	35-40 percent by weight
Coffee	Robusta-Berried to clean coffee	4.5 to 3.6:1
	Wet beans to dried beans	5.0 to 3.3:1
Cardamom	Green to dry	25-35 percent
Oil Palm	Palm Oil	20% by weight of Bunch
Soyabean seed	Oil to soyabean seed crushed	18 percent
	Meal to soyabean seed crushed	73 percent
	Hull from soyabean seed crushed	8 percent
Neem seed	Oil to kernel crushed	45-50 percent
	Cake to kernel crushed	50-55 percent

CONVERSION FACTORS FOR COCONUT

A. Number of Coconuts to a tonne of Copra:

Kerala	6,250 to 6,850 (at present it is 7250-7500 nuts due to mite attack)
Andrapradesh	8,820
Tamilnadu	7,000
Laccadives	12,000

B. Copra yield from coconut in different months in Kerala at 6% moisture level/1000 nuts

January	163kg
February	181kg
March	178kg
April	176kg
May	179kg
June	165kg
July	152kg
August	139kg
September	147kg
October	148kg
November	155kg
December	158kg

C. Nuts to shell, Coconut water etc.	114kg shell
1000 nuts	100 litres of coconut water
1000 nuts	35kg of charcoal

D. Coconut Oil from Copra

Chekkus	58-60%
Rotories	62-63%
Expellers	63-65%

E. Ball copra from coconut (per 1000 nuts)	1.5tonne (grade 1)
	1.3tonne (average)
F. Desiccated coconut (per 1000 nuts)	1 tonne of DC

G. Cake yield as percentage of copra crushed

Chekkus	38%
Rottories	36%
Expellers	34%

H. Coconut to Fibre (per 1000 nuts)

81.8kg - Kerala
68.3kg - Andhrapradesh
90.0kg - Tamilnadu
81.9kg - Karnataka
56.9kg - Others

I. Composition of Coconut (Husked)

Shell	27.9% (23.5 to32.8)
Kernel	55.2% (48.2 to 62.0)
Water	17.0% (8.2 to 25.1)

J. Composition of Standard Copra

Moisture	6%
Oil	68 to 71%
Free Fatty Acids	2%

Composition	**Kernel (%)**	**Copra (%)**	**Cake (%)**
Moisture	46.3	5.8	10.7
Protein	4.1	8.9	19.1
Fat	37.3	67.0	11.1
Carbohydrates	7.9	12.4	40.9
Crude Fibre	3.4	4.1	14.1
Ash	1.0	1.8	4.1

K. Fatty Acid Composition of Coconut Oil

Saturated Fatty Acids	Un-Saturated Fatty Acids
Lauric Acid	Palmitoleic Acid
Caprylic Acid	Oleic Acid
Myristic Acid	Linoleic Acid
Straric Acid	Arachidonic Acid
Arachidic Acid	

L. Coir pith per 10000 husk	2 tonnes
M. Charcoal yield from shell (per 3 tonnes of shell)	1 tonne
N. Processed coconut cream/1000 coconut	200kg cream
O. Coconut Vinegar (per 100 litres coconut water)	110 litre vinegar

Source:- Farm Guide.

Table: 14.13

Operational Holdings In Kerala During 2005-06

Type of operational holdings	No. of operational holdings	Area operated (ha)
Individual	6833448	1436394
Joint	4455	3953
Institutional	66389	114479
Total	**6904292**	**1554826**

Table: 14.14

Distribution of district wise number of operational holdings by size class

(Area in Ha)

Thiruvananthapuram	Below - 1.00	Small 1.00 - 1.99	Semi-medium 2.00-3.99	Medium 4.00-9.99	Large - 10 above	All categories
	784996	6081	1055	150	60	792342

Table: 14.15

District wise number and area of operational holdings according to major social groups

District	Number of operational holdings				Area operated (Ha)			
	SC	ST	Others	Total	SC	ST	Others	Total
Thiruvananthapuram	79377	7414	705551	792342	2637	2907	76882	82426
State	579188	87307	6237797	6904292	39618	30197	1485011	1554826

Table: 14.16

District wise number intensity of cropping 2005-06

(Area in Ha)

District	Net area sown	Gross cropped area	Intensity of cropping
Thiruvananthapuram	66151.95	73425.73	111.00
State	1300601.32	1552231.99	119.35

Source: Agricultural Census 2005-06

Table: 14.17

Number and area of operational holdings according to major social group

Sl. No.	Number of operational holdings					Area operated (Ha)			
	Size class (Ha)	All	SC	ST	Others	All	SC	ST	Others
1	Marginal (Below 1.00)	6602443 (95.63)	576683 (99.57)	79198 (90.71)	5946562 (95.33)	895786 (57.61)	35709 (90.13)	16432 (54.42)	843645 (56.81)
2	Small (1.00-1.99)	214832 (3.11)	2084 (0.36)	6165 (7.06)	206583 (3.31)	284820 (18.32)	2748 (6.94)	8052 (26.66)	274020 (18.45)
3	Semi-medium (2.00-3.99)	69710 (1)	381 (0.06)	1644 (1.88)	67685 (1.09)	178574 (11.48)	937 (2.36)	4056 (13.43)	173581 (11.69)
4	Medium (4.00-9.99)	14858 (0.22)	40 (0.01)	285 (0.33)	14533 (0.23)	78757 (5.07)	224 (0.57)	1374 (4.55)	77159 (5.2)
5	Large (10.00 & above)	2449 (0.04)	0	15 (0.02)	2434 (0.04)	116889 (7.52)	0	283 (0.94)	116606 (7.85)
	All sizes	6904292 (100)	579188 (100)	87307 (100)	6237797 (100)	1554826 (100)	39618 (100)	30197 (100)	1485011 (100)

Table: 14.18

Land utilization pattern 1995-96, 2000-01 and 2005-06

Sl. No.	Land use Pattern	1995-96		2000-01		2005-06	
		Area	Percentage	Area	Percentage	Area	Percentage
1	Net area sown	1446571	84.48	1311566	83.57	1300601	83.65
2	Area under current fallow	22308	1.30	26561	1.69	26382	1.70
3	Other uncultivated land excluding fallow land	24195	1.41	47919	3.05	12501	0.80
4	Fallow land other than current fallow	15729	0.93	16307	1.04	14771	0.95
5	Cultivable waste land	22149	1.29	25249	1.61	25191	1.62
6	Land not available for cultivation	181274	10.59	141886	9.04	175380	11.28
	Total Area of holdings	**1712223**	**100**	**1569488**	**100**	**1554826**	**100**

Source: Agricultural Census 2005-06

PLANTATION CROPS

Plantation crops are perennial crops which are grown in larger areas and commercially important. Plantation crops in general are either export oriented or import substituting. Each of the four plantation crops of South India has its distinct characteristics and economic problems. Kerala has a substantial share in the four plantations of crops of rubber, tea, coffee and cardamom and these four crops together occupy 6.81 lakh ha accounting for 32.88% of the net cropped area in the State and 39.6% of the area under these crops in the country. Kerala's share in the natural production of rubber is 90%, cardamom 76%, coffee 22% during the year 2010-11.

Rubber: - Natural Rubber occupies the prime position in Kerala among plantation crops. Kerala accounts 78.2% of the area under rubber in the country. In 2010-11 the productivity increases slightly to 1422 kg/ha from 1419 kg/ha in the previous year. Production of natural rubber for the year 2011-12 is projected at 9.02 lakh tonnes with a growth rate of 4.6%. Kerala accounts for 78.2% of the area under rubber in the country. Steady increase in demand from the domestic manufacturing sector necessitates massive imports of natural rubber and imports during 2010-11 seen to have stabilized at 1.88 lakh tonnes an increase of 0.11 lakh tonnes over the previous year. There is an area of 30970 ha under rubber plantation in Thiruvananthapuram for the year 2010-11.

Coffee: - Coffee is another plantation crop of natural importance cultivated in Kerala. Kerala is one of the chief producers of coffee in India. The major coffee variety grown in Kerala is robusta with a share of 95% in planted area. The robusta coffee plants last upto 60-80 years. Coffee provides livelihood opportunities to nearly one lakh families including agricultural labourers. Area under coffee registered substantial increase during the last two decades. The increase in production recorded during the period was much higher and registered an annual average growth rate of nearly 4%. The area under coffee in Kerala is 84931 ha and production is 21% during 2010-11. Domestic coffee production for the year 2010-11 is 299 thousand tonnes which is more than 9.4 thousand tonnes compared to the previous year. Thiruvananthapuram district is having no area under coffee plantation.

Cardamom: - Cardamom is called as the “Queen of Spices” and is an important spices crop cultivated in Kerala. Cardamom occupied 12% area under the cultivation of spices and condiments and it has third largest area among them. Cardamom is grown in the tropical rain forest plantations of Kerala. There are mainly three natural varieties of green cardamom plants. The share of Kerala in production at the all India level increased from 28% in 1992-93 to 76% in 2010-11 while area under cardamom in the country has declined from 0.97 lakh ha to 0.71 lakh ha, the total area of cardamom cultivation in the State is 41242 ha during 2010-11. Thiruvananthapuram district is free of cardamom cultivation.

Tea: - Tea is greater significant to Kerala because of high land productivity relative to other crops, exports earnings and employment in rural and backward areas. Area under tea cultivation in Kerala is only 0.37 lakh ha. and production share is 6.8% in 2010-11. Tea is one of the traditional plantation crops in Kerala. Area under tea cultivation is 36965 ha in 2010-11. There is a fluctuation in production and it ranged from 64.8 M.kgs in 1995-96 reaching to 69.1 M.kgs in 2000-2001 which declined to 52 M.kgs in 2007 and improved to 65.87 M.kgs in 2010-11. 965 ha area of land is cultivated tea in Thiruvananthapuram in the year 2010-11.

Table: 15.1

RUBBER STATISTICS

Type- wise Production & Consumption of NR & SR	August 2011	August 2010	April 2011 to August 2011	April 2010 to August 2010	April 2010 to March 2011	Percentage increase (+)/ decrease (-) of (3) & (4)
	(1)	(2)	(3)	(4)	(5)	(6)
PRODUCTION						
Natural Rubber (NR)						
Ribbed Smoked Sheet (RSS)	51365	53035	222330	213515	618960	
Solid Block Rubber	9740	9535	42840	40795	117830	
Latex Concentrates (drc)	6115	5690	28130	26210	76065	
Others	3980	4240	17900	17230	49095	
Total	**71200**	**72500**	**311200**	**297750**	**861950**	**4.5**
Synthetic Rubber (SR)						
Styrene Butadiene (SBR)	1515	1524	7848	7062	19994	
Poly Butadiene (BR)	6670	6325	32700	32345	75905	
Others	1206	918	5781	4504	14441	
Total	**9391**	**8767**	**46329**	**43911**	**110340**	**5.5**
Total NR & SR	**80591**	**81267**	**357529**	**341661**	**972290**	**4.6**
CONSUMPTION						
Natural Rubber (NR)						
Ribbed Smoked Sheet (RSS)	44965	45190	254165	247165	607455	
Solid Block Rubber	22720	25580	103485	97360	235130	
Latex Concentrates (drc)	6210	6310	31290	32305	77380	
Others	2295	2420	11675	11720	27750	

Total	**76190**	**79500**	**400615**	**388550**	**947715**	**3.1**
Out of which Auto Tyre Manufactures	47246	49358	263348	244230	597623	7.8
Synthetic Rubber (SR)						
Styrene Butadiene (SBR)	14605	14535	76760	69435	174855	
Poly Butadiene (BR)	9830	10330	55205	48585	125305	
Others	9200	9355	47600	49125	111670	
Total	33635	34220	179565	167145	411830	7.4
Out of which Auto Tyre Manufactures	23530	25092	130877	118803	298414	10.2
Total NR & SR	**109825**	**113720**	**580180**	**555695**	**1359545**	**4.4**
Out of which Auto Tyre Manufactures	70776	74450	394225	363033	896037	**8.6**

(Metric Tonnes)					
Production Consumption and stock of RR	**August 2011**	**August 2010**	**April 2011 to August 2011**	**April 2010 to August 2010**	**April 2010 to March 2011**
Reclaimed Rubber (RR)					
Production	8590	8540	41620	39670	99960
Consumption	8385	8480	41300	40160	100290
Out of which Auto Tyre Manufactures	3676	3406	17235	16032	40511
Stock with Manufactures (end of month/ year)	5270	4790			

Source:- Rubber Board

ANIMAL HUSBANDRY

The animal husbandry activities play a crucial role in the socio-economic transformation of the rural areas, especially in generating employment and income to the weaker section of the population. The preservation and the development of cattle wealth and poultry are also significant to the production of major livestock products of nutritional standard. Generally rearing cattle and poultry farming are the allied occupations of agricultural workers. In Kerala also livestock production has been traditionally practiced mainly as an extensive, low input subsistence system integrated with crop production. It is livelihood intensive and also a significant contributor to Gross State Domestic Product (GSDP), it could be a main role in the agricultural GSDP of Kerala.

Table: 16.1

NUMBER OF CASES TREATED UNDER IMPORTANT CATEGORIES OF DISEASES IN VARIOUS DEPARTMENT INSTITUTIONS DURING 2009-2010

Mastitis	Bovine	8691
	Goat	5000
	Others	531
Digestive Disorders	Bovine	53069
	Goat	47496
	Others	27182
Respiratory Diseases	Bovine	8256
	Goat	8009
	Others	40043
Metabolic Diseases	Bovine	7510
	Goat	1842
	Others	436
Deficiency Diseases	Bovine	2233
	Goat	1617
	Others	1465
Abortion	Bovine	590
	Goat	551
	Others	56
Worm Infections	Bovine	4392
	Goat	4123
	Others	3192
Coccidiosis	Bovine	1802
	Goat	1130
	Others	2107
Babesiosis	Bovine	332
	Goat	38
	Others	1

Source: Bulletin 2010, AHD.

Table: 16.2

ANTI RABIES VACCINATIONS DONE IN THE DISTRICT DURING 2009-2010

Prophylactic in dogs	Post Exposure Vaccinations					Number of deaths due to rabies				
	Cattle	Buffalo	Goat	Canine	Other Animals	Cattle	Buffalo	Goat	Canine	Other Animals
21,263	151	26	1081	1204	89	0	0	8	13	1

Table: 16.3

DAIRY CO-OPERATIVE SOCIETIES IN THE THIRUVANANTHAPURAM DISTRICT AS ON 31-03-2010

Primary Societies	413
Regional Unions	1
Total	414
Anand Mode (APCOS)	332
Traditional	81
Total	413

Source: Bulletin 2010, AHD

Table: 16.4

ESTIMATED PRODUCTION OF VARIOUS LIVESTOCK PRODUCTS

Livestock Products		2007-08	2008-09	2009-10
Milk (in '000 tonnes)				
Cows	Indigenous	98.04	143.04	132
	Crossbred	2025.34	2168.07	2234.35
Total cows milk		**2123.39**	**2311.12**	**2366.35**
Buffaloes		27.34	36.31	44.45
Goat		96.89	103.08	126.3
Total milk production		**2247.63**	**2450.52**	**2537.10**
Egg (in lakh nos)				
Fowls		12851	14133	15662
Ducks		941	933	668
Total eggs		**13792**	**15066**	**16330**
Meat (in MT)				
Cattle		28073	53410	48804
Buffaloes		23789	44472	41820
Goat & Sheep		5129	8910	7980
Pig		3202	3555	3422
Total Animal meat		**60193**	**110347**	**102026**
Total Poultry meat		**17390**	**13749**	**15482**
Total Meat Production		**77583**	**124096**	**117508**

Source: AHD

Table: 16.5

ACTIVITIES IN THE ANIMAL HUSBANDRY SECTOR (2003-04 TO 2010-11)

Sl. No.	Activities	Unit ('000)	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
1	Cases treated	Nos.	4629	4879	5029	5260	5015	4873	4663	4 287
2	Operations Performed	Nos.	136	135	125	120	121	116	122	86
3	Castration done	Nos.	6	6	5	5	4.8	5.6	4.7	4.37
4	**Vaccination done**									
	1. Livestock	Nos.	4414	1334	3440	2723	2517	2282	3653	1636
	2. Poultry	Nos.	4554	6170	9603	8752	7251	7008	8829	8903
5	Anti Rabies Vaccinations done in Dogs	Nos.	132	113	101	197	173	207	176	141.04
6	Artificial Insemination done	Nos.	1231	1176	1180	1204	1075	1196.96	1298.55	1387.46
7	Calvings recorded	Nos.	354	358	355	383	358	346.90	326.70	368.92
8	Chicks hatched out in Department Poultry Farms	Nos.	977	747	515	859	369	603	792	1054.77
9	**Vaccines produced in Veterinary Biologicals**									
	1. Poultry	Doses	17967	13488	10948	20892	11103	19285	138.49	16925.50
	2. Livestock	Doses	534	329	184	440	678	494	227	326

Source: Economic Review 2011.

Table: 16.6

STATEMENT OF OUTBREAKS, ATTACKS, DEATHS ETC. DUE TO CONTAGIOUS DISEASES AND NUMBER OF ANIMALS PROTECTED/VACCINATED DURING THE YEAR 2009-10

Foot and Mouth				Anthrax				Black Quarter				Hemorrhagic Septicemia			
Out break	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated
5	5	0	95456	0	0	0	410	1	5	2	1688	1	3	3	4495
Canine Distember				**Parvo Virus**				**Ranikhet**				**Fowl Pox**			
Out break	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated
1	192	17	1506	2	179	4	1191	1	387	143	498321	4	148	2	2638
Infectious Bursal Disease				**Duck Plague**				**Others**				**Total**			
Out break	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated	Outbreak	Attack	Death	Protected/ Vaccinated
0	0	0	5410	1	8	8	4692	1	23	22	33662	16	942	193	649469

Source: Bulletin 2010, AHD

Table: 16.7

ESTIMATED NUMBER OF ANIMALS SLAUGHTERED CATEGORY WISE (AUTHORISED SECTOR ONLY) DURING 2009-2010 (In Nos)

Cattle			Buffalo			Goats and Sheep			Pig		
Adult	Young	Total	Adult	Young	Total	Adult	Young	Total	Desi	Improved	Total
10400	6203	16603	5479	2796	8275	17269	8236	25505	105	324	429

Table: 16.8

ESTIMATED MEAT PRODUCTION – CATEGORY WISE (AUTHORISED SECTOR ONLY) IN MT DURING 2009-2010

Cattle			Buffalo			Goat and Sheep			Pig			Total Meat Production
Adult	Young	Total	Adult	Young	Total	Adult	Young	Total	Desi	Improved	Total	
1190.80	120.33	1311.13	660.22	85.27	745.49	284.93	61.77	346.70	3.09	16.36	19.46	2422.80

Source: Bulletin 2010, AHD

FISHERIES

In Kerala, fishing industry occupies an important position in its economy. With a coastal line of about 590 Km long, numerous lakes and backwaters close to the sea and connected thereto and a number of rivers that empty into them Kerala offers immense possibilities for fishing both marine and inland. The activities covered in this sector are (i) fishing in ocean, coastal, offshore and inland waters for commercial purposes. (ii) Subsistence fishing in inland waters. (iii) Gathering of sea weeds, seashells and other ocean and coastal water products (iv) fish curing. The important factor that has a decisive note in the fishery potential of the State is the existence of mud-banks, locally known as 'Chakara', closed to the coast. With the added advantage of the calmness of the sea in the mud-bank areas, which facilities even small country crafts to play over them, the effect of mud-banks have on the fishing aspect of the region is decisive. Not only do the fisheries contribute to about 3 percent of the economy of Kerala they also earn the state a great deal of foreign exchange and goodwill. The water resources of this State comprise of a coastline of 590 km length having a continental shelf area of the sea adjoining the Kerala State is 39139 sq.kms. The potential of the state in terms of marine fisheries is believed to be about 5.70 lakh MT and inland fisheries are 1.17 lakh MT during 2009-10. Thiruvananthapuram district stretches along the shores of the Arabian Sea for a distance of 78 km, offering immense scope for the development of fisheries as an important source of earning foreign exchange. Varkala, Anchuthengu, Marianda, Poonthura, Vizhinjam and Poovar are some of the major fishing centres. There are 46 fishing villages in the district and the number of fishermen population is 188095 during 2009-10, which comprised of 184878 in marine and 1577 in inland sectors. The fishery in the State can be classified into two broad groups as marine and inland fishery.

Marine Fishery: - Even though the condimental shelf has a fishable ground of about 39139 Sq.Km at present the exploitation is confined to the insure belt of (approx) 39 lakh Sq.Km from the shore. The total yield from the marine catch stands at the level of about 5.70 lakh MT in 2009-10.The lighterage port at Neendakara through not envisaged as a fishing harbour, is at present the most important fishing centre of the State using mechanised boats.

Inland Fishery:- The Inland water bodies of Kerala have a prominent role in the socio economic development of the State. The State is endowed with a significant wealth of inland fishery resources. The major inland water resources of the State having much fishery importance are the 44 rivers (85000 ha), 53 reservoirs (44289 ha) and 53 back waters and other brakish water bodies (65213 ha). The estuarine fishing from the lakes and backwaters and freshwater fishing from rivers, ponds, reservoirs etc. are grouped under this category. As Kerala has a good number of backwaters closed to the coast and 44 rivers that empty into them or direct to the sea, good facilities for the development of inland fishery are available. The fresh water reservoirs formed by construction of dams for irrigation and power generation are also good grounds for development of fresh water species. The total

yield from the inland catch stands at level of about 1.17 lakh MT in 2009-10. The fresh water reservoirs can be utilized as nurseries and research fields.

Table:17.1

FRESH WATER RESOURCES IN THIRUVANANTHAPURAM DISTRICT

Year	Panchayat Ponds		Holy ponds and streams		Village ponds and other water holds		Irrigation tanks	
	No	Area (Ha)	No	Area (Ha)	No	Area (Ha)	No	Area (Ha)
2010	1706	297.25	67	20.03	0	0	34	1.54
2009	1706	297.25	67	20.03	0	0	34	1.54

Table: 17.2

DETAILS OF FISH/SHRIMP/PRAWN SEED FARMS AND HATCHERIES IN THIRUVANANTHAPURAM

Number of Seed farms/Hatcheries			Total	Seed Production capacity (in lakhs)			Total
Fish	Shrimp	Scampi		Fish	Shrimp	Scampi	
1	1	0	**2**	5	200	0	**205**

Table: 17.3

DISTRICT WISE SPECIES WISE INLAND FISH LANDINGS IN THIRUVANANTHAPURAM (QTY in MT)

2009-2010	
Name of Fish	Number
Prawn	41
Etroplus	43
Murrels	117
Mullets	72
Cat Fish	82
Jew fish	41
Tilapia	170
Labeo fimbriatus	0
Barbus	18
Mrigal	0
Crabs	11
Common Carps	545
Catla	603
Gourami	0
Chamos	9
Eels	1
Labeo Rohitha	152
Shrimp	1
Mussel	0
Edible Oyster	0
Miscellaneous	48
Total	**1954**

2008-2009	
Name of Fish	Number
Prawn	40
Etroplus	43
Murrels	116
Mullets	72
Cat Fish	82
Jew fish	41
Tilapia	172
Labeo fimbriatus	0
Barbus	18
Mrigal	0
Crabs	9
Common Carps	455
Catla	453
Gourami	0
Chamos	9
Eels	1
Labeo Rohitha	131
Shrimp	0
Mussel	0
Edible Oyster	0
Miscellaneous	51
Total	**1693**

Table: 17.4

DISTRICT WISE SPECIES WISE VALUES OF INLAND FISHES IN THIRUVANANTHAPURAM (Rs in 000's)

2009-2010	
Name of Fish	Number
Prawn	9020
Etroplus	5590
Murrels	5850
Mullets	6840
Cat Fish	3854
Jew fish	1476
Tilapia	5950
Labeo fimbriatus	0
Barbus	504
Mrigal	0
Crabs	3355
Common Carps	24525
Catla	27135
Gourami	0
Chamos	540
Eels	36
Labeo Rohitha	6840
Shrimp	185
Mussel	0
Edible Oyster	0
Miscellaneous	2304
Total	**104004**

2008-2009	
Name of Fish	Number
Prawn	8800
Etroplus	3225
Murrels	5800
Mullets	6840
Cat Fish	3854
Jew fish	1476
Tilapia	6020
Labeo fimbriatus	0
Barbus	504
Mrigal	0
Crabs	2745
Common Carps	20475
Catla	20385
Gourami	0
Chamos	540
Eels	36
Labeo Rohitha	5895
Shrimp	0
Mussel	0
Edible Oyster	0
Miscellaneous	2248
Total	**89043**

Table: 17.5

CONTRIBUTION OF FISHING TO NDP ESTIMATES AT CONSTANT PRICES

2008-2009 (base year 2004-05)	Tvpm
Net Domestic Product (Rs. in lakhs)	1579377
Fishing (Rs. in lakhs)	10884
Percentage of fishing to Net Domestic Product	0.69
Population (In' 000)	3455
Per Capita Income (In Rs.)	45465

2009-2010 (base year 2004-05)	Tvpm
Net Domestic Product (Rs. in lakhs)	1742433
Fishing (Rs. in lakhs)	10890
Percentage of fishing to Net Domestic Product	0.62
Population (In' 000)	3481
Per Capita income (In Rs.)	50056

Table : 17.6

CONTRIBUTION OF FISHING TO NDP ESTIMATES AT CURRENT PRICES

2008-2009 (base year 2004-05)	Tvpm
Net Domestic Product (Rs. in lakhs)	1905349
Fishing (Rs. in lakhs)	17300
Percentage of fishing to Net Domestic Product	0.91
Population (In' 000)	3455
Per Capita income (In Rs.)	54552

2009-2010 (base year 2004-05)	Tvpm
Net Domestic Product (Rs. in lakhs)	2187523
Fishing (Rs. in lakhs)	17432
Percentage of fishing to Net Domestic Product	0.80
Population (In' 000)	3481
Per Capita income (In Rs.)	62842

Table: 17.7

WORKING OF FFDA IN THIRUVANANTHAPURAM

Year	No. of members during the year	Total area surveyed (Ha)	Area brought under fish culture (Ha)	No. of beneficiaries	Distribution of fish seed (No)	Harvested area (Ha)	Harvested Quantity (in tonne)	No. of farmers trained
2009-2010	236	150.00	104.00	450.00	129171	70.00	150.00	201
2008-2009	115	52.10	19.34	24	319646	0.00	4.145	61
2007-2008	295	50.00	42.26	100	407700	0	0	101

Table: 17.8

PERCENTAGE OF ACTIVE FISHERMEN TO THE FISHERMEN POPULATION (INLAND)

2009-2010			2008-2009			2007-2008			2006-2007		
Total Number of Fishermen	Total Number of Active Fishermen	Percentage of Active Fishermen	Total Number of Fishermen	Total Number of Active Fishermen	Percentage of Active Fishermen	Total Number of Fishermen	Total Number of Active Fishermen	Percentage of Active Fishermen	Total Number of Fishermen	Total Number of Active Fishermen	Percentage of Active Fishermen
1577	0	0	1563	0	0	1549	0	0	1533	0	0

Source: Inland Fisheries Statistics, Dept of Fisheries

WETLAND

Wetlands play a vital role in maintaining the fragile environmental balance. Wetlands serve as sinks, sources and transformers of innumerable chemical, biological and genetic materials. They offer a unique habitat for a wide variety of flora and fauna as well. Wetlands are lands transitional between terrestrial and aquatic ecosystem where the water table is usually at or near the surface or the land is covered by shallow water. This definition, given by Cowardin et al (1979), is widely accepted by wetland scientists of the United States and is also used in India (Mitsch and Gosselink, 1989). Wetlands include the swamps, bogs, marshes, mires, fens and other wet ecosystems found throughout the world under different names. Wetland is an area of ground that is saturated with water either permanently or seasonally. Wetlands are categorized by their characteristic vegetation, which is adapted to these unique soil conditions.

Wetlands are found on every continent except Antartica. The main functions of wetlands are as water purification systems flood control, shoreline stability and as reservoirs of biodiversity. Wetlands may be converted to agriculture or development or constructed as a water management tool as in the recent developing field of water sensitive urban design.

Wetlands have been categorized both biomes and ecosystem. A patch of land that develops pools of water after a rain storm would not be considered as a 'wetland' though the land is wet. Wetlands have unique characteristics. They are generally distinguished from other water bodies or landforms based on their water level and on the types of plants that thrive within their specifically wetlands are characterized as having a water table that stands at or near the land surface either permanently or seasonally for a large enough period each year to support aquatic plants.

Wetlands vary widely due to local and regional differences in topography, hydrology, vegetation and other factors including human interference. Wetlands can be divided into two main classes, tidal and non-tidal areas.

Wetland hydrology is associated with the spartial and dispersion, flow, and physio chemical attributes of surface and ground water in its reservoirs. Based on hydrology wetlands can be categorized as reveries (associated with streams) lacustrine (associated with lakes and reservoirs) and palustrine (isolated). Salinity has a very strong influence on wetland water chemistry. In non-reverine wetlands natural salinity is regulated by interaction between ground and surface water, which may be influenced by human activity.

Carbon is the major nutrient cycled within wetlands. Most nutrients such as carbon, sulfur, phosphorus and nitrogen are found within the soil of wetlands. The biota of a wetland system includes its vegetation zones and structure as well as animal population and distribution which are highly dependent of water chemistry. The chemistry of water flowing into wetlands depends on the source of water and the

geological material in which it flows through as well as the nutrients discharged from organic matter in the soils and plants at higher elevation as the slope wetlands.

There are four main groups of hydrophytes that found in wetland systems. Submerged water plants - found completely underwater, floating water plants usually small although it may take up a large surface area in wetland systems, emergent water plants seen above the surface of water but whose roots are completely submerged.

Fish are more dependent on wetland ecosystems than any other type of habitant. Frogs are the most crucial amphibian species in wetland systems.

Temperatures vary greatly depending on the location of the wetland. Rainfall also varies according its location.

Wetland reservoirs are very rich in our country which exhibit significant ecological diversity because of variability in climate conditions and topography.

Though small in size Kerala is land of affluent in water sources. 44 rivers drain the land of, which are west flowing and 3 flows east. Apart from these 44 rivers their tributaries and a countless number of streams and rivulets crisscross the land making it green and fertile and also serve as inland waterways.

Besides these rivers Kerala is bestowed with a number of lakes and backwater lagoon which add to the beauty of the land. The important wetlands of Kerala are Ashtamudi Lake, Vembanadu Lake and Sasthankotta Lake. In the State of Kerala 1762 wetlands have been delineated. Total wetlands area estimated to 160590 ha. The major wetland types are River/stream (65162 ha) Lagoons (38442 ha) Reservoirs (26167 ha) and waterlogged (20305 ha). Analysis of wetland status in terms of open water and aquatic vegetation showed that around 88 and 83% of wetland area is under open water category during post monsoon and pre monsoon respectively. Aquatic vegetation (floating / emergent) occupies around 8 and 6% of wetland area during post and pre monsoon respectively.

The wetlands can be broadly classified into inland fresh and saline as well as coastal fresh and saline areas. The coastal wetland ecosystems are often classified as tidal salt marshes, tidal freshwater marshes and mangrove wetlands; the inland wetland ecosystems, as inland fresh water marshes, peatlands, deepwater swamps and riparian wetlands. Examples of artificial wetlands are those of wild-life sanctuaries of Bharathpur and Kaziranga in India and the extensive man-managed rice fields in different parts of Asia.

The wetlands are among the most important ecosystems of the Earth. On a short-time scale, wetlands are useful as sources, sinks and transformers of a multitude of chemical, biological and genetic materials. They have been found to cleanse polluted waters, prevent floods, protect shorelines and recharge groundwater aquifers; further more wetlands provide unique habitats for a wide variety of flora and fauna. In a long-time scale, the swampy environment of the carboniferous Period produced and preserved many of the fossil fuels on which we depend now. Some

scientists have rightly called the wetlands as ‘nature’s kidneys’ because of the natural functions they perform.

Wetlands are the most productive life-supports system in the world and are of immense socio-economic and ecological importance to mankind. The management of these wetlands has become the most important concern of mankind today. The paddy wetlands are a potential source for the food security of the state. The area of these wetlands is shrinking at an alarming rate due to the shift from rice to cash crops and non-agricultural use. Scientific Management coupled with socioeconomic considerations will provide an effective tool to the planner for recognizing wetlands as one of the prime life-sustaining ecosystems. To save this unique inter-tidal ecosystem from being endangered its conservation and management as well as in river basin management policies/programmes.

Table:18.1

ATHIYANOOR BLOCK

(Area in Ha)

Sl. No.	Category	Athiyanoor	Kanjiram kulam	Karim kulam	Kottukal	Venganoor	Vizhinjam	Total
1	Paddy viruppu	7.14			20.69	11.37	13.97	53.17
2	Present paddy area	7.14			20.69	11.37	13.97	53.17
3	Paddy converted built up land	2.52			5.30	2.49	1.36	11.67
4	Paddy converted coconut	3.89			0.50	41.27	11.27	56.93
5	Paddy converted banana	16.92			4.73	15.36	3.50	40.51
6	Paddy converted coconut + banana	2.67			0.00	2.66	0.00	5.33
7	Paddy converted coconut + tapioca	6.75			3.60	0.00	1.62	11.97
8	Paddy converted coconut + vegetables	5.61			0.00	0.00	0.00	5.61
9	Paddy converted banana + tapioca	36.79			3.74	3.56	3.97	48.06
10	Paddy converted banana + vegetable	0.71			0.00	0.00	0.00	0.71
11	Paddy converted tapioca	20.82			1.43	11.09	5.19	38.53
12	Paddy converted tapioca + vegetable	6.67			0.00	0.00	0.00	6.67
13	Paddy converted vegetable	3.36			1.45	7.19	0.00	12.00
14	Paddy converted mixed crops	43.95			19.38	45.12	3.04	111.49
15	Paddy converted area	150.66			40.13	128.74	29.95	349.48
16	Total paddy area	157.80			60.82	140.11	43.92	402.65
17	Ponds	6.03			0.00	1.47	9.81	17.31
18	Waterbody	2.38			0.00	20.83	1.03	24.24
19	Water logged	0.00			0.00	3.52	0.00	3.52
20	Total water body	8.41			0.00	25.82	10.84	45.07
21	Total Panchayat area	1186.99	747.50	654.43	1012.43	1290.22	1184.55	6076.12

Table:18.2

CHIRAYINKEEZHU BLOCK

(Area in Ha)

Sl. No.	Category	Anchuthengu	Azhoor	Chirayin keezhu	Kadakka voor	Keezhu valam	Muthakkal	Vakkom	Total
1	Paddy viruppu + mundakan		9.47	9.88	0.16	141.85	100.97	66.05	328.38
2	Paddy viruppu + mundakan + puncha		0.00	0.00	0.00	13.99	0.00	0.00	13.99
3	Present paddy area		9.47	9.88	0.16	155.84	100.97	66.05	342.37
4	Paddy converted built up land		1.40	0.00	0.00	0.00	0.45	0.00	1.85
5	Paddy converted coconut		38.97	6.83	4.07	66.43	62.04	22.76	201.10
6	Paddy converted banana		6.53	4.00	0.00	21.94	23.64	7.31	63.42
7	Paddy converted coconut (RA)		0.00	0.00	0.00	2.30	0.35	0.00	2.65
8	Paddy converted coconut + banana		0.00	0.00	0.00	0.00	4.17	0.00	4.17
9	Paddy converted coconut + tapioca		0.00	0.00	0.00	0.00	0.48	0.00	0.48
10	Paddy converted tapioca		8.06	0.19	0.00	20.08	54.53	5.39	88.25
11	Paddy converted vegetable		0.00	0.00	0.00	0.00	0.52	0.00	0.52
12	Paddy converted mixed crops		18.81	0.77	3.45	25.58	11.42	0.00	60.03
13	Paddy converted to sand mining		0.00	0.00	0.00	0.00	0.33	0.00	0.33
14	Paddy converted area		73.77	11.79	7.52	136.33	157.93	35.46	422.80
15	Paddy - cultivable wasteland		0.00	0.00	0.00	0.00	3.15	0.00	3.15
16	Paddy - fallow		15.88	3.78	1.45	72.18	28.15	28.28	149.72
17	Total paddy area		99.12	25.45	9.13	364.35	290.20	129.79	918.04
18	Ponds		0.18	0.24	2.98	2.62	1.12	3.57	10.71
19	Total water body		0.18	0.24	2.98	2.62	1.12	3.57	10.71
20	Total Panchayat area	293.90	1252.44	872.63	337.12	1716.19	2668.39	1437.85	8578.52

Table:18.3

KAZHAKKUTTOM BLOCK

(Area in Ha)

Sl. No.	Category	Andoorkonam	Kadinam kulam	Kazhakoo ttam	Mangala puram	Pothencode	Sreekaryam	Total
1	Paddy viruppu	0.00	0.00	0.00	10.90	0.00	0.00	10.90
2	Paddy + viruppu + mundakan	15.62	10.05	17.47	30.71	24.13	0.00	97.98
3	Present paddy area	15.62	10.05	17.47	41.61	24.13	0.00	108.88
4	Paddy converted built up land	68.01	0.00	2.23	1.15	0.00	8.65	80.04
5	Paddy converted coconut	129.81	138.59	84.46	109.23	104.34	98.09	664.52
6	Paddy converted banana	19.78	0.00	12.19	23.42	46.65	46.74	148.78
7	Paddy converted coconut + banana	0.00	0.00	0.00	0.00	4.51	0.00	4.51
8	Paddy converted coconut + tapioca	0.00	0.00	0.00	0.00	8.53	0.00	8.53
9	Paddy converted banana + tapioca	0.00	0.00	0.00	0.00	8.75	0.00	8.75
10	Paddy converted tapioca	16.66	0.00	15.24	26.02	33.83	3.60	95.35
11	Paddy converted vegetable	0.00	0.00	0.74	0.02	1.51	10.50	12.77
12	Paddy converted mixed crops	43.94	9.07	21.38	22.89	53.57	111.53	262.38
13	Paddy converted area	278.20	147.66	136.24	182.73	261.69	279.11	1285.63
14	Paddy - cultivable wasteland	0.00	0.00	0.00	0.00	0.67	0.00	0.67
15	Paddy - fallow	38.00	10.96	11.81	6.68	1.27	1.80	70.52
16	Total paddy area	331.82	168.67	165.52	231.02	287.76	280.91	1465.70
17	Ponds	0.00	0.00	0.00	0.00	0.17	0.40	0.57
18	Waterbody	5.50	3.38	1.72	1.99	1.29	2.71	16.59
19	Total water body	5.50	3.38	1.72	1.99	1.46	3.11	17.16
20	Total Panchayat area	1540.09	2015.09	1293.53	2205.09	2479.59	2148.84	11682.23

Table:18.4

KILIMANOOR BLOCK

(Area in Ha)

Sl. No.	Category	Karavaram	Kilimanoor	Madavoor	Nagaroor	Navai kulam	Pallickal	Pazhayakunnumel	Pulimath	Total
1	Paddy mundakan	0.00	0.74	0.58	0.00	0.00	0.00	0.00	0.00	1.32
2	Paddy viruppu + mundakan	122.34	117.62	141.38	181.18	186.29	104.46	48.97	125.00	1027.24
3	Present paddy area	122.34	118.36	141.96	181.18	186.29	104.46	48.97	125.00	1028.56
4	Paddy converted built up land	0.61	0.00	0.85	0.00	0.66	0.86	1.68	3.72	8.38
5	Paddy converted coconut	50.66	29.52	26.99	48.09	74.27	17.69	24.47	45.42	317.11
6	Paddy converted banana	11.36	11.59	11.39	17.41	24.05	17.36	17.14	15.16	125.46
7	Paddy converted coconut + banana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.89	3.89
8	Paddy converted banana + tapioca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.39	5.39
9	Paddy converted tapioca	19.97	22.83	29.04	20.62	31.52	26.01	17.48	41.37	208.84
10	Paddy converted rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.86
11	Paddy converted nutmeg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.42
12	Paddy converted mixed crops	10.56	4.55	3.25	8.91	7.15	0.99	6.67	9.51	51.59
13	Paddy converted area	93.16	68.49	71.52	95.03	137.65	62.91	67.44	125.74	721.94
14	Wetland	0.00	0.00	0.00	0.87	0.00	0.00	0.00	0.19	1.06
15	Paddy - cultivable wasteland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	3.88
16	Paddy - fallow	124.89	62.60	36.89	41.93	82.71	37.54	43.74	18.59	448.89
17	Total paddy area	340.39	249.45	250.37	319.01	406.65	204.91	160.15	273.40	2204.33
18	Ponds	1.20	1.07	1.51	1.76	0.81	0.06	0.00	2.30	8.71
19	Total waterbody	1.20	1.07	1.51	1.76	0.81	0.06	0.00	2.30	8.71
20	Total Panchayat area	2329.15	1844.81	1799.32	2236.35	2959.42	1696.45	2425.58	2853.19	18144.27

Table:18.5

NEDUMANGAD BLOCK

(Area in Ha)

Sl. No.	Category	Anadu	Aruvikkara	Karakulam	Panavoor	Vembayam	Total
1	Paddy viruppu	3.67	3.03	0.00	1.13	0.00	7.83
2	Paddy mundakan	0.00	0.78	0.00	0.00	0.00	0.78
3	Paddy viruppu + mundakan	15.01	0.30	0.00	10.41	9.98	35.70
4	Present paddy area	18.68	4.11	0.00	11.54	9.98	44.31
5	Paddy converted built up land	2.73	1.05	5.32	0.59	0.00	9.69
6	Paddy converted coconut	26.97	38.54	33.75	12.36	30.44	142.06
7	Paddy converted banana	38.13	13.39	24.27	31.26	37.98	145.03
8	Paddy converted areacanut	0.00	0.00	0.00	0.29	4.19	4.48
9	Paddy converted coconut + banana	67.96	20.99	0.00	31.06	17.32	137.33
10	Paddy converted coconut + tapioca	1.42	1.79	0.00	2.67	0.00	5.88
11	Paddy converted coconut + rubber	0.69	0.00	0.00	1.15	0.00	1.84
12	Paddy converted coconut + areacanut	6.60	0.48	0.00	0.00	0.00	7.08
13	Paddy converted areacanut + pepper	0.00	0.00	0.00	0.23	0.00	0.23
14	Paddy converted banana + tapioca	7.16	30.28	0.00	9.06	2.45	48.95
15	Paddy converted tapioca	11.63	11.20	19.61	12.23	18.18	72.85
16	Paddy converted vegetable	0.00	0.00	0.00	0.00	0.85	0.85
17	Paddy converted rubber	8.00	8.89	0.00	15.68	0.00	32.57
18	Paddy converted rubber + banana	0.00	0.00	0.00	3.82	0.00	3.82
19	Paddy converted mixed crops	27.40	26.21	52.62	14.33	35.82	156.38
20	Paddy converted area	198.69	152.82	135.57	134.73	147.23	769.04
21	Paddy - cultivable wasteland	2.39	5.15	0.00	5.33	1.55	14.42
22	Paddy - fallow	8.08	0.79	21.58	0.00	5.75	36.20
23	Total paddy area	227.84	162.87	157.15	151.60	164.51	863.97
24	Ponds	2.07	1.13	0.00	1.40	0.00	4.60
25	Waterbody	0.55	2.25	1.11	0.29	0.15	4.35
26	Total water body	2.62	3.38	1.11	1.69	0.15	8.95
27	Total Panchayat area	2552.39	2076.58	2399.94	2942.96	2964.99	12936.86

Table:18.6

NEMOM BLOCK

(Area in Ha)

Sl. No.	Category	Balaramapuram	Kalliyoor	Malayin keezhu	Maranallor	Pallichal	Vilappil	Vilavoorkal	Total
1	Paddy viruppu	5.94	4.45	0.36	4.92	10.50	0.00	0.00	26.17
2	Paddy viruppu + mundakan	0.00	0.00	0.00	0.00	0.00	0.16	1.96	2.12
3	Paddy mundakan + puncha	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.11
4	Paddy viruppu + mundakan + puncha	0.00	48.01	0.00	0.00	0.00	0.00	0.00	48.01
5	Present paddy area	5.94	52.46	0.36	4.92	10.50	0.27	1.96	76.41
6	Paddy converted built up land	1.95	6.00	21.20	1.36	8.18	1.69	22.41	62.79
7	Paddy converted coconut	3.74	64.38	10.27	18.33	3.67	48.21	13.47	162.07
8	Paddy converted banana	1.66	32.04	27.42	45.36	28.64	2.95	15.18	153.25
9	Paddy converted coconut + banana	7.17	0.01	12.71	13.17	12.58	55.19	6.44	107.27
10	Paddy converted coconut + arecanut	0.00	0.00	0.00	0.00	0.00	1.65	0.28	1.93
11	Paddy converted coconut + tapioca	0.00	19.64	20.50	10.83	10.73	9.87	1.00	72.57
12	Paddy converted coconut + vegetables	0.00	10.48	0.00	12.72	16.38	0.00	0.00	39.58
13	Paddy converted coconut + rubber	0.00	0.00	0.00	0.00	0.00	1.22	1.18	2.40
14	Paddy converted banana + tapioca	14.44	38.61	33.61	55.04	50.35	11.41	19.53	222.99
15	Paddy converted banana + vegetable	2.51	3.51	0.56	3.37	2.61	0.00	0.00	12.56
16	Paddy converted tapioca	10.86	20.24	19.72	54.08	42.99	20.90	21.15	189.94
17	Paddy converted tapioca + vegetable	0.32	14.56	0.00	0.55	10.27	0.00	0.00	25.70
18	Paddy converted vegetable	2.33	18.00	1.79	4.70	14.21	0.00	0.00	41.03
19	Paddy converted rubber	0.00	0.00	0.00	0.00	0.00	4.35	0.00	4.35
20	Paddy converted mixed crops	21.10	48.35	48.77	65.46	68.13	11.71	12.77	276.29
21	Paddy converted brick industry	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46
22	Paddy converted area	66.08	275.82	196.55	284.97	268.74	169.15	113.87	1375.18
23	Water logged	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02
24	Paddy - cultivable wasteland	0.00	0.00	0.00	0.00	0.00	1.49	0.00	1.49
25	Total paddy area	5.94	52.48	0.36	4.92	10.50	1.76	1.96	77.92
26	Ponds	3.24	2.76	1.66	1.63	4.39	1.14	2.38	17.20
27	Waterbody	1.47	60.33	0.90	1.99	3.07	5.27	0.00	73.03
28	Total water body	4.71	63.09	2.56	3.62	7.46	6.41	2.38	90.23
29	Total Panchayat area	994.22	1567.21	1800.26	2486.19	2108.21	2167.85	1044.07	12168.01

Table:18.7

PARASSALA BLOCK

(Area in Ha)

Sl. No.	Category	Chenkal	Karode	Kulathoor	Parassala	Poovar	Thirupuram	Total
1	Paddy viruppu	10.60	6.52	12.49	40.87	2.62	2.30	75.40
2	Present paddyarea	10.60	6.52	12.49	40.87	2.62	2.30	75.40
3	Paddy converted built up land	2.35	0.00	0.00	0.00	0.00	0.00	2.35
4	Paddy converted coconut	20.91	29.99	11.75	45.18	6.28	4.12	118.23
5	Paddy converted banana	47.33	48.55	10.63	76.52	15.41	0.72	199.16
6	Paddy converted coconut + banana	23.33	9.03	0.00	5.91	5.98	0.00	44.25
7	Paddy converted coconut + tapioca	9.35	3.22	2.39	10.47	0.00	4.53	29.96
8	Paddy converted coconut + vegetables	7.50	0.76	0.00	1.26	3.27	2.72	15.51
9	Paddy converted banana + tapioca	61.68	34.82	22.00	42.49	3.24	8.78	173.01
10	Paddy converted banana + vegetable	7.60	18.32	17.67	1.26	12.47	0.00	57.32
11	Paddy converted tapioca	65.68	34.99	14.02	86.20	14.25	6.04	221.18
12	Paddy converted tapioca + vegetable	0.00	3.02	0.00	0.00	0.00	0.00	3.02
13	Paddy converted vegetable	10.94	4.15	0.55	18.83	0.00	0.94	35.41
14	Paddy converted rubber	0.00	0.00	0.00	0.00	3.26	0.00	3.26
15	Paddy converted mixed crops	80.85	8.28	27.09	30.01	5.60	1.31	153.14
16	Paddy converted area	337.52	195.13	106.10	318.13	69.76	29.16	1055.80
17	Paddy - fallow	1.03	1.99	0.00	21.60	0.00	0.00	24.62
18	Total paddy area	349.15	203.64	118.59	380.60	72.38	31.46	1155.82
19	Ponds	22.36	17.72	6.20	19.35	5.59	1.13	72.35
20	Waterbody	3.28	1.47	0.56	3.12	0.00	0.17	8.60
21	Total water body	25.64	19.19	6.76	22.47	5.59	1.30	80.95
22	Total Panchayat area	2061.57	1494.56	1227.52	1999.78	1014.15	700.37	8497.95

Table:18.8

PERUNKADAVILA BLOCK

(Area in Ha)

Sl. No.	Category	Amboori	Aryancode	Kallikad	Kollayil	Kunnathukal	Ottasekharamangalam	Perunkadavila	Vellarada	Total
1	Paddy viruppu	0.00	0.41	10.20	4.98	2.76	0.93	0.00	7.13	26.41
2	Present paddy area	0.00	0.41	10.20	4.98	2.76	0.93	0.00	7.13	26.41
3	Paddy converted built up land	0.00	0.06	0.06	0.04	0.81	0.00	2.39	1.54	4.90
4	Paddy converted coconut	2.78	5.51	8.23	5.73	9.27	4.12	12.43	9.27	57.34
5	Paddy converted banana	5.43	8.56	19.78	31.38	32.56	13.16	16.27	56.28	183.42
6	Paddy converted coconut + banana	2.95	1.66	18.40	2.88	5.53	11.78	2.33	0.00	45.53
7	Paddy converted coconut + arecanut	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05
8	Paddy converted coconut + tapioca	7.61	3.64	0.00	4.24	16.30	5.89	2.15	30.04	69.87
9	Paddy converted coconut + vegetables	1.23	1.37	0.00	3.21	5.01	0.00	5.24	7.89	23.95
10	Paddy converted banana + tapioca	6.09	14.86	7.51	40.61	19.33	12.18	36.09	8.97	145.64
11	Paddy converted banana + vegetable	0.91	2.35	0.00	9.31	12.81	0.00	0.00	7.81	33.19
12	Paddy converted tapioca	11.67	0.00	3.51	24.74	46.55	17.75	12.03	45.40	161.65
13	Paddy converted tapioca + vegetable	0.00	0.00	0.00	3.20	0.00	0.00	3.22	0.00	6.42
14	Paddy converted vegetable	0.00	0.00	0.00	2.56	0.00	0.00	5.14	2.28	9.98
15	Paddy converted rubber	0.00	0.00	6.88	0.00	0.00	0.00	0.00	0.00	6.88
16	Paddy converted rubber + nutmeg	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.16
17	Paddy converted rubber nursery	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00	1.33
18	Paddy converted mixed crops	25.55	32.68	7.09	98.02	85.13	27.34	81.10	93.83	450.74
19	Paddy converted area	64.22	70.63	72.94	225.88	232.49	92.22	176.00	261.77	1196.15
20	Paddy - cultivable wasteland	0.00	0.00	2.91	0.00	0.00	0.00	0.00	0.00	2.91
21	Total paddy area	64.22	71.04	86.05	230.86	235.25	93.15	176.00	268.90	1225.47
22	Ponds	0.00	0.00	1.37	4.45	0.00	0.66	4.71	0.00	11.19
23	Waterbody	0.69	3.46	0.00	5.48	8.71	2.36	1.43	11.05	33.18
24	Total water body	0.69	3.46	1.37	9.93	8.71	3.02	6.14	11.05	44.37
25	Total Panchayat area	4403.66	2434.34	12040.75	1347.21	2324.81	1956.37	1761.53	2495.23	28763.90

Table:18.9

VAMANAPURAM BLOCK (Area in Ha)

Sl. No.	Category	Kallara	Manikkal	Nanniyodu	Nallanadu	Pangodu	Peringa mala	Pullam para	Vamana puram	Total
1	Paddy viruppu	0.56	0.00	2.26	0.00	0.00	11.47	0.00	1.90	16.19
2	Paddy viruppu + mundakan	46.29	49.87	6.09	57.11	5.60	18.81	21.61	72.37	277.75
3	Paddy mundakan + puncha	2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.63
4	Present paddy area	49.48	49.87	8.35	57.11	5.60	30.28	21.61	74.27	296.57
5	Paddy converted built up land	0.00	2.29	2.79	4.60	0.00	1.26	0.40	0.51	11.85
6	Paddy converted coconut	10.36	59.73	18.97	15.83	2.23	19.22	19.99	9.06	155.39
7	Paddy converted banana	14.41	58.81	22.99	14.02	0.56	17.93	21.91	8.75	159.38
8	Paddy converted areacanut	0.72	1.28	0.00	0.00	0.00	0.00	0.00	0.17	2.17
9	Paddy converted pepper	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.27
10	Paddy converted coconut + banana	8.85	36.56	40.96	13.02	4.35	27.72	9.83	0.37	141.66
11	Paddy converted coconut + tapioca	12.50	10.38	9.82	5.39	1.36	9.20	5.71	2.95	57.31
12	Paddy converted coconut + pepper	0.00	0.00	0.00	0.00	0.00	1.23	0.00	0.00	1.23
13	Paddy converted coconut + rubber	0.49	0.00	0.00	0.00	0.00	3.27	0.00	0.00	3.76
14	Paddy converted coconut + areacanut	1.31	0.76	2.51	0.00	0.00	3.37	0.00	0.85	8.80
15	Paddy converted banana + tapioca	32.23	49.88	6.31	21.79	3.05	6.26	31.53	0.00	151.05
16	Paddy converted tapioca	45.64	15.29	14.07	42.64	15.02	27.16	11.82	49.60	221.24
17	Paddy converted vegetable	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.29
18	Paddy converted rubber	9.24	0.00	13.24	2.66	6.37	42.37	5.50	3.99	83.37
19	Paddy converted rubber + nutmeg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.20
20	Paddy converted rubber + banana	0.00	0.00	1.39	0.00	0.00	0.00	0.00	4.85	6.24
21	Paddy converted mixed crops	2.38	36.78	52.64	1.29	6.18	27.34	7.52	3.58	137.71
22	Paddy converted brick industry	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00	0.93
23	Paddy converted clay industry	0.32	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.77
24	Paddy - Sand Mining	2.58	0.49	0.00	0.00	0.21	0.00	0.00	1.55	4.83
25	Paddy converted rubber nursery	0.00	0.00	0.00	0.00	0.00	2.26	0.00	0.00	0.00
26	Paddy converted area	141.03	272.25	186.91	121.24	39.33	188.59	114.93	86.43	1148.45
27	Paddy - cultivable wasteland	16.77	11.77	62.00	4.36	3.66	12.34	1.76	11.10	123.76
28	Total paddy area	157.80	284.02	248.91	125.60	42.99	200.93	116.69	97.53	1272.21
29	Ponds	0.30	1.08	0.00	0.58	0.00	0.71	0.00	0.00	2.67
30	Waterbody	0.00	0.55	1.52	0.90	0.00	0.64	0.00	0.78	4.39
31	Total water body	0.30	1.63	1.52	1.48	0.00	1.35	0.00	0.78	7.06
32	Total Panchayat area	3398.73	3098.10	3824.18	1805.22	3246.50	22813.14	2434.66	1699.88	42320.41

Table:18.10

VARKALA BLOCK

(Area in Ha)

Sl. No.	Category	Chemmaruthy	Cherunniyur	Edava	Elakamon	Ottur	Vettoor	Manampoor	Total
1	Paddy viruppu + mundakan	91.83	41.82	25.91	126.63	80.97	1.43	85.10	453.69
2	Present paddy area	91.83	41.82	25.91	126.63	80.97	1.43	85.10	453.69
3	Paddy converted built up land	0.00	0.69	1.59	0.64	2.19	0.00	0.77	5.88
4	Paddy converted coconut	42.54	28.62	7.68	32.89	27.46	5.40	37.36	181.95
5	Paddy converted banana	6.31	4.52	1.52	6.34	2.21	0.89	0.60	22.39
6	Paddy converted tapioca	15.61	3.84	0.84	10.61	5.27	0.76	11.07	48.00
7	Paddy converted mixed crops	2.40	3.29	0.22	0.00	0.65	0.72	1.49	8.77
8	Paddy converted area	66.86	40.96	11.85	50.48	37.78	7.77	51.29	266.99
9	Paddy - fallow	43.58	27.93	14.39	64.36	24.12	3.29	0.00	177.67
10	Total paddy area	202.27	110.71	52.15	241.47	142.87	12.49	136.39	898.35
11	Ponds	0.10	0.09	0.00	0.00	1.36	0.00	0.70	2.25
12	Total water body	0.10	0.09	0.00	0.00	1.36	0.00	0.70	2.25
13	Total Panchayat area	1752.61	1090.16	710.54	1786.36	975.64	521.43	1513.39	8350.13

Table:18.11

VELLANADU BLOCK (Area in Ha)

Sl. No.	Category	Aryanadu	Kattakada	Kuttichal	Poovachal	Tholikkodu	Uzhamalackal	Vellanadu	Vithura	Total
1	Paddy viruppu	3.55	5.19	6.24	6.18	12.00	7.99	10.78	10.68	113.72
2	Paddy mundakan	0.00	0.00	0.00	0.00	7.15	0.00	0.00	0.00	7.15
3	Paddy viruppu + mundakan	10.11	0.00	0.84	1.05	6.44	18.96	0.00	2.63	40.03
4	Present paddy area	13.66	5.19	7.08	7.23	25.59	26.95	10.78	13.31	160.90
5	Paddy converted built up land	2.90	11.70	1.92	1.90	4.14	0.00	1.91	1.19	25.66
6	Paddy converted coconut	20.32	25.20	24.14	35.12	34.97	16.21	27.79	30.50	214.25
7	Paddy converted banana	12.99	40.50	7.75	26.14	17.95	13.56	25.29	20.22	164.40
8	Paddy converted areacanut	0.00	0.00	0.00	2.03	0.00	0.00	0.00	0.84	2.87
9	Paddy converted coconut + banana	17.10	29.70	26.82	77.73	48.50	30.37	41.15	32.92	304.29
10	Paddy converted coconut + arecanut	8.74	0.00	4.33	2.15	4.89	3.00	2.43	10.47	36.01
11	Paddy converted coconut + tapioca	10.41	23.12	5.35	23.16	13.43	3.51	13.27	3.70	95.95
12	Paddy converted coconut + vegetables	0.00	2.64	0.00	0.00	0.00	0.00	0.00	0.00	2.64
13	Paddy converted coconut + pepper	0.79	0.00	0.00	0.00	0.00	1.10	0.40	0.00	2.29
14	Paddy converted coconut + rubber	3.06	0.00	0.00	0.73	0.91	2.04	0.19	3.41	10.34
15	Paddy converted areacanut + banana	2.17	2.03	0.00	0.28	0.37	0.87	1.78	0.00	7.50
16	Paddy converted areacanut + tapioca	0.00	0.00	0.00	1.11	0.00	1.01	0.00	0.69	2.81
17	Paddy converted banana + tapioca	10.25	54.73	9.57	28.69	12.46	14.53	39.50	21.61	191.34
18	Paddy converted banana + vegetable	0.00	2.11	0.00	0.00	0.00	0.00	0.00	0.00	2.11
19	Paddy converted tapioca	14.02	37.32	17.76	32.75	25.62	5.68	32.69	10.45	176.29
20	Paddy converted tapioca + vegetable	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	1.30
21	Paddy converted vegetable	0.00	0.60	0.00	0.00	0.51	0.00	0.00	0.00	1.11
22	Paddy converted rubber	7.77	3.52	54.37	9.45	19.75	8.61	9.30	61.55	174.32
23	Paddy converted rubber + tapioca	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.46
24	Paddy converted rubber + banana	0.00	0.00	5.86	0.00	0.00	4.12	0.00	5.60	15.58
25	Paddy converted rubber nursery	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.98	1.28
26	Paddy converted mixed crops	39.45	57.05	5.53	36.64	44.38	26.29	56.33	69.95	335.62
27	Paddy converted brick industry	0.00	0.00	2.72	0.00	1.18	0.34	0.00	0.00	4.24
28	Paddy converted area	149.97	291.52	166.12	277.88	229.36	131.24	252.49	274.08	1772.66
29	Paddy - cultivable wasteland	2.46	0.48	1.39	1.82	13.70	0.00	4.11	22.51	46.47
30	Total paddy area	166.09	297.19	174.59	286.93	268.65	158.19	267.38	309.90	1980.03
31	Ponds	0.00	0.88	0.55	2.61	0.50	0.33	1.79	1.20	7.86
32	Waterbody	0.40	4.52	4.87	3.23	2.40	2.48	9.13	0.35	27.38
33	Total water body	0.40	5.40	5.42	5.84	2.90	2.81	10.92	1.55	35.24
34	Total Panchayat area	8794.30	2098.75	5602.54	3060.04	3035.23	1872.94	2218.76	11106.26	37788.82

Table:18.12

THIRUVANANTHAPURAM RURAL (Area in Ha)

Sl. No.	Category	Kudappana kkunnu	Vattiyoorkavu	Total
1	Paddy viruppu + mundakan	1.10	2.93	4.03
2	Present paddy area	1.10	2.93	4.03
3	Paddy converted built up land	2.99	7.27	10.26
4	Paddy converted coconut	82.17	33.52	115.69
5	Paddy converted banana	12.75	16.69	29.44
6	Paddy converted coconut + banana	1.60	17.84	19.44
7	Paddy converted coconut + tapioca		3.42	3.42
8	Paddy converted banana + tapioca		3.76	3.76
9	Paddy converted tapioca	4.10	11.27	15.37
10	Paddy converted mixed crops	40.34	19.67	60.01
11	Paddy converted area	143.95	113.44	257.39
12	Paddy - fallow	1.62	2.23	3.85
13	Total paddy area	146.67	118.60	265.27
14	Ponds		0.27	0.27
15	Waterbody	2.91	0.74	3.65
16	Total water body	2.91	1.01	3.92
17	Total panchayat area	857.76	1004.69	1862.45

Table:18.13

THIRUVANANTHAPURAM CORPORATION

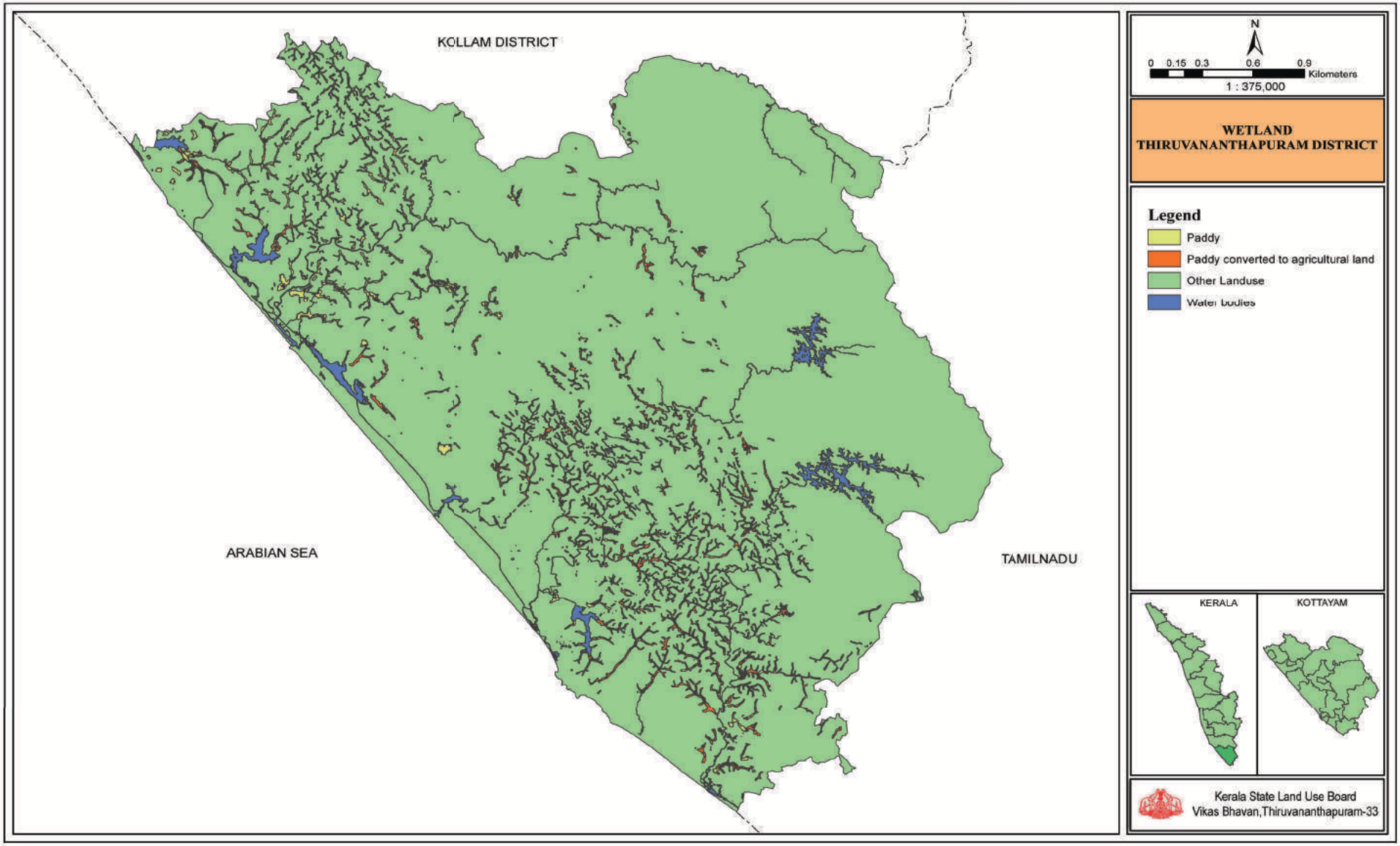
Sl. No.	**Category**	**Area (in Ha)**
1	Paddy viruppu	0.85
2	Paddy viruppu + mundakan	32.96
3	Paddy viruppu + mundakan + puncha	44.98
4	Present paddy area	78.79
5	Paddy converted built up land	71.74
6	Paddy converted coconut	519.09
7	Paddy converted banana	61.36
8	Paddy converted coconut + banana	2.95
9	Paddy converted coconut + tapioca	4.68
10	Paddy converted banana + tapioca	7.43
11	Paddy converted tapioca	36.74
12	Paddy converted tapioca + vegetable	0.02
13	Paddy converted vegetable	7.19
14	Paddy converted mixed crops	383.50
15	Paddy converted area	1094.70
16	Paddy - cultivable wasteland	2.24
17	Paddy - fallow	51.80
18	Total paddy area	1227.53
19	Ponds	568.36
20	Waterbody	23.62
21	Total water body	591.98
22	Total area	14025.76

Table:18.14

MUNICIPALITIES (Area in Ha)

Sl. No.	Category	Neyyan ttinkara	Neduman gad	Attingal	Varkala	Total
1	Paddy viruppu	8.19	0.00	0.00	0.00	8.19
2	Paddy mundakan	0.00	0.49	0.00	0.00	0.49
3	Paddy viruppu + mundakan	0.00	0.00	53.50	32.23	85.73
4	Present paddy area	8.19	0.49	53.50	32.23	94.41
5	Paddy converted built up land	10.05	2.40	0.00	1.55	14.00
6	Paddy converted coconut	26.40	34.32	42.15	24.06	126.93
7	Paddy converted banana	24.26	16.33	13.42	6.48	60.49
8	Paddy converted coconut + banana	23.16	2.90	0.00	0.00	26.06
9	Paddy converted coconut + tapioca	14.08	0.00	0.00	0.00	14.08
10	Paddy converted coconut + vegetables	1.22	0.00	0.00	0.00	1.22
11	Paddy converted banana + tapioca	130.63	0.47	0.00	0.00	131.10
12	Paddy converted banana + vegetable	0.78	0.00	0.00	0.00	0.78
13	Paddy converted tapioca	40.51	20.80	11.41	9.82	82.54
14	Paddy converted tapioca + vegetable	1.37	0.00	0.00	0.00	1.37
15	Paddy converted vegetable	2.19	0.00	0.00	0.00	2.19
16	Paddy converted mixed crops	98.14	43.27	8.60	8.89	158.90
17	Paddy converted area	372.79	120.49	75.58	50.80	619.66
18	Paddy fallow	0.00	21.96	53.62	56.82	132.40
19	Paddy - cultivable wasteland	0.00	3.50	0.00	0.00	3.50
20	Total paddy area	380.98	146.44	182.70	139.85	849.97
21	Ponds	2.54	0.23	0.00	2.11	4.88
22	Waterbody	8.47	0.13	0.00	7.16	15.76
23	Total water body	11.01	0.36	0.00	9.27	20.64
24	Total Panchayat area	2727.89	1572.45	1440.33	1854.49	7595.16

NB:- These data is based on the study conducted on wetlands in the year 2006


KOLLAM DISTRICT
ARABIAN SEA
TAMILNADU
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 375,000
WETLAND
THIRUVANANTHAPURAM DISTRICT
Legend
Paddy
Paddy converted to agricultural land
Other Landuse
Water bodies
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

WASTELAND

Land is a critical natural resource

Land is one of the most important critical resources which determine the success of development planning of any region. Promoting optimum land use is an essential purpose in achieving the planned goals of economic efficiency and ecological activity. Identification of prime and unique lands for agriculture and prevention of its misuse, assume utmost importance for food, security and self-reliance. It is therefore imperative that for sustainable development, effort should be made to ensure that the available land in the state is put to wise and optimum use.

Wasteland in Kerala

It is a not an exaggeration to say that wasteland exist in Kerala, where the per capita availability of land is only 0.13 hectare and the average size of holding is 0.33 hectare. The studies by National Remote Sensing Agency (1985) using satellite imageries has revealed that cultivable and uncultivable wasteland exists in Kerala, and it amounts to 5.2 percent of the total geographical area. The State Land Use Board made an attempt to estimate the extent of wasteland in the State utilizing the primary data available from the Department of Economics and Statistics; the only source on land utilization statistics in the State (Extent of Wasteland in Kerala State Land Use Board, 1986). This study has shown that 8.15 percent of the geographical area or 11.09 percent of the non-forest area of the State is categorized as wasteland. Though the two figures are from two different methodologies and classifications, the area involved is much significant in the small State like ours, where the density of population and pressure on land are so high.

The National Wasteland Development Board has undertaken the mapping of wasteland in India on 1:50,000 scale during 1987-88. They have identified six districts having maximum area of wastelands, viz, Kasargod, Kannur, Wayanad, Malappuram, Palakkad and Idukki under Wasteland mapping Project Phase II at national level. Kerala State Land use Board undertook the task of identifying and mapping and completed the project, Later the remaining eight districts, viz. Alapuzha, Ernakulam, Kollam, Kottayam, Kozhikode, Pathanamthitta, Thiruvananthapuram and Thrissur were taken up under the project, Wasteland Mapping Phase V. The study revealed that there is a total area of 1457 sq.km. (3.73 percent) under wasteland in the State.

Presently under this project, the updation of the wastelands was done using the LISS III satellite imagery of 2003. The data gathered by this task is presented for the use of various departments/agencies in the State engaged in the programme of reclamation of wastelands in the State.

Wasteland defined

Wasteland is defined as "degraded land which can be brought under vegetative cover with reasonable effort, and which is currently under utilized and land which is deteriorating for lack of appropriate water and soil management or on account of natural causes." Wastelands can result from inherent/imposed disabilities such as by location, environment, chemical and physical properties of the soil or financial or management constraints. These lands could fall under Government occupation, private occupation or forest lands. 13 categories of wasteland have been standardized and State and Central Government departments are using the same.

Wasteland classification

The wasteland categories standardized by National Remote Sensing Centre, Hyderabad for Kerala for this project is as follows:

01 Land with scrub
02 Land without scrub
03 Waterlogged –permanent
04 Waterlogged – seasonal
05 Under utilized/degraded notified forest land - scrub dominated
06 Degraded pastures/grazing land
07 Degraded land under plantation crop
08 Sands (riverine/coastal/desertic) - flood plain
09 Coastal sand
10 Mining/Industrial - Mining
11 Mining/Industrial – Industrial
12 Barren Rocky/Stony waste/Sheet rock
13 Steep slopping area

Brief description on spatial distribution and physical condition of wastelands in Thiruvananthapuram district

Area and percentage to total of major categories of wasteland in the district are given below:-

Sl. No.	Wasteland categories	Area in sq.km.	Percentage to total Geographical area (Total area 2192sq.km.)
1	Land with dense scrub	14.08	0.64
2	Barren rocky area	9.69	0.44
3	Coastal sand	8.81	0.40
4	Scrub dominated forest	145.23	6.62
5	Miscellaneous polygon	2004.90	91.46

1. Land with dense scrub:- Land with dense scrub identified and mapped covers 14.08 sq.km area which covers 0.64% of the total geographical area of the district. This is mainly distributed in Amboori (279.86ha), Peringammala (190.17ha), Aryanadu (110.53 ha) Panchayats.

2. Barren rocky area:- It covers an area of 9.69 sq.km. area which comes to 0.44% of the total geographical area of the district. It is mainly distributed in Kallikkad (370.73 ha), Peringammala (218.79ha), Amboori (142.43ha) Panchayats.

3. Coastal sand:- This is the third major category wasteland identified in the district. It covers in an area of 8.81 sq.km covering 0.40 % of the total geographical area of the district. It is mainly identified in Thiruvananthapuram Corporation (608.05ha), Kadinamkulam (244.92ha) and Perumkadavila (19.01ha) Panchayats.

4. Scrub dominated forest:- This is major category of the wasteland mapped in the district 145.23 sq.km. area which covers 6.62% of the total geographical area. It is distributed mainly in Peringammala (4660.91ha), Kallikkad (2944.21ha), Aryanad (2756.15ha) and Vithura (1754.29ha) Panchayats.

5. Miscellaneous Polygon:- It is mapped an area of 2004.90 sq.km covering 91.46% of the total geographical area. These are in Thiruvananthapuram Corporation (19941.15ha), Peringammala (17439.23ha), Vithura (9292.92ha) and Kallikkad (8645.25ha) Panchayats.

Table:19.1

ATHIYANOOR BLOCK

(Area in Ha)

Sl. No.	Description	Athiyannoor	Kanjiramkulam	Karumkulam	Kottukal	Venganoor
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00
2	Coastal Sands	0.00	0.00	4.43	1.67	0.00
3	Land with Dense Scrub	0.00	0.00	0.00	0.00	0.00
4	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	1187.25	747.66	650.14	1010.99	1128.91
7	Scrub Dominated Forest	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1187.25**	**747.66**	**654.57**	**1012.66**	**1128.91**
	Block Total	**4731.04**				

Table:19.2

NEDUMANGADU BLOCK

(Area in Ha)

Sl. No.	Description	Anad	Aruvikkara	Karakulam	Panavoor	Vembayam
1	Barren Rocky Area	4.90	0.00	5.70	0.00	0.00
2	Coastal Sands	0.00	0.00	0.00	0.00	0.00
3	Land with Dense Scrub	63.70	1.41	35.54	26.61	55.13
4	Land with Open Scrub	0.00	0.00	0.00	0.00	9.13
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	2484.33	2075.61	2359.22	2909.17	2901.36
7	Scrub Dominated Forest	0.00	0.00	0.00	7.81	0.00
	Panchayath Total	**2552.94**	**2077.03**	**2400.45**	**2943.59**	**2965.63**
	Block Total	**12939.64**				

Table:19.3

CHIRAYINKEEZHU BLOCK

(Area in Ha)

Sl. No.	Description	Anchuthengu	Chirayinkeezhu	Kadakkavoor	Kizhuvilam	Mudakkal	Vakkam
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Sands	0.00	2.96	0.00	0.00	0.00	0.00
3	Land with Dense Scrub	0.00	0.00	0.00	0.00	22.39	0.00
4	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	293.97	869.86	337.20	1716.56	2646.58	1438.16
7	Scrub Dominated Forest	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**293.97**	**872.82**	**337.20**	**1716.56**	**2668.97**	**1438.16**
	Block Total	**7327.67**					

Table:19.4

PARASSALA BLOCK

(Area in Ha)

Sl. No.	Description	Chenkal	Karode	Kulathoor	Parassala	Poovar	Thirupuram
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Sands	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Dense Scrub	0.00	0.00	0.00	0.00	0.00	0.00
4	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	2062.02	1494.88	1227.78	1992.21	1014.37	700.52
7	Scrub Dominated Forest	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2062.02**	**1494.88**	**1227.78**	**1992.21**	**1014.37**	**700.52**
	Block Total	**8491.78**					

Table:19.5

KILIMANOOR BLOCK

(Area in Ha)

Sl. No.	Description	Karavaram	Kilimanoor	Madavoor	Nagaroor	Navayikkulam	Pallickal	Pazhaya kunnummel	Pulimathu
1	Barren Rocky Area	16.60	6.38	0.00	19.90	0.00	10.62	24.08	0.00
2	Coastal Sands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Dense Scrub	22.98	3.74	1.85	0.47	0.00	19.99	25.22	21.78
4	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.71
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	2290.08	1835.09	1797.85	2216.47	2960.06	1636.85	2161.44	2739.66
7	Scrub Dominated Forest	0.00	0.00	0.00	0.00	0.00	0.00	215.36	89.65
	Panchayath Total	**2329.66**	**1845.21**	**1799.70**	**2236.83**	**2960.06**	**1667.46**	**2426.10**	**2853.80**
	Block Total	**18118.83**							

Table:19.6

PERUNKADAVILA BLOCK

(Area in Ha)

Sl. No.	Description	Amboori	Aryancode	Kallikkad	Kollayil	Kunnathukal	Ottasekhara mangalam	Perunkada vila	Vellarada
1	Barren Rocky Area	142.43	0.00	370.73	0.00	0.00	0.00	0.00	0.00
2	Coastal Sands	0.00	0.00	0.00	0.00	19.01	0.00	0.00	0.00
3	Land with Dense Scrub	279.86	0.00	83.17	0.00	0.00	44.14	0.00	20.08
4	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	3767.03	2434.86	8645.25	1347.50	2306.30	1912.65	1761.91	2475.69
7	Scrub Dominated Forest	215.29	0.00	2944.21	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**4404.61**	**2434.86**	**12043.37**	**1347.50**	**2325.31**	**1956.79**	**1761.91**	**2495.77**
	Block Total	**28770.12**							

Table:19.7

NEMOM BLOCK

(Area in Ha)

Sl. No.	Description	Balaramapuram	Kalliyoor	Malayinkeezhu	Maranalloor	Pallichal	Vilappil	Vilavoorkkal
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	8.40	0.00
2	Coastal Sands	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Dense Scrub	0.00	6.80	12.77	0.00	82.77	1.87	7.56
4	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	994.43	1560.75	1787.88	2486.73	2025.89	2158.06	1036.74
7	Scrub Dominated Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**994.43**	**1567.55**	**1800.65**	**2486.73**	**2108.66**	**2168.33**	**1044.29**
	Block Total	**12170.64**						

Table:19.8

VARKALA BLOCK

(Area in Ha)

Sl. No.	Description	Chemmaruthi	Cherunniyur	Edava	Elakamon	Manampoor	Ottoor	Vettoor
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Coastal Sands	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Dense Scrub	0.00	0.00	0.00	0.00	6.13	0.00	0.00
4	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	1752.99	1090.40	714.46	1786.75	1507.58	975.85	521.54
7	Scrub Dominated Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1752.99**	**1090.40**	**714.46**	**1786.75**	**1513.71**	**975.85**	**521.54**
	Block Total	**8355.69**						

Table:19.9

VAMANAPURAM BLOCK

(Area in Ha.)

Sl. No.	Description	Kallara	Manikkal	Nanniyode	Nellanadu	Pangod	Peringa mmala	Pullampara	Vamana puram
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	218.79	0.00	0.00
2	Coastal Sands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Dense Scrub	2.95	35.52	17.83	39.96	0.00	190.17	12.55	18.72
4	Land with Open Scrub	0.00	5.54	0.00	0.00	70.40	278.52	0.00	0.00
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	3347.91	3057.71	3631.29	1765.65	3149.71	17439.23	2422.64	1676.12
7	Scrub Dominated Forest	48.60	0.00	175.89	0.00	27.09	4660.91	0.00	5.41
	Panchayath Total	**3399.46**	**3098.77**	**3825.01**	**1805.61**	**3247.20**	**22787.62**	**2435.18**	**1700.25**
	Block Total	**42299.09**							

Table:19.10

VELLANADU BLOCK

(Area in Ha.)

Sl. No.	Description	Aryanad	Kattakada	Kuttichal	Poovachal	Tholikkode	Uzhamala ckal	Vellanadu	Vithura
1	Barren Rocky Area	0.00	0.00	25.22	0.00	0.00	32.39	0.00	35.38
2	Coastal Sands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Dense Scrub	110.53	2.72	13.68	0.00	23.31	47.60	0.00	24.27
4	Land with Open Scrub	2.04	0.00	0.00	0.00	17.71	0.00	0.00	1.80
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	5927.47	2096.48	3965.84	3060.70	2971.50	1793.35	2219.24	9292.92
7	Scrub Dominated Forest	2756.15	0.00	1599.00	0.00	23.36	0.00	0.00	1754.29
	Panchayath Total	**8796.19**	**2099.20**	**5603.74**	**3060.70**	**3035.88**	**1873.34**	**2219.24**	**11108.66**
	Block Total	**37796.95**							

Table:19.11

POTHENCODE BLOCK

(Area in Ha)

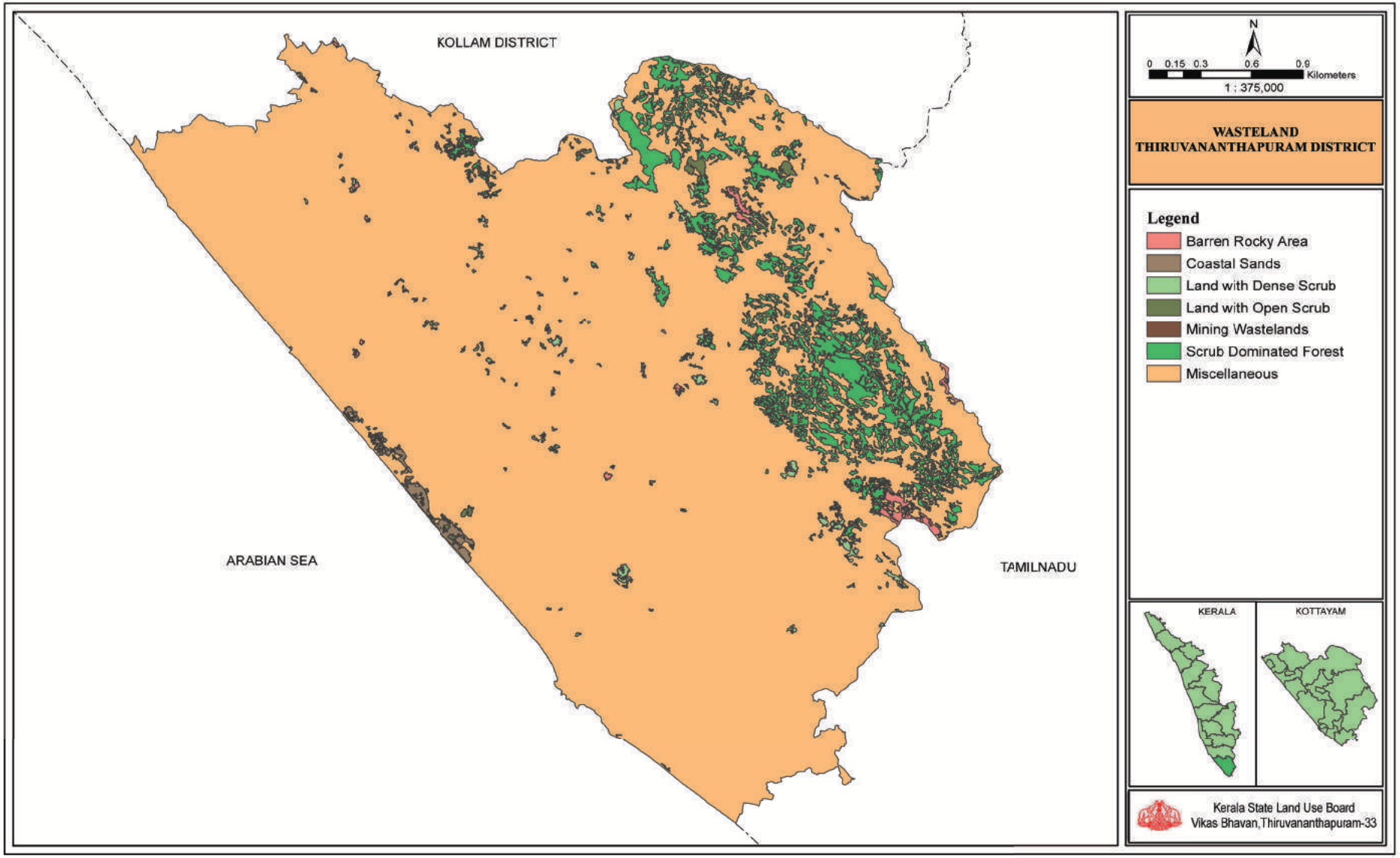
Sl. No.	Description	Andoorkkonam	Azhoor	Kadinamkulam	Mangalapuram	Pothencode
1	Barren Rocky Area	0.00	15.99	0.00	7.94	0.00
2	Coastal Sands	0.00	0.00	244.92	0.00	0.00
3	Land with Dense Scrub	0.00	0.00	0.00	0.00	2.69
4	Land with Open Scrub	0.00	0.00	0.00	0.00	14.64
5	Mining Wastelands	0.00	0.00	0.00	0.00	0.00
6	Miscellaneous Polygon	1540.42	1236.72	1770.60	2197.62	2462.80
7	Scrub Dominated Forest	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1540.42**	**1252.71**	**2015.52**	**2205.57**	**2480.13**
	Block Total	**9494.35**				

Table:19.12

MUNICIPALITY/CORPORATION

(Area in Ha)

Sl. No.	Description	Attingal Municipality	Nedumangad Municipality	Neyyatinkara Municipality	Varkala Municipality	Thiruvananthapuram Corporation
1	Barren Rocky Area	0.00	0.00	0.00	0.00	24.04
2	Coastal Sands	0.00	0.00	0.00	0.00	608.05
3	Land with Dense Scrub	0.00	10.58	0.00	0.00	9.23
4	Land with Open Scrub	0.00	0.00	0.00	0.00	91.92
5	Mining Wastelands	0.00	0.00	0.00	0.00	5.76
6	Miscellaneous Polygon	1440.65	1562.20	2728.48	1854.89	19941.15
7	Scrub Dominated Forest	0.00	0.00	0.00	0.00	0.00
	Total	**1440.65**	**1572.78**	**2728.48**	**1854.89**	**20680.15**


KOLLAM DISTRICT
ARABIAN SEA
TAMILNADU
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 375,000
WASTELAND
THIRUVANANTHAPURAM DISTRICT
Legend
Barren Rocky Area
Coastal Sands
Land with Dense Scrub
Land with Open Scrub
Mining Wastelands
Scrub Dominated Forest
Miscellaneous
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

WATERSHED

Watershed development and management is an integration of technology within the natural boundary of a drainage area for optimum development of land, water and plant resources to meet the basic minimum needs of the people in a sustained manner. The poor in the rural areas who are struggling for survival cannot be expected to pay heed to the conservation strategy unless their daily needs of food, fiber and fuel are met with. A still more urgent need is for assured and full employment for all. Integrated watershed development and management is not only the most effective solutions to many of the problems mentioned above, but also effective solution to many other common problems like drought, floods etc. It includes the integration of many scattered programs of soil conservation, afforestation, minor irrigation, crop production, tree plantation, fodder development and other development activities into a well prepared micro watershed project based on study of climate, land, water &plant resources on the one hand and man, animal resources on the other, offers hope for bringing about sustained natural resources development.

It also provides solution to many environmental problems like soil erosion, siltation, improper land use, lowering ground water table etc. Once these are solved the overall productivity, income of the family and employment opportunity in the villages could be increased and thereby the living conditions of the rural population can be enhanced.

The rain water after absorbed by the soil, flows as runoff in small gullies, rivulets and joins the stream and form river system. This represents a natural drainage system. The river basin at macro level and watershed /sub watershed at microlevel represent the Natural Drainage System.

A watershed is an area from which runoff, resulting from precipitation flows past a single point into a large stream, river, lake or an ocean. In other words a watershed is that area in which all the precipitation converges and drains past a particular point. The term watershed, catchment area of drainage basin can be used interchangeably. A watershed may be only a few hectares as in the case of small ponds, or hundreds of square kilometers as in the case of rivers or big reservoirs. For convenience watershed are classified in terms of size into: Basins, Catchments, Sub catchments, Watershed, Sub watershed, Mini & Micro watersheds. Each watershed is an independent hydrological unit; any modification of the land use in the watershed will be reflected on the water as well as in the sediment yield of the watershed.

The watershed can be demarcated from the topo sheet. But for a small (micro) watershed a detailed topographical survey has to be made and a contour map may have to be prepared. The ridge points are marked and the area below the ridge line is known as the watershed area. This contour map can be imposed with the village map. In case of small watershed, it could be demarcated by walking over the ridge point.

Watershed has become an acceptable unit of planning for optimum use and conservation of soil and water resources. A watershed is hydrological units which produce water as an end product by interaction of rainfall and watershed factor.

Table: 20.1

WATERSHED DETAILS

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
Athiyanoor	Athiyannoor		
		1N1b	91.80
		1N1c	7.75
		1N3a	655.95
		1N4a	40.73
		1N4b	391.02
			1187.25
	Kanjiramkulam		
		1N1a	2.43
		1N1b	15.24
		1N1c	630.81
		1N2a	63.88
		1N3a	35.29
			747.66
	Karumkulam		
		1N1a	15.12
		1N1c	605.17
		1N2a	34.28
			654.57
	Kottukal		
		1N1a	519.89
		1N1b	375.95
		1N1c	116.81
			1012.66
	Venganoor		
		1N1b	0.11
		2K29b	793.21
		2K30a	134.42
		2K31a	86.30
		2K31b	50.56
		2K31c	64.30
			1128.91
			4731.04
Attingal Municipality			
		4V1a	0.45
		4V28b	884.23
		4V29a	334.49
		4V2a	114.54
		4V4a	104.52
		4V5a	2.41
			1440.65
Chirayinkeezhu	Anchuthengu		
		4V1a	41.16
		4V2a	17.70
		4V30a	2.16
		4V3a	232.96
			293.97

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Chirayinkeezhu		
		3M1a	172.43
		3M2a	168.93
		3M5a	47.63
		3M6a	7.04
		4V1a	75.02
		4V30a	401.78
			872.82
	Kadakkavoor		
		4V1a	324.81
		4V30a	7.41
		4V3a	4.97
			337.20
	Kizhuvilam		
		3M2a	257.21
		4V1a	87.76
		4V28b	2.43
		4V29a	325.34
		4V29e	694.01
		4V30a	349.81
			1716.56
	Mudakkal		
		4V28a	7.08
		4V28b	947.74
		4V29a	532.63
		4V29b	840.89
		4V29d	133.72
		4V29e	205.69
		4V5a	0.00
		4V6a	1.23
			2668.97
	Vakkam		
		4V1a	784.01
		4V28b	3.43
		4V29a	7.84
		4V2a	413.33
		4V30a	1.62
		4V3a	16.69
		4V4a	211.26
			1438.16
			7327.67
Kilimanoor	Karavaram		
		4V28b	0.42
		4V2a	1307.91
		4V3b	8.08
		4V4a	265.81
		4V5a	703.00
		4V6a	35.73
		5a4b	8.72
			2329.66
	Kilimanoor		
		4V6a	817.90

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		4V7a	19.08
		4V7b	961.31
		4V7e	0.39
		4V7f	4.33
		6I18b	36.36
		6I19a	5.85
			1845.21
	Madavoor		
		4V6a	228.20
		5a4b	111.81
		6I18c	247.88
		6I19a	1209.77
		6I20a	2.04
			1799.70
	Nagaroor		
		4V28b	9.05
		4V2a	84.20
		4V5a	435.29
		4V6a	1670.05
		4V7b	23.53
		5a4b	14.71
			2236.83
	Navayikkulam		
		4V2a	29.67
		4V3b	3.34
		4V6a	8.81
		5a3c	23.74
		5a4a	0.57
		5a4b	2838.77
		6I21a	55.15
			2960.06
	Pallickal		
		5a4b	17.42
		6I18c	11.62
		6I19a	522.97
		6I20a	868.91
		6I21a	245.70
		6I3a	0.00
		6I4a	0.50
		6I5a	0.35
			1667.46
	Pazhayakunnummel		
		4V6a	0.00
		4V7a	0.15
		4V7b	638.26
		4V7c	1183.55
		4V7d	83.60
		4V7e	320.43
		4V7f	20.57
		6I18b	179.53
			2426.10

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Pulimathu		
		4V28a	27.79
		4V28b	5.32
		4V6a	289.48
		4V7a	595.07
		4V7b	5.14
		4V7c	0.29
		4V7d	250.29
		4V7e	320.60
		4V7f	1301.58
		4V8a	57.42
		4V9a	0.83
			2853.80
			18118.84
Nedumangad Municipality			
		2K4c	0.32
		2K6b	1156.98
		2K6d	383.00
		2K8a	32.48
			1572.78
Nedumangadu	Anad		
		2K6b	871.13
		2K6c	1027.64
		2K6d	29.53
		2K9b	55.02
		4V24b	482.04
		4V24c	26.16
		4V26a	39.56
		4V29c	21.84
			2552.94
	Aruvikkara		
		2K23a	298.02
		2K24a	611.53
		2K25a	1.99
		2K6d	189.96
		2K7a	6.14
		2K8a	961.26
		2K9a	8.14
			2077.03
	Karakulam		
		2K4c	779.75
		2K4d	15.71
		2K6a	279.26
		2K6b	937.70
		2K6d	50.51
		2K6e	298.41
		2K7a	15.39
		2K8a	23.73
			2400.45
	Panavoor		
		2K6c	692.85
		4V10a	60.86

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		4V23a	440.29
		4V24a	211.96
		4V24b	256.02
		4V24c	944.17
		4V25a	2.52
		4V26a	334.92
			2943.59
	Vembayam		
		2K4c	189.57
		2K5b	5.71
		2K6b	81.10
		4V26a	131.63
		4V29c	2551.09
		4V29d	6.54
			2965.63
			12939.64
Nemom	Balaramapuram		
		1N1b	697.25
		1N3a	0.53
		1N4b	2.47
		2K29b	0.67
		2K31b	293.51
		2K31c	0.00
			994.43
	Kalliyoor		
		2K28a	3.05
		2K29a	359.08
		2K29b	865.03
		2K29c	336.72
		2K30a	2.67
		2K31b	1.00
			1567.55
	Malayinkeezhu		
		1N6a	7.64
		2K25a	76.51
		2K26a	8.58
		2K27a	484.75
		2K27b	1201.36
		2K27c	21.82
			1800.65
	Maranalloor		
		1N19a	1.28
		1N20a	3.86
		1N4c	1.10
		1N6a	924.66
		1N7a	855.26
		1N8a	0.02
		2K27b	700.54
			2486.73
	Pallichal		
		1N1b	4.75

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		1N4b	150.02
		1N6a	18.83
		2K27b	359.93
		2K27c	85.92
		2K28a	516.00
		2K29a	586.71
		2K29b	7.08
		2K31b	379.43
			2108.66
	Vilappil		
		2K24a	697.13
		2K25a	1164.64
		2K26a	160.32
		2K27a	10.26
		2K27b	97.74
		2K7a	20.59
		2K8a	17.64
			2168.33
	Vilavoorkkal		
		2K25a	0.94
		2K26a	523.67
		2K27a	409.18
		2K27b	1.44
		2K27c	44.55
		2K28a	43.53
		2K7a	20.98
			1044.29
			12170.64
Neyyattinkara Municipality			
		1N1b	0.79
		1N20a	11.67
		1N21a	2.61
		1N21c	3.29
		1N22a	119.35
		1N3a	14.24
		1N4a	403.34
		1N4b	656.92
		1N4c	556.62
		1N5a	316.05
		1N6a	420.49
		1N7a	221.37
		2K31b	1.76
			2728.48
Parassala	Chenkal		
		1N22a	663.33
		1N23a	1350.94
		1N24b	38.35
		1N2a	0.02
		1N4a	0.90
		1N4c	8.48
			2062.02

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Karode		
		1N23a	15.74
		1N24b	731.99
		1N24c	478.20
		1N25a	267.81
		1N2a	1.14
			1494.88
	Kulathoor		
		1N23a	228.08
		1N24a	114.53
		1N24b	331.95
		1N24c	245.43
		1N25a	170.95
		1N2a	136.84
			1227.78
	Parassala		
		1N22a	4.20
		1N23a	1019.60
		1N24b	882.29
		T2a	86.11
			1992.21
	Poovar		
		1N1c	78.91
		1N23a	12.29
		1N24a	2.28
		1N2a	920.89
			1014.37
	Thirupuram		
		1N1c	4.80
		1N22a	1.08
		1N23a	6.32
		1N2a	293.35
		1N3a	387.26
		1N4a	7.72
			700.52
			8491.78
Perunkadavila	Amboori		
		1N15a	44.93
		1N16a	967.58
		1N17a	484.25
		1N18b	2409.19
		1N18c	23.46
		1N21b	30.38
		999	376.05
		T1a	68.76
			4404.61
	Aryancode		
		1N18a	1.94
		1N18b	258.09
		1N18c	722.56
		1N19a	974.57
		1N20a	420.19

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		1N21b	42.36
		1N7a	5.63
		1N8a	9.52
			2434.86
	Kallikkad		
		1N10a	343.01
		1N11a	588.60
		1N12a	639.96
		1N13a	2360.04
		1N13b	1541.07
		1N14a	1155.01
		1N14b	1268.56
		1N15a	1630.19
		1N16a	71.19
		1N17a	493.99
		1N9a	645.14
		2K15b	11.18
		2K16a	17.62
		2K17a	3.26
		2K17b	4.55
		2K18b	24.61
		2K21b	6.34
		2K21c	4.30
		999	1234.77
			12043.37
	Kollayil		
		1N21a	2.87
		1N21b	0.17
		1N21c	198.39
		1N22a	993.66
		1N23a	152.41
			1347.50
	Kunnathukal		
		1N19a	0.88
		1N20a	192.50
		1N21a	376.88
		1N21b	926.71
		1N21c	828.25
		1N22a	0.10
			2325.31
	Ottasekharamanglam		
		1N17a	684.95
		1N18a	661.61
		1N18b	570.59
		1N18c	27.15
		1N8a	3.52
		1N8c	0.81
		1N9a	8.16
			1956.79

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Perunkadavila		
		1N20a	535.25
		1N21a	400.46
		1N21c	352.34
		1N22a	473.51
		1N5a	0.30
		1N6a	0.04
			1761.91
	Vellarada		
		1N18b	195.17
		1N18c	106.73
		1N19a	70.12
		1N21b	1684.78
		1N21c	0.10
		T1a	438.87
			2495.77
			28770.12
Pothencode	Andoorkkonam		
		2K5a	12.91
		2K5b	1029.22
		2K5c	0.39
		3M4a	497.33
		4V29d	0.56
			1540.42
	Azhoor		
		3M2a	449.23
		3M3a	634.98
		3M5a	2.01
		3M6a	143.03
		4V29e	23.46
			1252.71
	Kadinamkulam		
		3M3a	205.83
		3M4a	831.02
		3M5a	949.94
		3M6a	28.73
			2015.52
	Mangalapuram		
		3M2a	6.93
		3M3a	702.97
		3M4a	312.12
		4V29a	5.05
		4V29b	10.60
		4V29d	749.01
		4V29e	418.88
			2205.57
	Pothencode		
		2K4c	0.09
		2K5b	867.89
		2K5c	261.78
		4V29b	2.07
		4V29c	3.00

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		4V29d	1345.30
			2480.13
			9494.35
Thiruvananthapuram Corporation			
		1N1a	49.60
		1N1b	4.82
		2K1a	1474.71
		2K26a	0.01
		2K28a	607.57
		2K29a	742.01
		2K29b	190.81
		2K29c	239.23
		2K2a	258.25
		2K30a	881.63
		2K31a	194.67
		2K31c	263.73
		2K31d	400.39
		2K3a	852.59
		2K4a	1452.91
		2K4b	724.33
		2K4c	471.88
		2K4d	3070.81
		2K4e	491.83
		2K5a	465.81
		2K5b	145.04
		2K5c	2949.87
		2K6a	1135.10
		2K6e	1196.64
		2K7a	1934.18
		2K8a	144.92
		3M4a	113.51
		3M5a	133.58
		4V29c	4.08
		999	85.66
			20680.15
Vamanapuram	Kallara		
		4V10a	1365.73
		4V11b	6.01
		4V11c	133.74
		4V12a	242.44
		4V12b	2.65
		4V12c	1.59
		4V12d	475.76
		4V13a	25.89
		4V1la	81.03
		4V23a	2.20
		4V24a	0.41
		4V24c	2.00
		4V25a	2.40
		4V7d	326.94
		4V7e	1.47

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		4V8a	0.63
		4V9a	728.57
			3399.46
	Manikkal		
		4V26a	83.25
		4V29b	627.55
		4V29c	887.10
		4V29d	1500.86
			3098.77
	Nanniyode		
		2K9b	13.68
		4V11c	14.22
		4V12a	136.93
		4V12d	124.41
		4V13a	373.56
		4V1la	0.01
		4V21a	412.49
		4V22a	825.90
		4V23a	1141.76
		4V24b	782.06
			3825.01
	Nellanadu		
		4V27a	431.23
		4V28a	579.31
		4V29b	782.91
		4V29d	11.82
		4V8a	0.35
			1805.61
	Pangode		
		4V10a	228.54
		4V11b	720.88
		4V11c	994.41
		4V12a	375.46
		4V12b	498.68
		4V12d	3.97
		4V1la	47.38
		4V7d	377.87
			3247.20
	Peringammala		
		4V12b	1661.96
		4V12c	4384.54
		4V12d	8.53
		4V13a	1104.34
		4V14a	1369.66
		4V15a	912.40
		4V16a	1557.24
		4V17a	509.11
		4V18a	217.14
		4V18b	746.82
		4V18c	6.79
		4V19a	13.20
		4V20a	23.17

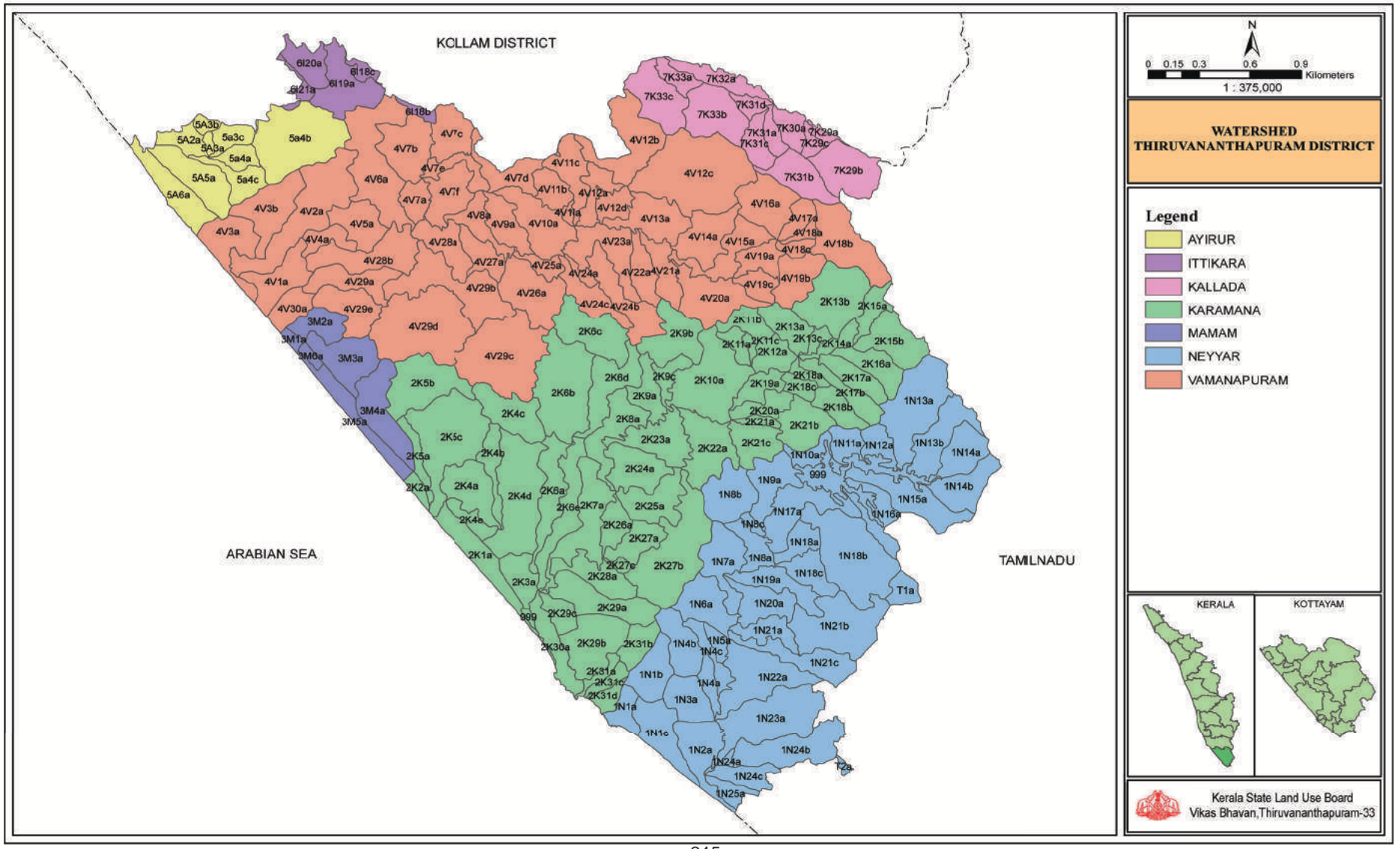
BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		4V21a	0.01
		6I12e	10.43
		7K23a	25.37
		7K24a	0.01
		7K25a	8.46
		7K26a	4.56
		7K28a	12.89
		7K29a	192.00
		7K29b	1738.11
		7K29c	264.85
		7K30a	616.78
		7K31a	427.43
		7K31b	1247.22
		7K31c	698.69
		7K31d	362.42
		7K32a	843.25
		7K33a	503.68
		7K33b	1703.89
		7K33c	1612.65
			22787.62
	Pullampara		
		4V10a	45.28
		4V24c	31.66
		4V25a	421.62
		4V26a	1312.41
		4V27a	305.55
		4V29b	293.34
		4V8a	7.43
		4V9a	17.89
			2435.18
	Vamanapuram		
		4V26a	2.06
		4V27a	79.45
		4V28a	541.20
		4V28b	8.37
		4V29b	25.35
		4V7f	3.30
		4V8a	766.85
		4V9a	273.68
			1700.25
			42299.09
Varkala	Chemmaruthi		
		4V3b	25.51
		5a3c	39.77
		5a4a	454.10
		5a4b	212.68
		5a4c	719.34
		5A5a	301.58
			1752.99
	Cherunniyur		
		4V2a	11.21
		4V3a	614.91
		4V3b	456.14

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		5a4c	3.60
		5A5a	4.54
			1090.40
	Edava		
		5A1a	0.98
		5A5a	272.97
		5A6a	440.51
			714.46
	Elakamon		
		5A2a	623.78
		5A3a	122.81
		5A3b	216.00
		5a3c	524.44
		5a4a	42.72
		5a4c	102.81
		5A5a	154.18
			1786.75
	Manampoor		
		4V1a	19.88
		4V2a	1149.58
		4V3a	72.75
		4V3b	266.94
		4V4a	4.56
			1513.71
	Ottoor		
		4V2a	29.14
		4V3b	935.47
		5a4b	9.10
		5a4c	2.15
			975.85
	Vettoor		
		4V3a	516.08
		5A5a	4.59
		5A6a	0.88
			521.54
			8355.70
Varkala Municipality			
		4V3a	16.47
		4V3b	0.37
		5A5a	878.48
		5A6a	959.57
			1854.89
Vellanadu	Aryanad		
		1N8b	2.60
		2K10a	1283.30
		2K11a	201.89
		2K11b	14.30
		2K11c	86.86
		2K12a	752.88
		2K13a	344.25
		2K13b	181.93
		2K13c	255.17

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		2K14a	430.94
		2K15a	265.56
		2K15b	1033.76
		2K16a	493.99
		2K17a	441.78
		2K17b	346.77
		2K18a	264.50
		2K18b	114.64
		2K18c	391.24
		2K19a	671.25
		2K20a	574.97
		2K21a	58.65
		2K21b	45.00
		2K21c	18.07
		2K22a	521.90
			8796.19
	Kattakkada		
		1N17a	1.79
		1N18a	0.43
		1N18c	0.03
		1N19a	3.39
		1N7a	378.27
		1N8a	730.53
		1N8b	45.15
		1N8c	117.02
		1N9a	6.30
		2K25a	54.52
		2K27a	6.06
		2K27b	755.73
			2099.20
	Kuttichal		
		1N10a	203.16
		1N11a	22.66
		1N12a	1.80
		1N13a	298.08
		1N8b	6.35
		1N9a	25.08
		2K15b	373.60
		2K16a	471.48
		2K17a	425.12
		2K17b	499.75
		2K18b	625.79
		2K20a	103.71
		2K21a	160.12
		2K21b	1228.38
		2K21c	1020.38
		2K22a	129.33
		999	8.96
			5603.74
	Poovachal		
		1N17a	0.52
		1N8a	6.65

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		1N8b	1429.95
		1N8c	49.94
		1N9a	587.74
		2K21c	47.93
		2K22a	617.37
		2K23a	25.18
		2K24a	1.02
		2K25a	79.10
		2K27b	215.29
			3060.70
	Tholikkode		
		2K10a	208.73
		2K6c	85.34
		2K6d	841.69
		2K8a	59.26
		2K9a	122.60
		2K9b	1305.63
		2K9c	135.25
		4V20a	47.84
		4V21a	198.41
		4V22a	1.29
		4V24b	29.83
			3035.88
	Uzhamalackal		
		2K10a	1021.77
		2K22a	7.97
		2K23a	5.83
		2K6d	11.24
		2K9a	412.39
		2K9b	41.54
		2K9c	372.60
			1873.34
	Vellanadu		
		2K10a	0.50
		2K22a	496.43
		2K23a	1183.08
		2K24a	64.42
		2K25a	6.43
		2K6d	7.97
		2K8a	153.18
		2K9a	307.19
		2K9c	0.03
			2219.24
	Vithura		
		2K10a	255.81
		2K11a	199.27
		2K11b	661.36
		2K11c	54.82
		2K12a	4.12
		2K13a	623.97
		2K13b	2042.28
		2K14a	22.75

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		2K15a	365.41
		2K15b	18.17
		2K9b	145.21
		4V13a	9.04
		4V14a	78.78
		4V15a	396.89
		4V17a	0.00
		4V18a	0.26
		4V18b	1293.48
		4V18c	306.37
		4V19a	730.98
		4V19b	1185.64
		4V19c	587.21
		4V20a	1791.74
		4V21a	334.14
		4V22a	0.95
			11108.66
			37796.95
			218772.76


KOLLAM DISTRICT
ARABIAN SEA
TAMILNADU
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 375,000
WATERSHED
THIRUVANANTHAPURAM DISTRICT
Legend
AYIRUR
ITTIKARA
KALLADA
KARAMANA
MAMAM
NEYYAR
VAMANAPURAM
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

IRRIGATION

Kerala is essentially an agricultural State. A major portion of the population of the State depends on agriculture for their livelihood. The climatic conditions of the State and the fertility of the soil suit the growth of variety of food crops and cash crops. The main food crops grown in the State are paddy, pulses, tapioca, banana, vegetable etc., while the cash crops include rubber, coffee, tea, cardamom, pepper, coconut, arecanut etc.

Paddy, the main cereal crop of the State is cultivated in the wetlands which are mostly concentrated in the central and coastal areas. In the higher reaches of wetlands sugarcane is also cultivated, in some river basins.

In the garden lands of the State, coconut, arecanut, tapioca, peas, banana and other plantations, pepper, vegetable etc., are extensively grown. These crops also require artificial supply of water for ensuring proper growth.

Need for Irrigation

In most developing countries, agriculture is the dominant user of water, accounting for more than 85% of all water use. Agriculture water use rise significant issues for water resource management like issues dealing with water scarcity, competing demands from other sectors, irrigation service delivery and system management, water use efficiencies are so forth. The primary objectives in coming years will be to balance water supply and demand among users to ensure adequate water for agriculture and sustainable irrigation system management while satisfying other needs.

Kerala is a deficit State in the matter of food production. The production of rice, the staple food of Kerala people is only about 17% of the requirements. The major balance quantity has to be imported from other outside places at exorbitant costs. With the increase in population, the demand for rice is also rising. To catch up with the demand, vigorous measures are being taken to step up agricultural production. Agricultural programmes such as multiple cropping, adoption of high yielding strains of seeds, application of mineral fertilizers, plant production measures etc., are being implemented to increase the output of agricultural products.

Intensive methods of cultivation which aim at producing “to years of corn where one grew before” have to be invariably resorted to. For this purpose, additional crops should be cultivated in the cultivable lands. Water is an essential input for the growth of paddy which perhaps consumers the largest quantity of water when compared to other wet crops.

The rains from the source of water for the crops, the State is blessed with a fairly high rainfall and 90% of the precipitation occurs during the South-West and North-East monsoon periods which confine to about 6 months from June to November. Even during this period, there will be dry spells during September and October. During June and July,

the rains are too intense while from December to May, Practically very little water is obtained for the crops from the rains. As a result of this uneven distribution of rainfall, the necessity for irrigation is keenly felt even when the monsoons are normal. Moreover, in certain years, either the monsoons May fail partly or wholly affecting the crops adversely. In such cases, the yield of the crop is reduced considerably. In order to protect the crops against the vagaries of nature and thus stabilize cultivation, and to enable an additional crop being raised during the summer months, an assured supply of water to the paddy lands in Kerala is an absolute necessity.

Paddy Crop Pattern

The main paddy crop pattern adopted in Kerala is:-

(i) The viruppu crop which roughly coincides with the South-West monsoon;
(ii) The mundakan crop which roughly coincides with the North-East monsoon and
(iii) The puncha crop which is cultivated in the summer months.

The first crop known as the viruppu crop (or autumn crop) is mostly a broadcast crop sowing is started with the pre-monsoon showers in April and the crop is harvested in August. This corresponds to the Kharif crop in other parts of India. The heavy rainfall during this period causes floods in some areas and submerges the crops in the low lying areas. Hence a sure crop during this season is possible only in the higher areas.

The second crop is a transplanted crop in most of the areas. The cultivation of this crop is started in September and harvesting is done in December. During the last weeks of its growth, when water is absolutely necessary, severe drought is experienced usually.

The third crop, cultivation on which starts in January, is harvested in April. In the low lying areas of the State like the “Kole” and “Kari” lands, cultivation is difficult during the first two crop periods as the fields will be under water. The practice in such lands is to put up bunds around Padasekharams (group of fields), dewater the area and then start cultivation. As rains are scanty during this period, the crop will be a failure if water is not steadily supplied to it. The second and third crop periods are almost the same as the rabi crop period in other parts of India.

Water Requirements for Crops (1970-71)

For working out the requirements of water for irrigation in each of the basins, the values adopted in the project reports of the then projects were, for paddy cultivation, the requirements are 152cm. for the viruppu and mundakan crops and 114 cm, for the puncha crop. Deducting the utilizable rainfall available during the crop periods, the net depth of water to be supplemented through irrigation will be about 279cm for the 3 crops. Adding seepage and other losses the total requirements works out to 343cm for 3 crops.

The yields of plantation crops such as coconut, arecanut, banana etc., which are cultivated in the garden lands, can be considerably increased if a few wettings are given

during the summer months. For this purpose, a depth of about 60cm of water is considered adequate.

Irrigation Facilities

Irrigation facilities to the cultivable areas are provided by the existing major irrigation projects, lift irrigation schemes, minor irrigation works consisting of small storage works, diversion weirs wells, irrigation canals and salinity control works etc., executed and maintained by the State. In addition to the above, there are some private owned irrigation works such as anicuts canals which are used for irrigation.

In addition to the above, there exist a large number of lift irrigation schemes and minor irrigation schemes (Class I and II). Because of the peculiar topography and the undulating terrain of the State, all the cultivable lands cannot be brought within the command of major projects. There will remain pockets of lands where minor irrigation alone is possible and feasible. Hence, it is desirable that implementation of minor irrigation works are taken up side by side with major irrigation projects to maximize benefits.

Thiruvananthapuram – Neyyar River Basin (Major Irrigation Project)

General:- The Neyyar river basin is the Southern most basin of the State lying adjacent to the Karamana river basin. The basin has an area of 497 sq.km. The water resource of the basin is assessed as 229 Mm^3.

Potential:- The basin contains 5450 ha of wetlands, 36230 ha of garden lands and about 350 ha of the garden lands can be made fit for paddy cultivation if adequate irrigation facilities are provided for them. Thus, the ultimate extent of wetlands will be about 12000 ha and that of garden lands 29700 ha.

Water Requirements:- The (ultimate) area of wetlands having an extent of 12000 ha will require 452 Mm^3 and the (14851 ha) 50% of garden lands will need 90 Mm^3. Thus, the total requirement of water for irrigation in the basin will be 542 Mm^3.

Irrigation Facilities:- There is one commissioned major project in the basin viz., the Neyyar Irrigation Project, which was planned to irrigate 15520 ha of lands in the basin. Of this area, 3780 ha are in Tamil Nadu (Kanyakumari district) and the balance 11740 ha are in Kerala, out of which 3440 ha wetlands are. The remaining ayacut consists of dry lands. A large portion of these dry lands can be converted as wetlands for the cultivation of paddy.

The Neyyar Irrigation Project is one of the Major Irrigation Project taken up in Kerala under the first five year plan. The above project envisages construction of a dam across Neyyar River near Kattakkada in Thiruvananthapuram district. The Project was completed in 1973 and the project envisages irrigating an ayacut of 11740 ha. The Project has now become an integral part of the lives of the people of Neyyatinkara taluk

and its surroundings, since it is the main source of water for agricultural and drinking purpose. Details of canals are given below.

Table: 21.1

Canal	Length in Km
Right bank main canal	33.82
Left bank main canal	33.40
Branch canals	104.60

The Neyyar dam area is a main Tourist centre in Thiruvananthapuram district and there is a garden, swimming pool, boat service in reservoir, crocodile farm and lion safari park.

Table: 21.2

Salient Features

Sl. No.	Name	Neyyar
1	ID	251
2	Type	Dam
3	Composition	Straight gravity masonry dam
4	Purpose	Irrigation
5	Ayacut area	3000ha
6	Catchment area	140Km²
(a)	Average rainfall	2260mm
7	Completion	1973
8	Location	Chembilamoodu , Neyyattinkara taluk
9	District	Thiruvananthapuram
10	Basin	Neyyar
11	Sub-basin	Neyyar
12	Longitude	77°09’ E
13	Latitude	8°32’ N
14	Length of the dam at top	294.13m
(a)	Maximum height of dam	50.6m
(b)	Top level of dam	+ 85.645
(c)	F.R.L.	+ 84.738
(d)	Live storage capacity	101.146mm^3
15	Crest level	79.55 m
16	Maximum Water Level	84.73 m
17	Full Reservoir Level	84.73 m
18	Dead Storage Level	54.86 m
19	Water Spread Area	9.1Km²
20	Gross storage	106.188 MCM

21	Live storage	101.146 MCM
22	Dead storage	5.933 MCM
23	Spillway length	34.6 m
24	Spillway gates	4 Nos
25	Spillway type	Ogee with radial gates
26	spillway gate size	8.69m x 5.18m
27	Spillway discharge	
(a)	R.B.C. length	35.4km
(b)	Capacity	7.07cumecs
28	Benefits	
(a)	Net area 1st stage	7695ha
	2nd stage	4045ha
(b)	Gross area 1st stage	15390ha
	2nd stage	8090ha
(c)	Cost 1st stage	Rs.291 lakhs
	2nd stage	Rs.170 lakhs

Table: 21.3

4th MINOR IRRIGATION CENSUS (2006-07)

Sl. No.	District	Ground Water			Surface Water		Total Schemes	Cultivable Area (In Ha)	Net sown Area (In Ha)	Net Area Irrigated (In Ha)
		Dug Well	Shallow Well	Deep Tube Well	Surface Flow	Surface Lift				
1	Thiruvananthapuram	6561	26	2	845	18	7452	130376	101388	43890

Table: 21.4

NUMBER OF NEW SCHEMES COMPLETED IN VARIOUS DEPARTMENTS DURING 2007-08 TO 2010-11

Sl. No.	Year	No of Schemes completed		Potential created (In Ha)		Potential utilised (In Ha)	
		Ground Water	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water
1	2007-08	21940	2898	30595	35831	27101	33389
2	2008-09	23753	2558	19899	29848	21846	28197
3	2009-10	45693	5456	16476	28608	15366	26521
4	2010-11	36302	4361	24118	39286	22772	37003

Table: 21.5

IRRIGATION DETAILS

Sl. No.	Year	Geographical Area (In Ha)	Net Area Sown (In Ha)	Gross Area Irrigated (In Ha)	Net Irrigated Area (In Ha)	Percentage of Irrigated Area as per Net Area sown
1	2007-08	3886287	2089029	455315	387545	18.55
2	2008-09	3886287	2088955	458238	399253	19.11
3	2009-10	3886287	2078715	454783	386262	18.58
4	2010-11	3886287	2071507	466038	415013	20.03

Source: Irrigation Department.

MINOR IRRIGATION CENSUS (2000-2001)

Table: 21.6

CONSTRUCTION OF DUGWELLS OVER THE YEARS

Up to 1993-94	During 1994-95	During 1995-96	During 1996-97	During 1997 -98	During 1998 -99	During 1999 - 2000	During 2000 - 2001	Total
4555	770	1407	1302	1053	1726	1423	922	13158

Table: 21.7

DISTRIBUTION OF SHALLOW TUBEWELLS IN USE AND THEIR POTENTIAL CREATED / UTILISED ACCORDING TO PUBLIC AND PRIVATE

No. in use			Potential created (Ha)			Potential Utilised (Ha)		
Public	Private	Total	Public	Private	Total	Public	Private	Total
1	52	53	0	111	111	0	101	101

Table: 21.8

CONSTRUCTION OF SHALLOW TUBEWELLS OVER THE YEARS

Up to 1993-94	During 1994-95	During 1995-96	During 1996-97	During 1997 - 98	During 1998 - 99	During 1999 - 2000	During 2000 - 2001	Total
32	4	6	4	1	2	1	7	57

Table: 21.9

SHALLOW TUBEWELLS IN THE COMMAND OF MAJOR/MEDIUM PROJECT AND SUPPLEMENTARY IRRIGATION

Location of Dugwells (Nos)			Supplementary Irrigation (Ha)				
Inside Command	Outside Command	Total	Kharif	Rabi	Perennial	Others	Total
0	57	57	0	0	0	0	0

Table: 21.10

CONSTRUCTION OF DEEP TUBEWELLS OVER THE YEARS

Up to 1993-94	During 1994-95	During 1995-96	During 1996-97	During 1997 -98	During 1998 -99	During 1999 - 2000	During 2000 - 2001	Total
4	0	1	0	0	0	0	0	5

Table: 21.11

DEEP TUBEWELLS IN THE COMMAND OF MAJOR/MEDIUM PROJECT AND SUPPLEMENTARY IRRIGATION

Location of Dugwells (Nos)				Supplementary Irrigation (Ha)				
Inside Command	Outside Command	Augmentation	Total	Kharif	Rabi	Perennial	Others	Total
0	5	0	5	0	0	0	0	0

Table: 21.12

SURFACE FLOW SCHEMES IN THE COMMAND OF MAJOR/ MEDIUM PROJECT AND SUPPLEMENTARY IRRIGATION

Location of Schemes (Nos.)		Augmentation	Total	Supplementary Irrigation (Ha)				
Inside Command	Outside Command			Kharif	Rabi	Perennial	Others	Total
20	1635	26	1681	17	20	19	16	72

Table: 21.13

SURFACE FLOW SCHEMES- POTENTIAL CREATED AND UTILISED THROUGH TANKS

Tanks (nos.)	Irrigation Potential Created				Total	Irrigation Potential utilised				Total
	Kharif	Rabi	Perennial	Others		Kharif	Rabi	Perennial	Others	
180	815	802	995	4857	7469	698	622	1335	3929	6584

Table: 21.14

DISTRIBUTION OF SURFACE FLOW SCHEMES (TEMPORARY DIVERSION) IN USE AND THEIR POTENTIAL CREATED/ UTILISED ACCORDING TO PRIVATE AND PUBLIC

No. in use			Potential Created (Ha)			Potential Utilised (Ha)		
Public	Private	Total	Public	Private	Total	Public	Private	Total
256	81	337	6669	1670	8339	6074	1438	7512

Table: 21.15

DISTRIBUTION OF SURFACE FLOW SCHEMES (WATER CONSERVATION-CUM GROUND WATER RECHARGE) IN USE AND THEIR POTENTIAL CREATED/ UTILISED ACCORDING TO PRIVATE AND PUBLIC

No. in use			Potential Created (Ha)			Potential Utilised (Ha)		
Public	Private	Total	Public	Private	Total	Public	Private	Total
4	2	6	24	1	25	17	1	18

Table: 21.16

CONSTRUCTION OF SURFACE LIFT SCHEMES OVER THE YEARS

Up to 1993-94	During 1994-95	During 1995-06	During 1996-97	During 1997-98	During 1998-99	During 1999-2000	During 2000-2001	Total
29	2	5	4	0	1	1	0	42

Table: 21.17

DISTRIBUTION OF SURFACE LIFT SCHEMES (ON RIVER) IN USE AND THEIR POTENTIAL CREATED/ UTILISED ACCORDING TO PUBLIC AND PRIVATE

No. in use			Potential Created (Ha)			Potential Utilised (Ha)		
Public	Private	Total	Public	Private	Total	Public	Private	Total
0	20	20	0	63	63	0	60	60

Table: 21.18

DISTRIBUTION OF SURFACE LIFT SCHEMES (ON STREAM) IN USE AND THEIR POTENTIAL CREATED/ UTILISED ACCORDING TO PUBLIC AND PRIVATE

No. in use			Potential Created (Ha)			Potential Utilised (Ha)		
Public	Private	Total	Public	Private	Total	Public	Private	Total
0	1	1	0	18	18	0	16	16

Table: 21.19

DISTRIBUTION OF SURFACE LIFT SCHEMES (ON DRAIN/ CANAL) IN USE AND THEIR POTENTIAL CREATED/ UTILISED ACCORDING TO PUBLIC AND PRIVATE

No. in use			Potential Created (Ha)			Potential Utilised (Ha)		
Public	Private	Total	Public	Private	Total	Public	Private	Total
1	0	1	10	0	10	10	0	10

Table: 21.20

DISTRIBUTION OF SURFACE LIFT SCHEMES (ON TANK/ POND) IN USE AND THEIR POTENTIAL CREATED/ UTILISED ACCORDING TO PUBLIC AND PRIVATE

No. in use			Potential Created (Ha)			Potential Utilised (Ha)		
Public	Private	Total	Public	Private	Total	Public	Private	Total
3	3	6	100	61	161	92	41	133

Table: 21.21

SURFACE LIFT SCHEMES- POTENTIAL CREATED AND UTILISED THROUGH TANKS/ PONDS

Tanks/ Ponds (Nos)	Irrigation Potential Created (Ha)					Irrigation Potential Utilised (Ha)				
	Kharif	Rabi	Perennial	Others	Total	Kharif	Rabi	Perennial	Others	Total
17	61	68	61	55	245	46	46	28	13	133

Table: 21.22

AGRICULTURE LAND AND ITS USE

Geographical Area	Cultivable Area	Net Area Shown	Net Area Irrigated through			
			Maj/ Med Scheme	Ground Water	Surface Water	Total
227753	150632	140497	2924	2941	17406	23271

Table: 21.23

VILLAGES ACCORDING TO THEIR GROUND WATER LEVEL

Below 10 Mtr	10-15 Mtr	15-20 Mtr	20-25 Mtr	25-30 Mtr	30-35 Mtr	35-40 Mtr	40-45 Mtr	45-50 Mtr	50-55 Mtr	55-60 Mtr	60-65 Mtr	65-70 Mtr	Above 70 Mtr	Total
42	39	4	1	3	0	0	0	0	0	0	0	0	0	89

Table: 21.24

MINOR IRRIGATION SCHEMES AT A GLANCE

No. of Blocks	No. of Villages	Number of Schemes							Total
		Ground Water				Surface Water			
		Dugwell	Shallow	Deep	Total	S. Flow	S. Lift	Total	
17	89	13158	57	5	13220	1681	42	1723	14943

Table: 21.25

IRRIGATION POTENTIAL CREATED /UTILISED THROUGH GROUND WATER SCHEMES IN USE

Dug wells			Shallow Tube wells		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilized
12992	5293	4580	53	112	101

Deep Tube wells			Total		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilized
1	31	31	13046	5436	4712

Table: 21.26

IRRIGATION POTENTIAL CREATED/ UTILISED THROUGH SURFACE WATER SCHEMES IN USE

Surface flow			Surface lift			Total		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilized
1611	37778	34912	28	252	219	1639	38030	35131

Table: 21.27

IRRIGATION POTENTIAL CREATED/ UTILISED THROUGH SURFACE FLOW SCHEMES IN USE

Tanks			Other storages			Permanent diversions		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilized
1	2	3	4	5	6	7	8	9
164	7149	6585	182	3282	3138	922	18983	17658

Temporary diversions			Water conservation cum ground water recharge			Total		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilized
10	11	12	13	14	15	16	17	18
337	8339	7513	6	25	18	1611	37778	34912

Table: 21.28

IRRIGATION POTENTIAL CREATED/ UTILISED THROUGH SURFACE LIFT SCHEMES IN USE

On river			On stream			On drain/canal		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilized
1	2	3	4	5	6	7	8	9
20	63	60	1	18	16	1	10	10

On tank/ pond			Total		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised
10	11	12	16	17	18
6	161	133	28	252	219

Table: 21.29

CROP WISE AREA IRRIGATED BY GROUND WATER SCHEMES

Dug wells					Shallow Tube wells				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
614	605	2114	1246	4579	6	10	44	41	101

Deep Tube wells					Total				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
0	0	30	1	31	620	615	2188	1288	4711

Table: 21.30

CROP WISE AREA IRRIGATED BY SURFACE FLOW SCHEMES

Tanks					Other storages				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
698	622	1335	3929	6584	507	269	609	1754	3139

Permanent diversions					Temporary diversions				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
3859	3577	3345	6877	17658	1795	1340	673	3704	7512

Water conservation cum ground water recharge					Total				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
21	22	23	24	25	26	27	28	29	30
5	7	4	2	18	6864	5815	5966	16266	34911

Table: 21.31

CROP WISE AREA IRRIGATED BY SURFACE WATER MINOR IRRIGATION SCHEMES

Surface flow					Surface lift				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
6864	5815	5967	16266	34912	60	64	69	26	219

Total				
Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15
6924	5879	6036	16292	35131

Table: 21.32

CROP WISE AREA IRRIGATED BY MINOR IRRIGATION SCHEMES

Ground water					Surface water				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
621	615	2188	1288	4712	6924	5879	6035	16292	35130

Total				
Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15
7545	6494	8223	17580	39842

Table: 21.33

CROP WISE AREA IRRIGATED BY GROUND WATER SCHEMES AS SUPPLEMENTARY SOURCE OF IRRIGATION

Dug wells					Shallow tubewells				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
3	1	6	8	18	0	0	0	0	0

Deep tubewells					Total				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
0	0	0	0	0	3	1	6	8	18

Table: 21.34

CROP WISE AREA IRRIGATED BY SURFACE FLOW SCHEMES AS SUPPLEMENTARY SOURCE OF IRRIGATION

Tanks					Other storages				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
9	12	12	13	46	0	0	0	0	0

Permanent diversions					Temporary diversions				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
5	8	3	3	19	0	0	0	0	0

Water conservation cum ground water recharge					Total				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
21	22	23	24	25	26	27	28	29	30
3	0	4	0	7	17	20	19	16	72

Table: 21.35

CROP WISE AREA IRRIGATED BY SURFACE LIFT SCHEMES AS SUPPLEMENTARY SOURCE OF IRRIGATION

On river					On stream				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0

On drain/canal					On tank/pond				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
0	0	0	0	0	0	0	0	0	0

Total				
Kharif	Rabi	Perennial	Other	Total
26	27	28	29	30
0	0	0	0	0

Table: 21.36

CROP WISE AREA IRRIGATED BY SURFACE WATER SCHEMES AS SUPPLEMENTARY SOURCE OF IRRIGATION

Surface flow					Surface lift				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
17	20	19	16	72	0	0	0	0	0

Total				
Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15
17	20	19	16	72

Table: 21.37

CROP WISE AREA IRRIGATED BY MINOR IRRIGATION SCHEMES AS SUPPLEMENTARY SOURCE OF IRRIGATION

Ground Water					Surface Water				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
3	1	6	8	18	17	20	19	16	72

Total				
Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15
20	21	25	24	90

Table: 21.38

ELECTRICAL/DIESEL PUMPS USED IN MINOR IRRIGATION SCHEMES

Electrical Pumps							
Dugwell	Shallow Tubewell	Deep Tubewell	Lift on River	Lift on Stream	Lift on Drain/ Canal	Lift on Tank/ Pond	Total
1	2	3	4	5	6	7	8
9144	53	5	20	1	0	17	9240

Diesel Pumps							
Dugwell	Shallow Tubewell	Deep Tubewell	Lift on River	Lift on Stream	Lift on Drain/ Canal	Lift on Tank/ Pond	Total
9	10	11	12	13	14	15	16
9159	53	5	20	1	1	17	9256

Total							
Dugwell	Shallow Tubewell	Deep Tubewell	Lift on River	Lift on Stream	Lift on Drain/ Canal	Lift on Tank/ Pond	Total
17	18	19	20	21	22	23	24
9159	53	5	20	1	1	17	9256

Table: 21.39

DISTRICT WISE PERCENTAGE DISTRIBUTION OF AREA OF HOLDINGS ACCORDING TO IRRIGATION STATUS 1995-96, 2000-01 & 2005-06

District	Wholly irrigated holdings			Partly irrigated holdings					
				Total area			Irrigated area		
	95-96	00-01	05-06	95-96	00-01	05-06	95-96	00-01	05-06
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Thiruvananthapuram	0.75	2.17	4.11	9.80	29.12	51.69	3.41	8.20	8.78
State	**4.90**	**5.67**	**3.07**	**37.73**	**49.44**	**55.09**	**18.66**	**21.61**	**22.99**

District	Net irrigated area			Wholly unirrigated holdings			Net area sown		
	95-96	00-01	05-06	95-96	00-01	05-06	95-96	00-01	05-06
1	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
Thiruvananthapuram	4.16	10.38	12.89	89.45	68.68	44.20	100	100	100
State	**23.56**	**27.28**	**26.23**	**57.37**	**44.88**	**38.29**	**100**	**100**	**100**

Table: 21.40

DISTRIBUTION OF DISTRICT WISE HOLDINGS RECEIVING IRRIGATION BY DIFFERENT SOURCES 2005-06

District	Source of Irrigation											
	Canal		Tank		Well		Tube wells		Other sources		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Thiruvananthapuram	3279	1.99	4538	3.83	205749	10.81	10288	4.67	120613	16.85	344467	11.03
State	**164794**	**100**	**118335**	**100.00**	**1903034**	**100.00**	**220092**	**100**	**715954**	**100.00**	**3122209**	**100.00**

Table: 21.41

DISTRIBUTION OF DISTRICT WISE AREA IRRIGATED BY DIFFERENT SOURCES 2005-06

District	Source of Irrigation											
	Canal		Tank		Well		Tube wells		Other sources		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Thiruvananthapuram	375	0.68	436	1.23	4595	3.96	487	2.22	2633	2.17	8537	2.43
State	**55384**	**100.00**	**35478**	**106**	**116020**	**100.00**	**21940**	**100.00**	**121548**	**100.00**	**350870**	**100.00**

Source:- Agricultural Census 2005-06.

Table: 21.42

DISTRICT WISE ACTUAL RAINFALL, NORMAL RAINFALL AND PERCENTAGE OF DEPARTURE FOR 2011

Sl. No.	District	Pre-Monsoon Rainfall (March to May)			South West Monsoon Rainfall (June to September)			North East Monsoon Rainfall (October to December)		
		Actual Rain fall (mm)	Normal Rainfall (mm)	Departure (%)	Actual Rain fall (mm)	Normal Rainfall (mm)	Departure (%)	Actual Rain fall (mm)	Normal Rainfall (mm)	Departure (%)
1	Alappuzha	470.1	477.3	-1	1584.3	1745.9	-9	469.2	571.7	-18.0
2	Kannur	137.7	300.4	-54	3030.4	2669.0	13	305.2	344.8	-11.0
3	Ernakulam	425.3	443.7	-4	2636	2065.0	28	315.5	489.1	-35.0
4	Idukki	370.7	426.6	-13	2637.6	2276.3	16	581.8	564.5	3.0
5	Kasargod	253.5	272.5	-7	3227.6	3007.1	7	376.0	337.4	11.0
6	Kollam	372.3	469.3	-21	1162.1	1332.1	-13	603.0	638.9	-6.0
7	Kottayam	502.4	460.1	9	2231.3	1897.9	18	456.7	535.4	-15.0
8	Kozhikode	223.0	352.9	-37	3324.8	2602.8	28	424.9	422.1	1.0
9	Malappuram	214.4	320.6	-33	2279.6	2060.7	11	422.9	448.2	-6.0
10	Palakkad	212.1	279.5	-24	1874	1572.0	19	462.5	427.5	8.0
11	Pathanamthitta	541.3	553.1	-2	1517.4	1715.0	-11	475.0	623.7	-24.0
12	**Thiruvananthapuram**	**265.0**	**368.8**	**-28**	**585.5**	**871.4**	**-33**	**550.6**	**522.6**	**5.0**
13	Thrissur	260.1	385.2	-33	2427.5	2197.5	11	424.4	469.5	-10.0
14	Wayanad	306.6	275.1	11	1967	2631.9	-25	323.3	331.5	-3.0
	Kerala	**313.3**	**379.7**	**-17**	**2215.8**	**2039.6**	**9**	**450.8**	**480.7**	**-6**

Source: Economic Review 2011.

POWER

Power Sector in Kerala plays a vital role in all developmental activities in Kerala. Obviously power crisis is the prime obstacle to start new initiatives in the industrial field. The need for power is increasing and the production of power should also be increased accordingly. Monsoon is essential tom sustain the hydropower base in the State and the shortage in rainfall usually creates power crisis. Kerala received abundant monsoon during the current year and increased the inflow in to KSEB reservoirs; the KSEB could manage the power supply situation with higher quantum of cheaper hydel power. Kerala is one among the very few states in the country where there was no load shedding and power out during 2010-11. KSEB has been responsible for the generation, transmission and supply of electricity in the State, with particular emphasis to provide electricity at affordable cost to the domestic as well as for agricultural purposes. The Board has been passing through a transitional phase of reforms in the electricity sector. The Electricity Act 2003 envisages separate organizations for Transmission and Distribution. Hydel and Thermal Projects, which form the backbone of the power sector of Kerala State, cater to needs of the various industries, which are augmented by the supply from National grids. High rainfall and terrain conditions have endowed the State with a vast potential of hydro-electricity, which is about 6% of India's total hydroelectric potential. The Small Hydro Power (SHP) units have spurted the momentum of development of wind, solar and biomass energy systems, paving the way for integrated renewable energy systems in all potential development blocks/taluks.

Kerala's power sector projections

In the past, the energy demand was presumed to be basis with load factor being used to convert the projected energy demand to peak MW demand. The projected energy demand was worked out by a combination of end use and time series analysis. This was the methodology used in the Electric Power Surveys (EPS) conducted by CEA in conjunction with the State Electricity Boards.

One of the problems with the above approach has been consistent over projection of peak demand. The annual growth of peak power demand has been assumed to be the order of 7-8% and this has resulted in projections well beyond actual demand realized.

Some of these anomalies have been corrected in the current Electric Power Surveys conducted and the projections for Kerala as continued in the 17th Survey. The figures for Kerala in terms of demand projection in the Draft 17th EPS are given below.

Table: 22.1

17th EPS ESTIMATES FOR 11th PLAN PERIOD

Year	Energy Consumption	Peak Demanded	Annual Load Factor (%)
2006-07	11147	2699	60.75
2007-08	12037	2823	61.54
2008-09	12973	2947	62.34
2009-10	13977	3078	63.14
2010-11	15112	3227	63.94
2011-12	16345	3391	64.74

It is evident from the 17th EPS Draft Report that a number of assumptions made for projections which may result in the actual demand being more than what is projected in the EPS or less. KSEB's own projections taking into account a higher growth rate and a slightly lower load factor projects the following demands for the 11th plan period.

Table: 22.2

Year	Energy Consumption	Peak Demand	Annual Load Factor (%)
2007-08	15217	2856	60.82
2008-09	16096	3004	61.17
2009-10	17025	3159	61.52
2010-11	18077	3335	61.87
2011-12	19230	3528	62.22

Source: EPA Draft Report

DETAILS OF POWER GENERATION IN KERALA

Table: 22.3

1. KSEB HYDRO

Sl. No.	Name of Station	Power (in Mega Watts)	Energy (in Million Units)
1	Pallivasal	37.50	284.00
2	Sengulam	48.00	182.00
3	Poringalkuthu	32.00	170.00
4	Neriamangalam	52.50	251.60
5	Panniyar	30.00	148.00
6	Sabarigiri	325.00	1338.00
7	Sholayar	54.00	233.00
8	Kuttiady	75.00	248.00
9	Idukki	780.00	2398.00
10	Idamalayar	75.00	320.00
11	Kallada	15.00	65.00
12	Peppara	3.00	11.50
13	Lower Periyar	180.00	493.00
14	Mattupetty	2.00	6.40
15	Poringal left bank extension	16.00	74.00
16	Kakkad	50.00	262.00
17	Kuttiadi extension scheme	50.00	75.00
18	Malampuzha shep	2.50	5.60
19	Chembukadavu - I	2.70	6.24
20	Chembukadavu - II	3.75	9.66
21	Urumi - I	3.71	9.53
22	Urumi - II	2.40	6.10
23	Malankara	10.50	65.00
24	Lower Meenmutty	3.50	7.00
25	Neriamangalam extension	25.00	58.00

2. DIVERSION/AUGMENTATION SCHEMES

1	Vazhikadavu		24.00
2	Panniar Augmentation		10.00
3	Narakakkanam (To Idukki)		7.00
4	Poringal (To Idamalayar)		60.00
5	Azhutha		57.00
6	Vadakkepuzha		12.00
7	Kuttiadi Augmentation		223.00

3. CAPTIVE HYDRO

1	Maniar	12.00	37.00
2	Kuthungal	21.00	79.00

4. KSEB DIESEL

1	Brahmapuram	106.60	535.00
2	KDPP Kozhikode	128.00	896.00

5. CENTRAL PUBLIC SECTOR - THERMAL

1	Kayamkulam (N.T.P.C)	359.58	2094.00

6. THERMAL IPPs

1	B.S.E.S Kerala Power Limited Kochi (IPP)	157.00	1099.00
2	KPC Kasargod (IPP)	20.44	140.00

7. WIND ENERGY (KSEB)

1	Wind Farm, Kanjikode	2.03	5.00
2	Ramakkalmedu (private sector)	10.50	20.24
3	Agali (private sector)	6.00	12.01

Table: 22.4

PLAN-WISE ACHIEVEMENTS

Sl. No.	Particulars	11th Plan			
		1st Year	2nd Year	3rd Year	4th Year
		2007-08	2008-09	2009-10	2010-11
1	Installed Capacity (MW)	13.68	68.1	7	116.6
2	220 KV line (km)	1.01	0	18.26	0
3	110 KV line (km)	56.38	17.5	48.30	34.22
4	66 KV line (km)	11.13	0	0	0
5	33 KV line (km)	105.44	169.57	199.22	63.6
6	11 KV line (km)	1816.45	3048.00	3398.27	36659
7	LT Lines (km)	8158.18	7563.00	7837.95	6761
8	Step up transformer capacity (MVA)	0	39.8	1.6	235.11
9	No. of EHT substations including upgradation	6	2	11	6
10	No. of 33 KV substations	13	16	18	7
11	Step down transformer capacity (MVA)	469	385	1095	934
12	Distribution transformer a. Nos.	2553	4109	5790	5804
	b. Capacity (MVA)	265.17	514.67	770.99	611.22
13	Consumer Nos.	482766	442895	380015	384470
14	Connected Load (MW)	912	2889.44	599.11	815.3
15	Street light installed (No)	49448	37641	61532	54768
16	Pump set connected (No)	15553	11231	10715	12467

Source: Kerala State Electricity Board.

Table: 22.5

ANNUAL GENERATION FROM RENEWABLE ENERGY SOURCES
(Small hydel up to 25 mw, wind, etc)

Sl. No.	Stations	Installed capacity (mw)	GENERATION (MU)				
			2006-07	2007-08	2008-09	2009-10	2010-11
	HYDEL (KSEB)						
1	Kallada	15	76.16	73.03	46.34	60.42	72.09
2	Peppara	3	7.48	8.18	5.52	6.05	9.75
3	Mattupetty	2	5.68	6.91	5.74	1.91	2.28
4	Poringalkuthu LBE	16	107.81	59.94	109.62	108.82	120.67
5	Malampuzha	2.5	2.06	0	0	0	0
6	Lower Meenmutty	3.5	5.62	4.92	4.11	3.43	7.19
7	Urumi	6.15	14.52	13.77	11.79	11.58	15.94
8	Chembukkadavu	6.45	12.17	9.28	10.03	8.46	13.54
9	Malankara	10.5	32.22	43.7	33.49	32.46	36.93
10	Neriamangalam Extention	25	-	-	47.41	92.6	95.48
11	Kuttiyadi Tailrace	3.75	-	-	5.76	4.62	4.34
	HYDEL(CPP)						
1	Maniyar	12	43.02	38.52	25.3	33.79	41.24
2	Kuthungal	21	37.52	62.88	38.42	34.25	47.05
	HYDEL(IPP)						
1	Ullungal	7	-	-	3.12	19.82	24.29
2	Iruttukkanam	3	-	-	-	-	5.96
	WIND (KSEB)						
1	Kanjikode	2.02	2.14	1.96	1.68	1.84	1.51
	WIND (IPP)						
1	Ramakkalmedu	14.25	-	-	21.72	32.54	29.38
2	Agali	13.8	-	-	10.28	35.07	33.66
	Cogeneration (IPP)						
1	MPS Steel Casting	10		-	10.26	49.02	34.07
	Total		**346.4**	**323.09**	**390.59**	**536.68**	**595.37**

Source: Kerala State Electricity Board.

Table: 22.6

ALL INDIA GENERATING INSTALLED ELECTRICITY GENERATION CAPACITY AS ON 31-03-11

Name of State/U.Ts	Hydro	Coal	Diesel	Gas
1	2	3	4	5
Northern Region	13822.75	24232.5	12.99	4134.76
Western Region	7447.5	30995.5	17.48	7903.81
Southern Region	11299.03	19882.5	939.32	4690.78
Eastern Region	3882.12	18747.88	17.2	190
North Eastern Region	1116	60	142.74	787
Islands	0	0	70.02	0
Total (All India)	**37567.4**	**93918.38**	**1199.75**	**17706.35**

Name of State/U.Ts	Nuclear	RES	Total
1	6	7	8
Northern Region	1620	3165.55	46988.55
Western Region	1840	5357.96	53562.25
Southern Region	1320	9341.67	47473.3
Eastern Region	0	359.64	23196.84
North Eastern Region	0	223.6	2329.34
Islands	0	6.1	76.12
Total (All India)	**4780**	**18454.52**	**173626.4**

Source: Kerala State Electricity Board

MISCELLANEOUS

Table: 23.1

NEWLY REGISTERED VEHICLES FOR THE YEAR 2010-11

Sl.No.	Classification of Vehicles	Number
1	Multiaxied Articulated Vehicles	2
2	Trucks and Lorries	300
3	Four Wheelers	1878
4	Three Wheelers	607
	Total	**2787**
5	Stage Carriage	93
6	Contract Carriage	223
7	Private Service Vehicles	71
8	Other Buses	174
	Total	**561**
9	Motor Cabs	696
10	Maxi Cabs/Taxi	0
11	Other Taxis	116
	Total	**812**
12	LMV 3 Seater	3270
13	LMV 4 to 6 Seater	0
14	Motor Cycle Hire	0
	Total	**3270**
	Other TVs	99
	Total Transport	**7529**
15	Scooters	0
16	Mopads	0
17	Motor Cycles including above & below 95cc	41188
	Total	**41188**
18	Cars	17612
19	Jeeps	0
20	Omni Buses	1
21	Tractors	33
22	Trailors	1
23	Others	789
	Total	**18436**
	Total Non Transport	**59624**
	Grand Total	**67153**

Source: Economic Review 2011

Table: 23.2

STANDARDISED LIST OF INSTITUTIONS IN THIRUVANANTHAPURAM DISTRICT

Sl. No.	Institutions	Location	No. of Beds	Municipalities/Panchayath/ Corporations
1	Gen H	Thiruvananthapuram	747	Thiruvananthapuram Corpn.
2	Speciality (MHC)	Mental Health Center, Peroorkada	507	Thiruvananthapuram Corpn.
3	Speciality (TB)	Pulayanarkotta	508	Thiruvananthapuram Corpn.
4	Speciality(W&CH)	W&C Thycaud	428	Thiruvananthapuram Corpn.
5	Speciality (TB)	District TB Centre	0	Thiruvananthapuram Corpn.
6	Speciality(W&CH)	Government Ayurvedic Maternity Hospital, Poojappura	0	Thiruvananthapuram Corpn.
7	DH	Peroorkada	337	Thiruvananthapuram Corpn.
8	DH	Neyyattinkara	436	Neyyattinkara Municipality
9	THQH	Chirayinkeezhu	243	Chirayinkeezhu Block Panchayath
10	THQH	Nedumangadu	225	Nedumangad Municipality
11	THQH	Parassala	119	Parassala Block Panchayath
12	TH	Varkala	64	Varkala Municipality
13	TH	Nemom	61	Thiruvananthapuram Corporation
14	TH	Attingal	60	Attingal Minicipality
15	CHC	Fort Hospital	76	TVPM Corporation.
16	CHC	Iranimuttom	89	TVPM Corporation.
17	CHC	Palode	31	TVPM Corporation.
18	CHC	Poonthura	24	CHC Poonthura
19	CHC	Kallara SCP	32	CHC Kallara
20	CHC	Vakkom	24	CHC Vakkom
21	CHC	Poovar	16	CHC Poovar
22	CHC	Manamboor	24	CHC Manamboor
23	CHC	Perumkadavila	12	CHC Perumkadavila
24	CHC	Vellanadu	22	CHC Vellanadu
25	CHC	Kattakada	20	CHC Vellanadu
26	CHC	Vizhinjam	42	CHC Vizhinjam
27	CHC	Vellarada	40	CHC Vellarada
28	CHC	Puthenthopu	24	CHC Puthenthopu
29	CHC	Kanyakulangara	12	CHC Kanyakulangara
30	CHC	Pulluvila	8	CHC Pulluvila
31	CHC	Kesavapuram	52	CHC Kesavapuram
32	CHC	Vilappil	16	CHC Vilappil
33	CHC	Malayinkeezhu	58	CHC Vilappil

Sl. No.	Institutions	Location	No. of Beds	Municipalities/Panchayath/ Corporations
34	CHC	Vithura	65	CHC Vithura
35	CHC	Aryanad	20	CHC Vellanadu
36	CHC	Anchuthengu	30	CHC Anchuthengu
37	CHC	Venpakal	52	CHC Venpakal
38	24X7 PHC	Valiyathura	34	TVPM Corporation
39	24X7 PHC	Vattiyoorkavu	0	CHC Poonthura
40	24X7 PHC	Pozhiyoor	0	CHC Poovar
41	24X7 PHC	Thiruvallom	29	CHC Vizhinjam
42	24X7 PHC	Kunnathukal	24	CHC Vellarada
43	24X7 PHC	Tholikkodu	0	CHC Vithura
44	24X7 PHC	Vamanapuram	14	PHC Vamanapuram
45	PHC	Palace dispensary Kowdiar	0	TVPM Corporation
46	PHC	Karamana	0	TVPM Corporation
47	PHC	Chettivilakam	0	CHC Poonthura
48	PHC	Kadakampally	24	CHC Poonthura
49	MCH Unit (PHC)	Pangappara	0	PHC Pangappara
50	PHC	Ulloor	0	PHC Pangappara
51	PHC	Bharathannur	0	CHC Kallara
52	PHC	Kizhuvilam	0	CHC Vakkom
53	PHC	Mudakkal	0	CHC Vakkom
54	PHC	Chenkal	0	CHC Poovar
55	PHC	Paraniyam	0	CHC Poovar
56	PHC	Kulathur	0	CHC Poovar
57	PHC	Karode	0	CHC Poovar
58	PHC	Cheruniyur	0	CHC Manamboor
59	PHC	Vettur	0	CHC Manamboor
60	PHC	Ottur	0	CHC Manamboor
61	PHC	Edava	24	CHC Manamboor
62	PHC	Chemmaruthy	0	CHC Manamboor
63	PHC	Thonippara	6	CHC Manamboor
64	PHC	Chembur	0	CHC Perumkadavila
65	PHC	Kollayil	10	CHC Perumkadavila
66	PHC	Poozhanad	10	CHC Perumkadavila
67	PHC	Perumpazhuthoor	10	CHC Perumkadavila
68	PHC	Uzhamalakkal	0	CHC Vellanadu
69	PHC	Kuttichal	0	CHC Vellanadu
70	PHC	Kallikad (old)	0	CHC Vellanadu
71	PHC	Katakada (New	0	CHC Vellanadu
72	PHC	Mukkola (Vizhinjam	0	CHC Vizhinjam
73	PHC	Amboori	0	CHC Vellarada
74	PHC	Kallikad (new)	0	CHC Vellarada
75	PHC	Veli	0	CHC Puthenthopu
76	PHC	Puthukurichi	6	CHC Puthenthopu

Sl. No.	Institutions	Location	No. of Beds	Municipalities/Panchayath/ Corporations
77	PHC	Andoorkonam	24	CHC Puthenthopu
78	PHC	Mangalapuram	0	CHC Puthenthopu
79	PHC	Thonnakkal	0	CHC Puthenthopu
80	PHC	Vembayam	0	CHC Kanyakulangara
81	PHC	Aruvikkara	0	CHC Kanyakulangara
82	PHC	Panavoor	0	CHC Kanyakulangara
83	PHC	Anad	0	CHC Kanyakulangara
84	PHC	Karakulam	0	CHC Kanyakulangara
85	PHC	Kanjiramkulam	0	CHC Pulluvila
86	PHC	Adayamon	0	CHC Kesavapuram
87	PHC	Pallickal	0	CHC Kesavapuram
88	PHC	Karavaram	0	CHC Kesavapuram
89	PHC	Kilimanoor	0	CHC Kesavapuram
90	PHC	Madavoor	0	CHC Kesavapuram
91	PHC	Navaikulam	0	CHC Kesavapuram
92	PHC	Pulimath	0	CHC Kesavapuram
93	PHC	Vilavoorkkal	0	CHC Vilappil
94	PHC	Maranalloor	0	CHC Vilappil
95	PHC	Kalliyoor	20	CHC Vilappil
96	PHC	Pallichal	0	CHC Vilappil
97	PHC	Balaramapuram	10	CHC Vilappil
98	PHC	Vellayani	20	CHC Vilappil
99	PHC	Peringammala	0	CHC Vithura
100	PHC	Malayadi	0	CHC Vithura
101	PHC	Perumathura	10	CHC Anchuthengu
102	PHC	Keezhattingal	0	CHC Anchuthengu
103	PHC	Azhoor	0	CHC Anchuthengu
104	PHC	Anakudi	0	PHC Vamanapuram
105	PHC	Pullampara	8	PHC Vamanapuram
106	PHC	Kottukal	0	CHC Venpakal

MOBILE UNITS

Sl. No.	Institutions	Location
1	Dental Mobile Unit	Thiruvananthapuram
2	Tribal Mobile Unit	Nedumangadu
3	GD	Rajbhavan dispensary Kowdiar
4	GD	MLA hostel health clinic
5	Jail Disp	Kattakada
6	Central Prison Hospital	Poojappura
7	Health Clinic	Secretariat Health Clinic
8	GD	Palayam Police Hospital
9	GH	Police Hospital, TVPM

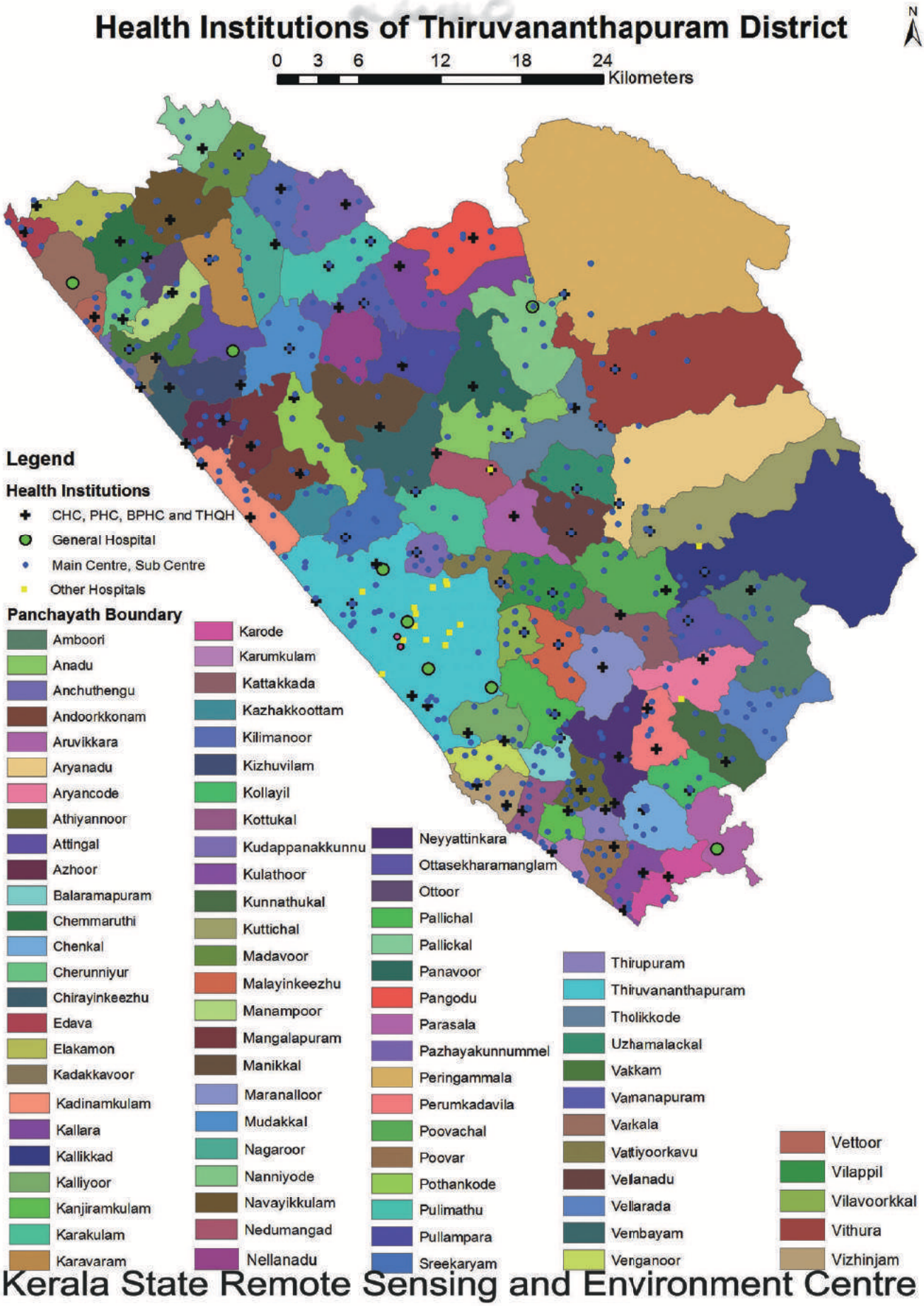
Water Transport

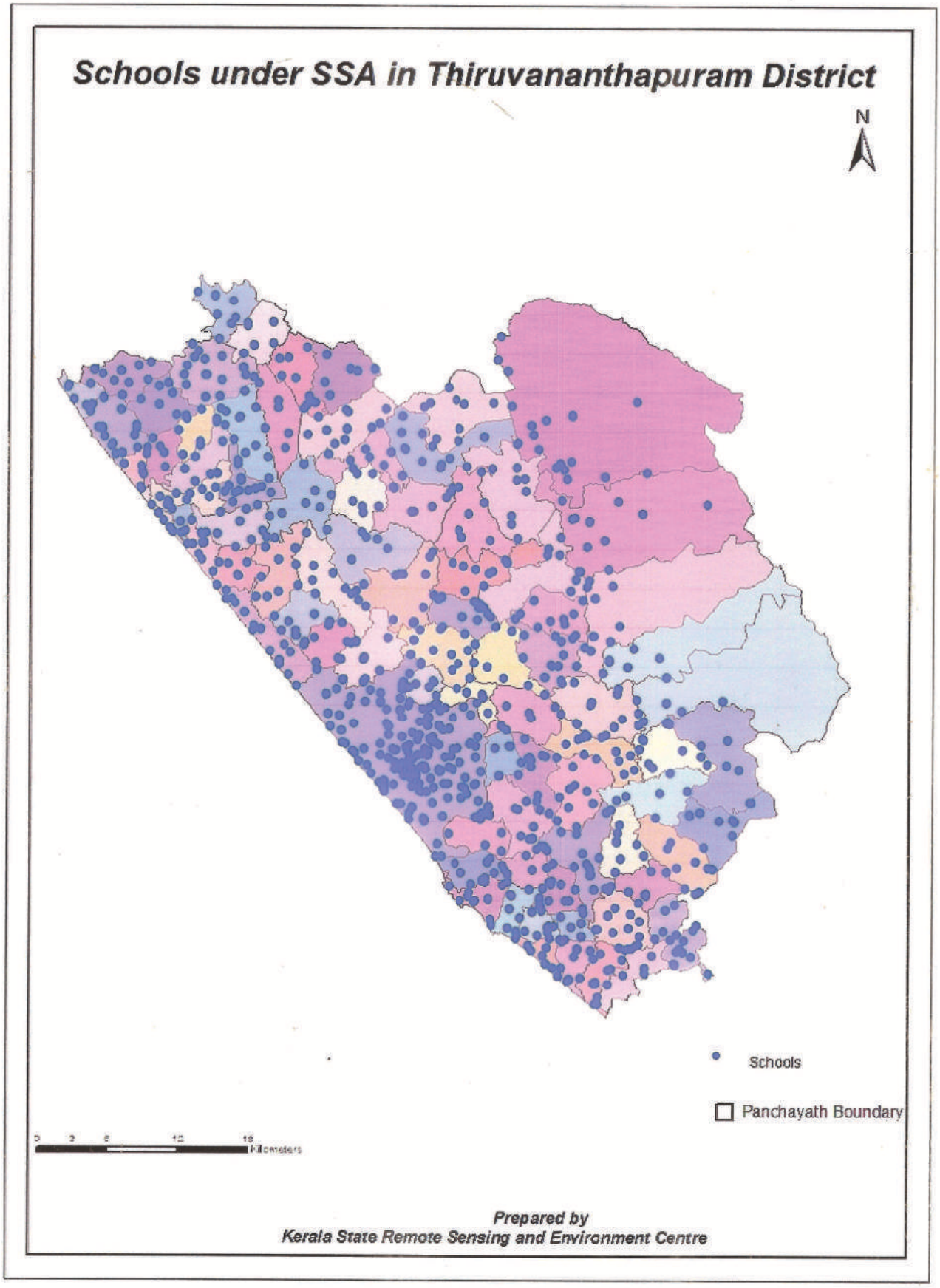
Thiruvananthapuram District is noted for its rivers, lakes, and coast line. These natural favours from Thiruvananthapuram to Kozhikode District gives plentiful opportunity to those who like to make journey through water ways. However, the outdated two tunnels of 282 meters and 721 meters at Varkala obstruct the water transport at present. Though the Government makes effort to revitalize these waterways, it does not find its outcome. The government of Kerala has started a project of international deep-water container transhipment at Vizhinjam. The acquisition of the land for the project is going on. The present project will soon be completed and it will open new ways for water transport.

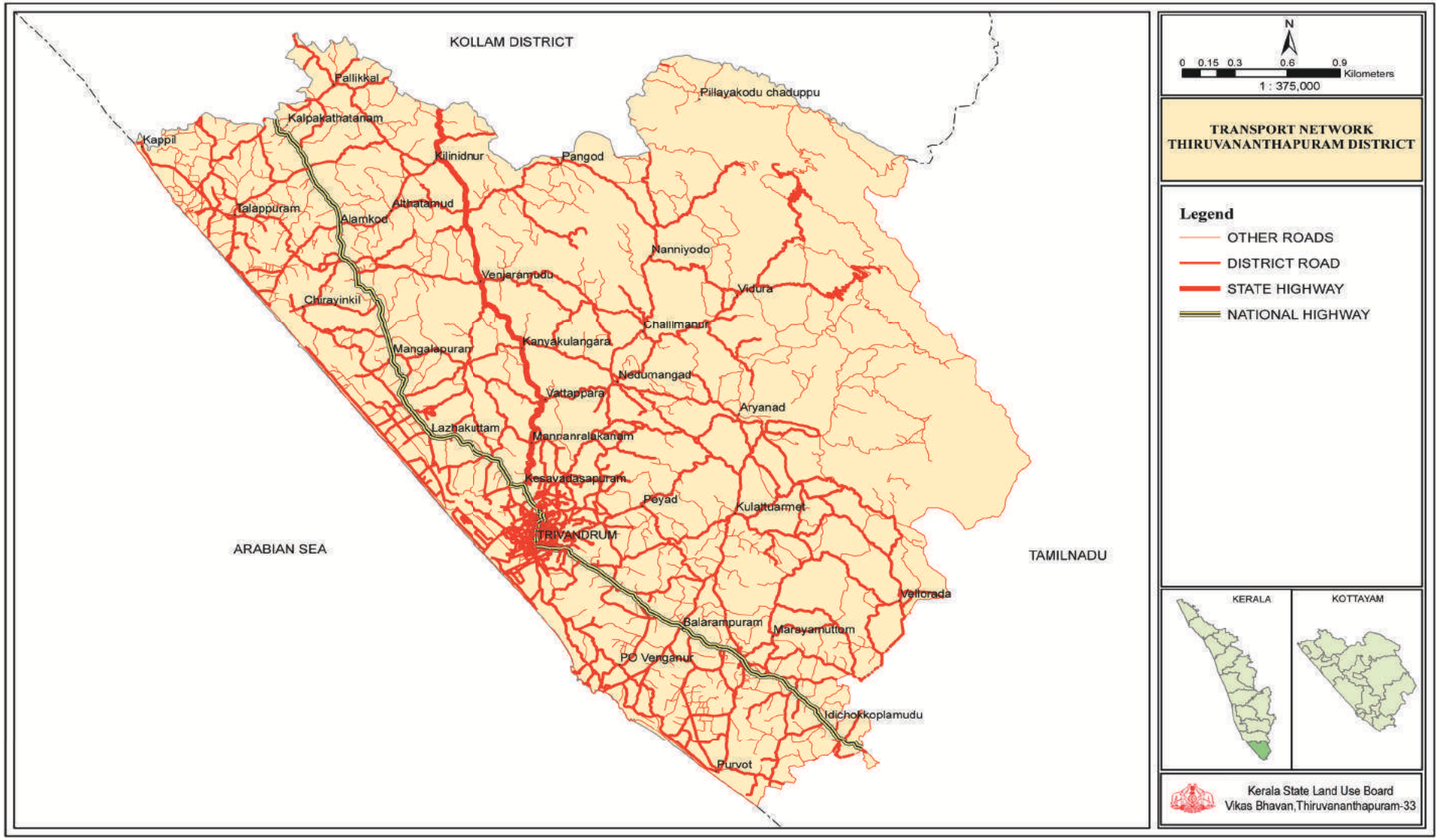
List of Panchayats

The Panchayats in Thiruvananthapuram district are:-

Athiyannoor, Kanjiramkulam, Karumkulam, Kottukal, Venganoor, Anchuthengu, Chirayinkeezhu, Kadakkavoor, Kizhuvilam, Mudakkal, Vakkam, Karavaram, Kilimanoor, Madavoor, Nagaroor, Navayikkulam, Pallickal, Pazhayakunnummel, Pulimathu, Anad, Aruvikkara, Karakulam, Panavoor, Vembayam, Balaramapuram, Kalliyoor, Malayinkeezhu, Maranalloor, Pallichal, Vilappil, Vilavoorkkal, Chenkal, Karode, Kulathoor, Parassala, Poovar, Thirupuram, Amboori, Aryancode, Kallikkad, Kollayil, Kunnathukal, Ottasekharamangalam, Perumkadavila, Vellarada, Andoorkkonam, Azhoor, Kadinamkulam, Mangalapuram, Pothencode, Kallara, Manikkal, Nanniyode, Nellanadu, Pangod, Peringammala, Pullampara, Vamanapuram, Chemmaruthi, Cherunniyur, Edava, Elakamon, Manampoor, Ottoor, Vettoor, Aryanad, Kattakada, Kuttichal, Poovachal, Tholikkode, Uzhamalackal, Vellanadu, Vithura.


Health Institutions of Thiruvananthapuram District
N
0 3 6 12 18 24
Kilometers
Legend
Health Institutions
CHC, PHC, BPHC and THQH
General Hospital
Main Centre, Sub Centre
Other Hospitals
Panchayath Boundary
Amboori
Anadu
Anchuthengu
Andoorkkonam
Aruvikkara
Aryanadu
Aryancode
Athiyannoor
Attingal
Azhoor
Balaramapuram
Chemmaruthi
Chenkal
Cherunniyur
Chirayinkeezhu
Edava
Elakamon
Kadakkavoor
Kadinamkulam
Kallara
Kallikkad
Kalliyoor
Kanjiramkulam
Karakulam
Karavaram
Karode
Karumkulam
Kattakkada
Kazhakkoottam
Kilimanoor
Kizhuvilam
Kollayil
Kottukal
Kudappanakkunnu
Kulathoor
Kunnathukal
Kuttichal
Madavoor
Malayinkeezhu
Manampoor
Mangalapuram
Manikkal
Maranalloor
Mudakkal
Nagaroor
Nanniyode
Navayikkulam
Nedumangad
Nellanadu
Neyyattinkara
Ottasekharamanglam
Ottoor
Pallichal
Pallickal
Panavoor
Pangodu
Parasala
Pazhayakunnummel
Peringammala
Perumkadavila
Poovachal
Poovar
Pothankode
Pulimathu
Pullampara
Sreekaryam
Thirupuram
Thiruvananthapuram
Tholikkode
Uzhamalackal
Vakkam
Vamanapuram
Varkala
Vattiyoorkavu
Vellanadu
Vellarada
Vembayam
Venganoor
Vettoor
Vilappil
Vilavoorkkal
Vithura
Vizhinjam
Kerala State Remote Sensing and Environment Centre


Schools under SSA in Thiruvananthapuram District
N
Schools
Panchayath Boundary
Prepared by
Kerala State Remote Sensing and Environment Centre


KOLLAM DISTRICT
Pallikkal
Kalpakathatanam
Kappil
Kilinidnur
Pangod
Pillayakodu chaduppu
Talappuram
Alamkod
Aithatamud
Nanniyodo
Venjaramudu
Vidura
Chirayinkil
Chaillmanur
Kanyakulangara
Mangalapuram
Nedumangad
Vattappara
Aryanad
Lazhakuttam
Mannanralakanam
Kesavadasapuram
Peyad
Kulattuarmet
TRIVANDRUM
ARABIAN SEA
TAMILNADU
Vellorada
Balarampuram
Marayamuttom
PO Venganur
Idichokkoplamudu
Purvot
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 375,000
TRANSPORT NETWORK
THIRUVANANTHAPURAM DISTRICT
Legend
OTHER ROADS
DISTRICT ROAD
STATE HIGHWAY
NATIONAL HIGHWAY
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33