NATURAL RESOURCES DATA BANK

KOTTAYAM

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
18-02-2013

M. NANDAKUMAR I.A.S
Land Use Commissioner

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

GENERAL INFORMATION

Kottayam district is located in central Kerala, consisting of 2208 sq.km and stands 10th in area in the State among districts. Kottayam is also called as "Akshara Nagari" which means the city of letters considering its contribution to print media and literature.

District is located in central Kerala and divided into four submicroregions. District lies between $9^0$15' and $10^0$21' North Latitude and $76^0$22' and $77^0$25' East Longitude. Based on physical features Kottayam can be divided as highland, midland and lowland, the bulk being constituted by midland regions. The important rivers of the District are the Meenachil, Muvattupuzha and Manimala. District has a tropical humid climate with oppressive hot season and plenty of rainfall during monsoon. The total forest area in the district is 100.84 sq.km showing that the extent of forest is not much. Kottayam is the first town in India selected by the Ministry of Environment and Forests, Government of India to be transformed as an Eco City. Geological formation of the districts is classified as belt of crystalline rocks of the archean group, belt of residual laterite, a narrow belt of warkalli beds of tertiary group and a western most belt of recent deposits.

The soil of the district is generally classified as alluvial, peaty and laterite. A pretty town in the foot hills of the Western Ghats, Kottayam is a commercial center noted for its trade in rubber, pepper, tea, etc. District contributes a significant share of the food crops of the State and rubber as the cash crop. 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 district is deprived of sea-coast and has abundant lakes and rivers which are the base of inland fishing. 24,714 small scale industrial units are in the district as on 2001 census. All the revenue villages in Kottayam district are electrified.

HISTORY

Kottayam is a correct form of the compound word KOTTAYAKAM (Kotta+Akam) which means the interior of a fort. The rulers of Munjanad and Thekkumkur had their Headquarters at Thazhathangadi in the present Kottayam Town. Marthanda Varma of Travancore attacked Thekkumkur and destroyed the palace and the fort. The remnants of the palace and the fort are still seen here which proves the fact that palace was the abode of some dynasties. Later, the name 'Kottayam' was assigned to the District.

In the sangam age, Kottayam was a part of the Kuttanad Geographical Division of the land. Nammalvar, who lived in the 9th century AD, had sung hymns in praise of the Vishnu Temple of Thrikkodithanam in Changanassery Taluk. By this time, the Ariyan immigrants had come from the North and set up their gramams in the selected areas of this District. Ettumanoor, Nattasseri, Kumaranalloor, Kattamuri, Kidangoor, etc., were among such Brahmin villages set up by these immigrants. Christianity also had a firm

foothold in the District by that time. There are several Churches in the District which trace their origin to the early centuries of Christian era.

The beginning of the 9th century AD is the age of the Kulasekharas. At that time, Kottayam was a part of Vempolinad which belonged to Kulesakhara Empire. The Vembanad Kayal (lake) itself derives its name from Vempolinad. The kingdom of Vempolinad split itself into Kingdoms of Thekkumkur and Vadakkumkur by about 1100 AD and later these two kingdoms were annexed by Marthanda Varma of Travancore. Indications are there that the areas coming under Kottayam District had played an important role in the international trade of ancient Kerala. The Portuguese and the Dutch had their business relations with both Thekkumkur and Vadakkumkur Kingdoms for pepper and other spices. The main items of export were ivory, teak wood, sandalwood, apes and peacocks.

The Kulasekhara Empire had several subordinate divisions called 'Nadus' which were ruled by feudatory chiefs appointed by the Emperor at Mahodayapuram. The present Kottayam district was included in those days in three such Administrative Divisions called Nantuzhainad, Manjunad and Vempolinad. Changanassery and Kanjirappally Taluks were formerly parts of Nantuzhainad, Meenachil Taluk under Nantuzhainad and Vempolinad, Vaikom Taluk under Vempolinad and Kottayam-Ettumanoor area under Manjunad. Vempolinad was referred to as 'Bimbalidesa' in Sanskrit literature.

The Northern portion of Vempolinad became Vadakkumkur while its Southern portion together with Manjunad and portions of Nantuzhainad constituted into the Kingdom of Thekkumkur. The boundaries of Thekkumkur were Illikkal Kodumudi on the East, the Vembanad Kayal on the West, Kanakkari Kunnu near Ettumanoor on the North and Kaippattur Kadavu on the South. Once, Thekkumkur Kingdom included Changanassery and Kanjirappally Taluks, portion of Meenachil Taluk, high ranges and also Thiruvalla – Chengannur area of then Alappuzha District. The Eastern and the Western boundaries of Vadakkumkur also were Illikkal Kodumudi and the Vembanad Kayal respectively. It was bounded by Thekkumkur on the South and Alangad on the North. At one time, the Vadakkumkur Kingdom included the Vaikiom-Ettumanoor area and a part of Meenachil Taluk and also portions of Muvattupuzha, Thodupuzha and Shertallai Taluks. Thekkumkur and Vadakkumkur were formerly the allies of Cochin. But later became subordinate to Cochin, first time under the Portuguese and later under the Dutch influence.

During the reign of Dharma Raja (1758-1798), Kottayam District was a part of Vadakkemugham, the Northern division of Travancore. In view of the threat of invasion by Mysore forces, Dharma Raja had taken special measures to strengthen the defense of the Northern boundary of the Kingdom and Kottayam had a key place in the new defence system built by the then Chief minister Raja Kesava Das and Captain D' Lannoy.

Kottyam District has played its role in the cultural life of the Travancore Princely State. The main reasons for this were the migration of Ramapurathu warrier, the famous poet of Vadakkumkur, to Trivandrum following the annexation of the territory by Marthanda Varma.

The present Kottayam district was previously a part of the erstwhile princely state of Travancore. Earlier, the Travancore state consisted of two revenue divisions viz. the southern and northern divisions, under the administrative control of a 'Diwan Peshkar' for each. Later in 1868 two more divisions Quilon (Kollam) and Kottayam were constituted. The fifth division Devikulam came next but only for a short period, which in course of time, was added to Kottayam. At the time of the integration of the State of Travancore and Cochin (Kochi) in 1949, these revenue divisions were renamed as districts and the Diwan peshkars gave way to District Collectors, paving the way for the birth of the Kottayam District in July 1949.

It was here that the famous Vaikom Satyagraha (1924-25), an epic struggle for eradication of untouchability, took place. Scheduled castes and other backward classes in Travancore were denied not only entry into temples, but also access to temple roads. Vaikom, the seat of a celebrated Siva Temple, was the venue of the symbolic satyagraha. It is of immense historic significance that national leaders like Mahatma Gandhi, C.Rajagopalachari, Acharya Vinoba Bhave and E.V.Ramswami Naykar, associated with this struggle.

In the closing decades of the 19th century and the beginning of the 20th century, Kottayam shot into the lime – light as the nerve centre of all literary and cultural activities in the erstwhile Travancore State. Among the dignitaries, Kottarathil Sankunny, Kandathil Varghese Mappilai and Kerala Varma Valiakoil Thampuran are worth mentioning. K.C.Mammen Mappilai, Kattakayathil Cheriyan Mappilai, Vaikom Muhammed Basheer, Vadakkumkur Rajaraja Varma, Ponkunnam Varkey, Karur Neelakanta Pillai, K.P.S.Menon and K.R.Narayanan, the former President of India are some among many notable personalities of the District in modern time.

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

Source:- Census Report, Govt. of India

KOTTAYAM AT A GLANCE

Table: 1.2

ADMINISTRATIVE SET UP

Sl. No.	Particulars	Kottayam	State
1	No. of Revenue Divisions	2	21
2	No. of Taluks	5	63
3	No. of Revenue Villages	95	1478
4	No. of Municipalities	4	60
5	No. of Municipality Wards	141	2216
6	No. of Block Panchayat	11	152
7	No. of Block Panchayat Wards	148	2095
8	No. of Grama Panchayat	73	978
9	No. of Grama Panchayat Wards	1180	16680
10	No. of Assembly Constituencies	9	140
11	No. of Parliament Constituencies	1	20
12	No. of District Panchayat Wards	23	332

Table: 1.3

GEOGRAPHICAL PARTICULARS

Sl. No.	Area Categorization	Kottayam	State
1	Total Area (Ha)	220442	3886287
2	Forest Area (Ha)	8141	1081509
3	Length of Coastal Line (Kms)	0	590

Table: 1.4

AGRICULTURE

Sl. No.	Land Utilization Pattern (Ha)	Kottayam	State
1	Total Geographical Area	220442	3886287
2	Forest Area	8141	1081509
3	Land put to non agricultural use	25893	384174
4	Barren & Uncultivable land	1469	19573
5	Permanent pastures and other grazing land	0	153
6	Land under miscellaneous tree crops	133	3690

7	Cultivable waste	4890	91665
8	Fallow other than current fallow	3046	51943
9	Current fallow	5808	76028
10	Net area sown	164451	2071507
11	Area sown more than once	42338	575954
12	Total cropped area	206789	2647461

Table: 1.5

ANIMAL HUSBANDRY

Sl. No.	Livestock Population	Kottayam	State
1	Cattle	122593	1740117
2	Buffaloes	1921	58145
3	Goats	124442	1729127
4	Pigs	9054	59017
5	Sheep	0	965
6	Ducks	42944	865331
7	Fowls	985605	11820376

Table: 1.6

FISHERIES

Sl. No.	Particulars	Kottayam	State
1	Fisher Folk Population		
	a. Marine		
	Population	0	887276
	Active Fishermen	0	188132
	b. Inland		
	Population	28093	265026
	Active Fishermen	6534	48281
2	Annual Fish Production		
	a. Marine		
	Quantity (In Tonnes)	0	560398
	Value (In Rs.Lakhs)	0	328168
	b. Inland		
	Quantity (In Tonnes)	5139	121215
	Value (In Rs.Lakhs)	3903	102124
3	No. of Fishing Villages		
	Marine	0	222
	Inland	8	113
4	No. of Brackish Water Area (Ha)	4326.74	65212.96
5	No. of Backwaters Area (Ha)	2926.77	46128.94

Table: 1.7

INDUSTRIES

Sl. No.	Industrial units	Kottayam	State
1	Number of Factories	267	18525
2	Number of SSI units registered	21510	194908
3	Number of Coir Societies	36	841
4	Number of women SSI units	5772	49688
5	Number of SC/ST SSI Units	589	9156

Table: 1.8

COMMUNICATION

Sl. No.	Communication Divisions	Kottayam	State
1	Total number of Post offices	409	5053
a)	Number of Head Post office	3	51
b)	Number of Sub Office	79	1455
c)	Number of Branch office	176	3559
d)	Number of ED Sub office	0	2
2	Number of Telephone Exchanges	100	1245

Table: 1.9

HEALTH

Sl. No.	Health Institutions	Kottayam	State
1	General Hospitals	1	11
2	Women & Children Hospital	-	6
3	District Hospital	1	15
4	Taluk HQ Hospital	3	80
5	Govt: Hospitals (Allopathic)	0	5
6	Primary Health Centre	54	835
7	Leprosy Control unit/Hospitals	0	3
8	TB Centre/Clinic	2	20
9	Mental Health Centres	-	3
10	Number of Ayurvedic Hospitals	9	119
11	Number of Ayurvedic Institutions	52	864
12	Number of Ayurvedic Dispensaries	43	745
13	Number of Homeopathic Hospitals	3	30

Table: 1.10

EDUCATION

Sl. No.	Educational Institutions	Kottayam	State
1	Lower Primary schools	458	6784
2	Upper Primary schools	206	2986
3	Higher Secondary schools	247	1908
4	Vocational Higher Secondary Schools	31	389
5	Kendriya Vidyalaya	1	32
6	Jawahar Navodaya Vidyalaya	1	14
7	CBSE School	74	797
8	ICSE School	10	108
9	ITIs	3	36
10	Engineering Colleges	3	360
11	Medical Colleges	1	5
12	Government Polytechnic Colleges	3	49

Table: 1.11

DRINKING WATER FACILITIES

Sl. No.	Water Supply connections	Kottayam	State
1	Number of public wells	Not Available	410
2	Number of public tanks/ponds	9	1720
3	Number of public taps	27397	209141
4	Number of tube wells	2	19716

Table: 1.12

WATER RESOURCES

River	Moovattupuzha
	Meenachil
	Manimala
Brackish Water	Vembanadu Lake

Table: 1.13

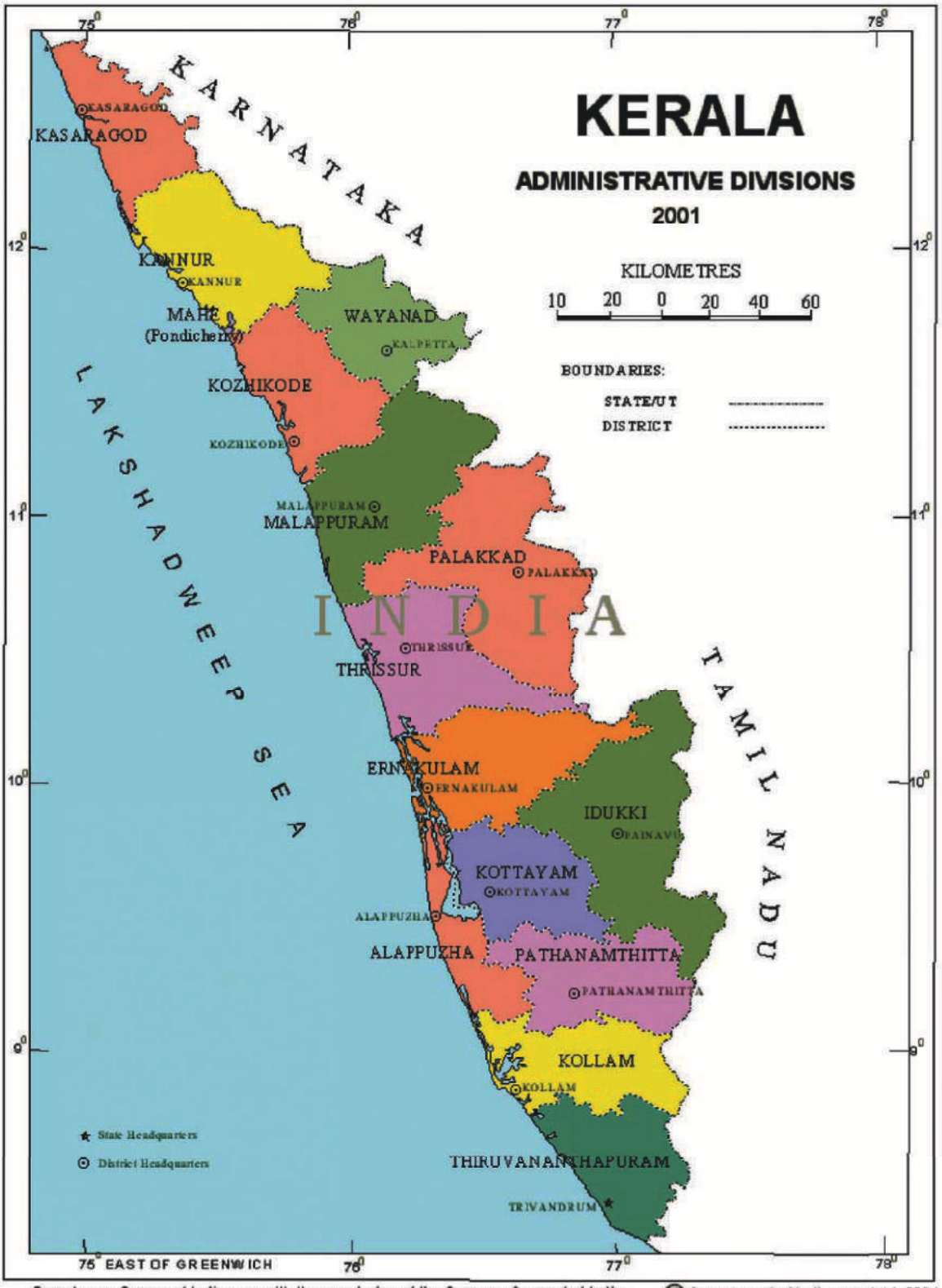
POWER

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

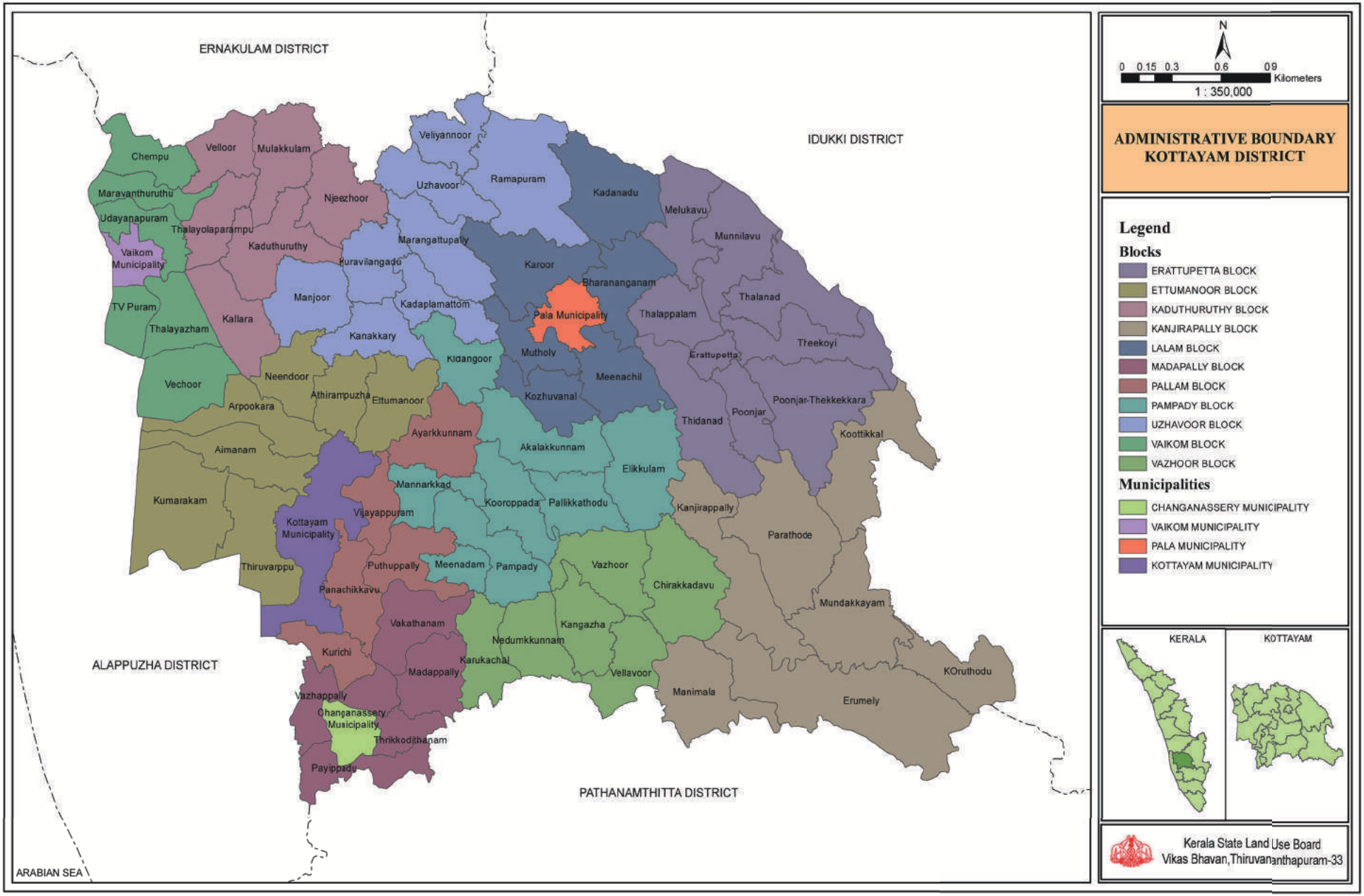
Table: 1.14

MAJOR TOURIST SPOTS IN KOTTAYAM

Sl. No.	Name	Main Focus
1	Alapra	Pretty cascades, small streams and rocks
2	Aruvikachal	Waterfalls
3	Aruvikuzhy	Waterfalls
4	Elaveezhapoonchira	Consisting of grass lands & small mounts
5	Ithipuzha	Greenary
6	Illickal Mala	Hill top centre
7	Kallara	Numerous canals and backwaters
8	Kayyoor-Nadukani	Green hills and rocky terrain with grasslands
9	Kottathavalam	Huge cave consisting reserve forest
10	Kumarakom	Bird sanctuary
11	Marmala	Waterfalls
12	Mariam Shrine Peermade	Pilgrim centre
13	Matrumala	Hill top area
14	Pallam	Backwaters
15	Vagamon	Famous pilgrim centre called Kurisumala and other tourism
16	Vennimala	The hill of Victory



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.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Kuravilangadu
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Pala Municipality
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TV Puram
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Kanjirappally
Vijayappuram
Kottayam Municipality
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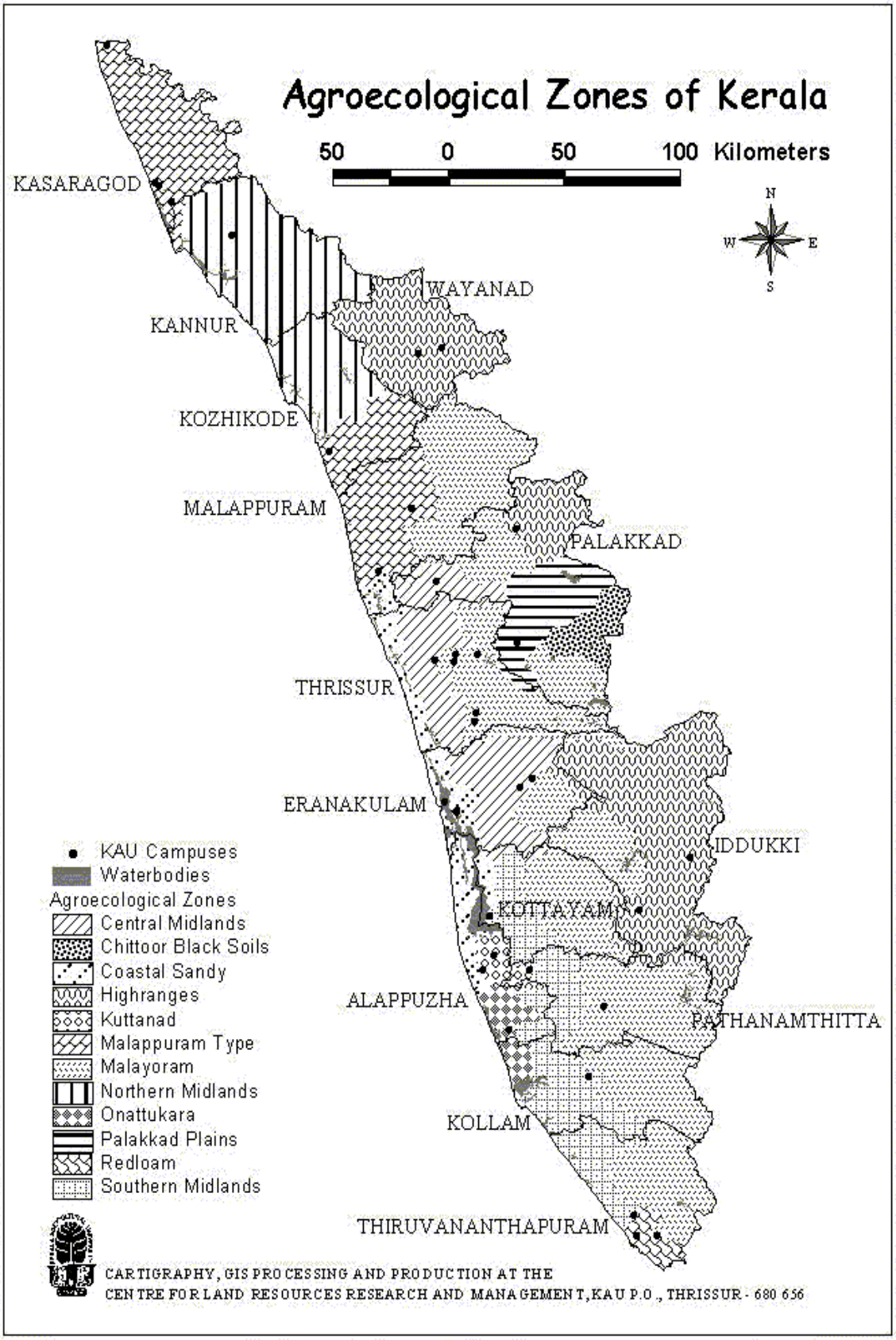
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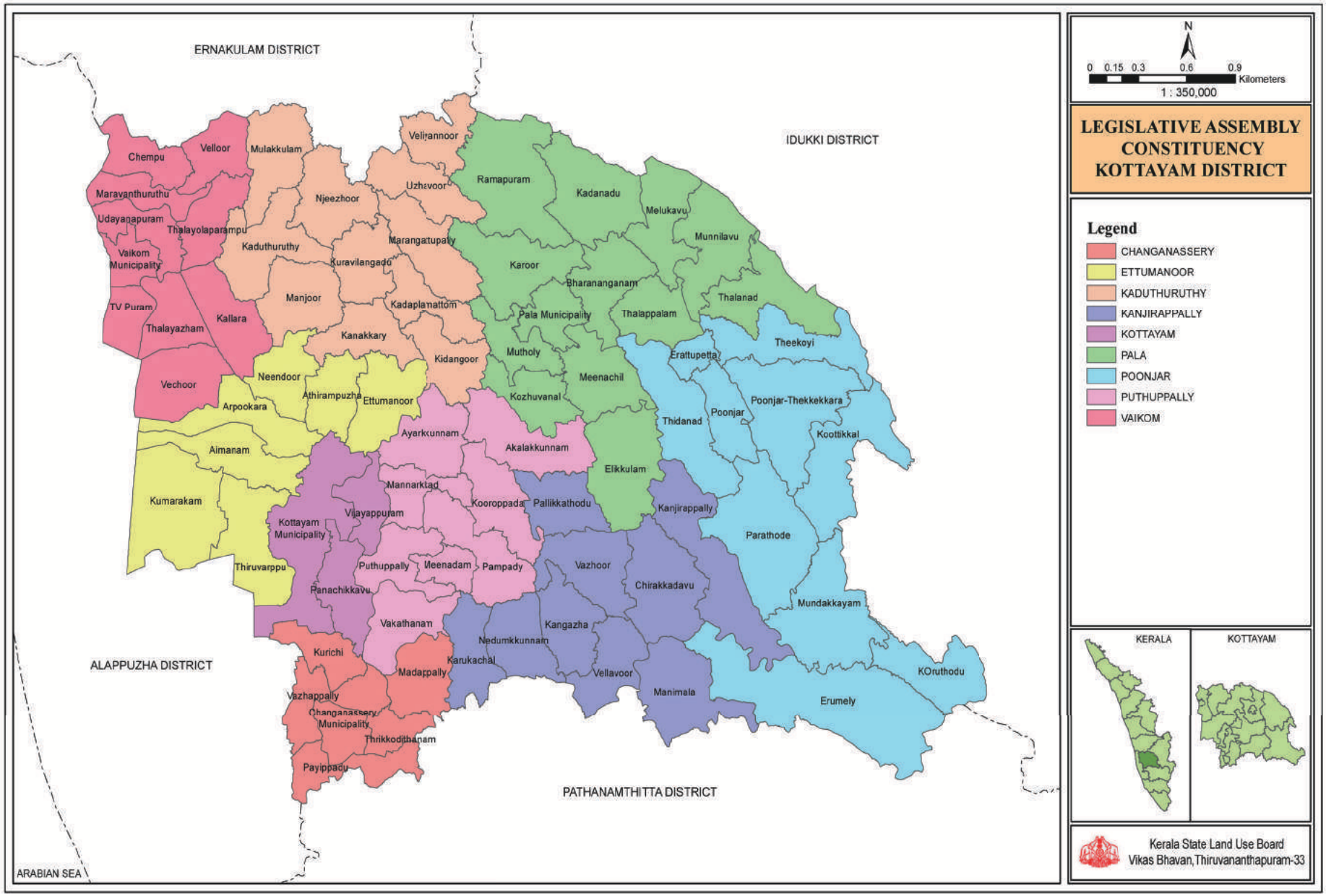
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Pallikkathodu
Kanjirappally
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Kottayam Municipality
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Vazhoor
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KOTTAYAM
PALA
POONJAR
PUTHUPPALLY
VAIKOM
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
Pathanamthitta	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
Pathanamthitta	96.93	97.7	96.26	3.12	1129	964
Kollam	93.77	95.83	91.95	1.72	1113	960
Thiruvanantapuram	92.66	94.6	90.89	2.25	1088	967

Source : Census Report 2011

Table: 4.3

BLOCK/PANCHAYAT WISE NUMBER OF HOUSEHOLDS, TOTAL POPULATION 2001 CENSUS

Block/Panchayat	No. of house holds	Total Population		
		Total	Male	Female
Uzhavoor Block	**32946**	**150021**	**74513**	**75508**
Kidangoor	4718	21386	10621	10765
Kadaplamattom	2853	13471	6697	6774
Kanakkari	4936	22360	10989	11371
Kuravilangad	3918	18242	8968	9274
Marangattupally	3851	17989	8978	9011
Ramapuram	6394	29467	14672	14795
Uzhavoor	3559	15420	7699	7721
Veliyannoor	2717	11686	5889	5797
Lalam Block	**22294**	**103571**	**51476**	**52095**
Bharananganam	3355	16054	7838	8216
Kadanad	4079	18737	9417	9320
Karoor	4792	22026	11075	10951
Kozhuvanal	2890	13304	6442	6862
Mutholi	3535	16489	8241	8248
Meenachil	3643	16961	8463	8498
Erattupetta Block	**27090**	**127352**	**63968**	**63384**
Erattupetta	4769	25103	12783	12320
Thidanad	4251	19880	9978	9902
Thalappalam	2751	12740	6421	6319
Melukavu	2495	11397	5573	5824
Moonilavu	2065	9065	4556	4509
Thalanad	1637	7337	3675	3662
Poonjar	2659	12260	6125	6135
Teekoy	2351	10947	5467	5480
Poonjar Thekkekara	4112	18623	9390	9233
Vaikom Block	**27726**	**123642**	**60577**	**63065**
Chempu	4504	20473	10197	10276
Maravanthuruthu	4886	21296	10360	10936
Thalayazham	4487	20171	9923	10248
T.V.Puram	4235	19409	9412	9997
Udayapuram	5787	25463	12380	13083
Vechoor	3827	16830	8305	8525
Kaduthuruthy Block	**36512**	**163303**	**81234**	**82069**
Kaduthuruthy	6937	`31808	15695	16113
Kallara	3093	13434	6640	6794
Manjoor	6262	28500	14221	14279
Mulakulam	5846	25810	12904	12906
Njeezhoor	4016	18111	9127	8984
Thalayolaparambu	4974	22145	10884	11261
Velloor	5384	23495	11763	11732

Table continued…….

Ettumanoor Block	**45306**	**205230**	**101636**	**103594**
Neendoor	4594	20720	10267	10453
Kumaranalloor	9382	42481	20835	21646
Arpookara	5249	23998	11865	12133
Athirampuzha	8216	38354	19259	19095
Aymanam	7966	34985	17268	17717
Ettumanoor	9899	44692	22142	22550
Pallom Block	**57351**	**253918**	**125103**	**128815**
Ayarkunnam	7579	34245	17033	17212
Kumarakam	5120	22995	11348	11647
Nattakam	9582	41702	20488	21214
Panachikkad	9397	40979	20194	20785
Vijayapuram	6834	30726	15046	15680
Manarcad	5729	25223	12555	12668
Puthupally	6883	29774	14480	15294
Thiruvarpu	6227	28274	13959	14315
Pampady Block	**29755**	**131310**	**64905**	**66405**
Meenadam	2894	12592	6243	6349
Pampady	7545	32753	16035	16718
Akalakunnam	4351	20192	9929	10263
Pallikkathode	3869	16765	8328	8437
Elikkulam	5190	23293	11623	11670
Kooroppada	5906	25715	12747	12968
Madappally Block	**48076**	**216007**	**106530**	**109477**
Kurichy	7438	32992	16320	16672
Madappally	7490	33517	16415	17102
Vazhappally	7681	35691	17635	18056
Paippad	5175	23612	11614	11998
Thrikkodithanam	7423	33849	16841	17008
Vakathanam	7660	33568	16492	17076
Karukachal	5209	22778	11213	11565
Vazhoor Block	**26849**	**117732**	**57554**	**60178**
Kangazha	4606	20054	9746	10308
Nedumkunnu	4875	21794	10554	11240
Vazhoor	5694	24808	12139	12669
Vellavoor	3959	17030	8336	8694
Chirakkadavu	7715	34046	16779	17267
Kanjirapally Block	**45731**	**203523**	**100398**	**103125**
Koottickal	3333	14555	7263	7292
Mundakayam	12260	53143	26117	27026
Parathode	6610	30735	15114	15621
Kanjirappally	8654	40212	20007	20205
Erumeli	10169	43803	21519	22284
Manimala	4705	21075	10378	10697
Panchayat Total	**392815**	**1764944**	**872880**	**892064**
Palai(M)	4578	22640	10987	11653
Vaikom(M)	5139	22641	10948	11693
Kottayam(M)	13936	60728	29916	30812
Changanassery(M)	11218	51967	25149	26618
District Total	**427686**	**1922920**	**949880**	**973040**

Source: Panchayat statistics

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 pertaining, 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*

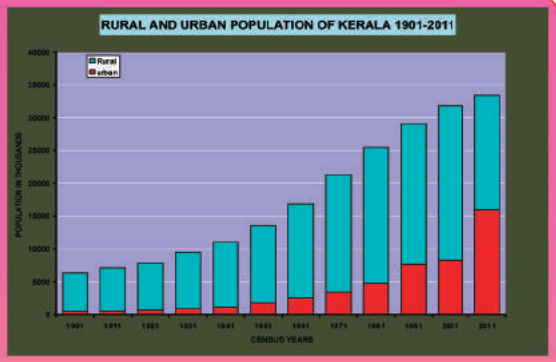
Census Town (CT): Places that satisfy the following criteria are termed as Census Towns (CTs). (a) A minimum population of 5000 (b) At least 75% of the male main working population engaged in non-agricultural pursuits (c) A density of population of at least 400 per sq.km
No. of CTs in Kerala: 461 *

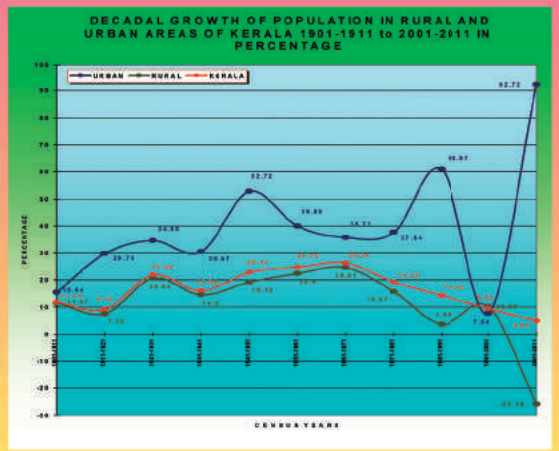
Out Growth (OG): Out Growth should be a viable unit such as a village or part of a village contiguous to a statutory town and possess the urban features in terms of infrastructure and amenities such as pucca roads, electricity, taps, drainage system, education institutions, post offices, medical facilities, 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 *

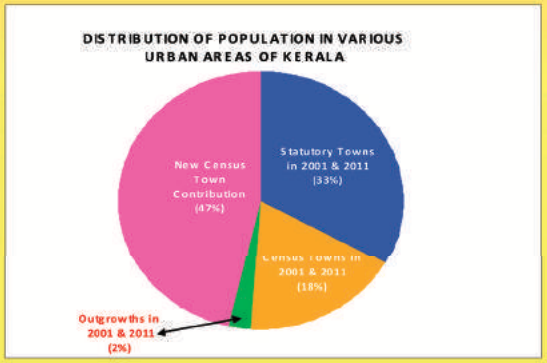
Urban Agglomeration (UA): It is a continuous urban spread constituting a town and its adjoining urban outgrowths (OGs) or two or more physically contiguous towns together and any adjoining urban out- growths of such towns.
No. of UAs in Kerala: 19 *

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	84.93	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	93.83	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	94.63	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	88.43	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	95.63	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	96.23	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	
			2001	2011
No. of Districts	14	14	25.96	47.72
No. of Sub-Districts (Taluks)	63	63		
No. of Towns	159	520		
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.

Kottayam district is lies between $9^0$15' and 10^0 21' North latitude and $76^0$22' and $77^0$25' East longitude. The Kottayam district has a tropical humid climate with oppressive hot season and plenty of rainfall during monsoon. Humidity is high and rises to about 90% during the rainy season. March, April and May are generally hot. November constitutes the post monsoon or retreating monsoon when day temperature increases gradually and the heat is nearly as intense as in summer. In the eastern portions of the district, which are at higher elevations on the Western Ghats known locally as high ranges. In the plains of interior, the temperature may be a little higher. The district gets rain from two monsoon seasons, the south-west monsoon locally known as Edavapathy, beginning by the end of May and the north-east monsoon known as Thulavarsham from October to November. The rainfall increases from the west to the east, being particularly heavy on the Western Ghats.

Table: 5.1

RAINFALL DISTRIBUTION OF KERALA FOR THE YEAR 2010-11

(Rainfall in mm)

Year	Jul	Aug	Sep	Oct	Nov	Dec
2010	568.9	294.4	366.9	559.3	456.0	97.9
State (Average)	631.0	361.1	271.7	441.7	336.8	47.3

Year	Jan	Feb	Mar	Apr	May	Jun
2011	35.3	63.4	59.1	176.8	266.5	860.1
State (Average)	20.8	45.4	24.8	168.0	120.6	789.9

Year	Actual	Normal	Departure %
2010-11	3804.6	3101.1	22.7
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
Kottayam	202	354	665	569	294	367	559	456	98

Monthly Rainfall in m.m.				
2011				
District	Jan	Feb	Mar	Total
Kottayam	35	63	58	3720

Source: Central Ground Water Department

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.
Kottayam	556	504	10	1895	1966	-4

District	N.E. Monsoon Season			Winter Season		
	2010			2011		
	Oct to Dec	Normal	% Dep.	Jan to Mar	Normal	% Dep.
Kottayam	1113	625	78	156	177	10

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	%
Kottayam	556	15	1895	51

District	N.E Monsoon Season		Winter Season		Annual Rainfall in m.m
	Oct to Dec 2010		Jan to Mar 2011		
	Rainfall	%	Rainfall	%	
Kottayam	1113	30	156	4	3720

Source: Central Ground Water Department

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
Kottayam	275	556	-51	1520	1895	-20

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
Kottayam	554	1113	-50	107	156	-31

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
Kottayam	Maximum	33.3	35.0	36.3	34.9	33.7	31.4
	Minimum	21.9	23.3	24.6	24.8	24.9	23.5

Station	Temperature (^{0}C)	Jul	Aug	Sep	Oct	Nov	Dec
Kottayam	Maximum	30.3	29.9	31.2	31.1	30.9	31.7
	Minimum	22.9	23.4	23.3	23.2	23.1	22.4

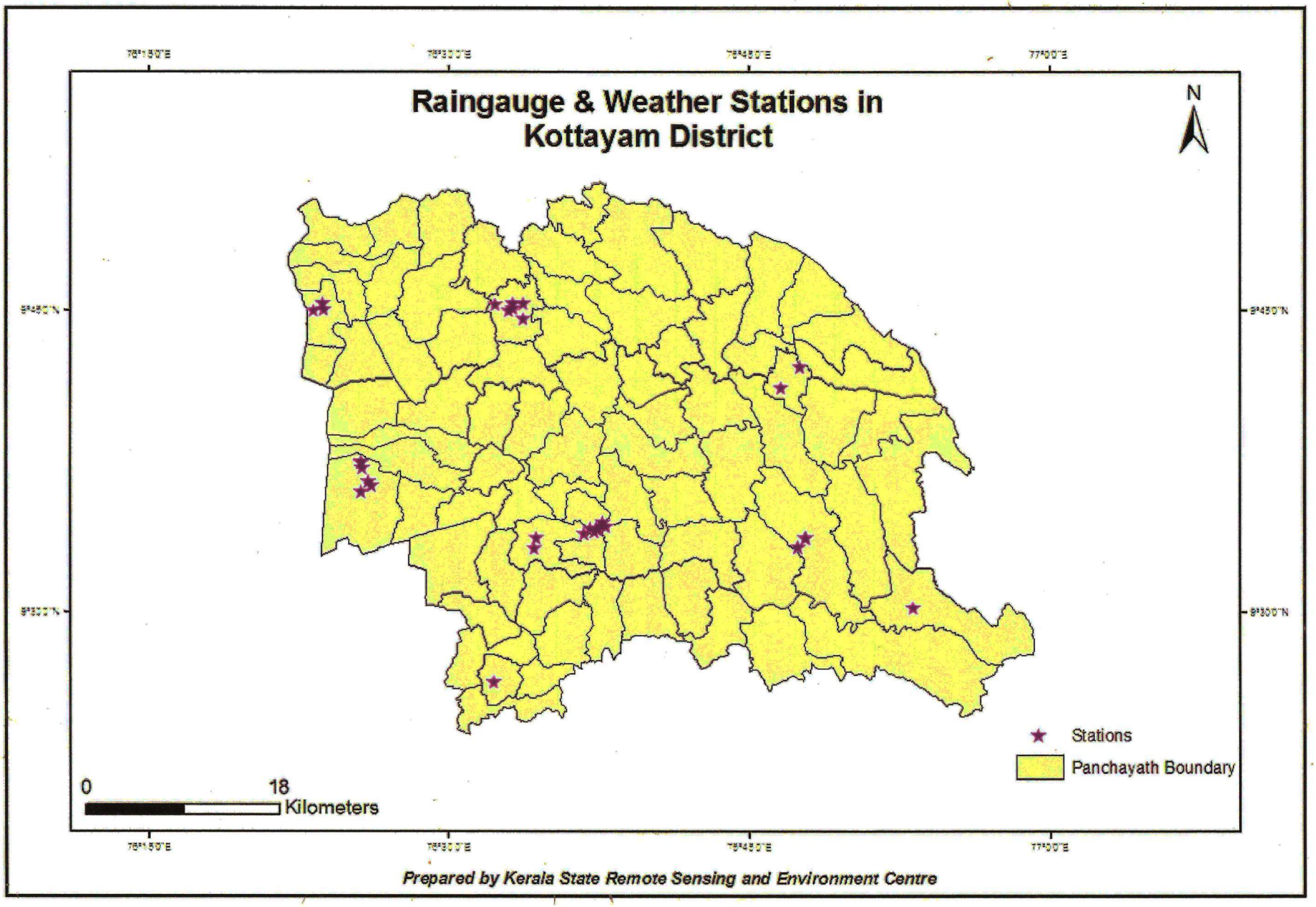
Source: Farm Guide

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.


Raingauge & Weather Stations in
Kottayam District
N
76°15'0"E
76°30'0"E
76°45'0"E
77°0'0"E
9°45'0"N
9°30'0"N
Stations
Panchayath Boundary
0
18
Kilometers
Prepared by Kerala State Remote Sensing and Environment Centre

GEOLOGY & GEOMORPHOLOGY

Geology of Kottayam

Kottayam district has a total area of 2208 sq.kms. which forms 5.68% of the total area of the State. The main rock type in the district belongs to the charnockites and khondalite group of the pre-cambian metamorphics. The charnockite group predominates in the district, and includes hypersthene-diopside gneisses and granulites, grandiferrous hypersthene hornblende granulates and their migmatite equivalents. The khondalite group includes granite-biotite gneisses and granite silminite genisses and granulates. Graphite is seen associated with khondalite group of rock. A few bands of magnetite quartz are also seen associated with above group. Cordierite gneisseis seen developed from both charnockite and khondalite groups of rock along a certain zone passing through Vadavathur trending in a NW-SE direction. The crystalline rocks of this district generally trend in NW-SE direction and have suffered repeated periods of folding and deformation.

A system of dolorite dyke and one major gabbrodyke represent the basic intrusion. They generally trend in NW-SE direction. The sedimentaries are represented by small patches of tertiaries seen towards the eastern fringes of Vembanad lake and the recent alluviam developed along the low lying western portion of the district. Laterisation is prevalent in the western margin of the district.

Kottayam rolling plain is coming under alluvium bed over its western portion with the intrusion of laterite bed and charnockite bed while its southern portion falls under cordierite gneiss biotite hornblende gneiss and other unclassified crystallines with younger segments. Meenachil, Kanjirappally upland has the charnockite bed with the intrusion of basic dykes here and there especially in the northern portion. The geological formations of the district are classified as (a) a belt of crystalline rocks of the Archean group (b) a belt of residual laterite (c) a narrow belt of Warkalli beds of tertiary group and (d) a western most belt of recent deposits. The crystalline rocks of the Archean group are made of pink granites gneisses, grey gneisses and charnockites. Around Kottayam, cordierite bearing rock is also reported to be occurring in association with charnockites. Residual laterite is the resultant product of ‘insitu’ alteration of the crystalline rocks. Warkalli formation consists of a succession of variegated clays and sand stones and at time carrying lignite material. The western most belt consists of recent sediments like alluvium, marine and lacustrine. South of Kottayam, the Warkalli formation forms a fringe between the areas of backwater and the metamorphosis rock.

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 – KOTTAYAM

Kottayam is a compound word Kotta+Akam which means the interior of a fort. Rulers of Munjanad and Thekkumkur had their headquarters at Thazhathangadi in the present Kottayam town. Marthanda varma of Travancore attached Thekkumkur and destroyed the palace and the Thaliyil fort. The remains of palaces and forts are still seen here.

Kottayam has played its role in all the political agitations of modern times. The “Malayali Memorial” agitation may be said to have had its origin in Kottayam. The memorial, which was presented to the Maharaja Srimulam Thirunal (1891), was drafted at a public meeting hold in the Kottayam public library. The event marked beginning of the modern political movement in the State.

It was here that the famous Vaikom Satyagraha (1924-25) an epic struggle for eradication of un-touchability took place. Scheduled casts and other backward classes in Travancore were not only denied entry into temples, but also access to temple roads. Vaikom, the seat of a celebrated Siva temple, was the venue of the symbolic

Satyagraha. It is of immense historic significance that national leaders like Mahatma Gandhi, C. Rajagopalachari, Acharya Vinoba bhava and E.V. Ramaswami Nayar associated with this struggle.

Kottayam district has a total area of 2208 sq.km. which forms 5.7% of the total area the State. The district is naturally divided into high land, mid land and low land. The bulk being constitutes by the midland regions. Meenachil and Kanjirapally taluks have highland and midland areas while Kottayam, Changanassery and Vaikom taluks have midland and lowland areas. Kanjirappally and Meenachil taluks have laterite soil, where as Vaikom taluk, part of Changanassery and Kottayam taluks have alluvial soil. The district has no coastal area. Out of the total area of the district lowland covers 398.4 km^2 (18.15%), mid land 1287.7 km^2 (58.65%) and high land 508.8 km^2 (23.20%).

Kottayam is one of the 14 districts in the State of Kerala. Kottayam district is bordered on the north by Ernakulam district, on the east by Idukki district and on the south by Alappuzha and Pathanamthitta districts. The Vembanadu Lake forms the western boundary. Kottayam lies between latitude 9015' and 10021' and longitude 76022' and 77025'. According to the 1991 census, it is the first district to achieve 100% literacy rate in the whole of India. On 27th September 2008, Kottayam district also become the first tobacco free districts in India.

The important rivers of the district are the Meenachil River, the Muvattupuzha River and the Manimala River. The 78km long Meenachil River flows through the taluks of Meenachil, Vaikom and Kottayam. The river is formed by several streams originating from the Western Ghats in Idukki district. The important towns in the basin are Pala, Poonjar, Ettumanoor and Kottayam.

The Muvattupuzha River originates from Idukki district flows through Vaikom taluk and empties into the Vembanadu Lake. The most important town in the basin is Vaikom, the famous pilgrim centre.

The Manimala River flows through Kanjirapally and Changanassery taluks. The chittar joins it on its course, further down the west as it flows to Alappuzha district. The important town in the basin is Mundakkayam.

The tropical type of climate in Kottayam which is quite pleasant and moderate does not provide any distinctive seasons to the inhabitants characterized with high to moderate humidity levels, the average annual temperature in this district of Kerala ranges from 200c to 350c. During the months of March, April and May, the warmer months in this district the pre-monsoon rainfall featured with lightening and thunder takes place.

The period in between June and September is marked as the monsoon in Kottayam, when the district receives the heaviest precipitation brought by the south-western monsoon. However, the amount of rainfall decreases during the months of October, November and December. The light rainfall is brought by the north-western

monsoon. On an average the district receives an annual rainfall of around 3,600m.m. Winter season in Kottayam mainly stretches from December to February.

The major type of soil prevalent in the area is alluvial. This type of soil is mostly found in Vaikom taluk as well as in some parts of the Kottayam and Changanassery taluks. Laterite soil is found in Meenachil and the Kanjirapally taluks through.

Kottayam district has two Revenue divisions viz, Kottayam and Pala each under the control of a Revenue divisional officer. Vaikom, Kottayam, Changanassery, Meenachil and Kanjirapally are the taluks in the district. There are 4 municipalities, 11 development blocks and 73 panchayats. Kottayam, Vaikom, Pala and Changanassey are the municipalities. Madappally, Pallom, Ettumanoor, Kaduthuruthy, Vaikom, Uzhavoor, Lalam, Erattupetta, Kanjirapally, Vazhoor and Pampady are the development blocks.

Agriculture forms the livelihood of the majority in the district. It is the main factor influencing the economy. Food crops as well as cash crops are cultivated here. Paddy and tapioca are the main food crops while rubber, coconut and pepper are the main cash crops. Annual crops like plantain and pineapple, seasonal crops like ginger, tubers, vegetables and a wide range of perennial crops like jack, mango etc are also grown.

Deprived of sea coast, but abundant in lakes and rivers, inland fishing flourished here fingerlings of new varieties of fish like catla, rohu etc are distributed to the farmers according to the suitability of their ponds.

There is a total population of 1979384 according to the census of 2011. Male population is 970140 and female population is 1009244. The density of population is 897 per km^2.

GEOLOGY DETAILS

Table: 6.1

ETTUMANOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Aimanam	Arpookara	Athirampuzha	Ettumanoor	Kumarakam	Neendoor	Thiruvarppu
1	Metamorphic Rocks	96.74	41.71	2026.04	2804.97	0.00	1343.99	0.00
2	Plutonic Rocks	0.00	0.00	0.00	27.09	0.00	0.00	0.00
3	Residual Cappings	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Semiconsolidated Sediment	145.49	58.68	0.00	0.00	0.00	0.00	60.55
5	Tank/WB/River	251.33	127.19	0.00	0.00	2774.45	0.00	112.21
6	Unconsolidated Sediments	2486.30	2656.71	20.87	0.00	2389.29	781.65	3296.29
	Panchayath Total	**2979.86**	**2884.29**	**2046.91**	**2832.06**	**5163.74**	**2125.64**	**3469.05**
	Block Total	**21501.55**						

Table: 6.2

KANJIRAPPALLY BLOCK

(Area in Ha)

Sl. No.	Rock Type	Erumely	Kanjirappally	Koottikkal	Koruthodu	Manimala	Mundakkayam	Parathode
1	Metamorphic Rocks	8295.96	4946.42	4293.07	2849.34	3556.13	4501.54	5524.61
2	Plutonic Rocks	558.22	64.65	0.00	10.46	163.70	192.77	100.70
3	Residual Cappings	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Semiconsolidated Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**8854.18**	**5011.07**	**4293.07**	**2859.80**	**3719.83**	**4694.31**	**5625.31**
	Block Total	**35057.57**						

Table: 6.3

KADUTHURUTHY BLOCK

(Area in Ha)

Sl. No.	Rock Type	Kaduthuruthy	Kallara	Mulakkulam	Njeezhoor	Thalayola parambu	Velloor
1	Metamorphic Rocks	2597.40	8.26	2716.73	2682.51	750.93	1294.23
2	Plutonic Rocks	7.40	0.00	4.72	255.14	0.00	0.00
3	Residual Cappings	0.00	0.00	220.20	0.00	87.02	58.19
4	Semiconsolidated Sediment	10.05	496.67	0.00	0.00	0.00	0.00
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	842.09	2276.48	0.00	0.00	1198.96	606.44
	Panchayath Total	**3456.94**	**2781.41**	**2941.65**	**2937.65**	**2036.91**	**1958.86**
	Block Total	**16113.42**					

Table: 6.4

LALAM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Bharananganam	Kadanadu	Karoor	Kozhuvanal	Meenachil	Mutholy
1	Metamorphic Rocks	2701.90	3863.37	3411.73	2079.88	2717.65	1774.20
2	Plutonic Rocks	30.19	109.28	247.31	94.83	179.03	96.87
3	Residual Cappings	0.00	0.00	0.00	0.00	0.00	0.00
4	Semiconsolidated Sediment	0.00	0.00	0.00	0.00	0.00	0.00
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2732.09**	**3972.65**	**3659.04**	**2174.71**	**2896.68**	**1871.07**
	Block Total	**17306.24**					

Table: 6.5

PALLAM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Ayarkkunnam	Kurichi	Panachikkavu	Puthuppally	Vijayapuram
1	Metamorphic Rocks	2728.92	515.80	1587.79	1745.14	1313.12
2	Plutonic Rocks	98.54	0.00	0.00	0.00	0.00
3	Residual Cappings	0.00	1.59	0.01	0.00	0.00
4	Semiconsolidated Sediment	0.00	599.48	10.84	0.00	0.00
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	0.00	534.60	676.24	540.53	240.85
	Panchayath Total	**2827.46**	**1651.47**	**2274.88**	**2285.67**	**1553.97**
	Block Total	**10593.45**				

Table: 6.6

MADAPPALLY BLOCK

(Area in Ha)

Sl. No.	Rock Type	Madappally	Payippadu	Thrikkodithanam	Vakathanam	Vazhappally
1	Metamorphic Rocks	1014.54	0.00	65.83	1295.72	234.62
2	Plutonic Rocks	0.00	0.00	0.00	0.00	0.00
3	Residual Cappings	1398.14	953.33	1064.58	401.73	494.88
4	Semiconsolidated Sediment	0.00	31.92	0.00	0.00	220.63
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	17.17	1027.39	0.00	914.80	1468.52
	Panchayath Total	**2429.85**	**2012.64**	**1130.41**	**2612.25**	**2418.65**
	Block Total	**10603.80**				

Table: 6.7

ERATTUPETTA BLOCK

(Area in Ha)

Sl. No.	Rock Type	Erattupetta	Melukavu	Munnilavu	Poonjar	Poonjar-Thekkekkara	Thalanad	Thalappalam	Theekoyi	Thidanad
1	Metamorphic Rocks	793.21	2785.27	3413.20	1974.15	5148.54	3321.58	2275.95	3240.79	4075.31
2	Plutonic Rocks	15.40	0.00	47.49	0.00	90.76	106.31	42.36	174.03	38.88
3	Residual Cappings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Semiconsolidated Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**808.61**	**2785.27**	**3460.69**	**1974.15**	**5239.30**	**3427.89**	**2318.31**	**3414.82**	**4114.19**
	Block Total	**27543.23**								

Table: 6.8

PAMPADY BLOCK

(Area in Ha)

Sl. No.	Rock Type	Akalakkunnam	Elikkulam	Kidangoor	Kooroppada	Mannarkkad	Meenadam	Pallikkathodu	Pampady
1	Metamorphic Rocks	3249.80	3881.69	2199.48	2634.32	1773.05	1104.26	2262.16	3043.30
2	Plutonic Rocks	235.07	108.76	115.64	77.74	0.00	13.02	68.37	27.16
3	Residual Cappings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Semiconsolidated Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3484.87**	**3990.45**	**2315.12**	**2712.06**	**1773.05**	**1117.28**	**2330.53**	**3070.46**
	Block Total	**20793.82**							

Table: 6.9

UZHAVOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Kadapla mattom	Kanakkary	Kuravilan gadu	Manjoor	Maranga ttupally	Rama puram	Uzha voor	Veliyannoor
1	Metamorphic Rocks	1843.64	2329.21	2175.26	2664.57	2737.87	5087.42	2414.10	1846.62
2	Plutonic Rocks	314.66	35.21	112.33	31.69	277.47	339.91	93.25	156.92
3	Residual Cappings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Semiconsolidated Sediment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	0.00	0.00	0.00	218.24	0.00	0.00	0.00	0.00
	Panchayath Total	**2158.30**	**2364.42**	**2287.59**	**2914.50**	**3015.34**	**5427.33**	**2507.35**	**2003.54**
	Block Total	**22678.37**							

Table: 6.10

VAIKKOM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Chempu	Maravan thuruthu	T.V.Puram	Thalaya zham	Udayana puram	Vechoor
1	Metamorphic Rocks	0.00	20.97	0.00	0.00	0.00	0.00
2	Plutonic Rocks	0.00	0.00	0.00	0.00	0.00	0.00
3	Residual Cappings	27.20	0.00	0.00	0.00	0.00	0.00
4	Sand and Silt	0.00	0.00	832.83	0.00	0.00	0.00
5	Semiconsolidated Sediment	0.00	0.00	0.00	0.00	0.00	0.00
6	Tank/WB/River	364.61	203.65	616.43	145.36	65.37	418.67
7	Unconsolidated Sediments	1560.74	1365.82	0.00	1979.30	1791.01	2598.03
	Panchayath Total	**1952.55**	**1590.44**	**1449.26**	**2124.66**	**1856.38**	**3016.70**
	Block Total	**11989.99**					

Table: 6.11

VAZHOOR BLOCK

(Area in Ha)

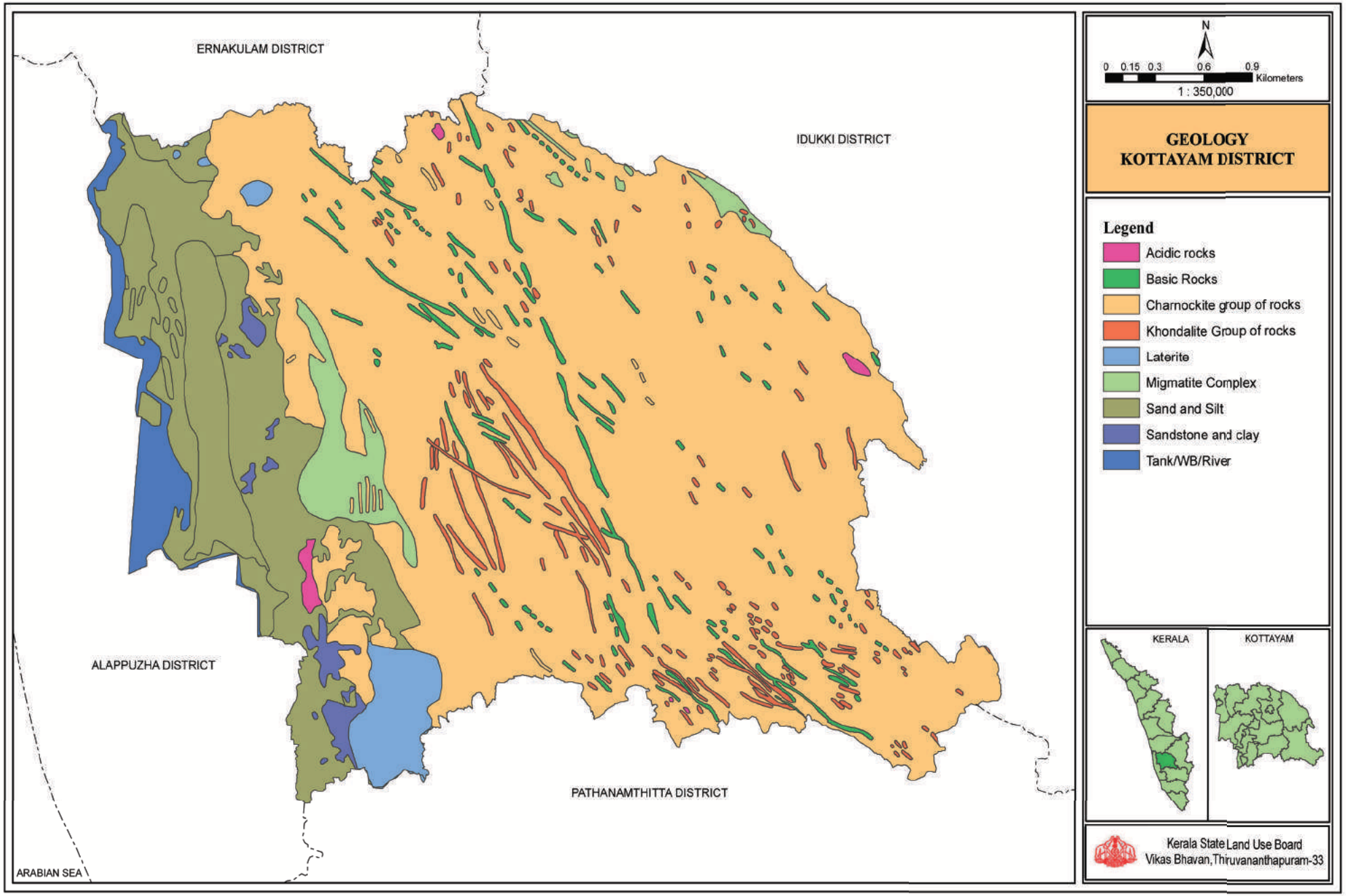
Sl. No.	Rock Type	Chirakkadavu	Kangazha	Karukachal	Nedumkkunnam	Vazhoor	Vellavoor
1	Metamorphic Rocks	3750.67	2456.34	2263.47	2317.08	2951.72	2179.10
2	Plutonic Rocks	221.70	50.73	0.00	91.10	134.72	168.66
3	Residual Cappings	0.00	0.00	0.00	0.00	0.00	0.00
4	Semiconsolidated Sediment	0.00	0.00	0.00	0.00	0.00	0.00
5	Tank/WB/River	0.00	0.00	0.00	0.00	0.00	0.00
6	Unconsolidated Sediments	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3972.37**	**2507.07**	**2263.47**	**2408.18**	**3086.44**	**2347.76**
	Block Total	**16585.29**					

Table: 6.12

MUNICIPALITY

(Area in Ha)

Sl. No.	Rock Type	Changanassery	Kottayam	Pala	Vaikom
1	Metamorphic Rocks	0.00	2509.12	1604.10	0.00
2	Plutonic Rocks	0.00	457.89	64.27	0.00
3	Residual Cappings	470.03	0.00	0.00	0.00
4	Sand and Silt	0.00	0.00	0.00	906.73
5	Semiconsolidated Sediment	669.02	63.92	0.00	0.00
6	Tank/WB/River	0.00	32.32	0.00	332.36
7	Unconsolidated Sediments	251.03	2452.14	0.00	0.00
	Municipality Total	**1390.08**	**5515.39**	**1668.37**	**1239.09**


ERNAKULAM DISTRICT
IDUKKI DISTRICT
ALAPPUZHA DISTRICT
PATHANAMTHITTA DISTRICT
ARABIAN SEA
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0 0.15 0.3 0.6 0.9
Kilometers
1 : 350,000
GEOLOGY
KOTTAYAM DISTRICT
Legend
Acidic rocks
Basic Rocks
Charnockite group of rocks
Khondalite Group of rocks
Laterite
Migmatite Complex
Sand and Silt
Sandstone and clay
Tank/WB/River
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

Table: 6.13

GEOMORPHOLOGY DETAILS

ERATTUPETTA BLOCK

(Area in Ha)

Sl. No.	Rock Type	Erattu petta	Melu kavu	Munni lavu	Poonjar	Poonjar-Thekkekkara	Thalanad	Thala ppalam	Theekoyi	Thidanad
1	Alluvial Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Coastal Plain	0.00	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	0.00	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	1298.56	2691.25	662.13	3890.40	2999.03	0.00	2403.89	273.34
6	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Lower Plateau (Lateritic) - Dissected	75.44	0.00	0.00	0.00	0.00	0.00	1151.53	0.00	1923.33
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	572.50	982.53	658.54	1031.28	968.20	362.61	463.60	859.54	1256.08
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Hill	0.00	154.20	0.00	0.00	145.83	0.00	394.15	0.00	92.02
12	Residual Mount	0.00	0.00	0.00	0.00	0.00	0.00	49.43	0.00	71.98
13	Residual Mount (Pediment)	60.37	105.79	27.93	124.48	54.39	0.00	37.41	1.93	62.53
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley	4.91	244.19	82.98	141.46	180.27	66.25	39.78	148.01	276.39
16	Valley Fill	68.21	0.00	0.00	14.79	0.21	0.00	157.98	1.44	103.83
17	Water Body	27.18	0.00	0.00	0.00	0.00	0.00	24.44	0.00	54.69
	Panchayath Total	**808.61**	**2785.27**	**3460.70**	**1974.14**	**5239.30**	**3427.89**	**2318.32**	**3414.81**	**4114.19**
	Block Total	**27543.23**								

Table: 6.14

ETTUMANOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Aimanam	Arpookara	Athiram puzha	Ettuma noor	Kumara kam	Neendoor	Thiruvarppu
1	Alluvial Plain	1624.53	1922.28	175.00	0.00	1864.62	1133.68	2251.16
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	2.40	0.00	0.00	0.00
3	Coastal Plain	518.04	456.11	0.00	0.00	562.56	21.23	610.88
4	Denudational Hills	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Lower Plateau (Lateritic) - Dissected	298.52	173.44	1636.28	2074.50	0.00	786.73	0.00
8	Mud Flat (Coastal Plain)	141.53	51.10	49.02	37.19	0.00	0.00	147.30
9	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Point Bar (Flood Plain)	0.00	0.00	0.00	5.10	0.00	0.00	0.00
11	Residual Hill	0.00	0.00	0.00	16.28	0.00	0.00	0.00
12	Residual Mount	0.00	0.00	0.00	60.39	0.00	0.00	0.00
13	Residual Mount (Pediment)	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	0.00	0.00	170.10	0.00	0.00	0.00	0.00
16	Valley Fill	0.00	0.00	0.00	578.40	0.00	66.17	2.12
17	Water Body	397.25	281.39	16.52	57.80	2736.57	117.83	457.59
	Panchayath Total	**2979.87**	**2884.32**	**2046.92**	**2832.06**	**5163.75**	**2125.64**	**3469.05**
	Block Total	**21501.61**						

Table: 6.15

KADUTHURUTHY BLOCK

(Area in Ha)

Sl. No.	Rock Type	Kaduthuruthy	Kallara	Mulakkulam	Njeezhoor	Thalayola parambu	Velloor
1	Alluvial Plain	892.21	2096.78	0.03	0.00	818.71	0.00
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
3	Coastal Plain	55.45	154.15	0.00	0.00	386.08	9.28
4	Denudational Hills	0.00	0.00	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	12.07	0.00	30.58	18.41	0.00	0.00
7	Lower Plateau (Lateritic) - Dissected	2165.48	397.05	2228.60	2314.99	647.81	1370.58
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Hill	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Mount	22.59	0.00	78.90	173.30	0.00	1.82
13	Residual Mount (Pediment)	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
15	Valley	0.00	0.00	0.00	0.00	0.00	0.00
16	Valley Fill	258.51	10.60	580.70	430.94	110.80	436.11
17	Water Body	50.63	122.83	22.83	0.00	73.50	141.07
	Panchayath Total	**3456.94**	**2781.41**	**2941.64**	**2937.64**	**2036.90**	**1958.86**
	Block Total	**16113.39**					

Table: 6.16

KANJIRAPPALLY BLOCK

(Area in Ha)

Sl. No.	Rock Type	Erumely	Kanjirappally	Koottikkal	Koruthodu	Manimala	Mundakkayam	Parathode
1	Alluvial Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Coastal Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Hills	366.52	0.00	0.00	0.00	265.75	540.35	473.25
5	Denudational Structural Hills	4273.13	0.00	4235.57	2625.52	0.00	842.46	1948.32
6	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00	53.25	0.00
7	Lower Plateau (Lateritic) - Dissected	1808.48	2103.29	0.00	0.00	2545.72	0.37	654.79
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	2049.51	1978.30	0.00	210.47	112.70	2805.30	1940.36
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	1.99	0.00	0.00
11	Residual Hill	0.00	0.00	0.00	0.00	474.47	0.00	0.00
12	Residual Mount	119.53	184.71	0.00	10.12	180.15	60.40	30.20
13	Residual Mount (Pediment)	0.00	151.40	0.00	0.00	0.00	12.71	162.77
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley	87.95	0.05	53.47	0.00	0.00	55.59	8.66
16	Valley Fill	91.72	463.18	0.00	0.00	122.03	247.18	406.96
17	Water Body	57.33	129.94	4.03	13.68	17.03	76.70	0.00
	Panchayath Total	**8854.17**	**5010.87**	**4293.07**	**2859.79**	**3719.84**	**4694.31**	**5625.31**
	Block Total	**35057.36**						

Table: 6.17

LALAM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Bharanan ganam	Kadanadu	Karoor	Kozhuvanal	Meenachil	Mutholy
1	Alluvial Plain	0.00	0.00	0.00	0.00	0.00	0.00
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
3	Coastal Plain	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Hills	0.00	0.00	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	1399.09	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	0.00	0.00	103.75	25.32	115.03	16.87
7	Lower Plateau (Lateritic) - Dissected	1726.44	342.70	2924.35	1645.41	2215.65	1412.61
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	179.97	1600.78	0.00	0.00	0.00	0.00
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Hill	434.34	144.40	78.49	0.00	3.80	0.00
12	Residual Mount	121.17	17.07	148.58	266.29	127.76	71.05
13	Residual Mount (Pediment)	20.24	130.97	0.00	0.00	0.00	0.00
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley	54.19	337.64	10.68	8.91	10.38	0.00
16	Valley Fill	178.69	0.00	373.42	213.41	387.68	324.59
17	Water Body	17.06	0.00	19.77	15.37	36.38	45.95
	Panchayath Total	**2732.10**	**3972.65**	**3659.04**	**2174.71**	**2896.68**	**1871.07**
	Block Total	**17306.25**					

Table: 6.18

MADAPPALLY BLOCK

(Area in Ha)

Sl. No.	Rock Type	Madappally	Payippadu	Thrikkodithanam	Vakathanam	Vazhappally
1	Alluvial Plain	0.00	921.38	0.00	0.00	1288.96
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00
3	Coastal Plain	0.00	248.45	17.87	0.00	18.82
4	Denudational Hills	0.00	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00
7	Lower Plateau (Lateritic) - Dissected	2080.86	609.61	1063.40	2028.28	986.38
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	0.00	0.00	0.00	0.00	0.00
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00
11	Residual Hill	0.00	0.00	0.00	0.00	0.00
12	Residual Mount	63.06	0.00	0.00	19.61	0.00
13	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
15	Valley	0.00	0.00	0.00	0.00	0.00
16	Valley Fill	285.92	151.77	47.25	564.37	65.22
17	Water Body	0.00	81.43	1.90	0.00	59.28
	Panchayath Total	**2429.84**	**2012.64**	**1130.42**	**2612.26**	**2418.66**
	Block Total	**10603.82**				

Table: 6.19

PALLAM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Ayarkkunnam	Kurichi	Panachikkavu	Puthuppally	Vijayapuram
1	Alluvial Plain	0.00	349.58	0.00	0.00	0.00
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.04
3	Coastal Plain	0.00	0.00	0.00	0.00	0.00
4	Denudational Hills	0.00	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	26.56	0.00	0.00	8.36	0.00
7	Lower Plateau (Lateritic) - Dissected	2137.75	1174.20	1449.46	1517.99	1017.74
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	0.00	0.00	0.00	0.00	0.00
10	Point Bar (Flood Plain)	4.63	0.00	0.00	0.00	26.18
11	Residual Hill	0.00	0.00	0.00	76.91	0.00
12	Residual Mount	57.42	0.00	0.00	103.80	19.92
13	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00
15	Valley	0.00	0.00	0.00	0.00	0.00
16	Valley Fill	545.67	64.20	803.87	560.82	415.71
17	Water Body	55.42	63.50	21.55	17.79	74.38
	Panchayath Total	**2827.45**	**1651.48**	**2274.88**	**2285.67**	**1553.97**
	Block Total	**10593.45**				

Table: 6.20

PAMPADY BLOCK

(Area in Ha)

Sl. No.	Rock Type	Akalakkunnam	Elikkulam	Kidangoor	Kooroppada	Mannarkkad	Meenadam	Pallikkathodu	Pampady
1	Alluvial Plain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Coastal 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	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	108.06	25.38	35.58	13.52	0.00	39.93	94.56	0.00
7	Lower Plateau (Lateritic) - Dissected	2635.34	3212.76	1610.24	2170.36	1316.07	834.40	1557.21	2476.41
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00	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	Residual Hill	20.10	0.00	0.00	0.00	0.00	27.66	198.06	0.00
12	Residual Mount	304.23	265.11	39.43	355.70	48.40	62.86	193.95	203.03
13	Residual Mount (Pediment)	0.00	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	0.00
15	Valley	95.96	216.54	0.00	0.00	0.00	0.00	0.00	0.00
16	Valley Fill	286.53	270.67	575.41	159.65	402.32	152.44	286.75	391.02
17	Water Body	34.68	0.00	54.45	12.84	6.26	0.00	0.00	0.00
	Panchayath Total	**3484.90**	**3990.46**	**2315.11**	**2712.07**	**1773.05**	**1117.29**	**2330.53**	**3070.46**
	Block Total	**20793.87**							

Table: 6.21

UZHAVOOR BLOCK

(Area in Ha)

Sl. No.	Rock Type	Kadapla mattom	Kanakkary	Kuravilan gadu	Manjoor	Maranga ttupally	Rama puram	Uzhavoor	Veliya nnoor
1	Alluvial Plain	0.00	9.89	0.00	395.33	0.00	0.00	0.00	0.00
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Coastal 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	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	460.59	0.00	50.11
6	Linear Ridge (Lower Plateau)	84.26	0.00	0.00	0.00	7.92	14.14	6.13	0.00
7	Lower Plateau (Lateritic) - Dissected	1563.82	1663.31	1761.07	2090.44	2231.49	2007.73	1972.32	1126.86
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	1646.40	0.00	318.53
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Hill	97.01	72.33	0.00	0.00	98.64	237.83	27.52	0.00
12	Residual Mount	67.74	28.12	154.38	0.00	229.15	123.96	184.08	87.16
13	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00	178.10	0.00	81.15
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Valley	0.00	0.00	0.00	0.00	0.00	590.30	0.00	25.81
16	Valley Fill	345.46	588.44	372.14	379.30	448.14	153.58	317.30	313.90
17	Water Body	0.00	2.34	0.00	49.44	0.00	14.67	0.00	0.00
	Panchayath Total	**2158.29**	**2364.43**	**2287.59**	**2914.51**	**3015.34**	**5427.30**	**2507.35**	**2003.52**
	Block Total	**22678.33**							

Table: 6.22

VAIKKOM BLOCK

(Area in Ha)

Sl. No.	Rock Type	Chempu	Maravan thuruthu	T.V.Puram	Thalayazham	Udayana puram	Vechoor
1	Alluvial Plain	0.00	0.02	0.00	918.26	599.76	1717.97
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
3	Coastal Plain	637.40	1010.68	668.31	716.74	1100.40	596.71
4	Denudational Hills	0.00	0.00	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	0.00	0.00	0.00	0.00	0.00	0.00
7	Lower Plateau (Lateritic) - Dissected	270.68	0.00	0.00	0.00	0.00	0.00
8	Mud Flat (Coastal Plain)	451.20	227.81	81.58	195.88	14.44	168.31
9	Piedmont Zone	0.00	0.00	0.00	0.00	0.00	0.00
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
11	Residual Hill	0.00	0.00	0.00	0.00	0.00	0.00
12	Residual Mount	0.00	0.00	0.00	0.00	0.00	0.00
13	Residual Mount (Pediment)	0.00	0.00	0.00	0.00	0.00	0.00
14	Swale (Coastal Plain)	4.26	55.27	42.64	29.51	18.01	6.40
15	Valley	0.00	0.00	0.00	0.00	0.00	0.00
16	Valley Fill	26.89	0.00	0.00	0.00	0.00	0.00
17	Water Body	562.12	296.66	656.71	264.28	123.76	527.32
	Panchayath Total	**1952.55**	**1590.44**	**1449.24**	**2124.67**	**1856.37**	**3016.71**
	Block Total	**11989.98**					

Table: 6.23

VAZHOOR BLOCK

(Area in Ha)

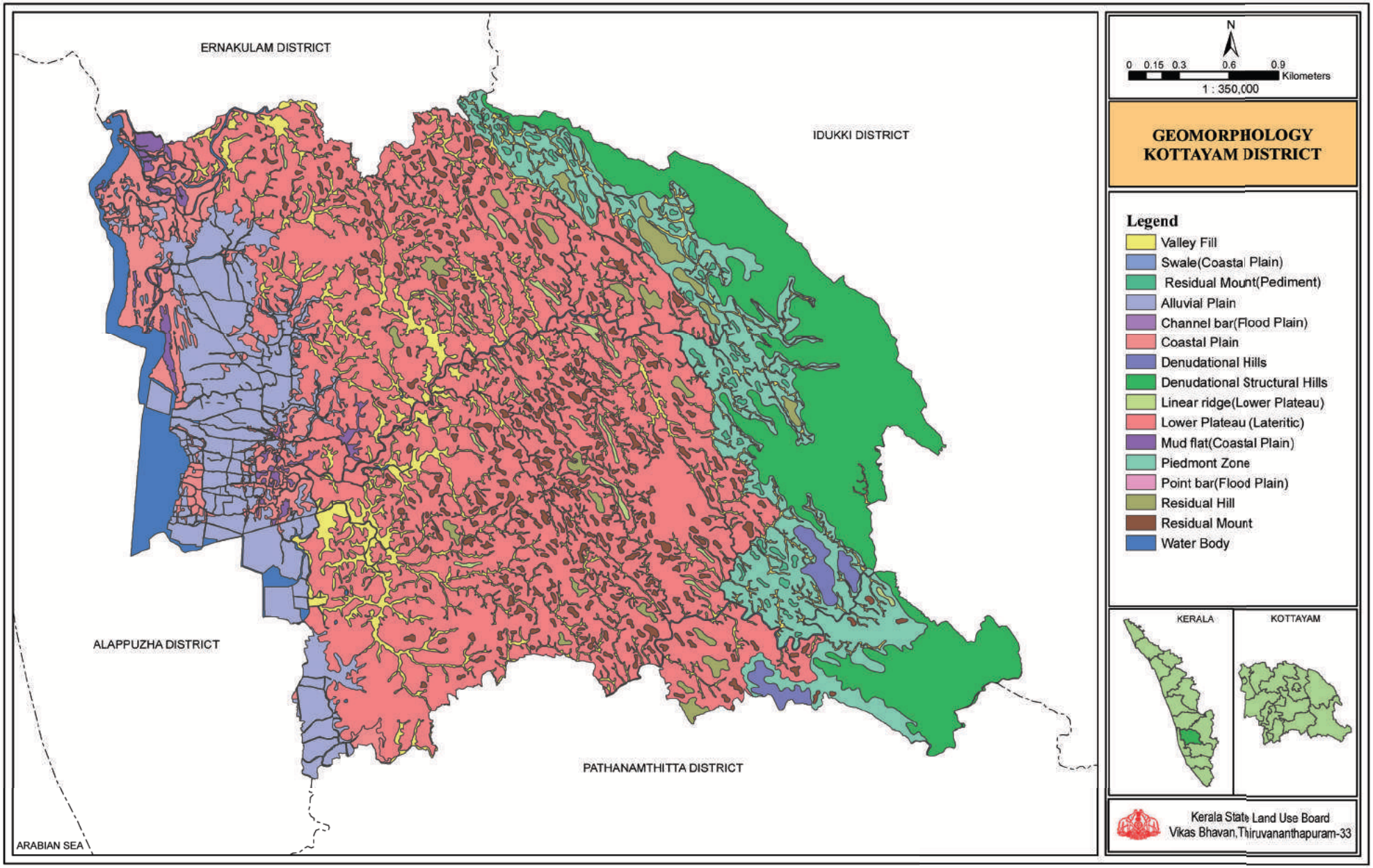
Sl. No.	Rock Type	Chirakkadavu	Kangazha	Karukachal	Nedumk kunnam	Vazhoor	Vellavoor
1	Alluvial Plain	0.00	0.00	0.00	0.00	0.00	0.00
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	0.00
3	Coastal Plain	0.00	0.00	0.00	0.00	0.00	0.00
4	Denudational Hills	0.00	0.00	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	80.79	0.00	0.00	0.00	13.43	0.00
7	Lower Plateau (Lateritic) - Dissected	3201.46	1943.59	1949.12	1906.75	2394.67	1768.29
8	Mud Flat (Coastal Plain)	0.00	0.00	0.00	0.00	0.00	0.00
9	Piedmont Zone	2.94	0.00	0.00	0.00	0.00	0.00
10	Point Bar (Flood Plain)	0.00	0.00	0.00	0.00	0.00	21.36
11	Residual Hill	0.00	62.91	0.00	48.01	0.00	78.64
12	Residual Mount	295.60	221.28	75.21	189.15	329.63	173.17
13	Residual Mount (Pediment)	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
15	Valley	0.00	0.00	0.00	0.00	0.00	0.00
16	Valley Fill	331.04	279.30	239.14	264.26	348.71	267.54
17	Water Body	60.53	0.00	0.00	0.00	0.00	38.77
	Panchayath Total	**3972.36**	**2507.08**	**2263.47**	**2408.17**	**3086.44**	**2347.77**
	Block Total	**16585.29**					

Table: 6.24

MUNICIPALITY

(Area in Ha)

Sl. No.	Rock Type	Changanassery	Kottayam	Pala	Vaikkom
1	Alluvial Plain	235.60	1106.61	0.00	105.56
2	Channel Bar (Flood Plain)	0.00	0.00	0.00	0.00
3	Coastal Plain	54.61	391.39	0.00	766.03
4	Denudational Hills	0.00	0.00	0.00	0.00
5	Denudational Structural Hills	0.00	0.00	0.00	0.00
6	Linear Ridge (Lower Plateau)	0.00	0.00	87.39	0.00
7	Lower Plateau (Lateritic) - Dissected	1076.13	2557.23	1280.74	0.00
8	Mud Flat (Coastal Plain)	0.00	246.01	0.00	9.88
9	Piedmont Zone	0.00	0.00	0.00	0.00
10	Point Bar (Flood Plain)	0.00	3.12	0.00	0.00
11	Residual Hill	0.00	0.00	0.00	0.00
12	Residual Mount	0.00	0.00	22.05	0.00
13	Residual Mount (Pediment)	0.00	0.00	0.00	0.00
14	Swale (Coastal Plain)	0.00	0.00	0.00	0.00
15	Valley	0.00	0.00	0.00	0.00
16	Valley Fill	0.00	986.40	203.24	0.00
17	Water Body	23.74	224.63	74.96	357.61
	Municipality Total	**1390.08**	**5515.39**	**1668.38**	**1239.08**


ERNAKULAM DISTRICT
IDUKKI DISTRICT
ALAPPUZHA DISTRICT
PATHANAMTHITTA DISTRICT
ARABIAN SEA
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 350,000
GEOMORPHOLOGY
KOTTAYAM DISTRICT
Legend
Valley Fill
Swale(Coastal Plain)
Residual Mount(Pediment)
Alluvial Plain
Channel bar(Flood Plain)
Coastal Plain
Denudational Hills
Denudational Structural Hills
Linear ridge(Lower Plateau)
Lower Plateau (Lateritic)
Mud flat(Coastal Plain)
Piedmont Zone
Point bar(Flood Plain)
Residual Hill
Residual Mount
Water Body
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

PHYSIOGRAPHY

Kottayam district lies between $9^0$15' and $10^0$21' North latitude and $76^0$22' and $77^0$25' East longitude. Based on the physical features, the districts can be divided into three regions; they are the lowland, midland and highland. Kanjirappally taluk and portion of the Meenachil taluk is the highland region, western portion of the Meenachil taluk and the eastern parts of Kottayam, Changanassery and Vaikom taluk falls in the midland region and the western portion of Kottayam, Changanassery and Vaikom taluks falls in the lowland region. The lowland lies on the border of the Vembanad lake. The highland lies on the extreme east covered by forests. It comprises of mountain ranges, valleys and the lower ground from which the mountains arise. These hills and the lower ground from which they arise together constitute the high ranges. There is forest area in Kanjirappally taluk.

Low lying plain region comprises of parts of Vaikom, Kottayam and Changanassery taluks and lies as a narrow strip over the Western portion of the district and makes its boundaries with Kottayam rolling plain in the north and the east, Kuttanad low lying plain in the south and the Vembanad lake in the west. Rolling plain region comprises of parts of Vaikom, Meenachil, Kottayam and Changanassery taluks and lies over the central part of the district and bounded by Periyar-Muvattupuzha rolling plain in the north, Meenachil-Kanjirappally upland in the east, Chengannur rolling plain in the south and Kumarakam low lying plain in the west. Upland region comprises parts of Meenachil, Kottayam, Kanjirappally and Changanassery taluks and lies in the eastern part of the district and makes its boundaries with the Periyar river basin in the north, Thekkedy forested hills and Ranni forested hills in the east, Mallappally taluk and part of Ranni taluk and Alappuzha rolling plain in the south and Kottayam rolling plain in the west. This region slopes towards the west. The important rivers of the district are Meenachil, Moovattupuzha and Manimala. Forested hills region which has a small area is bounded by Thekkady forested hills in the north and the east, pambakakki forested hills in the south and Meenachil-Kanjirappally upland in the west.

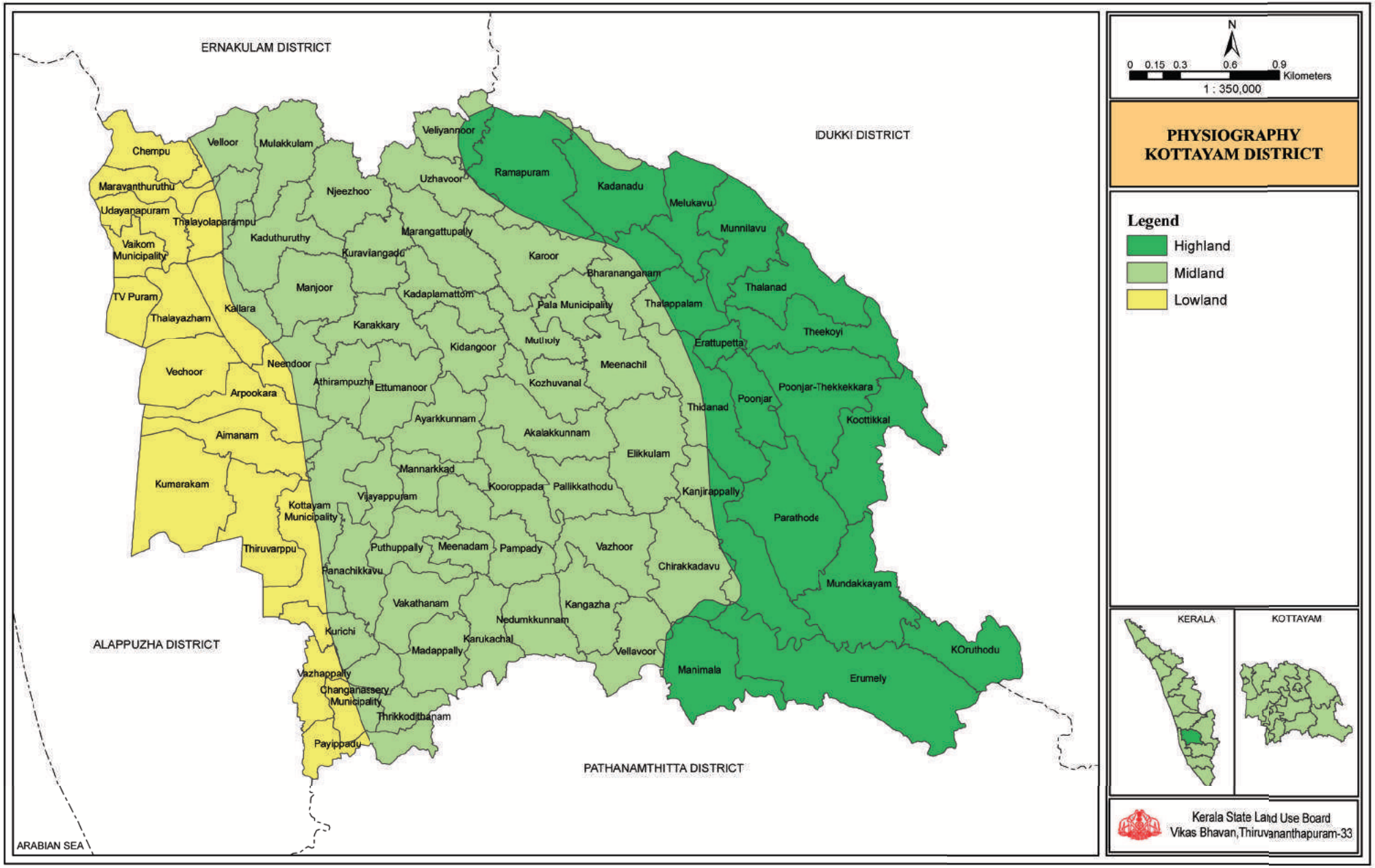
Table: 7.1

NATURAL REGIONS OF KOTTAYAM - DETAILS OF TALUKS & VILLAGES WITH AREA BY REGIONS

(Area in ha)

Sl.No.	Taluks/Villages	Lowland	Midland	Highland
Meenachil Taluk				
1	Veliyannur	-	1949	-
2	Velliyapally	-	2981	-
3	Uzhavoor	-	2509	-
4	Kurichithanam	-	2290	-
5	Kuravilangad	-	2293	-
6	Elakkad	-	2294	-
7	Vallachira	-	2221	-
8	Lalam(P)	-	1463	-
9	Bharananganam	-	3144	-
10	Kondur	-	4386	-
11	Thalapalam	-	2947	-
12	Poovarani	-	2831	-
13	Meenachil(P)	-	2174	-
14	Puliyannur(P)	-	1934	-
15	Kidangur	-	2984	-
16	Kanakari	-	2323	-
17	Palai(M)	-	1593	-
18	Melukavu	-	-	3757
19	Poonjar Vadakkekkara	-	-	5292
20	Poonjar Nedubhagam	-	-	5319
21	Poonjar Thekkekara	-	-	9092
22	Ramapuram	-	-	3328
23	Kadanad	-	-	3164
	Total	**-**	**42316**	**29952**
Vaikom Taluk				
1	Velloor	-	1929	-
2	Malakulam	-	2873	-
3	Manjoor	-	2898	-
4	Kaduthuruthy	-	3373	-
5	Njezhoor	-	2891	-
6	Chembu	1842	-	-
7	Vadayar	2063	-	-
8	Kulasekharamangalam	1569	-	-
9	Vadakkemuri(P)	1107	-	-
10	Naduvil(P)	908	-	-
11	Vaikom	1703	-	-
12	Vechoor	2913	-	-
13	Thalayazham	2240	-	-
14	Kallara	2748	-	-
15	Vaikom(M)	873	-	-
	Total	**17966**	**13964**	**-**

Sl.No.	Taluks/Villages	Lowland	Midland	Highland
Kottayam Taluk				
1	Kaippuzha	3750	-	-
2	Ayimanam	2930	-	-
3	Kumarakom	5166	-	-
4	Thiruvarpu	3365	-	-
5	Kottayam(P)	340	-	-
6	Nattakom	2233	-	-
7	Onamthuruthu	-	1287	-
8	Athirampuzha	-	2073	-
9	Ettumanur	-	2727	-
10	Ayarkunnam	-	2326	-
11	Akalakunnam	-	3500	-
12	Anikkad	-	2218	-
13	Koorappada	-	2726	-
14	Manarkad	-	2229	-
15	Vijayapuram(P)	-	1486	-
16	Perumpaikad	-	1404	-
17	Panachikad	-	2274	-
18	Puthupally	-	2240	-
19	Pampady	-	4160	-
20	Kottayam(M)	-	1555	-
Total		**17784**	**32205**	**-**
Kanjirapapally Taluk				
1	Chirakadavu	-	2761	-
2	Kanjirappally	-	6527	-
3	Manimala	-	3742	-
4	Cheruvally	-	1120	-
5	Mundakayam	-	-	7275
6	Erumeli	-	-	13706
7	Elikulam	-	4026	-
	Total	**-**	**18176**	**20981**
Changanacherry Taluk				
1	Kuruchi	1622	-	-
2	Vazhapally West(P)	1069	-	-
3	Changanassery(P)	1389	-	-
4	Thrikodithanan	-	2030	-
5	Madapally	-	2402	-
6	Vakathanam	-	2648	-
7	Vazhappally East(P)	-	1104	-
8	Karukachal	-	2125	-
9	Nedumkunnam	-	2532	-
10	Kangazha	-	2719	-
11	Vazhoor	-	2861	-
12	Vellavoor	-	2346	-
13	Changanacherry(M)	-	1350	-
Total		**4080**	**22117**	**-**


ERNAKULAM DISTRICT
IDUKKI DISTRICT
ALAPPUZHA DISTRICT
PATHANAMTHITTA DISTRICT
ARABIAN SEA
Velloor
Mulakkulam
Veliyannoor
Chempu
Uzhavoor
Ramapuram
Kadanadu
Maravanthuruthu
Njeezhoor
Melukavu
Udayanapuram
Thalayolaparampu
Marangattupally
Munnilavu
Kaduthuruthy
Vaikom Municipality
Kuravilangadu
Karoor
Bharananganam
Manjoor
Thalanad
TV Puram
Kadaplamattom
Pala Municipality
Thalappalam
Kallara
Thalayazham
Karakkary
Theekoyi
Kidangoor
Erattupetta
Meenachil
Vechoor
Neendoor
Athirampuzha
Kozhuvanal
Poonjar-Thekkekkara
Ettumanoor
Arpookara
Poonjar
Thidanad
Ayarkkunnam
Koottikkal
Aimanam
Akalakkunnam
Elikkulam
Mannarkkad
Kumarakam
Kooroppada
Pallikkathodu
Kanjirappally
Vijayappuram
Kottayam Municipality
Parathode
Thiruvarppu
Puthuppally
Meenadam
Pampady
Vazhoor
Chirakkadavu
Ranachikkavu
Mundakkayam
Vakathanam
Kangazha
Nedumkkunnam
Kurichi
Karukachal
Madappally
Vellavoor
KOruthodu
Manimala
Vazhappally
Erumely
Changanassery Municipality
Thrikkodithanam
Payippadu
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 350,000
PHYSIOGRAPHY
KOTTAYAM DISTRICT
Legend
Highland
Midland
Lowland
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. Rocks out crops are 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.

Alluvial, peaty and laterite soils exist in the Kottayam District. Paddy, Coconut and vegetables are the main crops cultivated in the alluvial/peaty soiled areas and rubber is the main crop. In the remaining area coconut, arecanut, pepper, tapioca and vegetable are also cultivated here. The soil of the district is generally fertile in nature. The soil is brown in some areas, gravely in some areas and brown and loam in some other areas. The alluvial soil can be found in the western portions of Changanassery and Kottayam taluks. It is well supplied with organic matter, nitrogen and potash, but is deficient in phosphorous and lime. The peaty or kari soil can be seen in Vaikom taluk which are characterized by a deep colour, extremely high content of organic matter and having a very strong acidity. There are clay soil with poor aeration, drainage, a rich content of nitrogen and potassium. Kari soil occurs 1-2 km. below sea level. Kumarakom in Kottayam taluk is covered with this type of soil. It is observed that large amount of crop failures occur in the peaty soil which was due to the production of tree sulphuric acid by the oxidation of sulphur compounds and the formation of iron and aluminium sulphates in toxic concentration. Laterite soil covers Meenachil and Kanjirappally taluks entirely and the eastern portions of Vaikom, Kottayam and Changanassery taluks. Those are characterized by a vesicular structure and a good content of hydrated oxides of iron and aluminium. This type of soil can be easily broken up and used as bricks for building purposes. Organic matter content is very low in laterite soil.

Table: 8.1

SOILS IN KOTTAYAM DISTRICT (COMPREHENSIVE LEGEND)

Soil Mapping Units	Description Major Soil	Classification	
		Major soils	**Inclusions**
K-01	Very deep, moderately well drained, sandy soils with moderately shallow water table on very gently sloping subdued sand dunes, with slight erosion;	Mixed, Aquic Ustipsamments	Fine-loamy, Mixed, Typic Dystropepts
	Associated with very deep, moderately well drained, sandy soils.	Mixed Typic Ustipsamments	Coarse-loamy, Mixed Aquic Ustorthents
K-04	Very deep, very poorly drained, clayey soils with shallow water table on level submerged lands, swamps and marshes;	Fine, Mixed, Typic Tropaquepts	Fine-loamy, Mixed, Typic Sulfaquents
	Associated with Very deep, very poorly drained, sulphide-rich, saline, clayey soils with very shallow water table	Fine, Mixed, Typic Sulfaquents	Mixed, Aquic Ustipasamments
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, Typic Tropaquepts
		Fine, Mixed, Aeric Tropaquepts	Fine-loamy, Mixed, Ustic Kanhaplohumults

K-06	Very deep, moderately well drained, loamy soils with moderately deep water table on very gently sloping reclaimed lands, with slight erosion; Associated with very deep, poorly drained, loamy soils with moderately shallow water table	Fine-loamy over sandy, Mixed, Fluventic Dystropepts Fine-loamy, Mixed, Typic Tropaquepts	Fine-loamy, Mixed, Typic Dystropepts Clayey over sandy, Mixed, Fluventic Dystropepts
K-07	Very deep, well drained, gravelly clay soils on gently sloping coastal laterites, with moderate erosion; Associated with very deep, well drained, gravelly clay soils with moderate surface gravelliness.	Clayey–skeletal, Kaolintic, Typic Kandiustults Clayey-skeletal, Kaolintic, Typic Kanhaplustults	Loamy-skeletal, Mixed, Ustoxic Dystropepts Clayey, Kaolintic, Typic Kandiustults
K-08	Very deep, moderately well drained, clayey soils with moderately shallow water table in nearly level narrow valleys, with slight erosion; Associated with very deep, imperfectly drained, clayey soils with moderately shallow water table on nearly level lands	Fine, Mixed, Typic Dystropepts Fine, Mixed, Typic Tropaquepts	Clayey, Kaolintic, Typic Kanhaplustults Fine, Mixed, Typic Ustropepts

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, welldrained, 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 Kandiustults
K-11	Very deep, well drained, gravelly clay soils on gently sloping mid-land laterites with valleys of Central Kerala, with moderate erosion; Associated with deep, well drained, clayey soils with coherent material at 100 to 150 cm gentle slopes	Clayey, Kaolintic, Ustic Kandihumults Clayey, Kaolintic, Typic Kanhaplustults	Fine, Mixed, Typic Dystropepts Clayey-skeletal, Kaolintic Oxic Humitropepts
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	Rockland Clayey, Mixed, Ustic Haplohumults

K-32	Deep, well drained, loamy soils on gently sloping low hills with isolated hillocks, 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
K-33	Deep, well drained, gravelly clay soils on moderately sloping medium hills with thin vegetation, with severe erosion; Associated with rock outcrops	Fine, Kaolintic, Oxic Humitropepts Rock land	Fine-loamy, Mixed, Ustic Palehumults
K-35	Deep, well drained, gravelly clay soils with coherent material at 100 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-37	Very deep, well drained, clayey soils on moderately sloping foot hills with moderate erosion; Associated with very deep, well drained, gravelly clay soils on gentle slopes	Clayey, Mixed, Ustic Palehumults Clayey, Mixed, Ustic Haplohumults	
K-38	Very deep, well drained, clayey soils on moderately steeply sloping high 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 Lowlands **- K01, K04, K05, K06, K07**

Soils of the Midlands **- K08, K09, K11**

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

Soils of the South Sahyadri **- K31, K32, K33, K37, K38**

Table: 8.2

LEGEND FOR THE SOIL MAPS OF KOTTAYAM DISTRICT

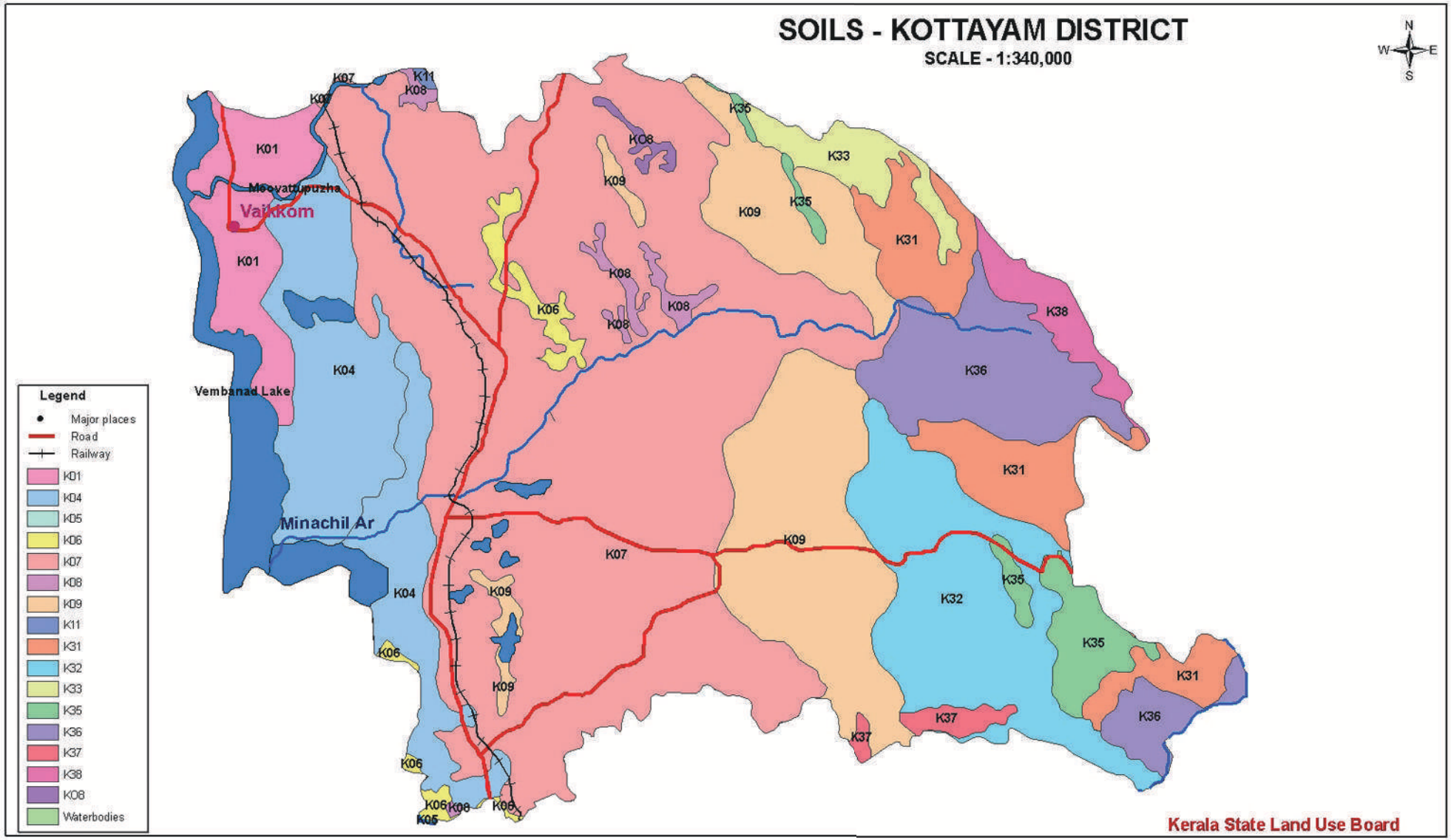
S1. No.	Map symbol	Depth	Texture	Slope	Drainage
1	K01	vd	s	vg	mw
2	K04	vd	c	vg	vp
3	K05	vd	c	vg	i
4	K06	vd	l	vg	mw
5	K07	vd	gc	g	w
6	K08	vd	c	vg	mw
7	K09	vd	gc	ms	w
8	K11	vd	gc	g	w
9	K31	vd	gl	s	w
10	K32	d	l	g	w
11	K33	d	gc	m	w
12	K35	d	gc	m	w
13	K36	vd	c	ms	w
14	K37	vd	c	m	w
15	K38	vd	c	ms	w

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	mw	moderatley well drained
2	w	well
3	vp	very poor
4	i	imperfectly


SOILS - KOTTAYAM DISTRICT
SCALE - 1:340,000
N
W
E
S
Legend
Major places
Road
Railway
K01
K04
K05
K06
K07
K08
K09
K11
K31
K32
K33
K35
K36
K37
K38
K08
Waterbodies
Vaikkom
Moovattupuzha
Vembanad Lake
Minachil Ar
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 manages and develops 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 Muvattupuzha, Meenachil and Manimala.

The Muvattupuzha River

It is formed by the confluence of three rivers the Thodupuzha, the Kaliyar and the Kothamangalam. The length of the river is 121km. The total drainage area is 1554sq.km. During its course it passes through 45 villages of the Thodupuzha, Vaikom, Kunnathunad and Kanayannur Taluks.

The Meenachil River

This river is formed by several streams originating from the Western Ghats. The length of the river is 78km. and the total drainage area is 1272sq.km. The entire catchment lies within the State. The river passes through the villages of Poonjar, Erattupetta, Kondur, Bharananganam, Lalam, Kummannur, Nirikkad and finally through Kottayam, Kumarakom etc. The important towns in the basin are Poonjar, Palai, Ettumanoor and Kottayam.

The Manimala River

Rising at an altitude of +1156m above M.S.L. in Tattamala, the river gains shape only from Elamkadu Estate. The river passes through the villages of Peruvanthanam, Mundakayam, Erumeli, Manimala, Kallupara, Kaviyur and the Thiruvalla Town. It drains an area of 847sq.km. The length of the river is 90km.

Source:- ER, CGWD, PWD.

Table: 9.2

GROUND WATER STATISTICS - KOTTAYAM 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	Erattupetta	Non-command	2400.96	17.97	527.44	81.54	3027.91	302.79	2725.12
2	Ettumanoor	Non-command	2420.13	7.46	531.65	480.00	3439.24	343.92	3095.31
3	Kaduthuruthy	Non-command	2803.61	31.70	615.89	1760.00	5211.19	521.12	4690.07
4	Kanjirappally	Non-command	4073.32	17.85	894.82	87.39	5073.38	507.34	4566.04
5	Lalam	Non-command	3262.62	8.87	716.72	440.00	4428.22	442.82	3985.39
6	Madappally	Non-command	3791.02	17.50	827.19	550.00	5185.71	259.29	4926.42
7	Pallom	Non-command	4478.61	8.28	983.85	1500.00	6970.74	697.07	6273.66
8	Pampady	Non-command	2829.17	0	621.50	90.00	3540.68	354.07	3186.61
9	Uzhavoor	Non-command	3295.73	11.95	724.00	920.00	4951.68	495.17	4456.51
10	Vaikom	Non-command	5601.25	11.48	1230.47	1000.00	7843.19	784.32	7058.87
11	Vazhoor	Non-command	2117.62	0	465.19	30.00	2612.81	261.28	2351.53
	Total (Ha.m)	**Non-command**	**37074.04**	**133.05**	**8138.71**	**6938.94**	**52284.74**	**4969.19**	**47315.55**
	Total (MCM)	**Non-command**	**370.74**	**1.33**	**81.39**	**69.39**	**522.85**	**49.69**	**473.16**

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	Erattupetta	Non-command	397.39	588.15	985.53	648.84	1678.90	36.16
2	Ettumanoor	Non-command	212.53	947.81	1160.34	1045.61	1837.17	37.49
3	Kaduthuruthy	Non-command	685.08	754.18	1439.26	832.00	3173.00	30.69
4	Kanjirappally	Non-command	420.96	939.93	1360.89	1036.91	3108.17	29.80
5	Lalam	Non-command	208.63	582.88	791.51	643.02	3133.74	19.86
6	Madappally	Non-command	417.23	1237.58	1654.80	1365.28	3143.92	33.59
7	Pallom	Non-command	245.83	1453.12	1698.95	1603.06	4424.77	27.08
8	Pampady	Non-command	65.30	606.42	971.72	1045.61	2075.70	21.08
9	Uzhavoor	Non-command	285.16	692.84	978.00	1045.61	3125.73	21.95
10	Vaikom	Non-command	261.26	760.02	1021.28	838.44	5959.17	14.47
11	Vazhoor	Non-command	291.33	543.72	835.05	599.82	1460.38	35.51
	Total (Ha.m)	**Non-command**	**3490.69**	**9106.64**	**12597.33**	**10704.21**	**33120.65**	**26.62**
	Total (MCM)	**Non-command**	**34.91**	**91.07**	**125.97**	**107.04**	**331.21**	**26.62**

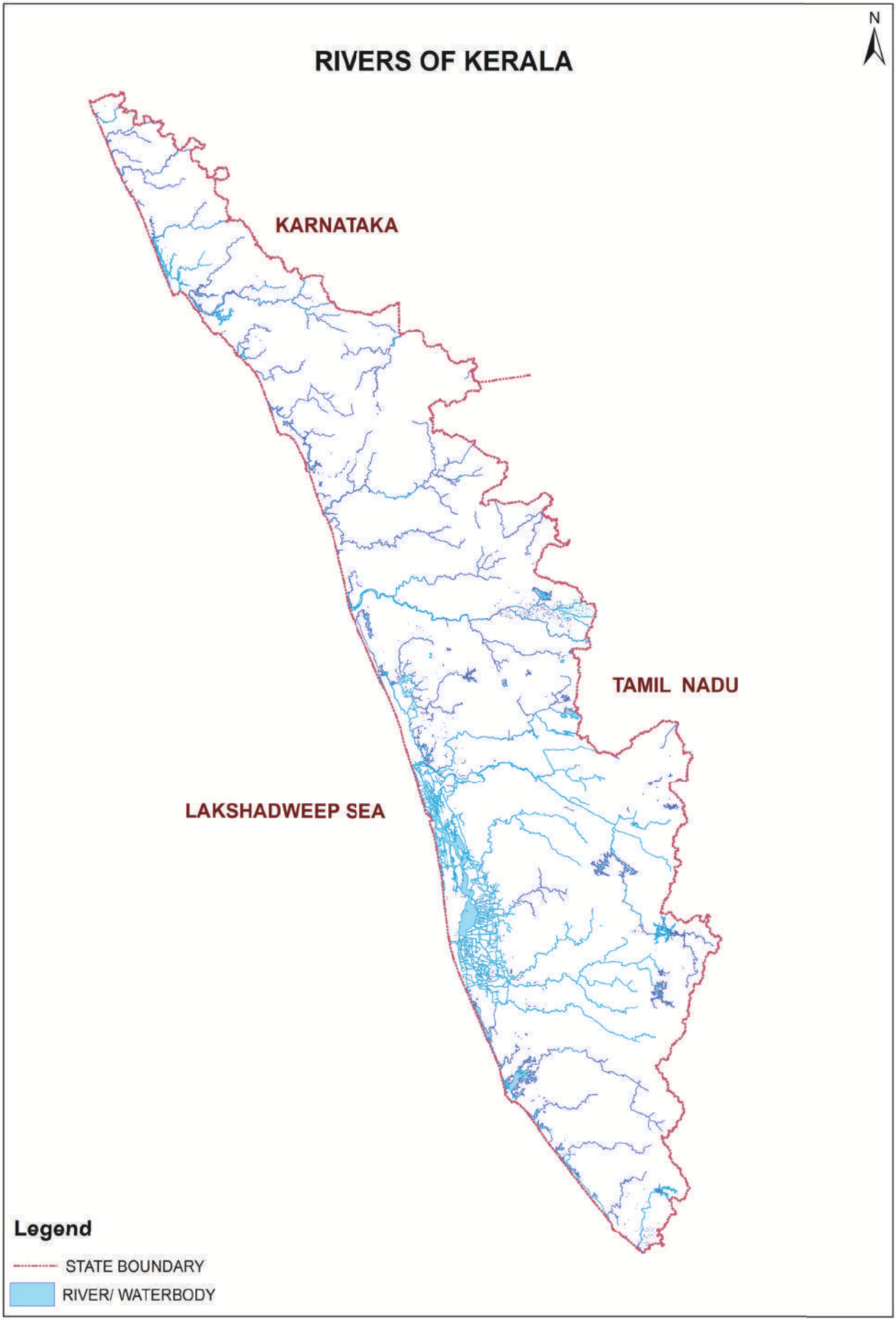
Source: Central Ground Water

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	Cheruthikara	8.72	96	24	5.6	2.4	5.5	3.8	7.2	17	3.2	11	0	3.5
2	Edinjillam	-	279	48	18	0.5	12	21	-	-	19	26	0.38	38
3	Elemkulam	-	90	32	10	1.5	1.4	1.1	-	-	6.1	2.8	0.02	5.2
4	Kalakatty	-	115	30	9.6	1.5	5.1	4.1	-	-	5.4	11	0.15	8.9
5	Kangazha	-	181	50	17	1.9	9.5	2.9	-	-	4.9	20	0.24	8.7
6	Kanjirappalli	-	130	44	8.8	5.4	4.7	1.7	-	-	7	9.9	0.1	10
7	Kidangur	7.76	62	12	2.4	1.5	5.9	1	0	9.8	0.08	0.08	0.01	6.6
8	Kozhuvanal	7.5	54	14	4	1	3.6	1.6	0	9.8	1.4	1.4	0.03	6.6
9	Mundakkayam	7.48	54	14	4	1	3.2	0.8	0	9.8	0.16	0.16	0	8.4
10	Mundukuzhi	7.2	33	10	2.4	1	1.7	0.3	0	4.9	0.16	0.16	0	4.9
11	Naranganam	7.37	25	6	1.6	0.5	1.5	0.6	0	9.8	0.04	0.04	0	1.8
12	Paippad	6.99	217	40	12	2.4	14	12	0	7.3	5.3	5.3	0.1	33
13	Palai	7.67	88	28	6.4	2.9	4.5	0.6	0	32	4	4	0.05	5.6
14	Pallikathodu	7.6	67	18	4.8	1.5	4.8	1.3	0	22	4.8	7.1	0.08	2.2
15	Pambadi	7.38	58	14	3.2	1	4.2	1	0	17	0.72	7.1	0.01	3.3
16	Pulikuttisseri	7.3	116	16	4	1.5	13	2.9	0	12	0.2	24	0.06	9.4
17	Poonjar	7.39	40	8	2.4	0.5	2.7	0.9	0	9.8	0.4	4.3	0	4.9
18	Ramapuram	7.4	189	48	14	3.4	14	1.9	0	20	12	26	0	23
19	Thottakkad	7.36	45	12	4	0.5	2.6	0.4	0	7.3	0.76	4.3	0.01	7.4
20	Thrikodithanam	7.32	129	28	8	1.9	6	7.2	0	12	0.4	17	0.1	29
21	Urulikkunnam	7.42	69	10	3.2	0.5	5.9	3.1	0	9.8	0.08	11	0	6.5
22	Vazhoor	7.68	42	12	3.2	1	2.7	0.3	0	17	0.16	4.3	0	1.8
23	Changanassery	8.59	459	96	27	6.8	34	21	4.8	29	46	65	0.14	58
24	Kalattur	7.6	63	16	4.8	1	3.2	1.2	0	7.3	0.04	8.5	0	11
25	Kozha	7.46	84	20	4.8	1.9	4.3	2.4	0	12	1	11	0.06	14
26	Kumarakom	-	211	58	22	1	6.9	1.3	-	-	20	17	0.09	2.5
27	Palamkadavu	8.56	260	68	18	5.4	17	1.2	2.4	73	8.9	38	0.08	0.44
28	Vempalli	8.77	101	20	5.6	1.5	5.1	0.4	2.4	9.8	2	16	0	8.9
29	Vechur	8.65	181	64	23	1.5	4.7	0.8	4.8	54	12	16	0	2.2

Source: Central Ground Water Department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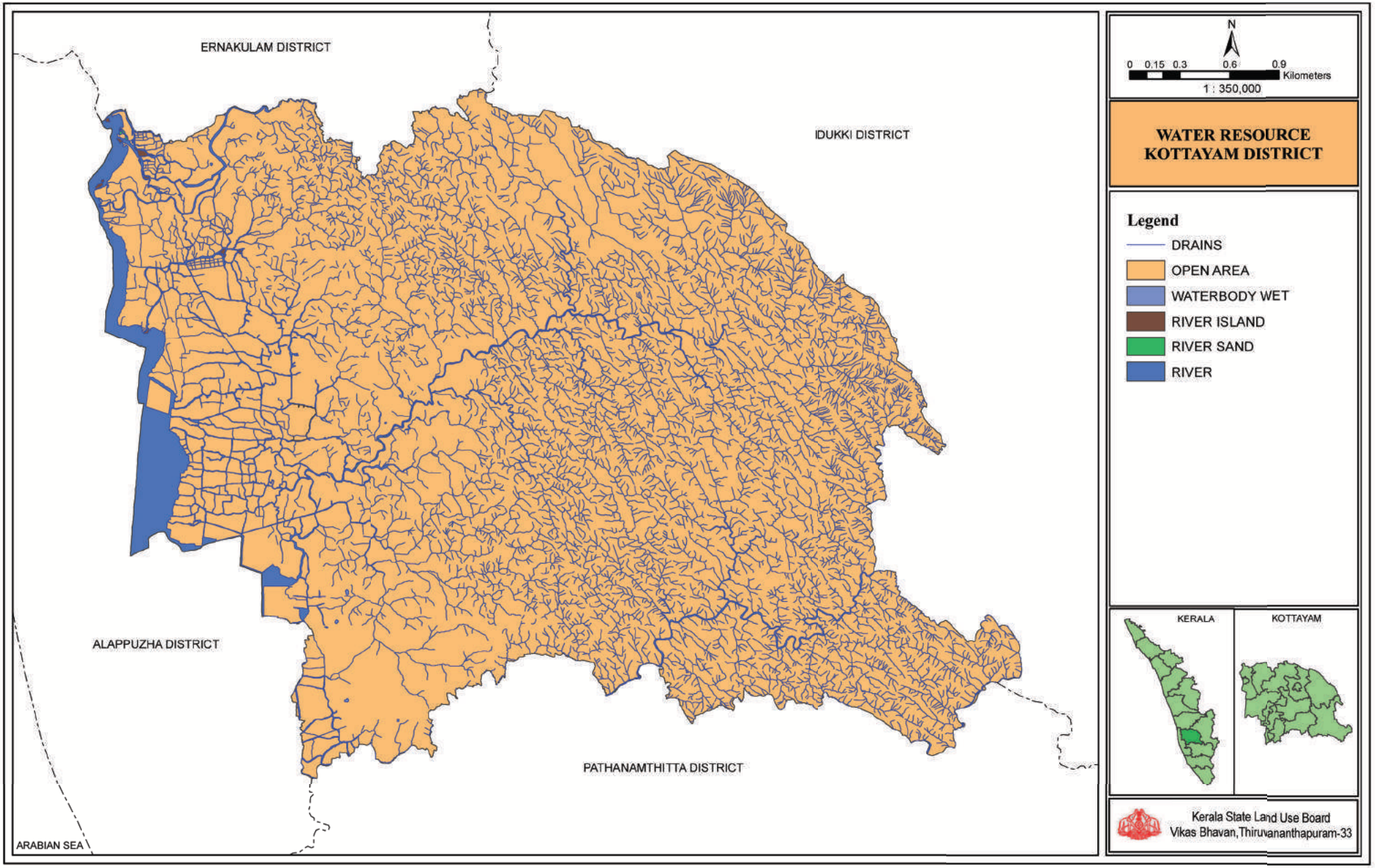
KARNATAKA
TAMIL NADU
LAKSHADWEEP SEA
Legend
STATE BOUNDARY
RIVER/ WATERBODY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ALAPPUZHA DISTRICT
PATHANAMTHITTA DISTRICT
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WATER RESOURCE
KOTTAYAM DISTRICT
Legend
DRAINS
OPEN AREA
WATERBODY WET
RIVER ISLAND
RIVER SAND
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. Minerals have many different properties. Kerala State is endowed with a number of occurrences/deposits of minerals such as Heavy Mineral Sands (Ilmenite, 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 radioactive elements. Chalcopyrite occurs in Vadavathur about 4.8 km. east of Kottayam. The copper mineralization observed is more of the nature of disseminations. Extensive deposits of alluvial clay are found at Punnathurai between Ettumanoor and Kidangoor. A large deposit of lime shell is also reported to occur within the Vembanad Lake.

The flake type of graphite is extensive in occurrence in Kottayam district which have been studied by Geological Survey of India and are 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 first two types of occurrences are found in Kerala. 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. The studies in various laboratories in the country and abroad in respect of the bulk samples collected from the flaky graphite deposits of Chirakkadavu (Kanjirappally taluk, Kottayam district) point to good beneficiation characteristics, a high recovery of fixed carbon (about 85%) and preservation of suitable flake size facilitating their use in key value added industrial application like crucible manufacture etc. Graphite is found in association with the khondalite group of rocks at Aranikunnu, Velavur, Idanad, Kallambakka, Vazhoor, Poovarani, Idamala, Chelavu and near Idayar. Limeshell is found near Thanneermukkom. Tile clay is seen towards the western portion of the district in the plain fringes of the Vembanad lake. A number of industries in Kerala are 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., Puttumala, 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

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 Kadalundipuzha 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 and 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	TVM	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

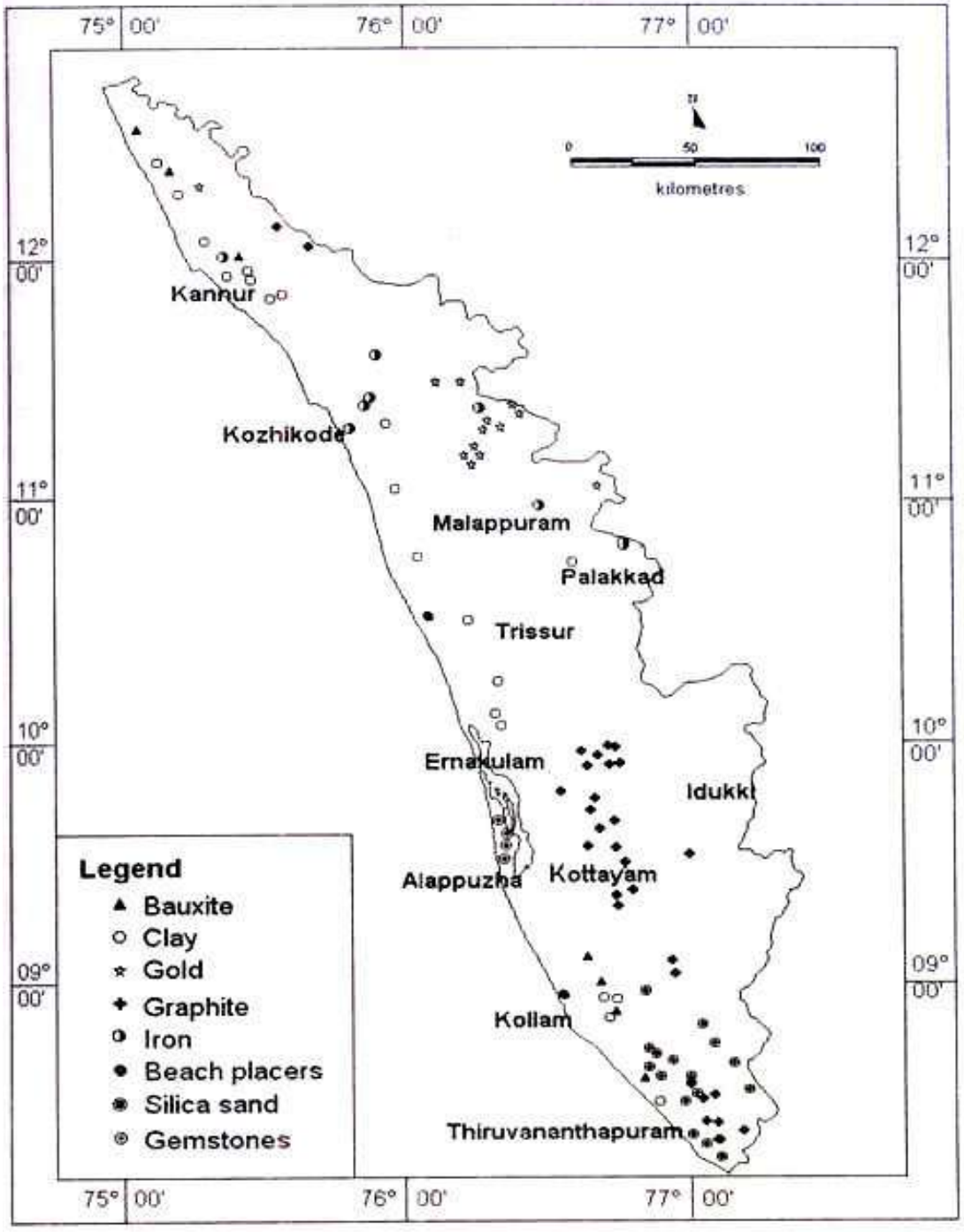
Table: 10.5

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 Kottayam

Land use/Land cover: 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 Kottayam 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 22152 ha accounting for 10.06 per cent of the TGA is estimated under this category.

ii) Agricultural Land

It is defined as the land primarily used for farming and for production of food, fiber 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 167104 ha accounting for 75.89 per cent of the TGA. Of these, the paddy area covers an area of 19358 ha. Nearly 9296 ha of paddy area has been converted to other landuses. The rubber which covers an area of 113730 ha is the major landuses 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 8141 ha, which is 1.55 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 exposures or loose fragments of boulders or as sheet rocks on plateau and plains. The waste lands occupy an area of 18636 ha accounting for 8.46 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 8056 ha accounting for 3.66 percent of the total area.

vi) Others

It includes all those which can be treated as miscellaneous because of their nature of occurrence, physical appearance and other characteristics. Marshy area mainly constitutes this category occupying an area of 807 Ha accounting for 0.37 percent.

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 - KOTTAYAM

Sl. No.	Category	Area (Sq.Km.)	Percentage
1	Built up land (urban) - commercial	13.72	0.62
2	Built up land (rural) - residential	92.36	4.19
3	Built up land (rural) - mixed builtup	115.44	5.24
4	Paddy - viruppu + mundakan	193.58	8.79
5	Paddy reclaimed coconut	22.47	1.02
6	Paddy reclaimed rubber	32.65	1.48
7	Paddy reclaimed mixed crop	7.15	0.32
8	Paddy reclaimed banana	26.12	1.19
9	Paddy reclaimed residential area	4.57	0.21
10	Paddy - fallow	31.53	1.43
11	Tea	6.22	0.28

12	Rubber	597.92	27.16
13	Coconut	30.62	1.39
14	Teak	8.22	0.37
15	Mixed crop	357.12	16.22
16	Coconut dominant mixed crop	344.38	15.64
17	Mixed trees	4.61	0.21
18	Banana	3.88	0.18
19	Semi evergreen/Evergreen - Dense mixed forest	18.71	0.85
20	Semi evergreen/Evergreen - Scrub forest	0.45	0.02
21	Teak (Reserve Forest)	5.96	0.27
22	Grass land	9.02	0.41
23	Land with scrub	85.95	3.9
24	Barren rocky/sheet rock area	0.92	0.04
25	Sands - riverine	0.41	0.02
26	Degraded land under plantation crop (Tea)	1.62	0.07
27	Degraded land under plantation crop (Teak)	0.14	0.01
28	Degraded land under plantation crop (Rubber)	62.88	2.86
29	Under utilised/degraded notified forest	27.86	1.27
30	Waterlogged area	6.58	0.3
31	Marshy area	8.07	0.37
32	Water bodies	80.56	3.66
	Total	**2201.69**	**100**

Table: 11.2

ERATTUPETTA BLOCK

(Area in Ha)

Sl. No.	Land Use	Erattu petta	Melukavu	Munnilavu	Poonjar	Poonjar-Thekkekara	Thalanad	Thalappalam	Theekoyi	Thidanad
1	Acquaculture	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	53.73	0.00	0.00	0.00
6	Agriculture plantation (Mixed)	320.58	680.01	323.19	248.51	132.58	209.22	478.69	121.68	1286.22
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	442.37	1874.83	2465.77	1725.64	4485.76	2280.38	1800.85	2623.03	2756.17
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.69	0.00	63.75	0.00
10	Barrenrock/Stonywaste/Sheetrock	0.00	17.28	74.78	0.00	78.91	4.21	0.00	23.61	0.00
11	Built-up(Cities/Town/Villages)	18.47	0.00	0.00	0.00	0.00	0.00	0.00	4.37	2.53
12	Cropland(kharif)	0.00	0.00	0.00	0.00	0.00	61.76	0.00	1.83	0.00
13	Doublecrop(kharif+Rabi)	0.00	8.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	Fallow Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	224.39	169.15	0.00	347.47	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	248.39	0.00	118.63	94.79	0.00	92.80	0.00
19	Land with scrub	0.00	121.93	329.67	0.01	186.01	538.60	14.33	122.87	0.00
20	Land without scrub	0.00	82.22	0.00	0.00	13.02	15.36	0.00	13.42	14.62
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	River/waterbodies	27.18	0.00	18.89	0.00	0.00	0.00	24.44	0.00	54.66
23	Sandy Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Wetlands (Waterlogged)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**808.60**	**2785.25**	**3460.69**	**1974.16**	**5239.30**	**3427.89**	**2318.31**	**3414.83**	**4114.20**
	Block Total	**27543.23**								

Table: 11.3

ETTUMANOOR BLOCK

(Area in Ha)

Sl. No.	Land Use	Aimanam	Arpookara	Athirampuzha	Ettumanoor	Kumarakam	Neendoor	Thiruvarppu
1	Acquaculture	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	13.02	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	1009.24	300.42	0.00	0.00	736.89	0.00	750.00
6	Agriculture plantation (Mixed)	0.00	252.78	809.34	1102.39	0.38	443.80	0.00
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	0.03	93.30	737.90	1127.29	0.00	479.86	0.00
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	37.60	64.89	167.14	43.09	9.71	8.45	23.63
12	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	1539.29	1892.20	216.60	486.19	1680.16	1072.31	2237.83
14	Fallow Land	0.00	0.00	0.00	1.43	0.00	3.47	0.00
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	0.00	0.00	0.00	2.40	0.00	0.00	0.00
20	Land without scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	0.78	0.00	0.00	0.00	0.00
22	River/Waterbodies	393.71	280.70	102.13	64.39	2736.60	117.83	457.59
23	Sandy Area	0.00	0.00	0.00	4.89	0.00	0.00	0.00
24	Wetlands(Waterlogged)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2979.87**	**2884.29**	**2046.91**	**2832.07**	**5163.74**	**2125.72**	**3469.05**
	Block Total	**21501.65**						

Table: 11.4

KADUTHURUTHY BLOCK

(Area in Ha.)

Sl. No.	Land Use	Kaduthuruthy	Kallara	Mulakkulam	Njezhoor	Thalayola parampu	Velloor
1	Acquaculture	0.00	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	4.03	0.00	0.93	2.49	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	305.67	99.85	1.82	0.00	564.51	38.71
6	Agriculture plantation (Mixed)	81.78	0.00	206.43	660.38	1.76	752.70
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	2284.42	513.63	2390.26	2171.66	517.92	576.63
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	107.91	24.00	39.41	20.47	179.12	258.77
12	Cropland(kharif)	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	566.76	2022.19	278.18	60.64	693.72	98.95
14	Fallow Land	57.15	1.19	0.00	0.00	0.00	92.94
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	0.00	0.00	0.00	0.00	0.00	0.00
20	Land without scrub	0.00	0.00	0.00	0.00	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00	0.00
22	River/Waterbodies	49.22	120.55	24.62	22.01	79.89	140.16
23	Sandy Area	0.00	0.00	0.00	0.00	0.00	0.00
24	Wetlands(Waterlogged)	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3456.94**	**2781.41**	**2941.65**	**2937.65**	**2036.92**	**1958.86**
	Block Total	**16113.43**					

Table: 11.5

KANJIRAPALLY BLOCK

(Area in Ha)

Sl. No.	Land use	Erumely	Kanjirappally	Koottikkal	Koruthodu	Manimala	Munda kkayam	Parathode
1	Acquaculture	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	50.00
5	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Mixed)	720.08	1242.82	265.49	119.41	781.32	369.30	372.72
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	5261.22	3591.87	3003.70	1420.13	2374.97	3946.80	5198.27
9	Agriculture plantation (Tea)	0.00	0.00	202.80	690.25	0.00	179.08	0.00
10	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	47.07	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	31.44	23.49	0.00	10.68	2.53	10.80	4.32
12	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	34.82	0.00	3.83	3.41	0.00	0.00	0.00
14	Fallow Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Deciduous(Dense)	2088.72	0.00	739.52	31.09	465.10	111.63	0.00
16	Forest Evergreen(Dense)	43.16	0.00	0.00	571.15	0.00	0.00	0.00
17	Forest Evergreen(Open)	588.90	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	15.94	0.00	0.00	0.00	0.00
19	Land with scrub	28.51	0.00	5.77	0.00	71.31	0.00	0.00
20	Land without scrub	0.00	0.00	0.00	0.00	5.59	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	River/Waterbodies	57.33	152.69	8.93	13.68	17.03	76.70	0.00
23	Sandy Area	0.00	0.00	0.00	0.00	1.99	0.00	0.00
24	Wetlands (Waterlogged)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**8854.18**	**5010.87**	**4293.05**	**2859.80**	**3719.84**	**4694.31**	**5625.31**
	Block Total	**35057.36**						

Table: 11.6

LALAM BLOCK

(Area in Ha)

Sl. No.	Land Use	Bharananganam	Kadanadu	Karoor	Kozhuvanal	Meenachil	Mutholy
1	Acquaculture	0.00	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.36	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Mixed)	421.21	119.63	389.55	134.85	566.35	215.25
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	9.62
8	Agriculture plantation (Rubber)	2247.74	3614.74	3093.22	1977.86	2156.05	1484.81
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/Stonywaste/Sheetrock	0.00	1.83	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	16.68	0.00	0.00	0.00	4.04	9.96
12	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	5.75	143.72	156.50	46.62	51.38	105.49
14	Fallow Land	0.00	0.00	0.00	0.00	24.06	0.00
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	23.65	85.48	0.00	0.00	0.00	0.00
20	Land without scrub	17.06	6.89	0.00	0.00	58.43	0.00
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00	0.00
22	River/Waterbodies	0.00	0.00	19.77	15.37	36.38	45.95
23	Sandy Area	0.00	0.00	0.00	0.00	0.00	0.00
24	Wetlands (Waterlogged)	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2732.09**	**3972.65**	**3659.04**	**2174.70**	**2896.69**	**1871.08**
	Block Total	**17306.25**					

Table: 11.7

MADAPPALLY BLOCK

(Area in Ha)

Sl. No.	Land Use	Madapally	Payippadu	Thrikkodithanam	Vakathanam	Vazhappally
1	Acquaculture	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	27.48	0.00	2.40	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	0.00	29.04	60.57	7.51	269.03
6	Agriculture plantation (Mixed)	907.97	181.02	264.55	1180.37	674.25
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	1364.14	563.27	734.22	1219.47	99.67
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	17.95	12.29	8.85	0.00	18.09
12	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	92.87	990.00	26.30	204.70	1227.32
14	Fallow Land	4.99	7.12	27.74	0.00	68.43
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	14.45	148.20	0.00	0.00	2.57
20	Land without scrub	0.00	0.00	0.00	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	5.78	0.00	0.00
22	River/Waterbodies	0.00	81.72	0.00	0.17	59.28
23	Sandy Area	0.00	0.00	0.00	0.00	0.00
24	Wetlands (Waterlogged)	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2429.85**	**2012.66**	**1130.41**	**2612.22**	**2418.64**
	Block Total	**10603.78**				

Table: 11.8

PALLAM BLOCK

(Area in Ha)

Sl. No.	Land Use	Ayarkkunnam	Kurichi	Panachikavu	Puthuppally	Vijayapuram
1	Acquaculture	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.00	0.00	10.33	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	0.00	92.29	309.48	93.66	274.60
6	Agriculture plantation (Mixed)	590.05	818.35	767.87	759.78	473.20
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	1716.36	186.13	468.24	1029.31	193.39
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/stonywaste/sheetrock	0.00	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	3.82	15.62	61.86	24.32	154.90
12	Cropland(kharif)	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(kharif+Rabi)	462.16	470.41	614.51	338.41	343.60
14	Fallow Land	0.00	20.17	21.74	0.00	0.00
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	0.00	0.00	0.00	12.06	13.11
20	Land without scrub	0.00	0.00	0.00	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00
22	River/waterbodies	52.29	48.50	0.00	17.79	77.95
23	Sandy Area	2.78	0.00	0.00	0.00	23.22
24	Wetlands (Waterlogged)	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2827.46**	**1651.47**	**2243.70**	**2285.66**	**1553.97**
	Block Total	**10562.26**				

Table: 11.9

PAMPADY BLOCK

(Area in Ha.)

Sl. No.	Land Use	Akalakkunam	Elikkulam	Kidangoor	Kooroppada	Mannarkkad	Meenadam	Pallikkathodu	Pampady
1	Acquaculture	0.00	0.00	0.00	0.00	7.50	0.00	0.00	7.41
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Mixed)	393.33	1022.46	475.46	800.67	698.43	351.06	685.35	1287.37
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	2997.08	2919.77	1360.68	1898.56	715.91	697.56	1642.02	1729.41
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/stonywaste/sheetrock	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	2.87	6.84	36.46	0.00	36.86	0.00	3.16	8.09
12	Cropland(kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(kharif+Rabi)	50.63	41.39	383.12	0.00	298.02	18.18	0.00	0.00
14	Fallow Land	6.30	0.00	4.94	0.00	0.00	0.00	0.00	0.00
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	0.00	0.00	0.00	0.00	10.06	0.00	0.00	0.00
20	Land without scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.03
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	River/waterbodies	34.68	0.00	54.45	12.84	6.26	50.47	0.00	35.16
23	Sandy Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Wetlands (Waterlogged)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3484.89**	**3990.46**	**2315.11**	**2712.07**	**1773.04**	**1117.27**	**2330.53**	**3070.47**
	Block Total	**20793.84**							

Table: 11.10

UZHAVOOR BLOCK

(Area in Ha.)

Sl. No.	Land Use	Kadapla mattom	kanakkary	Kuravilangadu	Manjoor	Maranga ttupally	Ramapuram	Uzhavoor	Veliyannoor
1	Acquaculture	0.00	0.00	0.00	0.00		0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00	2.53	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	0.00	0.00	0.00	17.24	0.00	0.00	0.00	0.00
6	Agriculture plantation (Mixed)	493.66	1069.37	550.48	627.17	595.87	324.94	557.12	294.35
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	1549.67	988.95	1528.16	1571.18	2285.56	4716.49	1872.31	1493.32
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/stonywaste/sheetrock	0.00	0.00	0.00	0.00	0.00	0.00	0.95	21.68
11	Built-up(Cities/Town/Villages)	0.00	2.86	0.00	44.94	84.89	17.94	4.03	1.28
12	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	114.96	297.35	208.95	588.22	42.46	292.55	69.92	152.73
14	Fallow Land	0.00	3.55	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	8.43	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	0.00	0.00	0.00	0.00	6.56	46.64	0.00	12.64
20	Land without scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00	0.00	0.50	1.97
22	River/waterbodies	0.00	2.34	0.00	65.76	0.00	14.67	0.00	24.97
23	Sandy Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Wetlands (Waterlogged)	0.00	0.00	0.00	0.00	0.00	5.66	0.00	0.00
	Panchayath Total	**2158.29**	**2364.42**	**2287.59**	**2914.51**	**3015.34**	**5427.32**	**2507.36**	**2002.94**
	Block Total	**22677.77**							

Table: 11.11

VAIKKOM BLOCK

(Area in Ha.)

Sl. No.	Land Use	Chempu	Maravanthuruthu	T.V Puram	Thalayazham	Udayanapuram	Vechoor
1	Acquaculture	0.00	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.00	0.00	0.00	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	857.28	1143.09	745.03	957.08	1288.70	722.66
6	Agriculture plantation (Mixed)	417.69	58.39	0.00	0.00	0.00	0.21
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	0.00	0.00	0.00	0.00	0.00	0.00
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/stonywaste/sheetrock	0.00	0.00	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	27.48	16.85	10.43	15.92	39.76	8.82
12	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	75.82	72.53	36.69	880.36	295.65	1757.69
14	Fallow Land	5.85	2.53	0.00	0.00	103.37	0.00
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	0.00	0.00	0.00	0.00	0.00	0.00
20	Land without scrub	0.00	0.00	0.00	0.00	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00	0.00
22	River/Waterbodies	562.32	296.66	656.72	264.28	126.24	527.32
23	Sandy Area	0.00	0.36	0.41	7.03	0.00	0.00
24	Wetlands(Waterlogged)	6.11	0.03	0.00	0.00	2.66	0.00
	Panchayath Total	**1952.55**	**1590.44**	**1449.27**	**2124.67**	**1856.38**	**3016.70**
	Block Total	**11990.01**					

Table: 11.12

VAZHOOR BLOCK

(Area in Ha.)

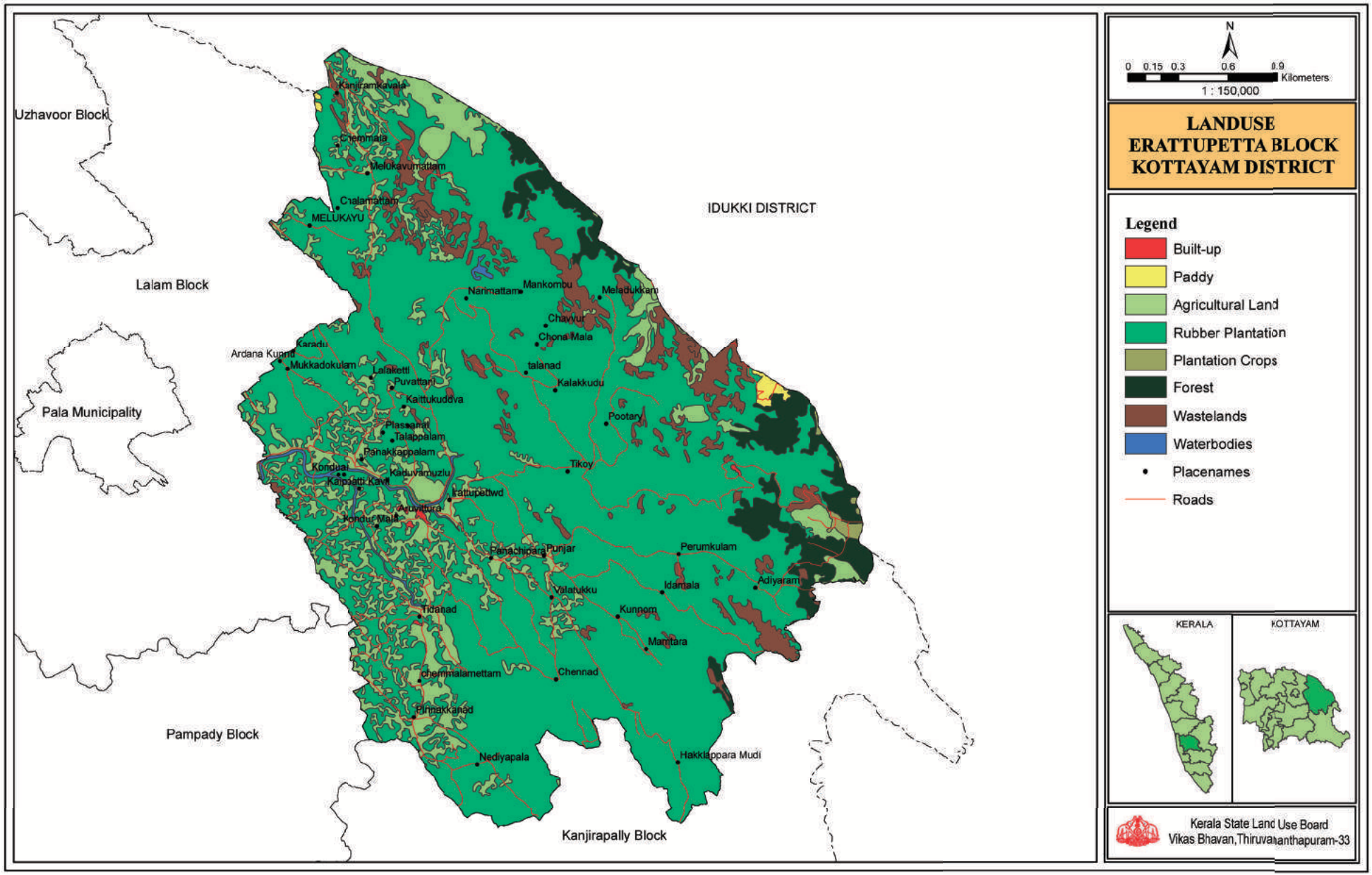
Sl. No.	Land Use	Chirakkadavu	Kangazha	Karukachal	Nedumkkunnam	Vazhoor	Vellavoor
1	Acquaculture	0.00	0.00	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	0.00	0.74	2.09	0.00	8.02	6.10
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	0.00	0.00	0.00	0.00	0.00	0.00
6	Agriculture plantation (Mixed)	1210.03	739.90	760.42	740.06	1060.70	620.30
7	Agriculture plantation (Pepper)	0.00	0.00	0.00	0.00	0.00	0.00
8	Agriculture plantation (Rubber)	2682.12	1721.51	1461.07	1655.94	2008.15	1646.09
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00	0.00	0.00
10	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	15.14	38.95	0.00	9.93	9.57	4.29
12	Cropland(Kharif)	0.00	0.00	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	0.00	0.00	0.00	0.00	0.00	0.00
14	Fallow Land	0.00	0.00	0.00	0.00	0.00	0.00
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00	0.00	0.00
19	Land with scrub	4.54	5.98	39.85	2.23	0.00	10.86
20	Land without scrub	0.00	0.00	0.00	0.00	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	0.00	0.00	0.00	0.00
22	River/Waterbodies	60.53	0.00	0.03	0.00	0.00	38.77
23	Sandy Area	0.00	0.00	0.00	0.00	0.00	21.36
24	Wetlands(Waterlogged)	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3972.36**	**2507.08**	**2263.46**	**2408.16**	**3086.44**	**2347.77**
	Block Total	**16585.27**					

Table: 11.13

MUNICIPALITY

(Area in Ha.)

Sl. No.	Land Use	Changanassery	Kottayam	Pala	Vaikom
1	Acquaculture	0.00	0.00	0.00	0.00
2	Agriculture plantation (Arecanut)	0.00	0.00	0.00	0.00
3	Agriculture plantation (Banana)	5.06	0.00	0.00	0.00
4	Agriculture plantation (Cashew)	0.00	0.00	0.00	0.00
5	Agriculture plantation (Coconut)	859.62	2162.08	0.00	759.13
6	Agriculture plantation (Mixed)	64.80	338.43	542.04	0.00
7	Agriculture plantation (Pepper)	0.00	0.00	2.08	0.00
8	Agriculture plantation (Rubber)	16.59	222.17	899.40	0.00
9	Agriculture plantation (Tea)	0.00	0.00	0.00	0.00
10	Barrenrock/Stonywaste/Sheetrock	0.00	0.00	0.00	0.00
11	Built-up(Cities/Town/Villages)	148.60	558.93	107.26	72.74
12	Cropland(Kharif)	0.00	0.00	0.00	0.00
13	Doublecrop(Kharif+Rabi)	185.61	1887.00	42.65	36.03
14	Fallow Land	88.46	39.23	0.00	9.85
15	Forest Deciduous(Dense)	0.00	0.00	0.00	0.00
16	Forest Evergreen(Dense)	0.00	0.00	0.00	0.00
17	Forest Evergreen(Open)	0.00	0.00	0.00	0.00
18	Grass Land	0.00	0.00	0.00	0.00
19	Land with scrub	0.00	5.52	0.00	0.00
20	Land without scrub	0.00	0.00	0.00	0.00
21	Mining/Industrial waste	0.00	0.00	0.00	0.00
22	River/Waterbodies	21.34	298.89	74.96	361.34
23	Sandy Area	0.00	3.12	0.00	0.00
24	Wetlands (Waterlogged)	**1390.08**	**5515.37**	**1668.39**	**1239.10**
	Municipality Total	**9812.94**			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Meladukkam
Chavvur
Chona Mala
Ardana Kunnu
Karadu
Mukkadokulam
Lalakotti
talanad
Puvattan
Kalakkudu
Kaittukuddva
Pala Municipality
Pootary
Plassanal
Talappalam
Panakkappalam
Konduai
Tikoy
Kaduvamuzhi
Kaipatti Kavil
Irattupettwd
Aruvittura
Kondur Mala
Panachipara
Punjar
Perumkulam
Idamala
Adiyaram
Valatukku
Tidanad
Kunnom
Mamtara
chemmalamettam
Chennad
Pinnakkanad
Pampady Block
Nediyapala
Hakkappara Mudi
Kanjirapally Block
N
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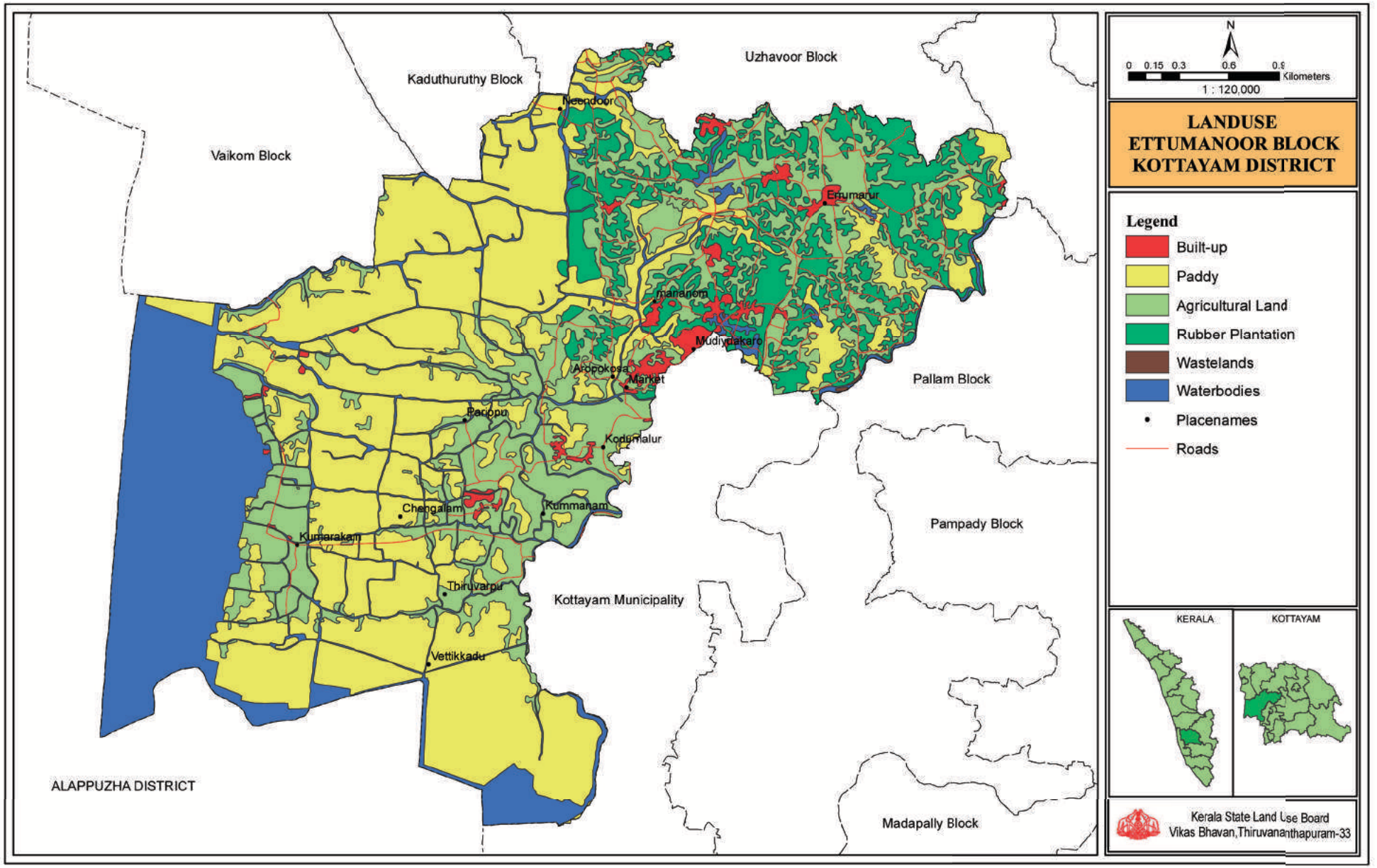
Kilometers
1 : 150,000
LANDUSE
ERATTUPETTA BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Plantation Crops
Forest
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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Arpookosa
Market
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Parappu
Kodumalur
Chengalam
Kummanam
Kumarakam
Pampady Block
Thiruvarpu
Kottayam Municipality
Vettikkadu
ALAPPUZHA DISTRICT
Madapally Block
N
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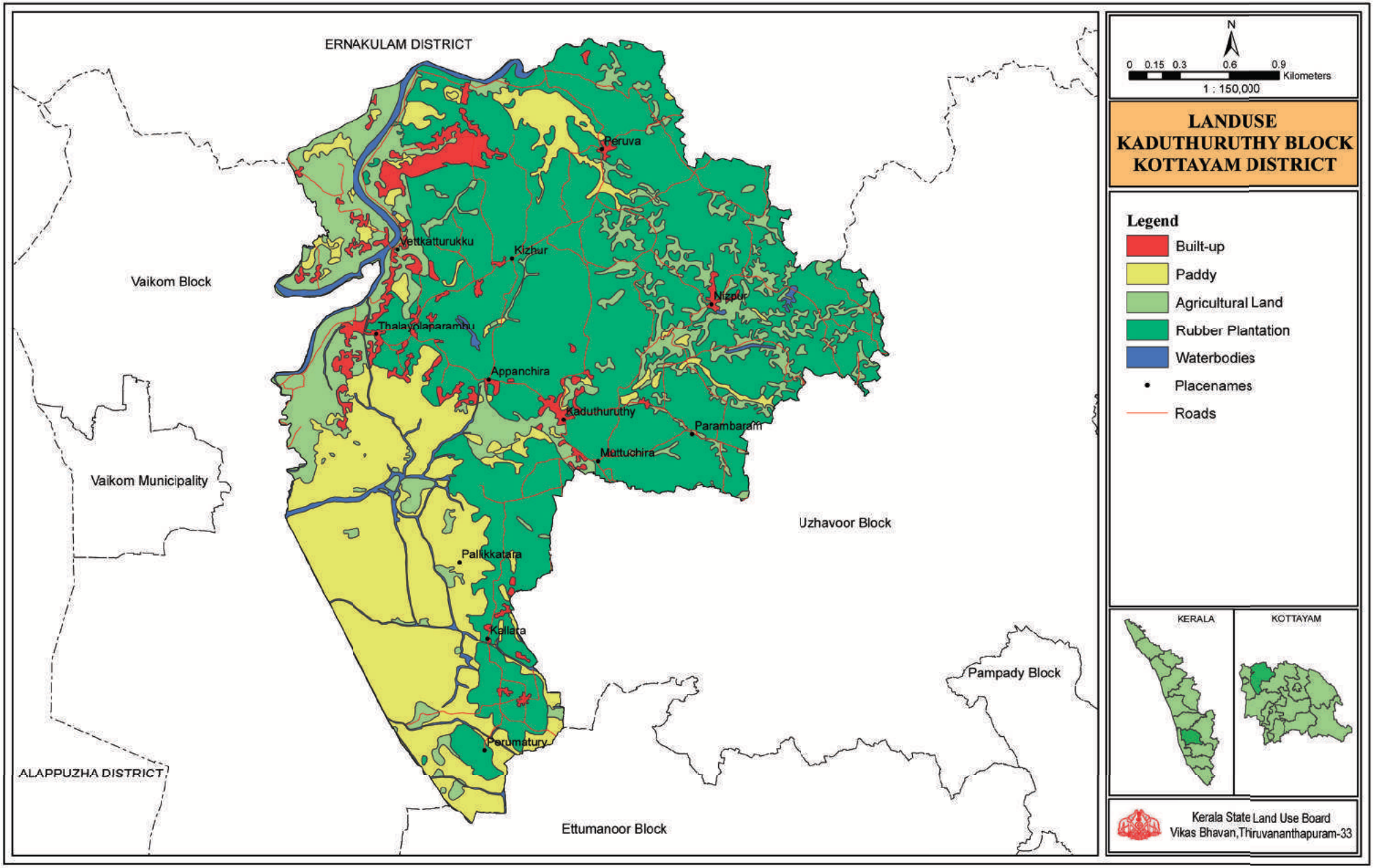
Kilometers
1 : 120,000
LANDUSE
ETTUMANOOR BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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ALAPPUZHA DISTRICT
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Pampady Block
Uzhavoor Block
Peruva
Vettkatturukku
Kizhur
Nizpur
Thalayolaparambu
Appanchira
Kaduthuruthy
Parambaram
Muttuchira
Pallikkatara
Kallara
Perumatury
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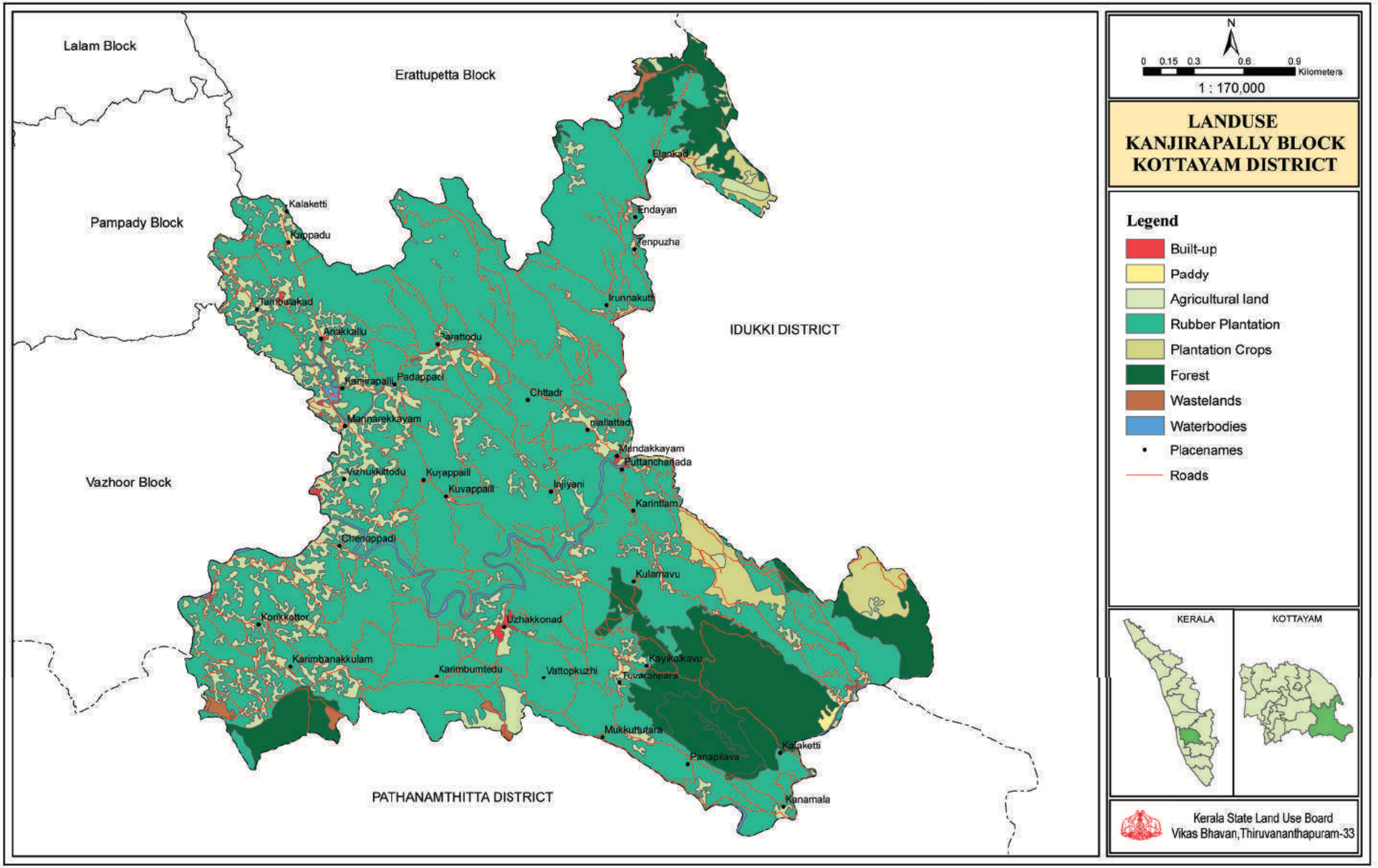
1 : 150,000
LANDUSE
KADUTHURUTHY BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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Pampady Block
Vazhoor Block
IDUKKI DISTRICT
PATHANAMTHITTA DISTRICT
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Kalaketti
Kappadu
Endayan
Tenpuzha
Tambalakad
Irunnakutti
Anakkallu
Parattodu
Kanjirapalli
Padappadi
Chttadr
Mannarekkayam
matlattadi
Mundakkayam
Puttanchirada
Vizhukkattodu
Kuyappaill
Kuvappaill
Injiyani
Karintlam
Chenappadi
Kulamavu
Korikkottor
Uzhakkonad
Karimbanakkulam
Karimbumtedu
Vattopkuzhi
Kayikalkavu
Tuvarampara
Mukkuttutara
Kalaketti
Panapilava
Kanamala
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Kilometers
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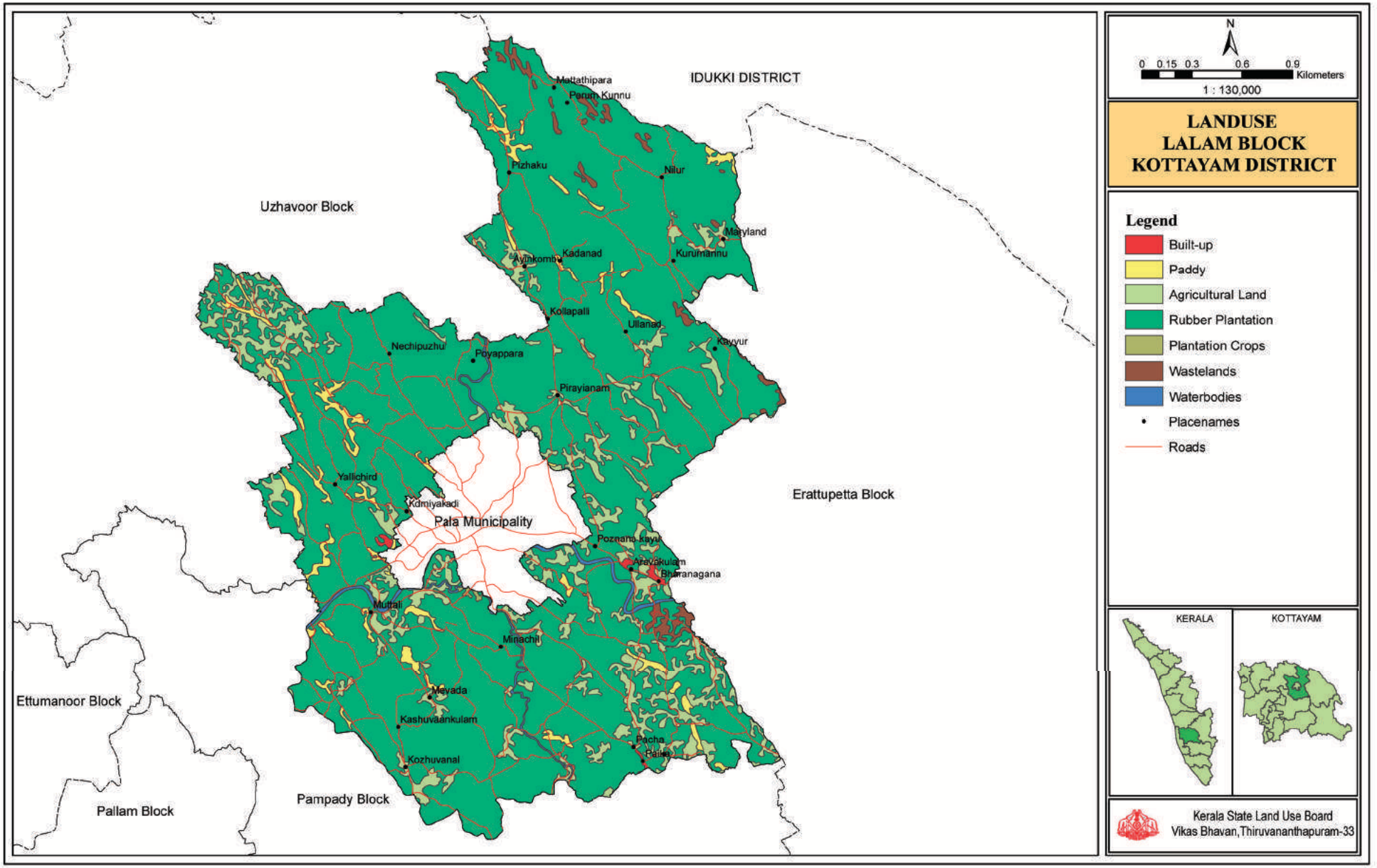
LANDUSE
KANJIRAPALLY BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural land
Rubber Plantation
Plantation Crops
Forest
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan, Thiruvananthapuram-33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Pampady Block
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Mattathipara
Perum Kunnu
Pizhaku
Nilur
Maryland
Kurumannu
Kadanad
Avinkombu
Kollapalli
Ullanad
Kayyur
Nechipuzhu
Poyappara
Pirayianam
Yallichird
Kidmiyakadi
Poznana Kayu
Aravekulam
Bharanagana
Muttali
Minachil
Mevada
Kashuvaankulam
Kozhuvanal
Pacha
Pallo
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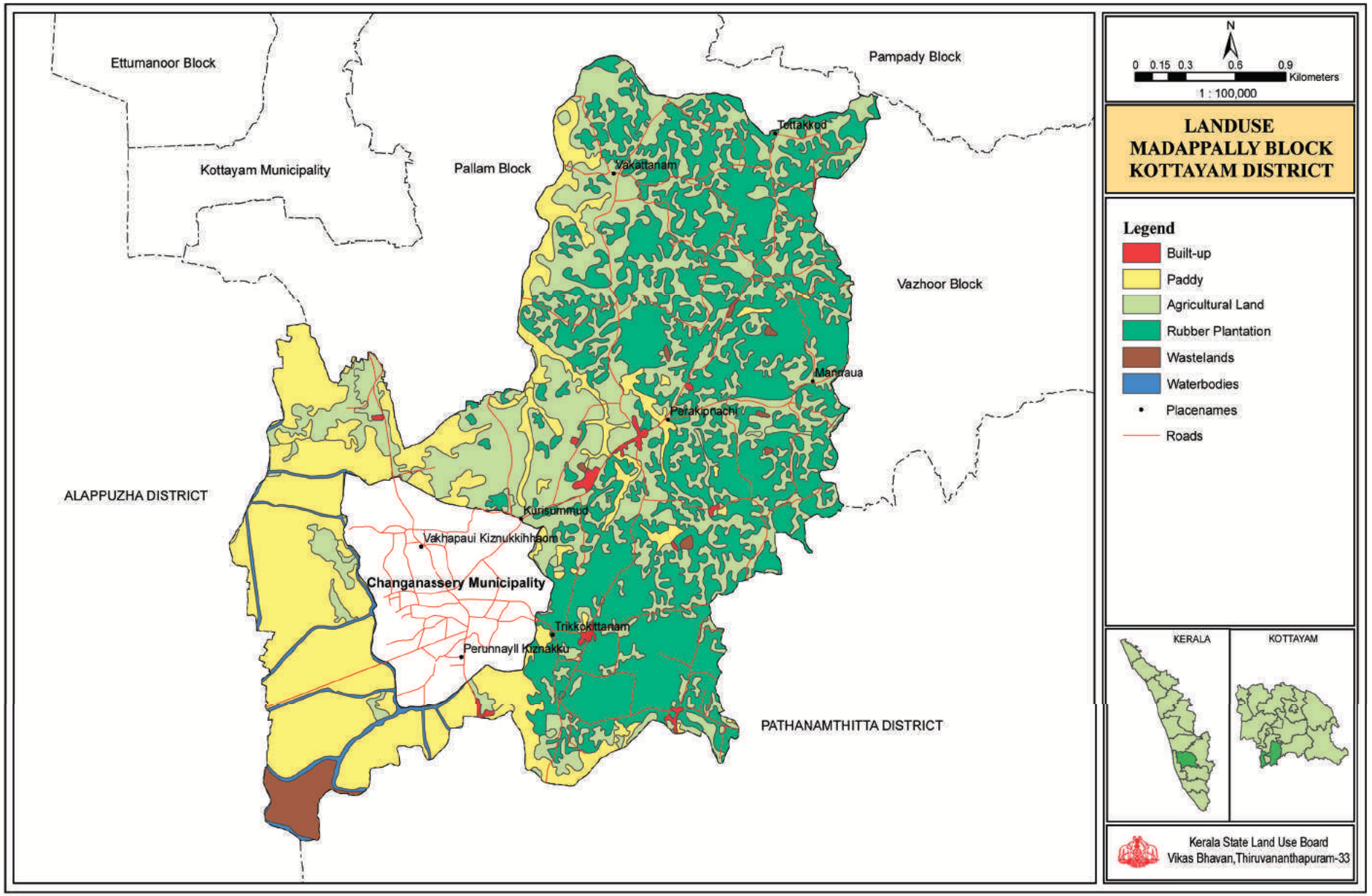
1 : 130,000
LANDUSE
LALAM BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Plantation Crops
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan, Thiruvananthapuram-33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PATHANAMTHITTA DISTRICT
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Manrraua
Perakipnachi
Trikkokittanam
Peruhnayll Kiznakku
Vakhapaui Kiznukkihhaom
Kurisummuo
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Kilometers
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LANDUSE
MADAPPALLY BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Wastelands
Waterbodies
Placenames
Roads
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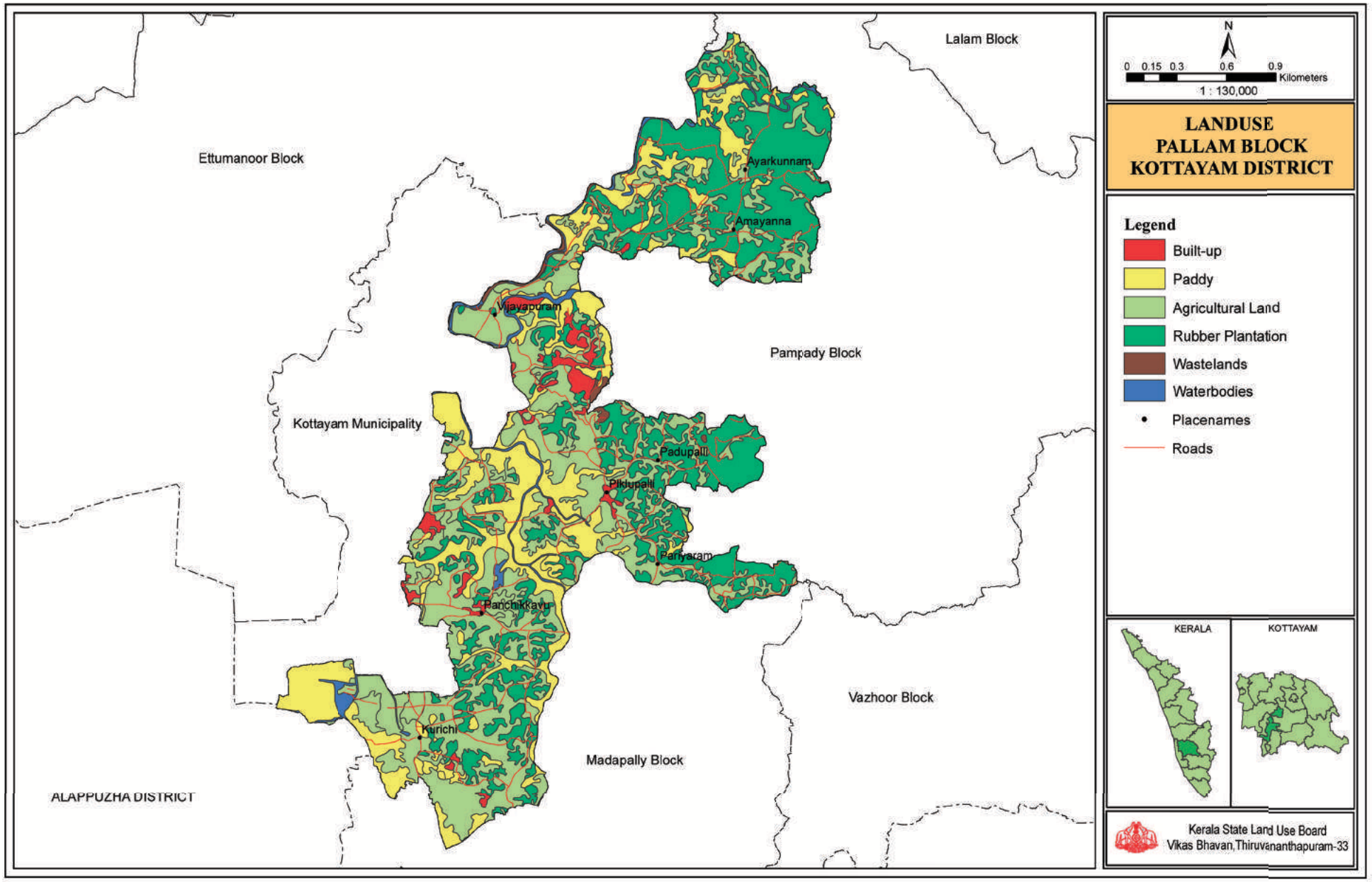
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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Amayanna
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Pariyaram
Panchikkavu
Vazhoor Block
Kurichi
Madapally Block
ALAPPUZHA DISTRICT
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Kilometers
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PALLAM BLOCK
KOTTAYAM DISTRICT
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Built-up
Paddy
Agricultural Land
Rubber Plantation
Wastelands
Waterbodies
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Roads
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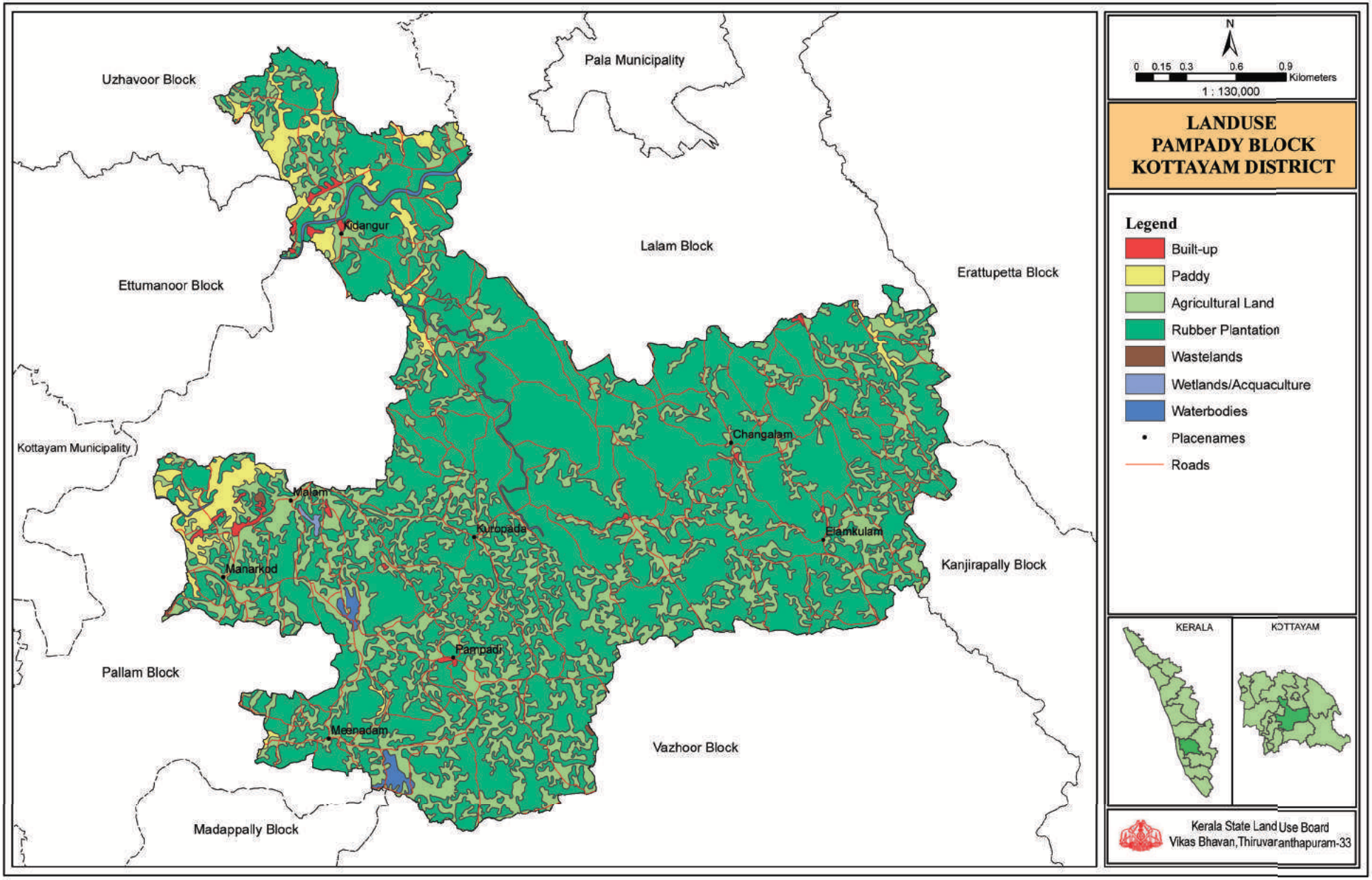
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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Lalam Block
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Ettumanoor Block
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Kottayam Municipality
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Kuropada
Elamkulam
Manarkod
Kanjirapally Block
Pampadi
Pallam Block
Meenadam
Vazhoor Block
Madappally Block
N
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Kilometers
1 : 130,000
LANDUSE
PAMPADY BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Wastelands
Wetlands/Acquaculture
Waterbodies
Placenames
Roads
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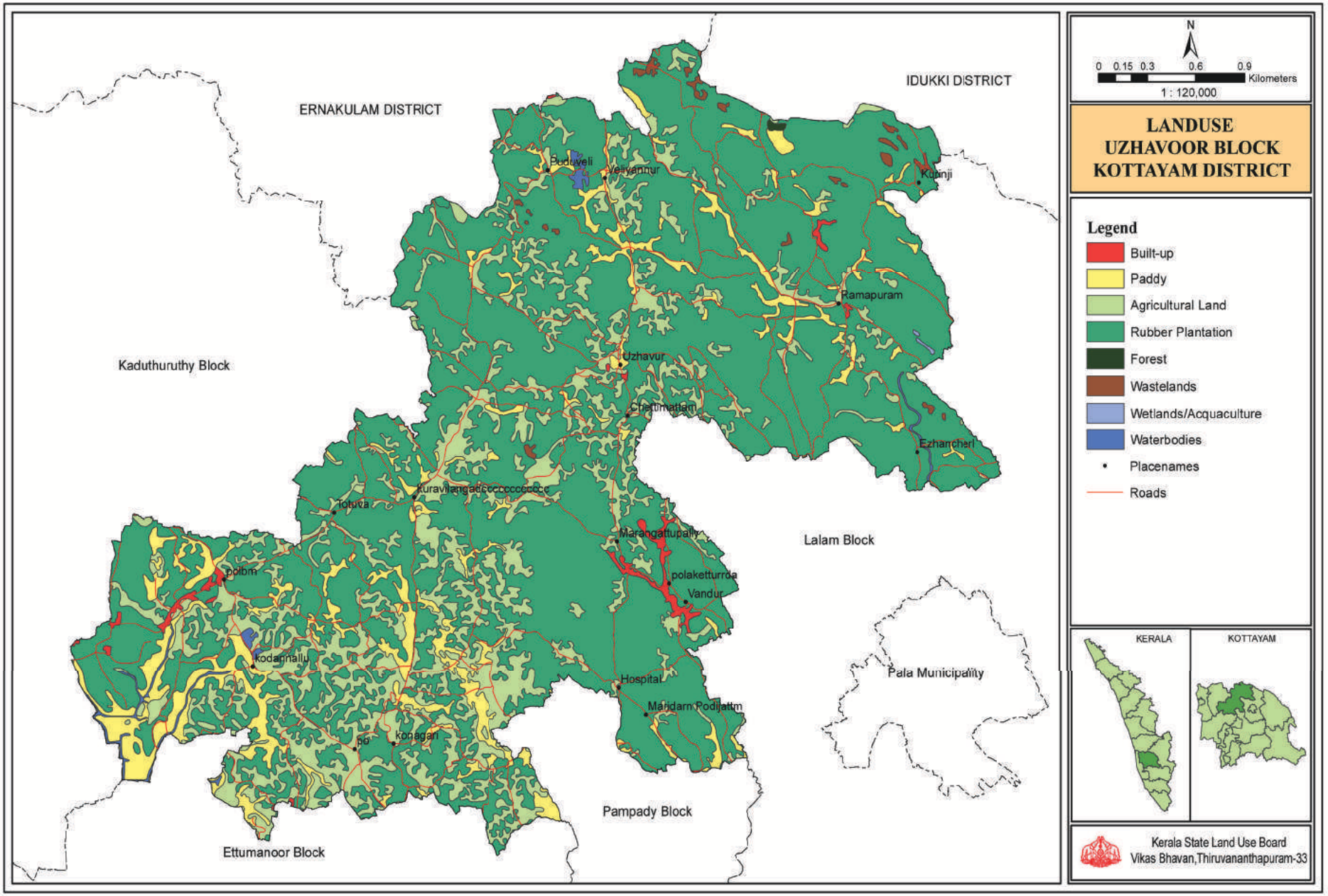
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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IDUKKI DISTRICT
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Lalam Block
Pampady Block
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Pala Municipality
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Velivannur
Kuttinji
Ramapuram
Uzhavur
Chettimattam
Ezhancheri
Kuravilangad
Iotuva
Marangattupally
polaketturra
Vandur
Hospital
Manjarn Podiattm
Konagari
N
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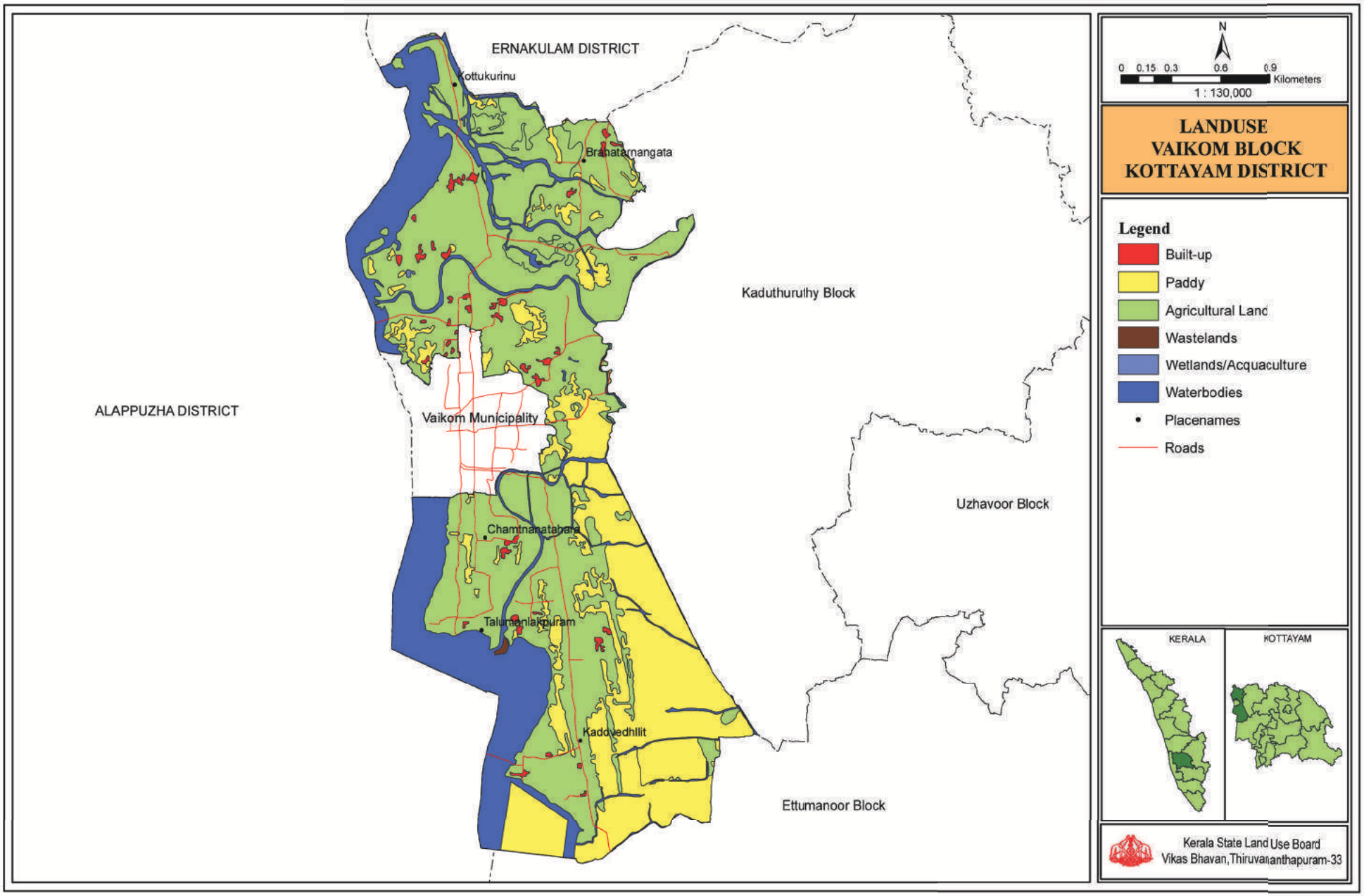
Kilometers
1 : 120,000
LANDUSE
UZHAVOOR BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Forest
Wastelands
Wetlands/Acquaculture
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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Kottukurinu
Brahatamangata
Kaduthuruthy Block
ALAPPUZHA DISTRICT
Vaikom Municipality
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Chamtnanatabara
Talumanlakpuram
Kaddvedhlit
Ettumanoor Block
N
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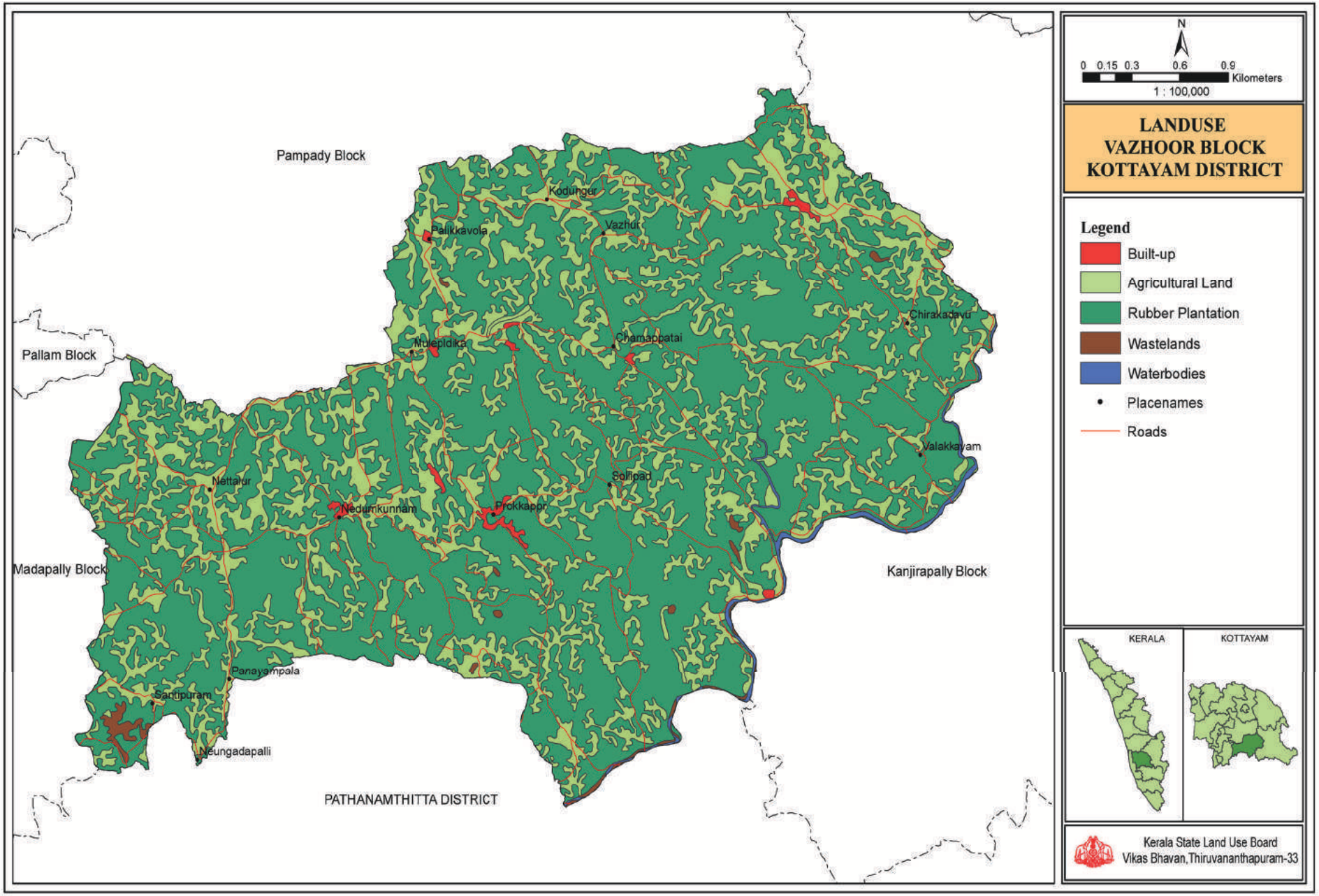
Kilometers
1 : 130,000
LANDUSE
VAIKOM BLOCK
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Wastelands
Wetlands/Acquaculture
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan, Thiruvananthapuram-33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Kilometers
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VAZHOOR BLOCK
KOTTAYAM DISTRICT
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Rubber Plantation
Wastelands
Waterbodies
Placenames
Roads
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan, Thiruvananthapuram-33
Pampady Block
Pallam Block
Madapally Block
Kanjirapally Block
PATHANAMTHITTA DISTRICT
Kodungor
Vazhur
Palikkavola
Mulepidika
Chamappatai
Chirakadavu
Valakkayam
Solipad
Nettalur
Nedumkunnam
Prokkapor
Panayampala
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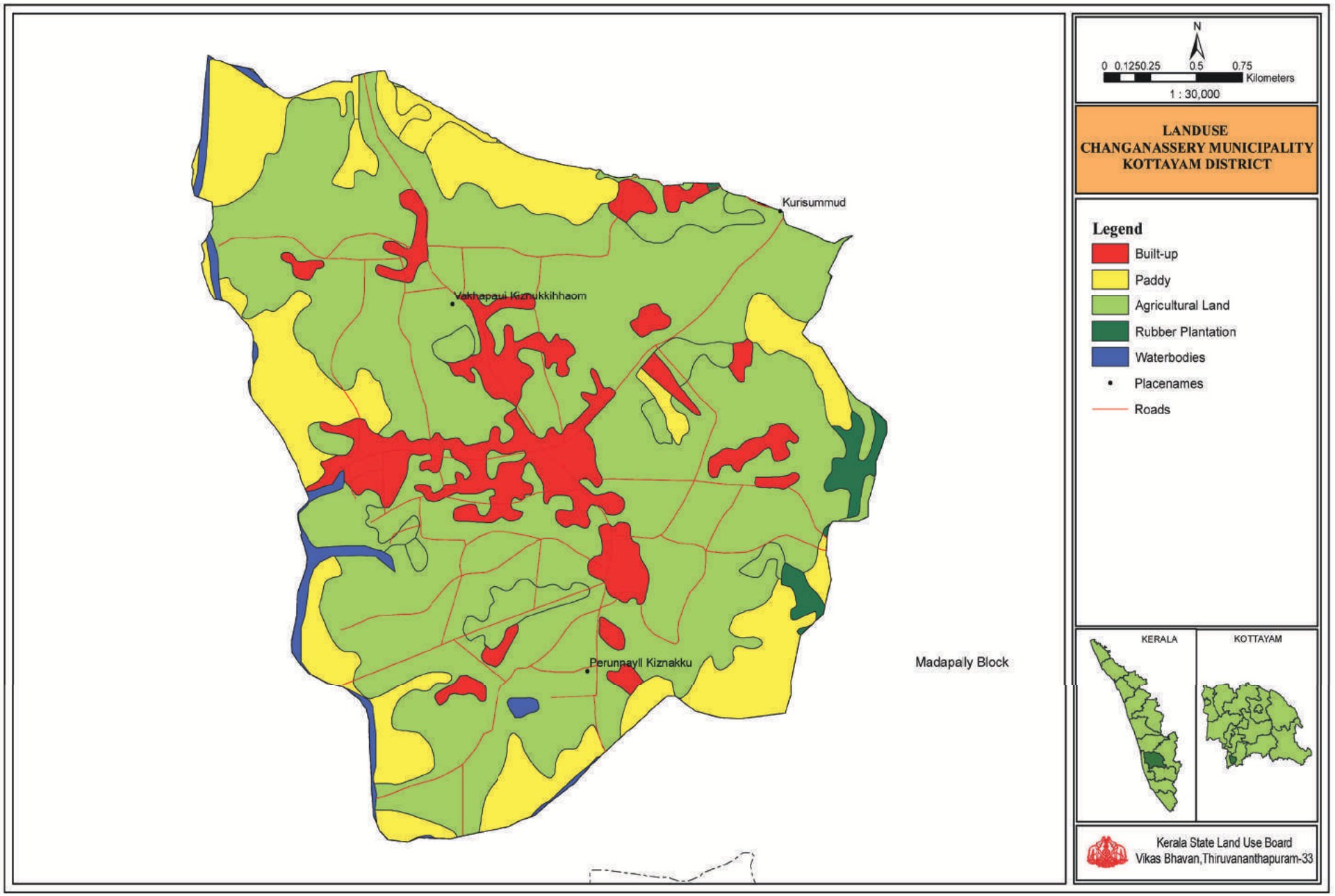
Neungadapalli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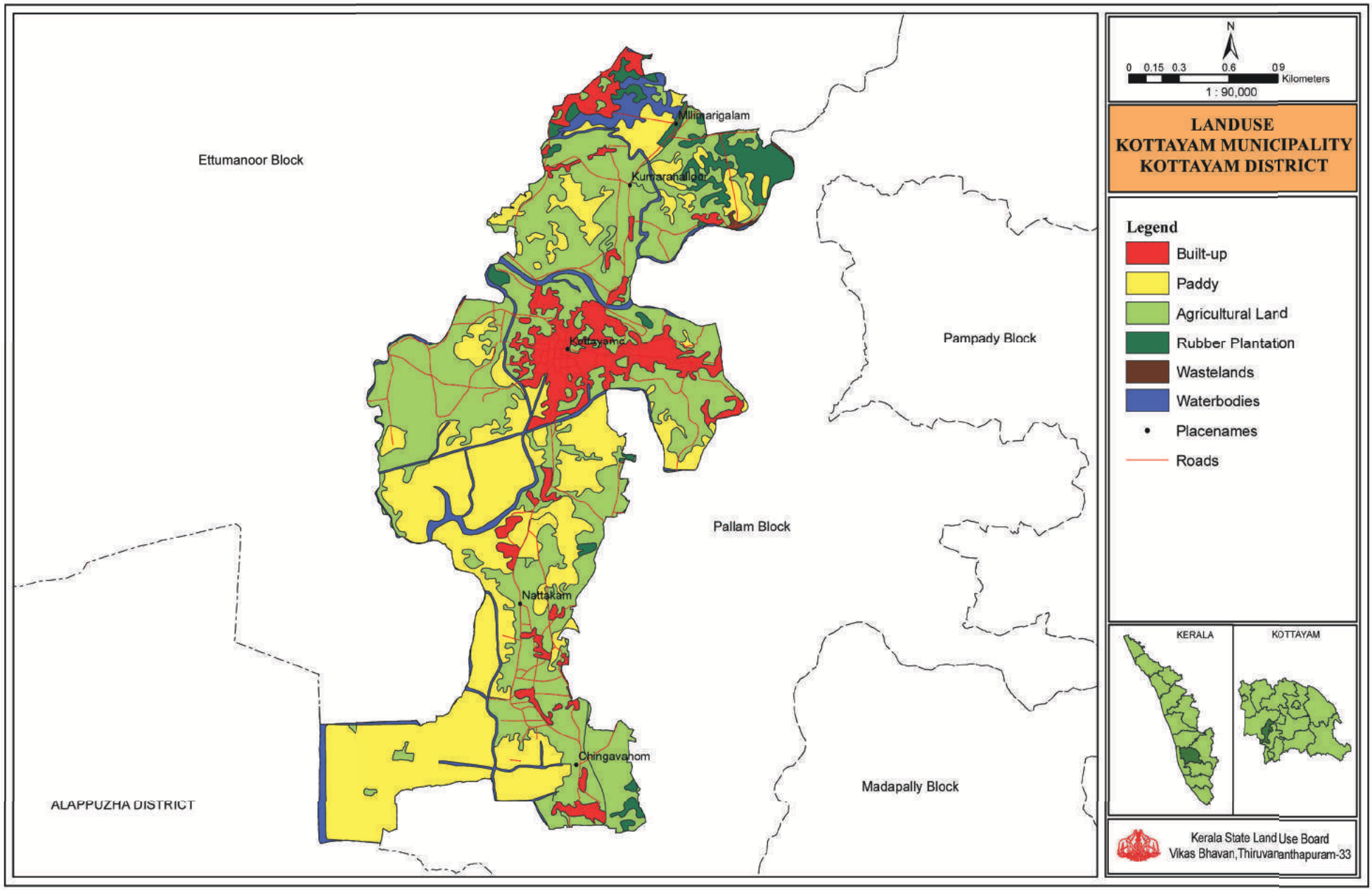
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Rubber Plantation
Waterbodies
Placenames
Roads
Kurisummud
Vakhapaui Kiznukkihhaom
Perunnayil Kiznakku
Madapally Block
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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KOTTAYAM MUNICIPALITY
KOTTAYAM DISTRICT
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Built-up
Paddy
Agricultural Land
Rubber Plantation
Wastelands
Waterbodies
Placenames
Roads
Ettumanoor Block
Pampady Block
Pallam Block
Madapally Block
ALAPPUZHA DISTRICT
Kumaranallur
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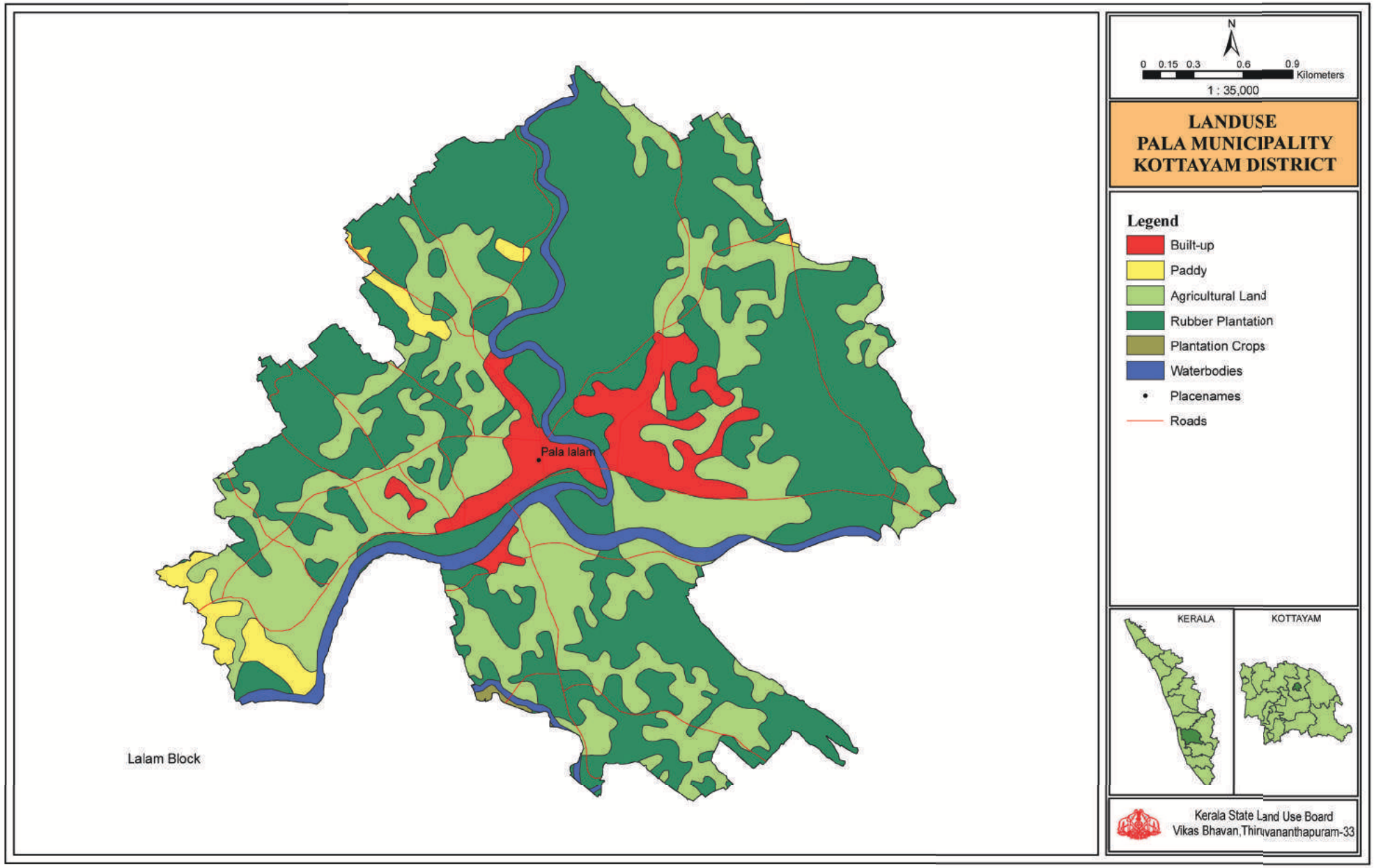
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan, Thiruvananthapuram-33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Legend
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Paddy
Agricultural Land
Rubber Plantation
Plantation Crops
Waterbodies
Placenames
Roads
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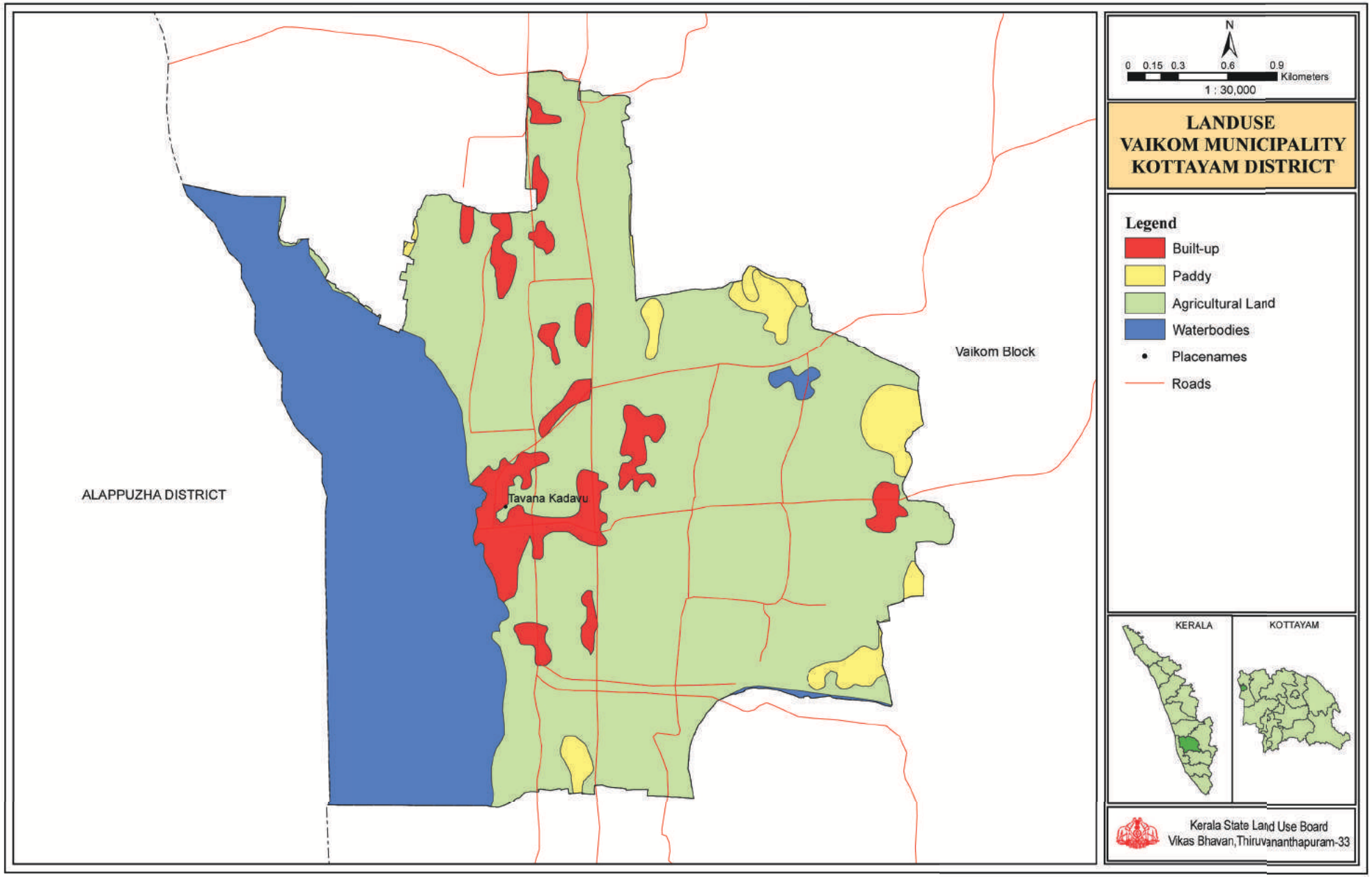
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33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VAIKOM MUNICIPALITY
KOTTAYAM DISTRICT
Legend
Built-up
Paddy
Agricultural Land
Waterbodies
Placenames
Roads
ALAPPUZHA DISTRICT
Tavana Kadavu
Vaikom Block
KERALA
KOTTAYAM
Kerala State Land 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.

Western Ghats, one of the Biodiversity hot spots is running along the length of Kerala. 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.

Kottayam district which once had vast stretches of forest have at present only about 2.45% of geographical area under forest cover. About 57% of the 54 Km^2 extent of actual forest is under severe degradation due to various factors. The forest types could be broadly classified in to West Coast Tropical Evergreen, West Coast Semi-Evergreen and South Indian Moist Deciduous (KFRI, 2012). The following table depicted the biodiversity statistics in Kerala.

Table: 12.1

PLANT DIVERSITY

Sl. No.	Items	Nos.
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	Nos.
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 KOTTAYAM DISTRICT

Category	No. of families	No. of Genera	No. of Species	No. of Endemic species	No. of RET # species
Angiosperms	166	801	1422	158	33
Gymnosperms	4	4	5	---*	---*
Pteridophytes	26	44	67	---*	---*
Fungi	---*	60	152	---*	---*

*Data not available; #Rare Endangered and Threatened

Source: Kerala Forest Research Institute

FORESTS

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). The forest of the district may be classified broadly under three categories. These are southern tropical wet evergreen forest, southern tropical and semi evergreen forest and southern tropical moist deciduous forests. 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. Forest Resource Development Programme are being carried out by the Forest Development Corporation, the headquarters of which is located at Kottayam.

The forest area in the district is confined to a few villages of Kanjirapally Taluk. These villages are Koottickal, Erumeli North, Erumeli South and Manimala. The Kottayam Forest Division covers the area. The total forest area in the district is 100.845 sq.km., thus showing that the extent of forest in the District is not much i.e., about 4.6 per cent of the total geographical area of the district.

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**

Table: 13.2

RANGE WISE AREA OF FORESTS AS ON 31.03.2010

Division/Range	Area (Km^2)
Erumeli	162.18
Ayyappancovil	88.07
Nagarampara	143.40
Kumili	265.59
Total	**659.25**

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
High Range Circle, Kottayam						
1	Kothamangalam	316.84	-	0.15	317.00	2.80
2	Munnar	371.39	244.37	2.45	618.21	5.47
3	Marayoor	13.97	47.26	0.07	61.30	0.54
4	Mankulam	90.06	-	-	90.06	0.80
5	Kottayam	627.28	-	31.96	659.25	5.83
	Total	**1419.55**	**291.63**	**34.65**	**1745.83**	**15.44**
FDPT, Kottayam						
1	Periyar East	618.00	-	-	618.00	5.46
2	Periyar West	157.00	-	-	157.00	1.39
3	Munnar	276.84	-	-	276.84	2.45
4	Idukki	130.52	-	-	130.52	1.15
	Total	**1182.36**	**-**	**-**	**1182.36**	**10.45**

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 an 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.

Paddy is the most important food crop and Kayal land cultivation is a peculiarity of the district. Next to paddy tapioca is the main food crop. Annual crops like pineapple and plantain seasonal crops like ginger, tubers, vegetables and a wide range of perennial crops like jack, mango etc are also grown. Coconut another important cash crop has a total area of 28410 ha under cultivation of the district during 2010-11. Pepper, tea, coffee and ginger are the other cash crops cultivated in the district. Arecanut, pulses, sugarcane, cocoa etc are also cultivated here. Rubber is the major cash crop in the district and this district has the credit of largest content of area under this crop. Area under rubber cultivation in this district is 113730 ha. and contribution to total area is 21%.

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	220442	8141	25893	1469	0	133
2009-2010	220442	8141	24591	1512	0	128
2008-2009	220442	8141	23214	1628	0	127

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	4890	3046	5808	0	6362	159
2009-2010	4711	3173	5418	6	6362	159
2008-2009	5384	2839	3054	10	6362	161

Year	Social Forestry	Net Area Sown	Area sown more than once	Total Cropped Area
1	14	15	16	17
2010-2011	90	164451	42338	206789
2009-2010	87	166154	39697	205851
2008-2009	87	169435	46955	216390

Source: Agricultural Statistics 2011, DES.

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	5464	1536	7775	14775	0	0	1	14776	0	1	62	63	14839
2009-2010	3940	3138	8396	15474	0	0	0	15474	0	2	186	188	15662
2008-2009	3331	2279	5341	10951	0	0	0	10951	0	0	56	56	11007

Year	Sugar Crops			Spices And Condiments												
	Sugar cane	Palmyrah	Total	Pepper	Ginger	Turmeric	Cardamom	Arecanut	Tamarind	Vanilla	Clove	Nutmeg	Cinnamon	Garlic	Total	Grand Total
1	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2010-2011	19	330	349	6771	107	84	200	1681	392	61	159	1606	20	0	11081	11430
2009-2010	31	364	395	6711	88	77	200	1731	370	127	192	1440	23	0	10959	11354
2008-2009	8	369	377	9573	193	169	200	1854	495	165	50	1236	21	0	13956	14333

Table Continued…….

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	3362	2060	2853	2780	1286	1203	586	14130	416	14546
2009-2010	3319	2153	2839	2631	1286	1298	676	14202	404	14606
2008-2009	4196	2849	2904	3746	1689	1118	595	17097	556	17651

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	566	2280	2824	5670	482	537	91	1	0	1110
2009-2010	721	2303	2844	5868	532	526	112	2	17	1189
2008-2009	686	3037	2549	6272	888	740	203	3	14	1848

Year	Vegetables												Total	Total Food Crops
	Drum stick	Amaranthus	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	657	70	180	249	46	67	43	242	38	40	57	161	1850	49905
2009-2010	656	42	209	206	40	81	98	224	39	35	38	516	2184	50863
2008-2009	529	94	221	233	51	112	92	316	53	40	49	606	2396	53507

Table Continued…….

Year	Non Food Crops															
	Oil Seeds					Fibre Drugs and Narcotics					Plantation Crops					Grand Total
	Ground nut	Sesa mum	Coco nut	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	28410	41	28451	0	7	0	4	11	1973	0	113730	975	116678	145140
2009-2010	0	0	28185	83	28268	0	10	0	4	14	1963	0	112918	984	115865	144147
2008-2009	0	0	34881	109	34990	0	13	0	7	20	1963	0	112590	1339	115892	150902

Year	Non Food Crops						Total non food crops	Total Cropped Area
	Fodder Grass	Green Manure Crops	Other Crops and trees	Medicinal Plants	Teak	Total		
1	81	82	83	84	85	86	87	88
2010-2011	213	579	8140	58	2754	11744	156884	206789
2009-2010	274	526	9960	81	0	10841	154988	205851
2008-2009	213	733	10954	81	0	11981	162883	216390

Source: Agricultural Statistics 2011

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	Madappally	0.34	21.90	1553.65	0	573.65	5.85	2.74
2	Vazhoor	0	6.27	4.73	0.03	1004.35	5.60	4.49
3	Ettumanoor	2076.99	72.46	1005.54	4.50	449.28	4.37	7.17
4	Pallom	368.79	889.00	1712.39	0	891.21	19.27	15.95
5	Pampady	4.16	35.26	2.00	0	1337.28	9.94	7.81
6	Erattupetta	0.32	1.94	0	0	1485.45	7.20	6.57
7	Lalam	15.76	126.66	1.19	2.00	713.22	9.69	8.20
8	Uzhavoor	101.86	320.33	56.78	1.93	791.56	106.14	81.83
9	Kaduthuruthy	58.72	497.16	830.58	0	450.10	7.20	13.37
10	Vaikom	704.11	299.51	60.20	0	200.20	0.29	0.73
11	Kanjirappally	0	0	0	0	1559.60	13.20	12.19
	Municipalities	0	8.07	114.35	0	116.85	4.27	8.26
	District Total	**3331.05**	**2278.56**	**5341.41**	**8.46**	**9572.75**	**193.02**	**169.31**

Sl. No.	Block	Arecanut	Nutmeg	Jack	Banana	Plantain	Pine apple	Pappaya
1	2	10	11	12	13	14	15	16
1	Madappally	60.04	17.50	434.15	179.15	294.00	72.46	101.32
2	Vazhoor	107.14	42.99	250.27	67.88	144.25	73.96	65.99
3	Ettumanoor	51.04	53.81	307.06	93.28	285.00	6.66	74.74
4	Pallom	140.38	88.18	353.89	130.35	444.00	111.30	150.78
5	Pampady	94.89	64.22	338.30	116.98	230.00	124.00	97.12
6	Erattupetta	249.29	160.86	483.78	328.78	436.05	98.90	80.17
7	Lalam	162.19	144.46	296.97	274.68	291.35	52.81	64.99
8	Uzhavoor	243.18	186.75	380.46	980.03	433.50	187.80	96.72
9	Kaduthuruthy	182.31	149.90	278.22	331.62	291.00	119.35	70.54
10	Vaikom	323.61	187.40	288.25	110.00	315.21	4.86	76.92
11	Kanjirappally	187.06	80.83	672.38	265.20	450.50	828.00	189.66
	Municipalities	52.83	59.53	111.95	25.86	131.45	8.41	48.73
	District Total	**1853.96**	**1236.43**	**4195.68**	**2903.81**	**3746.31**	**1688.51**	**1117.68**

Table Continued……

Sl. No.	Block	Cashew	Tapioca	Drum stick	Sesa mum	Coconut	Betel Leaves	Cocoa
1	2	17	18	19	20	21	22	23
1	Madappally	36.13	517.85	80.60	0	2995.19	0.06	43.67
2	Vazhoor	38.70	277.46	22.79	0	1961.96	0.10	74.46
3	Ettumanoor	24.45	392.27	52.52	0	3035.29	0.45	28.26
4	Pallom	46.12	410.66	67.15	0	4371.98	1.84	94.28
5	Pampady	29.55	501.82	46.01	0	2162.67	2.15	87.77
6	Erattupetta	85.37	612.29	29.98	0	2376.28	0	168.55
7	Lalam	29.04	563.37	24.20	0	2165.70	0.01	155.16
8	Uzhavoor	48.17	1914.87	37.61	0	3401.91	5.91	284.69
9	Kaduthuruthy	34.49	387.20	42.01	0	3480.87	1.29	60.50
10	Vaikom	108.84	65.22	31.45	0	4718.63	0.78	25.01
11	Kanjirappally	49.06	518.66	54.45	0	2645.90	0	304.06
	Municipalities	24.00	110.25	39.93	0	1564.51	0.22	12.96
	District Total	**553.92**	**6271.92**	**528.70**	**0**	**34880.89**	**12.81**	**1339.37**

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	Madappally	29.15	2.09	1642.76	0	467.67	2.78	1.39
2	Vazhoor	0	2.98	5.93	0	704.45	6.01	5.17
3	Ettumanoor	2171.05	102.03	1689.28	0.05	265.35	1.73	2.9
4	Pallom	665.59	481.48	3793.13	30.43	504.57	8.00	6.75
5	Pampady	3.06	24.95	1.56	0	699.72	5.37	5.73
6	Erattupetta	0	0.73	0	0	877.12	7.09	6.03
7	Lalam	14.27	78.30	0	0	515.5	4.91	4.32
8	Uzhavoor	43.79	98.86	28.59	0	749.26	32.31	21.73
9	Kaduthuruthy	364.38	873.69	987.04	0	400.27	6.53	10.5
10	Vaikom	647.27	1467.29	133.60	0	115.08	0.27	0.48
11	Kanjirappally	0	0	0	0	1315.97	11.57	11.26
	Municipalities	0.75	5.77	114.17	0.08	96.24	1.09	0.31
	District Total	**3939.31**	**3138.17**	**8396.06**	**30.56**	**6711.20**	**87.66**	**76.57**

Table Continued……

Sl. No.	Block	Arecanut	Nutmeg	Jack	Banana	Plantain	Pine apple	Pappaya
1	2	10	11	12	13	14	15	16
1	Madappally	40.9	18.85	316.56	128	191.66	89.37	103.32
2	Vazhoor	139.52	69.94	164.26	35.95	77.23	70.38	75.95
3	Ettumanoor	56.56	102.58	321.25	166.63	271.5	16.41	131.44
4	Pallom	122.48	112.25	310.8	165.25	498.18	156.93	204.06
5	Pampady	109	79.29	280.58	133.85	181.05	116.13	84.34
6	Erattupetta	192.62	234.64	415.79	264.65	273.68	65.96	100.18
7	Lalam	136.66	149.29	220.81	193.11	177.13	50.91	78.02
8	Uzhavoor	201.96	154.99	282.01	817.53	263.44	168.2	97.97
9	Kaduthuruthy	125.61	208.95	274.65	368.94	224.07	222.59	161.16
10	Vaikom	304.44	165.45	167.11	80.35	132.95	2.62	66.51
11	Kanjirappally	208	108.76	420.51	465.13	251.34	324.97	151.9
	Municipalities	92.83	35.11	144.7	19.77	88.70	1.17	43.6
	District Total	**1730.58**	**1440.1**	**3319.03**	**2839.16**	**2630.93**	**1285.64**	**1298.45**

Sl. No.	Block	Cashew	Tapioca	Drumstick	Sesamum	Coconut	Betel Leaves	Cocoa
1	2	17	18	19	20	21	22	23
1	Madappally	29.94	472.39	76.11	0	2036.84	0.44	53.63
2	Vazhoor	35.85	264.46	27.26	0	1274.38	0.61	45.14
3	Ettumanoor	17.52	305.63	84.21	0	2260.63	0.55	20.32
4	Pallom	24.39	481.3	82.57	0	3336.11	2.3	51.69
5	Pampady	20.3	507.67	55.53	0	1835.53	2.13	67.1
6	Erattupetta	60.9	833.7	47	0	2052.1	0	130.13
7	Lalam	30.13	544.39	33.48	0	1886.05	0	128.35
8	Uzhavoor	35.89	1313.48	40.37	0.25	2740.68	2.52	211.57
9	Kaduthuruthy	28.99	452.53	66.58	0	3390.12	0.65	43.29
10	Vaikom	58.81	43.5	30.02	0	3874.73	0.7	9.71
11	Kanjirappally	50.6	608.36	84.85	0	2209.47	0	217.39
	Municipalities	11.05	40.22	27.72	0	1288.56	0.09	5.94
	District Total	**404.37**	**5867.63**	**655.7**	**0.25**	**28185.2**	**9.99**	**984.26**

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	Madappally	69.96	0	1918.25	0	520.13	4.80	4.05
2	Vazhoor	5.73	24.49	6.31	0	719.49	4.44	3.49
3	Ettumanoor	2557.51	74.82	2182.45	3.88	271.76	2.05	4.51
4	Pallom	896.57	630.98	2583.14	14.01	595.45	6.91	7.06
5	Pampady	4.11	39.73	8.29	0	769.03	8.06	6.53
6	Erattupetta	0	3.16	0	0.05	918.08	6.82	5.75
7	Lalam	48.85	136.04	1.86	0.03	462.61	4.44	3.56
8	Uzhavoor	37.42	138.13	30.66	0.66	749.64	50.58	27.54
9	Kaduthuruthy	408.13	124.53	796.73	0	402.36	4.20	8.01
10	Vaikom	1434.01	355.81	140.00	0	152.19	0.31	0.61
11	Kanjirappally	0	0	0	0	1111.11	13.77	12.27
	Municipalities	1.27	8.43	107.68	0	98.75	1.03	0.56
	District Total	**5463.56**	**1536.12**	**7775.37**	**18.63**	**6770.60**	**107.41**	**83.94**

Sl. No.	Block	Arecanut	Nutmeg	Jack	Banana	Plantain	Pine apple	Pappaya
1	2	10	11	12	13	14	15	16
1	Madappally	44.14	31.30	323.95	245.26	262.92	78.57	109.18
2	Vazhoor	101.89	63.16	174.26	73.12	96.76	52.45	49.13
3	Ettumanoor	53.57	89.76	311.77	127.69	247.51	9.29	118.96
4	Pallom	135.27	142.15	373.06	223.74	522.19	139.85	213.25
5	Pampady	92.82	83.84	307.52	167.70	210.98	120.75	98.55
6	Erattupetta	215.18	239.56	422.28	278.67	291.95	137.90	105.69
7	Lalam	149.66	202.89	222.78	218.47	189.49	24.92	66.67
8	Uzhavoor	164.84	201.96	287.49	639.39	271.42	259.44	99.15
9	Kaduthuruthy	124.84	206.22	247.16	296.07	214.84	212.41	90.76
10	Vaikom	323.48	171.63	183.90	76.01	145.52	3.84	58.83
11	Kanjirappally	187.34	135.04	389.12	493.94	235.67	244.48	143.15
	Municipalities	88.19	38.45	119.01	13.16	91.15	1.77	50.14
	District Total	**1681.22**	**1605.96**	**3362.30**	**2853.22**	**2780.40**	**1285.70**	**1203.46**

Table Continued…….

Sl. No.	Block	Cashew	Tapioca	Drumstick	Sesamum	Coconut	Betel Leaves	Cocoa
1	2	17	18	19	20	21	22	23
1	Madappally	29.50	557.82	59.41	0	2060.35	0	62.98
2	Vazhoor	30.85	217.45	24.93	0	1372.01	0.31	66.47
3	Ettumanoor	12.78	261.12	71.01	0	2181.02	0.27	17.94
4	Pallom	31.36	501.52	93.44	0	3558.54	1.21	54.39
5	Pampady	20.71	528.23	60.26	0	1828.77	1.11	74.79
6	Erattupetta	58.13	782.01	49.69	0	2110.07	0	129.81
7	Lalam	24.77	485.85	31.83	0	1719.30	0	141.22
8	Uzhavoor	37.20	1221.67	46.49	0	2783.71	2.22	185.22
9	Kaduthuruthy	30.52	352.52	62.62	0	3555.98	0.95	38.06
10	Vaikom	59.83	85.20	36.44	0	4019.64	0.66	8.00
11	Kanjirappally	63.70	626.23	80.54	0	2120.39	0	191.64
	Municipalities	16.34	50.30	40.36	0	1100.56	0.06	4.11
	District Total	**415.69**	**5669.92**	**657.02**	**0**	**28410.34**	**6.79**	**974.63**

Table: 14.7

PRODUCTION OF IMPORTANT CROPS (In Ha.)

YEAR	Rice				Jowar	Ragi	Other Cereals	Sugar cane (canegur)	Black Pepper	Green Chillies
	Autumn	Winter	Summer	Total						
1	2	3	4	5	6	7	8	9	10	11
2010-11	16065	3469	21436	40970	0	0	0	165	867	39
2009-10	11484	7634	20295	39413	0	0	0	147	967	121
2008-09	10065	5842	16247	32154	0	0	0	55	1347	83

YEAR	Pulses including Tur	Cured Ginger	Cured Turmeric	Ground nut	Areca nut	Tamarind	Mango	Jack (Million Numbers)	Banana	Other Plantain
1	12	13	14	15	16	17	18	19	20	21
2010-11	54	294	233	0	1239	686	11565	16	25290	22950
2009-10	163	268	178	0	1333	707	12057	15	25696	22167
2008-09	48	528	388	0	1346	946	15954	18	27413	32544

YEAR	Pineapple	Tapioca	Sweet Potato	Pappaya	Drumstick	Sesamum	Coconut (Million Nos.)	Cotton (No. of bales of 170kg each)	Nutmeg
1	22	23	24	25	26	27	28	29	30
2010-11	7879	214799	3	6006	524	0	148	0	908
2009-10	7064	226941	16	7743	453	0	141	0	915
2008-09	9769	221996	24	4462	422	0	194	0	743

YEAR	Tobacco	Tea	Coffee	Rubber	Cocoa	Processed Cardamom	Raw cashew nuts	Betel leaves	Clove(dry)	Garlic
1	31	32	33	34	35	36	37	38	39	40
2010-11	0	204	0	172200	813	11	111	169	13	0
2009-10	0	45	0	170800	603	13	127	344	15	0
2008-09	0	32	0	176905	775	14	160	355	4	0

Source: Agricultural Statistics 2011

Table: 14.8

BLOCK WISE PRODUCTION OF IMPORTANT CROPS 2010-2011 (In Tonnes)

Block	Rice			Sugarcane (Canegur)	Black pepper	Cured Ginger	Cured Turmeric	Arecanut	Tamarind	Jack (Million Nos.)
	Autumn	Winter	Summer							
1	2	3	4	5	6	7	8	9	10	11
Madappally	184.40	0	4283.72	0	74.00	10.90	6.52	25.92	89.01	1.93
Vazhoor	15.19	39.93	15.02	0	70.03	10.17	59.17	59.25	20.82	0.74
Ettumanoor	7712.50	210.73	6210.18	36.86	36.93	4.99	7.92	28.10	72.92	1.57
Pallom	2826.24	1793.77	8319.29	124.68	72.56	20.88	14.74	82.81	138.53	1.48
Pampady	10.28	92.29	27.75	0	93.49	27.61	14.82	65.83	88.30	1.37
Erattupetta	0	6.31	0	0	118.37	17.64	11.64	191.63	13.16	1.86
Lalam	94.89	301.58	4.61	0.10	49.43	13.22	8.52	157.57	11.59	1.37
Uzhavoor	78.57	301.19	69.23	3.69	143.16	139.23	60.98	180.58	23.03	1.17
Kaduthuruthy	993.46	255.43	1907.98	0	54.22	11.48	19.67	96.04	40.85	1.27
Vaikom	4146.67	452.23	386.96	0	10.28	0.60	0.86	218.17	80.54	0.72
Kanjirappally	0	0	0	0	136.18	34.99	34.99	119.95	78.64	2.57
Municipalities	2.51	15.66	210.80	0	7.82	2.7	2.70	13.46	28.72	0.43.
District Total	**16064.76**	**3469.16**	**21435.58**	**165.35**	**866.53**	**294.45**	**294.45**	**1239.35**	**686.16**	**16.48**

Table Continued…….

Block	Banana	Other Plantain	Pineapple	Tapioca	Pappaya	Sesamum	Coconut (Million Nos)	Nutmeg	Cocoa	Raw cashew	Betel Leaves
1	12	13	14	15	16	17	18	19	20	21	22
Madappally	2014.26	2169.87	469.06	22047.83	914.92	0	9.72	12.58	142.75	5.54	0
Vazhoor	818.78	637.93	311.34	7534.64	273.45	0	5.73	24.50	63.18	5.40	12.40
Ettumanoor	801.25	2589.45	50.78	7474.56	570.77	0	12.71	50.53	6.16	3.29	4.05
Pallom	1880.03	4502.84	824.13	15020.52	726.11	0	17.67	97.51	33.08	10.54	49.61
Pampady	1422.24	2013.17	668.83	16348.71	401.39	0	8.11	38.06	52.16	4.73	35.52
Erattupetta	2269.97	1871.69	1170.75	36167.96	622.51	0	10.05	130.32	78.73	16.34	0
Lalam	2032.66	1860.41	157.42	20199.21	362.21	0	8.32	104.48	75.06	6.17	0
Uzhavoor	6691.45	2864.56	2052.68	58426.36	508.73	0	15.08	113.30	148.65	11.26	17.76
Kaduthuruthy	2522.88	912.64	740.88	7742.39	414.41	0	19.10	113.83	28.17	9.83	24.70
Vaikom	547.69	591.97	9.70	2013.95	346.09	0	27.16	115.16	3.35	18.97	21.12
Kanjirappally	4201.08	1963.60	1415.29	20430.75	640.31	0	10.29	85.34	177.89	18.53	0
Municipalities	88.12	971.56	8.04	1392.10	224.59	0	4.44	22.45	3.76	0.34	3.90
District Total	**25290.47**	**22949.73**	**7878.95**	**214799.03**	**6005.55**	**0**	**148.42**	**908.10**	**812.99**	**110.99**	**169.06**

Source: Agricultural Statistics 2011

Table 14.9

BLOCK WISE PRODUCTION OF IMPORTANT CROPS 2009-2010 (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
Madappally	83.88	5.13	4269.68	4358.70		61.88	6.93	2.36	25.28	1.75	880.48
Vazhoor	0	8.66	15.93	24.59		90.40	12.95	8.60	83.06	0.72	230.10
Ettumanoor	6468.63	285.69	4649.19	11403.52	0.46	37.12	4.91	6.06	38.84	1.44	981.82
Pallom	2143.17	1205.22	8226.37	11574.77	147.28	92.41	27.06	13.33	73.36	1.32	1716.49
Pampady	6.01	52.48	3.73	62.23		107.08	19.28	12.50	59.06	1.51	1557.20
Erattupetta	0	0.96	0	0.96		131.89	21.17	13.31	205.04	1.79	2134.65
Lalam	28.43	172.21	0	200.65		71.38	14.01	8.24	160.26	1.13	1782.72
Uzhavoor	109.63	216.43	62.43	388.50		175.38	108.04	52.58	305.38	1.50	9311.00
Kaduthuruthy	822.05	2212.03	2482.40	5516.49		42.51	18.51	31.35	86.88	1.19	3818.88
Vaikom	1819.29	3461.75	316.95	5598.01		12.25	0.54	0.83	152.48	0.48	634.05
Kanjirappally	0	0	0	0		136.31	31.85	27.90	123.38	1.41	3793.89
Municipalities	2.38	13.31	267.99	283.68		8.76	2.69	0.53	20.23	0.48	172.96
District Total	**11483.51**	**7633.92**	**20294.70**	**39412.14**	**147.74**	**967.42**	**267.99**	**177.63**	**1333.30**	**14.76**	**25696.01**

Table Continued…….

Block	Other Plantain	Pineapple	Tapioca	Pappaya	Drum stick	Sesa mum	Coconut (Million Nos)	Nutmeg	Cocoa	Raw cashew	Betel Leaves
1	13	14	15	16	17	18	19	20	21	22	23
Madappally	1467.15	544.53	19734.09	890.10	50.91	0	8.79	15.49	39.44	8.93	37.84
Vazhoor	423.83	419.53	9712.29	328.10	28.51	0	4.66	31.12	25.95	13.09	54.9
Ettumanoor	2780.16	85.85	12584.31	602.12	60.71	0	11.87	47.18	6.04	4.35	22.55
Pallom	5188.04	836.59	17543.38	778.89	77.12	0	14.17	101.81	17.21	8.28	73.6
Pampady	1445.50	739.16	17064.31	473.06	35.15	0	7.77	43.05	28.74	8.38	72.42
Erattupetta	2516.21	422.67	35380.56	555.59	22.56	0	8.88	132.33	77.11	24.55	0
Lalam	1487.00	419.85	19012.82	336.42	20.59	0	9.83	98.53	70.57	11.84	0
Uzhavoor	2021.90	1076.48	60174.45	544.22	19.17	0	19.01	94.54	165.31	14.52	35.28
Kaduthuruthy	1558.85	1088.24	13649.66	1741.65	52.06	0	17.80	212.71	32.73	7.37	24.05
Vaikom	1000.98	5.38	1207.69	339.66	21.22	0	25.07	77.1	5.56	14.05	23.8
Kanjirappally	1915.21	1420.44	19558.77	966.23	52.35	0	9.98	47.20	131.04	10.63	0
Municipalities	362.62	5.49	1318.50	186.42	12.45	0	3.54	14.05	2.92	0.93	0
District Total	**22167.49**	**7064.25**	**226940.87**	**7742.51**	**452.83**	**0**	**141.42**	**915.15**	**602.67**	**126.96**	**344.44**

Source: Agricultural Statistics 2011

Table: 14.10

ESTIMATED AREA AND PRODUCTION OF RICE (AUTUMN)

(Area in Ha & Production in Tonnes)

YEAR	High Yielding						Local Varieties						Total	
	Irrigated		Un-irrigated		Total		Irrigated		Un-irrigated		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)

(Area in Ha & Production in Tonnes)

YEAR	High Yielding						Local Varieties						Total	
	Irrigated		Un-irrigated		Total		Irrigated		Un-irrigated		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)

(Area in Ha & Production in Tonnes)

YEAR	High Yielding						Local Varieties						Total	
	Irrigated		Un-irrigated		Total		Irrigated		Un-irrigated		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 2011

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.

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%. 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 tones an increase of 0.11 lakh tonnes over the previous year. Rubber is the major cash crop in the Kottayam district and area under this cultivation is 113730 ha. This district stands 1st position in rubber cultivation with 21% area. The average price of RSS4 in the domestic market at Kottayam was increased to Rs.190.03 per Kg from Rs.114.98 per kg.

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. Kottayam district is having little importance in 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, whereas area in Kottayam district is around 200 ha.

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 36965 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.kg. in 2010-11. Area under tea plantation in Kottayam arounds 1973 ha during 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. The egg production in Kerala increased from 2054 million in 1999-2000 to 1686 million in 2010-11. The milk production in Kerala is 26.43 lakh tonnes during 2010-11. 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 DEPARTMENTAL INSTITUTIONS DURING 2009-2010

Mastitis	Bovine	8146
	Goat	2935
	Others	12
Digestive Disorders	Bovine	69378
	Goat	48061
	Others	21781
Respiratory Diseases	Bovine	8035
	Goat	5377
	Others	22742
Metabolic Diseases	Bovine	6961
	Goat	1472
	Others	163
Deficiency Diseases	Bovine	5162
	Goat	3769
	Others	2041
Abortion	Bovine	885
	Goat	562
	Others	13
Worm Infections	Bovine	1873
	Goat	1224
	Others	892
Coccidiosis	Bovine	3142
	Goat	2391
	Others	6655
Babesiosis	Bovine	1072
	Goat	166
	Others	20

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
30867	75	55	330	71	22	0	0	0	0	0

Table: 16.3

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

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

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: Animal Husbandry Department

FISHERIES

Kerala is a coastal State and is bordered on the west by the rich marine flora and fauna by Arabian Sea. 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 potential of the State in terms of marine fisheries is believed to be about 5.60 lakh MT and inland fisheries are 1.21 lakh MT during 2010-11. The fishery in the State can be classified into two broad groups as Marine and Inland Fishery. Kottayam district has no costal area, hence no marine fishery sector.

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 fresh water reservoirs can be utilized as nurseries and research fields. The main sources of fish in the district are Vembanad lake, Muvattupuzha and Meenachil rivers.

Table: 17.1

FRESH WATER RESOURCES IN KOTTAYAM 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	226	19.05	207	25.53	7	0.40	75	19.07
2009	226	19.05	207	25.53	7	0.40	75	19.07

Table: 17.2

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

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

Table: 17.3

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

2009-2010	
Name of Fish	**Quantity**
Prawn	439
Etroplus	349
Murrels	437
Mullets	425
Cat Fish	450
Jew fish	202
Tilapia	476
Labeo fimbriatus	323
Barbus	65
Mrigal	0
Crabs	2
Common Carps	344
Catla	202
Gourami	0
Chamos	26
Eels	2
Labeo Rohitha	979
Shrimp	17
Mussel	0
Edible Oyster	0
Miscellaneous	230
Total	**4968**

2008-2009	
Name of Fish	**Quantity**
Prawn	430
Etroplus	350
Murrels	434
Mullets	427
Cat Fish	447
Jew fish	204
Tilapia	482
Labeo fimbriatus	321
Barbus	65
Mrigal	0
Crabs	2
Common Carps	287
Catla	152
Gourami	0
Chamos	26
Eels	2
Labeo Rohitha	844
Shrimp	0
Mussel	0
Edible Oyster	0
Miscellaneous	247
Total	**4720**

Source: Inland Fisheries Statistics, Dept of Fisheries.

Table: 17.4

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

2009-2010	
Name of Fish	**Value**
Prawn	96580
Etroplus	45370
Murrels	21850
Mullets	40375
Cat Fish	21150
Jew fish	7272
Tilapia	16660
Labeo fimbriatus	12920
Barbus	1820
Mrigal	0
Crabs	610
Common Carps	15480
Catla	9090
Gourami	0
Chamos	1560
Eels	72
Labeo Rohitha	44055
Shrimp	3145
Mussel	0
Edible Oyster	0
Miscellaneous	11040
Total	**349049**

2008-2009	
Name of Fish	**Value**
Prawn	94600
Etroplus	26250
Murrels	21700
Mullets	40565
Cat Fish	21009
Jew fish	7344
Tilapia	16870
Labeo fimbriatus	12840
Barbus	1820
Mrigal	0
Crabs	610
Common Carps	12915
Catla	6840
Gourami	0
Chamos	1560
Eels	72
Labeo Rohitha	37980
Shrimp	0
Mussel	0
Edible Oyster	0
Miscellaneous	11856
Total	**314831**

Table : 17.5

CONTRIBUTION OF FISHING TO NDP ESTIMATES AT CONSTANT PRICES

2008-2009 (base year 2004-05)	Kottayam
Net Domestic Product (Rs. in lakhs)	1008146
Fishing (Rs. in lakhs)	982
Percentage of fishing to Net Domestic Product	0.10
Population (In' 000)	2048
Per Capita Income (In Rs.)	48820

2009-2010 (base year 2004-05)	Kottayam
Net Domestic Product (Rs. in lakhs)	1106926
Fishing (Rs. In lakhs)	983
Percentage of fishing to Net Domestic Product	0.09
Population (In' 000)	2064
Per Capita income (In Rs.)	53630

CONTRIBUTION OF FISHING TO NDP ESTIMATES AT CURRENT PRICES

2008-2009 (base year 2004-05)	Kottayam
Net Domestic Product (Rs. in lakhs)	1229996
Fishing (Rs. in lakhs)	1560
Percentage of fishing to Net Domestic Product	0.13
Population (In' 000)	2048
Per Capita income (In Rs.)	59330

2009-2010 (base year 2004-05)	Kottayam
Net Domestic Product (Rs. in lakhs)	1106926
Fishing (Rs. in lakhs)	983
Percentage of fishing to Net Domestic Product	0.09
Population (In' 000)	2064
Per Capita income (In Rs.)	53630

Source: Inland Fisheries Statistics, Dept of Fisheries.

Table: 17.6

CHECK DAMS IN KOTTAYAM DISTRICT

Year	Name of the Check Dam	Area in Ha.	Location		Type of construction	Ownership
			Block	Panchayath		
2010	Karimkunnel	5.00	Uzhavoor	Veliyannur	Concrete	Panchayath
	Kochukaroth	6.00	Pampady	Akalakunnam	Concrete	Panchayath
	Mangamkuzhy	4.00	Pampady	Kooroppada	Concrete	Panchayath
	Makkappady	1.50	Pampady	Kooroppada	Concrete	Panchayath
	Aruvikuzhy	1.00	Pampady	Kooroppada	Concrete	Panchayath
	Panayam	1.00	Pampady	Kooroppada	Concrete	Panchayath
	Pingana	0.50	Kanjirappally	Kooroppada	Concrete	Panchayath
	Total	**19.00**				
Year	**Name of the Check Dam**	**Area in Ha.**	**Location**		**Type of construction**	**Ownership**
			Block	**Panchayath**		
2009	Karimkunnel	5.00	Uzhavoor	Veliyannur	Concrete	Panchayath
	Kochukaroth	6.00	Pampady	Akalakunnam	Concrete	Panchayath
	Mangamkuzhy	4.00	Pampady	Kooroppada	Concrete	Panchayath
	Makkappady	1.50	Pampady	Kooroppada	Concrete	Panchayath
	Aruvikuzhy	1.00	Pampady	Kooroppada	Concrete	Panchayath
	Panayam	1.00	Pampady	Kooroppada	Concrete	Panchayath
	Pingana	0.50	Kanjirappally	Kooroppada	Concrete	Panchayath
	Total	**19.00**				

Source: Fisheries Statistics, Dept of Fisheries

Table: 17.7

DETAILS OF DISTRICT WISE PADASEKHARAMS IN KERALA

Sl. No.	Name of District	No. of Panchayats	No. of Padasekharams	Area in	
				Acre	Cent
1	Kollam	17	104	6837	31.5
2	Alappuzha	52	557	68173	67
3	**Kottayam**	**18**	**206**	**15810**	**40**

4	Ernakulam	40	257	10432	20
5	Thrissur	10	92	6002	30
6	Palakkad	11	44	1638	16
7	Malappuram	15	85	580	34
8	Kozhikode	3	8	173	0
9	Kannur	41	117	3381	69
10	Kasaragode	11	80	2479	78
	Total	218	1550	115508	85.5

Table: 17.8

STATE WISE INLAND WATER RESOURCES IN INDIA

Sl. No.	State	Length of Rivers & Canals	Area of Reservoirs	Area under Tanks & Ponds (lakh Ha)	Beels, Oxblow & Direlict water (lakh Ha)	Brackish water (lakh Ha)
1	Andhra Pradesh	11514	2.24	5.17	0.00	0.79
2	Arunachal Pradesh	2000	0.00	2.76	0.42	0.00
3	Assam	4820	0.02	0.23	1.10	0.00
4	Bihar	3200	0.60	0.95	0.05	0.00
5	Goa	250	0.03	0.03	0.00	0.00
6	Gujarat	3865	3.48	0.22	0.12	3.76
7	Haryana	5000	0.00	0.10	0.10	0.00
8	Himachal Pradesh	3000	42.00	0.01	0.00	0.00
9	Jammu & Kashmir	27781	0.07	0.17	0.06	0.00
10	Karnataka	9000	2.11	2.90	0.00	0.08
11	**Kerala**	**3092**	**0.43**	**0.28**	**2.43**	**0.65**
12	Madhya Pradesh	20661	2.94	1.19	0.00	0.10
13	Maharashtra	16000	2.79	0.59	0.00	0.00
14	Manipur	3360	0.01	0.05	0.04	0.00
15	Meghalaya	5600	0.08	0.02	0.00	0.00
16	Mizoram	1395	0.00	0.02	0.00	0.00
17	Nagaland	1600	0.17	0.50	0.00	0.00
18	Orissa	4500	2.56	1.14	1.80	4.17
19	Punjab	15270	0.00	0.07	0.00	0.00
20	Rajasthan	5290	0.00	1.80	0.00	0.00
21	Sikkim	900	1.20	0.00	0.03	0.00
22	Tamil Nadu	7420	.0.52	0.56	0.07	0.56
23	Tripura	1200	0.05	0.13	0.00	0.00
24	Uttar Pradesh	31200	1.50	1.62	1.33	0.00
25	West Bengal (P)	2526	0.17	2.76	0.42	2.10
26	Andaman & Nicobar	115	0.01	0.03	0.00	0.37
27	Chandigarh	2	0.00	0.00	0.00	0.00
28	Delhi	150	0.04	0.00	0.00	0.00
29	Lakshadweep	0	0.00	0.00	0.00	0.00
30	Pondicherry	247	0.00	0.00	0.01	0.01
31	Dadra & Nagar Haveli	54	0.05	0.00	0.00	0.00
32	Daman & Diu	12	0.00	0.00	0.00	0.00
	Total	**191024**	**63.07**	**23.3**	**7.98**	**12.59**

Source: Inland Fisheries Statistics 2010

Table : 17.9

WORKING OF FFDA IN KOTTAYAM

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	189	27.70	18.37	33	104640	0	10.00	80
2008-2009	269	51.45	56.10	237	312245	24.00	62.00	237
2007-2008	174	222.48	68.70	120	349395	48.50	68.70	105

Table : 17.10

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
27856	6724	24.14	27612	6469	23.43	27357	6344	23.19	27018	5986	22.16

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

VAIKOM BLOCK

Sl. No.	Land Use	Thalayazham	Chempu	Maravanthuruthu	T.V.Puram	Vechoor	Udayanapuram	Total
1	Virippu	1125.11	381.37	221.23	87.37	762.56	430.6	3008.24
2	Mundakan	0.00	5.94	0.00	0.00	0.00	0.00	5.94
3	Virippu / Mundakan	5.69	0.00	0.00	0.00	949.85	0.00	955.54
4	Virippu / Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Punja	0.00	0.00	0.00	0.00	0.61	0.00	0.61
6	Paddy Converted to Mixed Crops	0.00	51.85	0.00	0.00	0.00	0.00	51.85
7	Paddy Converted to Banana / Tapioca	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Paddy Converted to Coconut	1.42	0.00	0.00	1.69	31.64	34.35	69.10
9	Paddy Converted to Rubber	0.00	6.01	0.00	0.00	0.00	0.00	6.01
10	Paddy Converted to wasteland	1.36	1.56	46.20	0.00	20.57	15.66	85.35
11	Paddy Converted to Built-up Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Other Land Uses	718.60	580.49	1024.65	405.13	651.64	1138.96	4519.48
13	River	849.65	834.55	344.21	491.68	39.66	149.94	2709.69
14	Water Body	0.00	0.00	0.00	0.00	1.51	0.00	1.51
	Total Area	**2701.82**	**1861.76**	**1636.29**	**985.87**	**2458.04**	**1769.52**	**11413.30**

Table: 18.2

KADUTHURUTHY BLOCK

Sl. No.	Land Use	Kaduthuruthy	Kallara	Manjoor	Mulakkulam	Njeezhoor	Thalayolaparambu	Velloor	Total
1	Virippu	0.00	0.00	0.00	0.00	1.20	0.69	0.00	0.00
2	Mundakan	788.81	130.85	664.27	318.02	227.26	0.00	279.45	1619.84
3	Virippu / Mundakan	243.16	1844.56	0.00	0.00	0.00	783.36	2.41	2630.33
4	Virippu / Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Punja	0.00	66.94	0.00	0.00	0.00	0.00	0.00	66.94
6	Paddy Converted to Mixed Crops	17.05	0.00	10.40	0.00	8.88	0.00	6.24	25.52
7	Paddy Converted to Banana / Tapioca	0.00	0.00	0.00	0.00	4.41	0.00	0.00	4.41
8	Paddy Converted to Coconut	0.00	0.00	0.00	0.00	0.00	15.41	0.00	15.41
9	Paddy Converted to Rubber	67.41	0.00	43.33	15.26	12.49	2.79	92.73	166.61
10	Paddy Converted to Wasteland	0.00	0.00	0.00	82.46	0.00	0.00	18.33	100.79
11	Paddy Converted to Built-up Land	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.93
12	Other Land Uses	2657.79	558.68	2062.17	2218.23	2620.10	1057.99	1393.12	9910.29
13	River	54.92	181.28	56.28	33.15	0.00	100.83	115.37	486.91
14	Water Body	0.00	0.00	0.00	0.00	0.00	0.00	1.87	1.87
	Total Area	**3829.14**	**2782.31**	**2836.45**	**2667.12**	**2875.27**	**1961.08**	**1909.53**	**18860.89**

Table: 18.3

ETTUMANOOR BLOCK

Sl. No.	Land Use	Ettuma noor	Aymanam	Athirampuzha	Arpookara	Kumaranalloor	Neendoor	Total
1	Virippu	0.00	0.00	0.00	0.00	0.00	12.09	12.09
2	Mundakan	0.00	0.00	0.00	0.00	0.00	67.73	67.73
3	Virippu / Mundakan	52.54	0.00	0.00	98.67	0.00	453.34	604.54
4	Virippu / Punja	0.00	1560.11	0.00	2.83	1.95	0.00	1564.88
5	Punja	394.13	70.71	177.06	1157.27	270.28	1253.31	3322.76
6	Paddy Converted to Mixed Crops	18.58	35.20	50.47	6.72	54.56	0.00	165.53
7	Paddy Converted to Banana / Tapioca	52.32	1.34	35.62	6.99	11.84	0.00	108.11
8	Paddy Converted to Coconut	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Paddy Converted to Rubber	1.81	0.00	0.00	0.00	0.00	0.00	1.81
10	Paddy Converted to Wasteland	8.57	0.00	3.34	0.72	0.00	0.00	12.63
11	Paddy Converted to Built-up Land	0.99	0.00	4.64	0.00	0.00	0.00	5.63
12	Other Land Uses	2122.57	747.76	1815.47	785.21	1113.80	851.91	7436.72
13	River	9.03	441.39	19.87	248.12	30.93	179.97	929.31
14	Water Body	0.00	3.33	0.00	0.00	0.00	0.00	3.33
	Total Area	**2663.21**	**2859.85**	**2106.47**	**2306.54**	**1483.36**	**2818.34**	**14237.77**

Table: 18.4

UZHAVOOR BLOCK

Sl. No.	Land Use	Kadaplamattom	Marangattupally	Kanakkary	Veliyannoor	Kidangoor	Kuravilangad	Uzhavoor	Ramapuram	Total
1	Virippu	0.00	12.21	0.42	0.00	0.00	64.88	0.00	7.71	85.21
2	Mundakan	94.29	110.54	74.42	27.71	44.90	154.26	83.30	320.66	910.10
3	Virippu / Mundakan	111.49	36.77	213.70	162.56	371.14	19.39	101.34	163.70	1180.09
4	Virippu / Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Punja	0.00	0.00	61.44	0.00	0.00	0.00	0.00	0.00	61.44
6	Paddy Converted to Mixed Crops	1.42	6.83	39.90	54.04	62.30	30.69	1.49	107.58	304.25
7	Paddy Converted to Banana / Tapioca	1.56	0.56	40.79	29.36	30.91	6.50	0.73	13.17	123.58
8	Paddy Converted to Coconut	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Paddy Converted to Rubber	0.00	0.81	20.60	1.35	25.95	5.08	0.00	2.59	56.37
10	Paddy Converted to Wasteland	2.21	3.40	4.77	3.68	11.90	7.15	1.50	3.15	37.76
11	Paddy Converted to Built-up Land	0.00	0.72	0.53	2.07	3.45	0.00	0.00	0.00	6.77
12	Other Land Uses	2256.27	1825.67	1898.73	1600.83	2374.05	2001.61	2601.41	4814.95	19373.52
13	River	0.00	0.00	2.63	0.00	49.53	0.00	0.00	16.28	68.44
14	Water Body	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area	**2467.23**	**1997.51**	**2357.94**	**1881.60**	**2974.13**	**2289.55**	**2789.77**	**5449.79**	**22207.52**

Table: 18.5

LALAM BLOCK

Sl. No.	Land Use	Bharananganam	Karoor	Kozhuvanal	Kadanadu	Meenachil	Mutholy	Total
1	Virippu	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Mundakan	154.52	182.33	27.09	189.36	0.12	172.64	726.07
3	Virippu/Mundakan	0.00	11.66	0.25	0.00	62.04	0.00	73.96
4	Virippu/Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Paddy Converted to Mixed Crops	0.00	43.21	14.49	25.59	12.14	42.02	137.45
7	Paddy Converted to Banana / Tapioca	0.00	0.59	2.12	0.00	13.09	7.45	23.24
8	Paddy Converted to Coconut	0.00	0.00	0.60	0.00	0.68	0.00	1.28
9	Paddy Converted to Rubber	1.09	4.75	0.00	0.89	15.20	6.27	28.21
10	Paddy Converted to Wasteland	0.00	5.14	0.00	0.00	1.07	11.64	17.85
11	Paddy Converted to Built-up Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Other Land Uses	2540.04	3507.31	2142.57	3751.74	2713.67	1551.28	16206.60
13	River	10.69	20.87	17.04	0.00	53.26	51.05	152.90
14	Water Body	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area	**2706.34**	**3775.86**	**2204.17**	**3967.58**	**2871.27**	**1842.35**	**17367.56**

Table: 18.6

ERATTUPETTA BLOCK

Sl. No.	Land Use	Melukavu	Munnilavu	Poonjar	Erattu petta	Poonjar-Thekkekara	Thalap palam	Thee koyi	Thala nadu	Thida nadu	Total
1	Virippu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Mundakan	6.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.45
3	Virippu / Mundakan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Virippu / Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Paddy Converted to Mixed Crops	55.33	2.04	7.56	0.00	23.05	0.00	12.11	0.00	36.31	136.40
7	Paddy Converted to Banana / Tapioca	0.00	7.28	0.00	0.00	0.00	0.00	11.30	0.00	0.00	18.58
8	Paddy Converted to Coconut	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Paddy Converted to Rubber	0.00	15.91	0.00	0.00	0.00	0.00	0.00	0.00	12.85	28.76
10	Paddy Converted to Wasteland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Paddy Converted to Built-up Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Other Land Uses	3436.70	2745.13	3639.44	1481.10	2682.51	1573.16	3308.19	3326.39	3835.15	26027.77
13	River	0.00	0.00	0.00	30.44	0.00	3.63	0.00	0.00	64.01	98.07
14	Water Body	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area	**3498.49**	**2770.36**	**3646.99**	**1511.53**	**2705.56**	**1576.79**	**3331.60**	**3326.39**	**3948.33**	**26316.03**

Table: 18.7

PAMPADY BLOCK

Sl. No.	Land Use	Akalakunnam	Elikkulam	Kooroppada	Pampady	Pallikkathodu	Meenadam	Total
1	Virippu	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Mundakan	1.66	0.00	0.00	0.00	0.00	0.00	1.66
3	Virippu / Mundakan	66.45	0.34	1.78	79.98	0.00	2.27	150.82
4	Virippu / Punja	0.63	0.00	0.00	26.37	0.00	0.00	27.00
5	Punja	0.00	0.00	0.00	0.96	0.00	0.00	0.96
6	Paddy Converted to Mixed Crops	144.72	105.54	15.66	87.85	37.87	24.21	415.84
7	Paddy Converted to Banana / Tapioca	8.00	42.55	3.23	2.51	1.26	10.35	67.91
8	Paddy Converted to Coconut	0.00	0.00	0.00	37.34	0.00	7.66	45.00
9	Paddy Converted to Rubber	15.83	52.81	3.08	20.59	3.25	30.52	126.07
10	Paddy Converted to Wasteland	2.57	0.00	15.73	0.00	10.43	0.00	28.73
11	Paddy Converted to Built-up Land	0.00	0.00	0.00	1.46	0.00	0.16	1.62
12	Other Land Uses	3091.14	3722.21	2616.46	3004.63	2425.82	917.82	15778.08
13	River	27.05	0.00	13.62	0.00	0.00	0.00	40.67
14	Water Body	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area	**3358.05**	**3923.44**	**2669.56**	**3261.69**	**2478.64**	**992.98**	**16684.37**

Table: 18.8

PALLAM BLOCK

Sl. No.	Land Use	Ayarkkunnam	Kumarakam	Nattakam	Puthuppally	Panachikkadu	Thiruvarppu	Vijayapuram	Mannarkkadu	Total
1	Virippu	242.68	0.00	0.00	0.00	0.00	0.00	2.97	11.49	257.14
2	Mundakan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Virippu / Mundakan	5.83	0.00	0.00	0.00	0.00	0.00	2.42	0.00	8.25
4	Virippu / Punja	136.17	1662.99	9.60	29.96	6.16	626.99	202.75	386.45	3061.06
5	Punja	33.49	0.20	2613.14	363.82	502.93	392.38	0.00	9.39	3915.35
6	Paddy Converted to Mixed Crops	186.67	0.00	24.40	21.97	11.21	0.00	37.56	0.00	281.81
7	Paddy Converted to Banana / Tapioca	8.04	0.00	0.00	0.00	2.28	0.00	0.00	0.00	10.33
8	Paddy Converted to Coconut	0.00	9.07	0.00	5.71	0.00	0.00	0.00	0.00	14.78
9	Paddy Converted to Rubber	21.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.96
10	Paddy Converted to Wasteland	14.97	27.59	40.11	10.21	68.72	82.91	0.94	99.26	344.71
11	Paddy Converted to Built-up Land	2.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.79
12	Other Land Uses	2476.57	719.67	958.01	2126.26	1635.29	674.95	920.28	974.68	10485.71
13	River	79.98	2881.38	485.96	21.40	18.55	188.84	4.55	71.82	3752.47
14	Water Body	10.36	0.00	16.46	0.00	5.67	0.00	0.00	0.00	32.49
	Total Area	**3219.50**	**5300.91**	**4147.67**	**2579.33**	**2250.81**	**1966.06**	**1171.47**	**1553.09**	**22188.85**

Table: 18.9

MADAPPALLY BLOCK

Sl. No.	Land Use	Karukachal	Kurichi	Madappally	Payippadu	Thrikkodithanam	Vazhappally	Vakathanam	Total
1	Virippu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Mundakan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Virippu / Mundakan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Virippu / Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Punja	56.23	812.25	209.95	1125.12	130.13	1127.07	367.25	3827.99
6	Paddy Converted to Mixed Crops	36.61	24.13	42.81	12.88	32.10	22.11	11.51	182.15
7	Paddy Converted to Banana / Tapioca	7.58	0.00	0.00	0.00	0.00	0.00	0.00	7.58
8	Paddy Converted to Coconut	26.62	0.00	10.66	0.00	0.00	0.00	0.00	37.28
9	Paddy Converted to Rubber	0.00	0.00	2.00	0.00	19.99	0.00	0.00	21.99
10	Paddy Converted to Wasteland	0.00	0.02	0.00	3.71	0.00	13.88	0.00	17.60
11	Paddy Converted to Built-up Land	3.69	0.00	0.00	0.00	0.00	7.29	0.00	10.98
12	Other Land Uses	2034.22	1017.78	2130.85	775.58	999.98	969.79	2261.97	10190.19
13	River	0.00	24.38	0.00	79.77	0.00	59.58	0.29	164.03
14	Water Body	0.00	4.34	0.00	0.00	1.96	0.00	2.57	8.87
	Total Area	**2164.96**	**1882.90**	**2396.27**	**1997.06**	**1184.16**	**2199.72**	**2643.60**	**14468.66**

Table: 18.10

VAZHOOR BLOCK

Sl. No.	Land Use	Chirak kadavu	Kangazha	Nedum kunnam	Vellavoor	Vazhoor	Total
1	Virippu	0.00	0.00	0.00	0.00	0.00	0.00
2	Mundakan	0.00	0.00	0.00	0.00	0.00	0.00
3	Virippu / Mundakan	0.00	0.00	0.00	0.00	0.00	0.00
4	Virippu / Punja	0.00	0.00	0.00	0.00	0.00	0.00
5	Punja	0.00	0.00	0.00	0.00	0.00	0.00
6	Paddy Converted to Mixed Crops	0.00	27.38	119.06	0.00	25.12	171.55
7	Paddy Converted to Banana / Tapioca	0.00	15.71	26.24	0.00	3.90	45.85
8	Paddy Converted to Coconut	28.02	0.00	11.25	0.00	2.07	41.34
9	Paddy Converted to Rubber	1.65	8.84	6.94	0.00	12.16	29.60
10	Paddy Converted to Wasteland	0.00	1.02	0.00	0.00	0.00	1.02
11	Paddy Converted to Built-up Land	6.50	0.00	0.67	0.00	0.00	7.18
12	Other Land Uses	3869.71	2617.00	2321.71	2347.79	2884.29	14040.50
13	River	19.58	0.00	0.00	99.18	0.00	118.76
14	Water Body	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area	**3925.46**	**2669.94**	**2485.88**	**2446.97**	**2927.53**	**14455.78**

Table: 18.11

KANJIRAPPALLY BLOCK

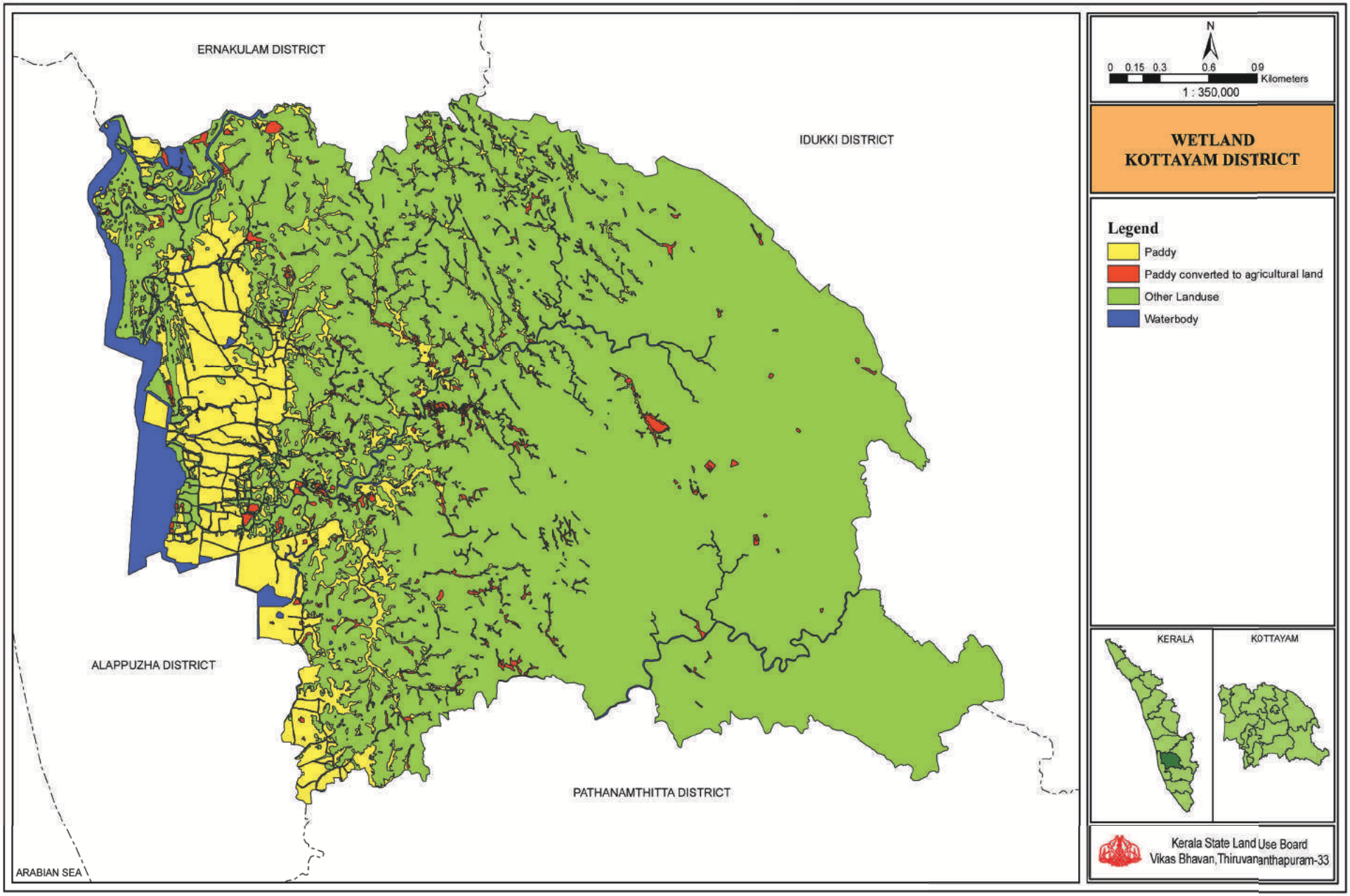
Sl. No.	Land Use	Erumely	Kanjirappally	Koottikkal	Manimala	Mundakayam	Parathodu	Total
1	Virippu	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Mundakan	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Virippu / Mundakan	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Virippu / Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Punja	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Paddy Converted to Mixed Crops	0.00	23.47	0.00	27.66	0.00	0.00	51.12
7	Paddy Converted to Banana / Tapioca	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Paddy Converted to Coconut	0.12	5.79	0.00	1.65	0.00	0.00	7.56
9	Paddy Converted to Rubber	0.00	27.24	0.00	5.64	0.00	11.50	44.37
10	Paddy Converted to Wasteland	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Paddy Converted to Built-up Land	0.00	3.69	0.00	0.00	0.00	7.25	10.94
12	Other Land Uses	8677.05	6417.84	6234.84	3656.10	6060.65	4800.36	35846.84
13	River	100.04	83.69	0.06	26.82	65.57	3.65	279.83
14	Water Body	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area	**8777.21**	**6561.72**	**6234.89**	**3717.86**	**6126.22**	**4822.75**	**36240.66**

Table: 18.12

MUNICIPALITY

Sl. No.	Land Use	Kottayam	Changanassery	Vaikom	Pala
1	Virippu	0.00	0.00	187.40	0.00
2	Mundakan	0.00	0.00	0.00	52.88
3	Virippu / Mundakan	0.00	0.00	0.00	0.00
4	Virippu / Punja	172.47	0.00	0.00	0.00
5	Punja	0.00	348.07	0.00	0.00
6	Paddy Converted to Mixed Crops	38.95	4.40	0.00	5.79
7	Paddy Converted to Banana / Tapioca	0.00	0.97	0.00	4.86
8	Paddy Converted to Coconut	2.73	0.00	3.11	0.00
9	Paddy Converted to Rubber	0.00	0.00	0.00	0.00
10	Paddy Converted to Wasteland	44.19	0.00	0.00	0.78
11	Paddy Converted to Built-up Land	44.07	4.59	0.00	0.00
12	Other Land Uses	1164.25	957.99	1113.54	1503.98
13	River	108.41	12.33	480.23	57.56
14	Water Body	0.00	0.00	0.00	0.00
	Total Area	1575.08	1328.35	1784.29	1625.85

NB: These data is based on the study conducted on wetlands in the year 2006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PATHANAMTHITTA DISTRICT
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Kilometers
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WETLAND
KOTTAYAM DISTRICT
Legend
Paddy
Paddy converted to agricultural land
Other Landuse
Waterbody
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan, Thiruvananthapuram-33

WASTELANDS

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.

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 Kottayam 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 2208sq.km.)
1	Land with Dense scrub	63.52	2.87
2	Land with Open scrub	47.36	2.14
3	Miscellaneous Polygon	2051.08	92.89
4	Waterlogged Permanent	44.24	2.00

1. **Land with dense scrub**: - Land with dense scrub identified and mapped covers 63.52 sq.km area which covers 2.87% to total geographical area of the district. This is mainly distributed in Thalanad (439.31ha), Erumely (2170.79ha), Parathode (648.30ha), Koottikkal (464.68 ha) Panchayats.
2. **Land with open scrub**:- This category has been identified as wasteland in an area of 47.36 sq.km. in this district covering 2.14% of the total geographical area. This is mainly distributed in Poonjar-Thekkekara (865.41ha), Theekoy (627.49ha) and Koottikkal (649.14ha) Panchayats.
3. **Miscellaneous Polygon**:- It is mapped in an area of 2051.08 sq.km. covering 92.89% of the total geographical area. These are in Erumely (6634.32ha), Ramapuram (5298.81ha), Kumarakom (4764.88ha) and Poonjar-Thekkekara (4112.98ha) Panchayats.
4. **Waterlogged – Permanent:-** This category has been identified as wasteland in an area of 44.24 sq.km. in the district covering 2% of the total geographical area. This is located in Kumarakom Panchayat (285.06ha), Kottayam Municipality (41.07ha)

Table: 19.1

ERATTUPETTA BLOCK

(Area in Ha)

Sl. No.	Description	Erattupetta	Melukavu	Munnilavu	Poonjar	Poonjar-Thekkekkara	Thalanad	Thalappalam	Theekoyi	Thidanad
1	Barren Rocky Area	0.00	0.00	42.74	0.00	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	0.00	6.99	212.21	66.85	260.91	439.31	2.95	133.05	100.14
3	Land with Open Scrub	0.00	344.61	352.41	5.47	865.41	419.93	67.67	627.49	72.89
4	Miscellaneous Polygon	808.61	2433.66	2582.22	1901.82	4112.98	2409.35	2247.70	2654.28	3941.16
5	Scrub dominated forest	0.00	0.00	271.12	0.00	0.00	159.31	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**808.61**	**2785.26**	**3460.70**	**1974.14**	**5239.30**	**3427.90**	**2318.32**	**3414.82**	**4114.19**
	Block Total	**27543.24**								

Table: 19.2

ETTUMANOOR BLOCK

(Area in Ha)

Sl. No.	Description	Aimanam	Arpookara	Athirampuzha	Ettumanoor	Kumarakam	Neendoor	Thiruvarppu
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Miscellaneous Polygon	2979.87	2884.30	2046.31	2832.06	4764.88	2119.63	3469.05
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	285.06	6.01	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	113.81	0.00	0.00
	Panchayath Total	**2979.87**	**2884.30**	**2046.31**	**2832.06**	**5163.75**	**2125.64**	**3469.05**
	Block Total	**21500.98**						

Table: 19.3

KANJIRAPALLY BLOCK

(Area in Ha)

Sl. No.	Description	Erumely	Kanjirappally	Koottikkal	Koruthodu	Manimala	Munda kkayam	Parathode
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	2170.79	149.13	464.68	219.66	315.54	560.51	648.3
3	Land with Open Scrub	43.67	83.09	649.14	0.00	0.00	144.78	235.63
4	Miscellaneous Polygon	6634.32	4778.66	3148.33	2640.14	33.22	3989.02	4741.37
5	Scrub dominated forest	5.40	0.00	30.92	0.00	3371.07	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**8854.18**	**5010.88**	**4293.07**	**2859.80**	**3719.83**	**4694.31**	**5625.3**
	Block Total	**35057.37**						

Table: 19.4

KADUTHURUTHY BLOCK

(Area in Ha)

Sl. No.	Description	Kaduthuruthy	Kallara	Mulakkulam	Njezhoor	Thalayola parampu	Velloor
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00
4	Miscellaneous Polygon	3456.94	2781.41	2941.65	2937.65	2036.91	1958.85
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3456.94**	**2781.41**	**2941.65**	**2937.65**	**2036.91**	**1958.85**
	Block Total	**16113.41**					

Table: 19.5

LALAM BLOCK

(Area in Ha)

Sl. No.	Description	Bharanan ganam	Kadanadu	Karoor	Kozhuvanal	Meenachil	Mutholy
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	25.70	31.74	23.74	6.30	25.41	0.00
3	Land with Open Scrub	131.35	241.85	33.39	0.00	4.49	0.00
4	Miscellaneous Polygon	2575.04	3699.06	3601.90	2168.40	2866.78	1871.08
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2732.09**	**3972.65**	**3659.03**	**2174.70**	**2896.68**	**1871.08**
	Block Total	**17306.23**					

Table: 19.6

MADAPPALLY BLOCK

(Area in Ha)

Sl. No.	Description	Madapally	Payippadu	Thrikkodi thanam	Vakathanam	Vazhappally
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	0.00	0.00	4.76	0.00	0.00
3	Land with Open Scrub	15.41	0.00	0.00	6.44	0.00
4	Miscellaneous Polygon	2414.43	2012.64	1125.65	2605.81	2417.01
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	1.64
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2429.84**	**2012.64**	**1130.41**	**2612.25**	**2418.65**
	Block Total	**10603.79**				

Table: 19.7

UZHAVOOR BLOCK

(Area in Ha)

Sl. No.	Description	Kadapla mattom	Kanakkary	Kuravilan gadu	Manjoor	Maranga ttupally	Ramapuram	Uzhavoor	Veliyannoor
1	Barren Rocky Area	0.00	0.00	0.00	0.00	14.53	0.00	0.00	10.56
2	Land with Dense Scrub	0.00	0.00	0.00	0.00	0.00	22.19	0.00	12.67
3	Land with Open Scrub	56.04	0.00	0.00	0.00	56.57	106.33	12.50	0.00
4	Miscellaneous Polygon	2102.25	2364.42	2287.59	2914.50	2944.24	5298.81	2494.86	1980.30
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2158.29**	**2364.42**	**2287.59**	**2914.50**	**3015.34**	**5427.33**	**2507.36**	**2003.53**
	Block Total	**22678.36**							

Table: 19.8

PAMPADY BLOCK

(Area in Ha)

Sl. No.	Description	Akalakk unam	Elikkulam	Kidangoor	Kooro ppada	Mannar kkad	Meenadam	Pallikka thodu	Pampady
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	61.90	88.10	0.00	56.61	11.73	0.00	133.98	2.17
3	Land with Open Scrub	8.92	1.29	0.00	0.00	0.00	0.00	0.00	0.00
4	Miscellaneous Polygon	3414.06	3901.06	2315.11	2655.46	1761.32	1117.29	2196.56	3068.29
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3484.88**	**3990.45**	**2315.11**	**2712.07**	**1773.05**	**1117.29**	**2330.54**	**3070.46**
	Block Total	**20793.85**							

Table: 19.9

VAZHOOR BLOCK

(Area in Ha)

Sl. No.	Description	Chirakkadavu	Kangazha	Karukachal	Nedumkkunnam	Vazhoor	Vellavoor
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	0.00	25.05	0.00	29.52	23.45	8.40
3	Land with Open Scrub	0.24	43.20	10.80	72.52	17.34	0.00
4	Miscellaneous Polygon	3972.13	2438.83	2252.66	2306.13	3045.65	2339.35
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**3972.37**	**2507.08**	**2263.46**	**2408.17**	**3086.44**	**2347.75**
	Block Total	**16585.27**					

Table: 19.10

VAIKOM BLOCK

(Area in Ha)

Sl. No.	Description	Chempu	Maravanthuruthu	T.V Puram	Thalayazham	Udayanapuram	Vechoor
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	0.00	0.00	0.00	0.00	0.00	0.00
3	Land with Open Scrub	0.00	0.00	0.00	0.00	0.00	0.00
4	Miscellaneous Polygon	1952.55	1590.44	1449.26	2124.67	1856.37	3016.70
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	0.00	0.00	0.00	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**1952.55**	**1590.44**	**1449.26**	**2124.67**	**1856.37**	**3016.70**
	Block Total	**11989.99**					

Table: 19.11

PALLAM BLOCK

(Area in Ha)

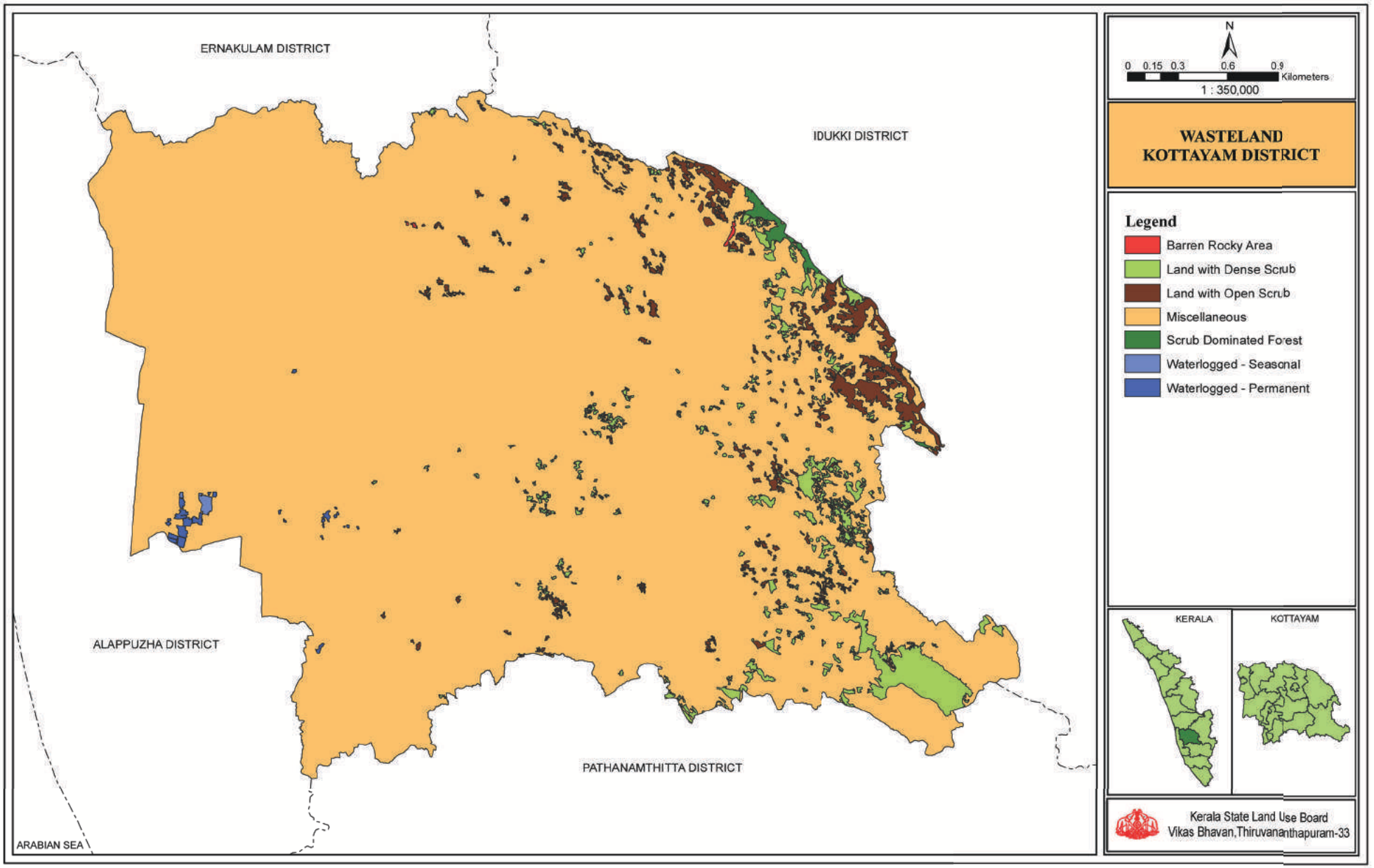
Sl. No.	Description	Ayarkkunnam	Kurichi	Panachi kkavu	Puthuppally	Vijayapuram
1	Barren Rocky Area	0.00	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	2.53	0.00	0.00	0.00	5.36
3	Land with Open Scrub	0.00	0.00	0.00	6.08	0.00
4	Miscellaneous Polygon	2824.93	1637.65	2263.57	2279.57	1548.60
5	Scrub dominated forest	0.00	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	13.82	11.30	0.00	0.00
7	Waterlogged Seasonal	0.00	0.00	0.00	0.00	0.00
	Panchayath Total	**2827.46**	**1651.47**	**2274.87**	**2285.65**	**1553.96**
	Block Total	**10593.41**				

Table: 19.12

MUNICIPALITY

(Area in Ha)

Sl. No.	Description	Changanassery	Kottayam	Pala	Vaikom
1	Barren Rocky Area	0.00	0.00	0.00	0.00
2	Land with Dense Scrub	0.00	0.00	0.00	0.00
3	Land with Open Scrub	0.00	0.00	0.00	0.00
4	Miscellaneous Polygon	1390.08	5471.43	1668.38	1239.10
5	Scrub dominated forest	0.00	0.00	0.00	0.00
6	Waterlogged Permanent	0.00	41.07	0.00	0.00
7	Waterlogged Seasonal	0.00	2.88	0.00	0.00
	Municipality Total	**1390.08**	**5515.38**	**1668.38**	**1239.10**


ERNAKULAM DISTRICT
IDUKKI DISTRICT
ALAPPUZHA DISTRICT
PATHANAMTHITTA DISTRICT
ARABIAN SEA
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 350,000
WASTELAND
KOTTAYAM DISTRICT
Legend
Barren Rocky Area
Land with Dense Scrub
Land with Open Scrub
Miscellaneous
Scrub Dominated Forest
Waterlogged - Seasonal
Waterlogged - Permanent
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, afforest ration, 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)
Changanassery Municipality			
		11M15a	23.47
		11M16a	1010.82
		11M21a	355.80
			1390.08
Erattupetta	Erattupetta		
		12M24a	50.79
		12M25a	111.36
		12M25n	298.38
		12M26a	58.48
		12M28a	274.58
		12M29a	15.01
			808.61
	Melukavu		
		12M21h	0.02
		12M25a	174.00
		12M25b	582.18
		12M25c	1207.68
		12M25d	280.90
		12M25e	24.98
		12M25g	3.16
		13M48a	8.94
		13M49a	0.91
		13M51a	502.50
			2785.27
	Munnilavu		
		12M25a	15.31
		12M25b	1.48
		12M25c	92.90
		12M25d	184.71
		12M25e	1458.03
		12M25f	842.70
		12M25g	725.86
		12M25h	42.41
		12M25j	32.52
		12M25n	0.47
		13M47d	3.52
		13M48a	32.23
		13M51a	28.54
			3460.69
	Poonjar		
		12M25n	52.78
		12M26a	176.03
		12M27a	0.32
		12M27d	334.00
		12M28a	336.33
		12M29a	881.94
		12M29b	192.75
			1974.15

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Poonjar-Thekkekkara		
		11M33b	12.87
		11M34a	9.68
		11M34b	139.48
		11M35a	14.12
		11M35b	66.31
		12M25l	62.14
		12M25n	54.22
		12M26a	40.21
		12M27a	519.81
		12M27b	1804.72
		12M27c	429.39
		12M27d	2086.33
			5239.30
	Thalanad		
		12M25e	57.64
		12M25f	479.37
		12M25g	32.89
		12M25h	460.60
		12M25i	228.17
		12M25j	908.98
		12M25k	577.86
		12M25l	568.57
		12M25m	6.96
		12M25n	0.26
		13M47c	104.00
		13M47d	2.59
			3427.89
	Thalappalam		
		12M21i	151.27
		12M22a	89.76
		12M23a	59.85
		12M24a	893.05
		12M25a	1115.02
		12M25g	1.24
		12M25n	2.16
		12M28a	2.25
		12M30a	3.72
			2318.31
	Theekoyi		
		12M25g	27.09
		12M25h	217.20
		12M25i	3.94
		12M25j	2.48
		12M25k	6.68
		12M25l	987.88
		12M25m	624.82
		12M25n	1477.17
		12M27a	18.81
		12M27b	35.04
		13M47c	13.11
			3414.82

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Thidanad		
		11M30c	108.05
		11M30f	11.08
		12M23a	9.26
		12M24a	7.55
		12M28a	90.31
		12M29a	598.00
		12M29b	423.17
		12M29c	1487.03
		12M29d	663.80
		12M30a	499.32
		12M31a	1.06
		12M31b	215.56
			4114.19
			27543.22
Ettumanoor	Aimanam		
		12M10a	649.71
		12M12a	629.18
		12M2a	21.67
		12M38f	3.98
		12M3a	464.26
		12M44a	6.16
		12M4a	387.37
		12M5a	561.86
		12M6a	3.90
		13M81a	242.82
		13M82a	8.97
			2979.87
	Arpookara		
		12M10a	2.97
		12M12a	20.63
		12M13a	36.97
		12M14a	199.33
		12M3a	5.59
		12M4a	2.33
		12M5a	74.41
		12M6a	896.24
		12M7a	429.96
		12M8a	289.96
		12M9a	705.21
		13M69a	14.94
		13M80a	17.48
		13M81a	187.99
		13M82a	0.28
			2884.30
	Athirampuzha		
		12M13a	177.25
		12M14a	1619.93
		12M16a	64.04
		13M67b	104.36
		13M67c	2.98
		13M68a	77.78
		13M69a	0.56
			2046.91

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Ettumanoor		
		12M13a	160.05
		12M14a	49.32
		12M15a	731.89
		12M16a	1347.40
		12M17a	480.22
		12M17f	16.01
		12M36a	9.86
		12M36f	4.64
		12M37a	16.58
		12M38a	4.80
		13M67b	11.30
			2832.06
	Kumarakam		
		11M4a	0.81
		11M6a	1.34
		12M10a	1.27
		12M1a	966.44
		12M2a	921.19
		12M3a	15.00
		12M46a	271.60
		12M47a	458.13
		13M81a	2490.94
		13M82a	37.03
			5163.75
	Neendoor		
		12M14a	177.44
		12M7a	93.73
		12M8a	446.93
		12M9a	0.18
		13M67a	0.82
		13M67c	22.30
		13M68a	452.25
		13M69a	882.08
		13M70a	39.95
		13M71a	9.97
			2125.64
	Thiruvarppu		
		11M12a	1.15
		11M6a	0.01
		12M10a	550.45
		12M11a	397.33
		12M12a	120.06
		12M1a	227.55
		12M2a	2.15
		12M40a	10.46
		12M41a	107.60
		12M42a	1383.54
		12M43a	4.81
		12M44a	18.41
		12M45a	364.29
		12M46a	281.25
			3469.05
			21501.58

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
Kaduthuruthy	Kaduthuruthy		
		12M17b	6.71
		13M63a	494.98
		13M64a	823.00
		13M64g	5.24
		13M64h	658.42
		13M65a	660.57
		13M66a	716.82
		13M72a	0.13
		13M73a	88.73
		13M74a	0.04
		13M75a	2.32
			3456.94
	Kallara		
		13M65a	231.06
		13M67a	3.43
		13M69a	103.30
		13M70a	350.38
		13M71a	1147.56
		13M72a	204.45
		13M73a	13.02
		13M74a	704.53
		13M75a	16.72
		13M79a	0.17
		13M80a	6.81
			2781.41
	Mulakkulam		
		13M31a	9.27
		13M60a	4.29
		13M60b	7.22
		13M60c	1.86
		13M60e	33.79
		13M60f	447.01
		13M61a	1454.16
		13M62a	96.53
		13M63a	714.95
		13M64a	171.73
		13M64b	0.84
			2941.65
	Njeezhoor		
		12M17c	110.80
		13M60e	228.24
		13M60f	47.05
		13M61a	253.38
		13M64a	321.24
		13M64b	466.17
		13M64c	53.09
		13M64e	339.23
		13M64f	377.75
		13M64g	624.85
		13M64h	105.26
		13M66a	10.58
			2937.65

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Thalayolaparampu		
		13M28a	14.76
		13M62a	272.36
		13M63a	708.45
		13M73a	0.07
		13M74a	0.00
		13M75a	1036.95
		13M76a	4.32
			2036.91
	Velloor		
		13M27a	1.58
		13M28a	35.41
		13M29a	461.22
		13M30a	163.94
		13M30c	120.51
		13M31a	10.09
		13M61a	323.99
		13M62a	832.31
		13M63a	9.79
			1958.85
			16113.41
Kanjirapally	Erumely		
		10P23a	709.38
		10P24a	1146.03
		10P24b	223.86
		10P24l	22.57
		10P48a	4.02
		10P48b	0.81
		11M30a	0.04
		11M30g	0.21
		11M31a	3.96
		11M32a	0.99
		11M42a	14.79
		11M42b	959.93
		11M42c	388.37
		11M42d	1679.35
		11M43a	861.61
		11M43c	545.88
		11M44a	1153.89
		11M45a	1009.21
		11M46a	129.29
			8854.17
	Kanjirappally		
		11M30a	32.98
		11M30b	687.03
		11M30c	1459.11
		11M30d	246.36
		11M30e	104.12
		11M30g	1024.43
		11M31a	1161.81
		11M32a	243.64

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		11M41a	0.36
		11M42d	0.01
		11M43a	0.04
		11M43c	0.39
		11M44a	19.71
		11M45a	21.82
		12M29c	8.00
		12M31b	1.05
			5010.88
	Koottikkal		
		11M33b	35.88
		11M33c	58.05
		11M34a	577.20
		11M34b	752.35
		11M34c	156.89
		11M35a	731.70
		11M35b	353.14
		11M36a	754.54
		11M36b	537.81
		11M37a	12.85
		11M38a	0.00
		11M38d	0.26
		12M25l	180.71
		12M27b	139.31
		12M27d	2.37
			4293.07
	Koruthodu		
		10P24b	1160.83
		10P24c	317.06
		10P24k	0.57
		10P24l	7.52
		11M39d	377.21
		11M39e	3.15
		11M39f	524.50
		11M40a	6.41
		11M42a	71.18
		11M42b	391.35
			2859.79
	Manimala		
		10P18b	104.55
		10P18c	0.06
		11M28a	0.61
		11M29a	0.09
		11M30a	2.77
		11M44a	219.98
		11M45a	392.02
		11M46a	1075.62
		11M47a	520.63
		11M47b	406.15
		11M47c	756.27
		11M48a	241.09
			3719.84

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Mundakkayam		
		11M30f	59.44
		11M32a	488.68
		11M33a	999.24
		11M33b	3.72
		11M33c	680.85
		11M39f	270.96
		11M40a	623.17
		11M41a	964.90
		11M42a	577.12
		11M42b	10.92
		11M42c	6.18
		11M42d	9.12
			4694.32
	Parathode		
		11M30c	440.62
		11M30d	41.18
		11M30e	295.91
		11M30f	1831.59
		11M30g	427.59
		11M31a	16.11
		11M32a	335.29
		11M33a	217.68
		11M33b	1361.10
		11M33c	45.63
		11M34a	22.82
		12M27d	169.65
		12M29a	5.52
		12M29b	412.42
		12M29c	2.20
			5625.31
			35057.37
Kottayam Municipality			
		11M12a	0.81
		12M11a	1.55
		12M12a	629.47
		12M13a	545.12
		12M14a	6.41
		12M15a	208.99
		12M38a	2.40
		12M38f	375.52
		12M39a	566.17
		12M39m	172.38
		12M39n	67.48
		12M39p	115.03
		12M40a	1179.97
		12M41a	645.84
		12M42a	2.52
		12M43a	366.92
		12M44a	628.34
		12M45a	0.46
			5515.38

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
Lalam	Bharananganam		
		12M21h	230.85
		12M21i	856.00
		12M21j	3.31
		12M22a	877.88
		12M23a	517.31
		12M24a	13.82
		12M25a	177.64
		12M25b	53.15
		12M32a	2.14
			2732.09
	Kadanadu		
		12M21f	485.88
		12M21g	830.79
		12M21h	1420.23
		12M21i	276.90
		12M25b	90.69
		12M25c	566.67
		13M51a	294.88
		13M52b	5.70
		13M54b	0.91
			3972.65
	Karoor		
		12M19b	61.34
		12M19c	4.16
		12M19d	940.84
		12M20a	1316.29
		12M21a	253.43
		12M21b	510.33
		12M21i	199.77
		12M21j	292.85
		12M22a	79.71
		13M64d	0.33
			3659.03
	Kozhuvanal		
		12M18a	0.83
		12M33a	2.36
		12M33b	21.01
		12M33d	127.54
		12M33e	391.76
		12M34a	1124.35
		12M35a	494.41
		12M36a	2.82
		12M36b	9.64
			2174.71
	Meenachil		
		12M22a	11.77
		12M23a	14.66
		12M29c	28.05
		12M30a	186.26
		12M31a	444.75

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		12M31c	471.43
		12M32a	622.73
		12M33a	860.90
		12M33b	228.90
		12M33c	19.12
		12M33d	0.01
		12M33e	8.10
			2896.68
	Mutholy		
		12M18a	4.24
		12M19a	151.30
		12M19c	105.85
		12M19d	247.79
		12M20a	278.95
		12M21a	3.94
		12M32a	22.08
		12M33a	70.95
		12M33e	320.35
		12M34a	579.38
		12M35a	86.26
			1871.08
			17306.24
Madapally	Madappally		
		11M23b	95.07
		12M39i	107.60
		12M39j	110.33
		12M39k	1812.83
		12M39l	304.02
			2429.85
	Payippadu		
		11M15a	610.37
		11M16a	2.08
		11M17a	151.56
		11M18a	165.06
		11M19a	4.29
		11M21a	875.20
		11M22a	190.90
		11M56a	13.17
			2012.64
	Thrikkodithanam		
		11M21a	585.72
		11M22a	2.04
		11M23b	42.05
		12M39l	500.61
			1130.42
	Vakathanam		
		12M39c	0.02
		12M39e	0.71
		12M39f	0.40
		12M39h	257.76
		12M39i	711.52

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
		12M39j	1584.01
		12M39k	46.20
		12M39l	3.12
		12M39m	6.39
		12M39n	2.02
		12M39o	0.09
			2612.25
	Vazhappally		
		11M13a	0.74
		11M14a	55.10
		11M15a	708.13
		11M16a	982.92
		11M21a	44.60
		12M39j	4.69
		12M39l	615.34
		12M39m	7.12
			2418.65
			10603.80
Pala Municipality			
		12M20a	148.52
		12M21a	474.99
		12M21b	0.61
		12M21j	339.91
		12M22a	361.15
		12M32a	158.85
		12M33a	179.70
		12M33e	3.91
		12M34a	0.74
			1668.38
Pallam	Ayarkkunnam		
		12M15a	0.76
		12M16a	1.70
		12M17f	0.03
		12M35a	37.16
		12M36a	210.64
		12M36f	455.66
		12M37a	1231.30
		12M38a	241.26
		12M38b	648.12
		12M38d	0.85
			2827.46
	Kurichi		
		11M12a	5.08
		11M13a	0.24
		11M16a	309.71
		12M39l	37.15
		12M39m	802.70
		12M40a	227.59
		12M41a	269.00
			1651.47

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Panachikkavu		
		12M39a	2.86
		12M39j	1.97
		12M39m	675.47
		12M39n	1140.11
		12M39o	1.55
		12M39p	406.36
		12M40a	46.55
			2274.88
	Puthuppally		
		12M38c	37.53
		12M38e	70.91
		12M39b	1100.49
		12M39c	276.75
		12M39e	95.04
		12M39f	288.98
		12M39h	6.56
		12M39i	76.15
		12M39j	32.20
		12M39n	8.89
		12M39o	292.19
			2285.67
	Vijayapuram		
		12M12a	2.19
		12M13a	6.18
		12M15a	11.01
		12M38a	421.36
		12M38e	222.38
		12M38f	346.00
		12M39a	391.63
		12M39b	140.17
		12M39n	3.59
		12M39p	9.46
			1553.97
			10593.45
Pampady	Akalakkunnam		
		11M29c	86.75
		12M33b	3.64
		12M33c	105.67
		12M33d	677.57
		12M34a	468.25
		12M35a	60.29
		12M36a	227.14
		12M36b	965.93
		12M36c	306.22
		12M36e	157.69
		12M36f	419.88
		12M37a	5.84
			3484.88

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Elikkulam		
		11M29c	727.36
		11M29d	0.17
		11M30b	466.49
		11M30c	191.47
		12M29c	8.04
		12M31a	141.53
		12M31b	722.37
		12M31c	114.80
		12M33a	166.43
		12M33b	0.57
		12M33c	1438.54
		12M33d	12.70
			3990.45
	Kidangoor		
		12M17a	2.89
		12M17e	110.83
		12M17f	852.61
		12M18a	477.41
		12M19a	32.80
		12M19d	0.14
		12M35a	658.73
		12M36a	179.64
		12M36f	0.05
			2315.11
	Kooroppada		
		12M36c	152.54
		12M36d	398.41
		12M36e	497.03
		12M36f	242.07
		12M37a	137.69
		12M38b	81.66
		12M38c	537.49
		12M39c	1.12
		12M39d	542.04
		12M39g	122.01
			2712.06
	Mannarkkad		
		12M38a	292.78
		12M38b	277.99
		12M38c	219.95
		12M38d	538.10
		12M38e	424.28
		12M39b	19.95
			1773.05
	Meenadam		
		12M39b	48.36
		12M39c	323.92
		12M39e	633.30
		12M39f	61.06
		12M39g	50.42
		12M39h	0.22
			1117.29

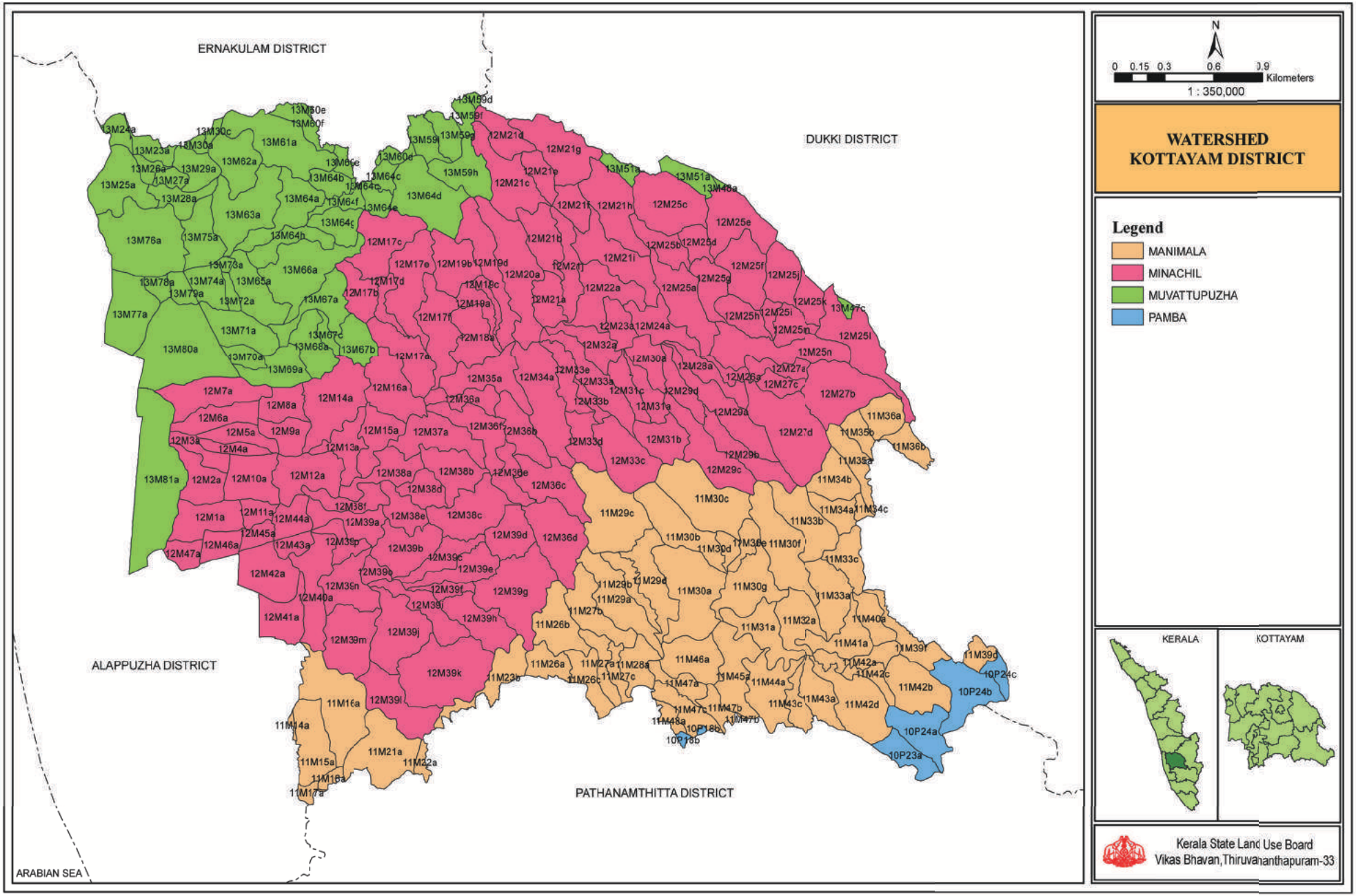
BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Pallikkathodu		
		11M29c	838.77
		12M33d	1.50
		12M36c	874.41
		12M36d	615.82
		12M36e	0.03
			2330.53
	Pampady		
		11M26b	2.73
		12M38b	93.91
		12M38c	821.59
		12M38d	114.14
		12M39b	26.40
		12M39c	122.45
		12M39d	418.48
		12M39e	197.90
		12M39g	1272.85
			3070.46
			20793.84
Uzhavoor	Kadaplamattom		
		12M17e	894.08
		12M17f	572.81
		12M18a	579.37
		12M19a	98.63
		12M19b	11.78
		12M19c	1.54
		12M19d	0.08
			2158.29
	Kanakkary		
		12M14a	2.11
		12M16a	31.07
		12M17a	763.28
		12M17b	217.15
		12M17d	201.58
		12M17e	147.94
		12M17f	6.58
		13M67a	29.16
		13M67b	643.63
		13M67c	133.03
		13M68a	188.89
			2364.42
	Kuravilangadu		
		12M17b	535.33
		12M17c	1106.95
		12M17d	171.33
		12M17e	188.23
		13M64e	10.13
		13M64g	110.30
		13M66a	165.13
		13M67a	0.20
			2287.59

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Manjoor		
		12M17b	50.92
		13M64h	0.05
		13M65a	306.25
		13M66a	1159.10
		13M67a	1048.85
		13M67b	26.82
		13M67c	86.57
		13M68a	228.19
		13M69a	2.33
		13M71a	5.42
			2914.50
	Marangattupally		
		12M17c	356.99
		12M17e	393.25
		12M17f	26.89
		12M19a	205.99
		12M19b	1074.94
		12M19c	121.66
		12M19d	101.61
		13M64c	1.40
		13M64d	658.90
		13M64e	73.70
			3015.34
	Ramapuram		
		12M19d	0.67
		12M20a	299.51
		12M21b	537.65
		12M21c	1535.38
		12M21d	691.55
		12M21e	552.05
		12M21f	127.75
		12M21g	813.93
		12M21i	73.38
		12M21j	277.15
		13M54b	26.32
		13M54c	6.74
		13M59h	485.24
			5427.33
	Uzhavoor		
		12M19d	184.46
		12M20a	169.01
		12M21c	1.25
		13M59h	320.73
		13M59i	13.42
		13M60d	252.67
		13M64c	296.36
		13M64d	1266.58
		13M64e	2.88
			2507.36

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Veliyannoor		
		12M21c	73.02
		12M21d	91.44
		13M54c	14.09
		13M59d	61.60
		13M59f	311.66
		13M59g	579.18
		13M59h	289.43
		13M59i	545.21
		13M60d	18.83
		13M64d	19.08
			2003.53
			22678.36
Vaikkom	Chempu		
		13M23a	464.03
		13M24a	362.18
		13M25a	372.80
		13M26a	180.97
		13M27a	282.20
		13M28a	10.37
		13M29a	253.70
		13M30a	0.54
		13M6a	0.30
		13M87a	25.46
			1952.55
	Maravanthuruthu		
		13M25a	889.45
		13M26a	80.26
		13M27a	1.97
		13M28a	586.82
		13M75a	3.63
		13M76a	18.45
		13M86a	5.38
		13M87a	4.48
			1590.44
	T.V.Puram		
		13M77a	1414.47
		13M80a	34.79
			1449.26
	Thalayazham		
		13M71a	1.88
		13M74a	2.97
		13M75a	0.13
		13M76a	3.97
		13M77a	19.85
		13M78a	252.95
		13M79a	356.03
		13M80a	1486.60
		13M84c	0.29
			2124.67

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Udayanapuram		
		13M25a	192.36
		13M28a	2.14
		13M75a	24.08
		13M76a	1620.09
		13M78a	16.33
		13M79a	0.50
		13M86a	0.88
			1856.37
	Vechoor		
		12M6a	3.23
		12M7a	935.10
		13M69a	3.87
		13M70a	1.05
		13M80a	1578.93
		13M81a	478.09
		13M82a	5.15
		13M84b	3.71
		13M84c	7.57
			3016.70
			10540.73
Vaikom Municipality			
		13M76a	1035.74
		13M77a	203.35
			1239.10
			9815.94
			11989.99
Vazhoor	Chirakkadavu		
		11M29a	58.04
		11M29b	105.39
		11M29c	11.14
		11M29d	1042.87
		11M30a	2317.70
		11M30b	409.70
		11M30g	7.80
		11M45a	7.54
		11M46a	12.19
			3972.37
	Kangazha		
		11M26a	5.25
		11M26b	729.18
		11M26c	347.20
		11M27a	336.77
		11M27b	750.07
		11M27c	3.03
		11M29a	176.03
		12M36d	159.54
			2507.08

BLOCK	PANCHAYAT	WS CODE	AREA (Ha)
	Karukachal		
		11M23b	510.75
		11M25a	16.37
		12M39f	1.70
		12M39g	126.68
		12M39h	690.79
		12M39i	95.01
		12M39k	822.17
			2263.47
	Nedumkkunnam		
		11M23b	345.75
		11M25a	8.31
		11M26a	638.63
		11M26b	460.13
		11M26c	36.39
		12M39g	675.32
		12M39h	243.65
			2408.18
	Vazhoor		
		11M26b	43.76
		11M27b	187.00
		11M29a	969.13
		11M29b	462.80
		11M29c	571.67
		11M29d	226.33
		12M36d	540.58
		12M39g	85.18
			3086.44
	Vellavoor		
		11M26c	389.94
		11M27a	235.67
		11M27b	247.44
		11M27c	336.90
		11M28a	764.87
		11M29a	349.47
		11M29d	5.09
		11M46a	2.36
		11M47a	5.20
		11M47c	1.57
		11M48a	5.93
		11M49a	2.18
		11M49d	1.13
			2347.76
			16585.28
			220579.50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ALAPPUZHA DISTRICT
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WATERSHED
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Legend
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MINACHIL
MUVATTUPUZHA
PAMBA
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan,Thiruvananthapuram-33

IRRIGATION

Development patterns, increasing population pressure and the demand for better livelihoods across the globe are contributing to a looming global water crisis. Addressing this crisis will require maintaining a sustainable relationship between water and development, one that balances current needs against the prospects for future generations. Only 3% of the world's water supply is fresh water and two-thirds of that is locked in glacier ice or buried in deep underground aquifers, leaving only 1% readily available for human use.

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.

Physical Achievement of Minor Irrigation (Surface Water)

(Net area in Ha)

Sl. No	Name of Schemes	2009-10	2010-11
1	MI Class I	396.30	791.13
2	MI Class II	404.86	486.33
3	Lift Irrigation works	407.43	61.31
4	Repairs to MI structure	201.42	583.04
5	MI Class I- NABARD	4682.73	2753.81
6	MI Class II- NABARD	2522.78	479.43
7	Lift Irrigation- NABARD	68.19	0
	Total	**8683.71**	**5155.05**

Minor irrigation is considered to have an important role to play in States like Kerala, where the average farm size is small, land labour ratio is low and capital and foreign exchange resources scarce.

Table: 21.1

4th MINOR IRRIGATION CENSUS 2006-07 DISTRICT WISE DATA

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	Kottayam	6093	23	0	155	579	6850	193203	135944	21542

Table: 21.2

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 utilized (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

Source: Irrigation Department.

Table: 21.3

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

MINOR IRRIGATION CENSUS – KOTTAYAM (2000-2001)

Table : 21.4

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
5760	1127	893	738	574	730	593	396	10811

Table : 21.5

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
4	121	125	7	246	253	7	241	248

Table : 21.6

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
82	19	6	8	6	4	2	1	128

Table : 21.7

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
3	125	128	0	0	0	0	0

Table: 21.8

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
6	5	0	0	0	0	0	0	11

Table : 21.9

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

Location of Dugwells (Nos)				Supplementary Irrigation (Ha)				
Inside Command	Outside Command	Augme ntation	Total	Kharif	Rabi	Perennial	Others	Total
0	11	0	11	0	0	0	0	0

Table : 21.10

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
2	526	5	533	0	0	0	0	0

Table : 21.11

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	
110	52	63	277	57	449	31	31	255	45	362

Table : 21.12

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
63	115	178	736	544	1280	672	423	1095

Table : 21.13

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
7	0	7	222	0	222	185	0	185

Table : 21.14

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
562	145	99	55	26	26	34	34	981

Table : 21.15

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
13	57	70	467	233	700	435	199	634

Table : 21.16

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
33	190	223	207	3105	3312	145	1852	1997

Table : 21.17

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
41	204	245	53	2940	2993	47	2327	2374

Table : 21.18

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
14	323	337	259	419	678	229	336	565

Table : 21.19

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
348	207	146	362	58	773	155	99	260	51	565

Table : 21.20

AGRICULTURE LAND AND ITS USE

Geographical Area	Cultivable Area	Net Area Shown	Net Area Irrigated through			
			Maj/ Med Scheme	Ground Water	Surface Water	Total
213011	182879	172049	0	6173	14853	21026

Table : 21.21

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
67	11	0	0	0	0	0	0	0	0	0	0	0	0	78

Table : 21.22

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	
15	78	10811	128	11	10950	533	981	1514	12464

Table : 21.23

IRRIGATION POTENTIAL CREATED /UTILISED THROUGH GROUND WATER SCHEMES IN USE

Dug Wells			Shallow Tubewells		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilized
10680	8090	6956	125	253	248

Deep Tubewells			Total		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilized
11	234	185	10816	8577	7389

Table : 21.24

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
511	14832	9739	875	7683	5569	1386	22515	15308

Table : 21.25

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
108	422	362	40	217	189	178	12690	7908

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
178	1280	1095	7	222	185	511	14831	9739

Table : 21.26

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
70	700	634	223	3312	1997	245	2993	2374

On tank/pond			Total		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised
10	11	12	16	17	18
337	679	564	875	7684	5569

Table : 21.27

CROP WISE AREA IRRIGATED BY GROUND WATER SCHEMES

Dug wells					Shallow tubewells				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
222	273	5848	613	6956	0	0	247	1	248

Deep tubewells					Total				
Kharif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
79	79	25	2	185	301	352	6120	616	7389

Table : 21.28

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
31	31	255	45	362	38	92	44	14	188

Permanent diversions					Temporary diversions				
Karif	Rabi	Perennial	Other	Total	Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
2151	2119	145	3493	7908	371	228	378	119	1096

Water conservation cum ground water recharge					Total				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
21	22	23	24	25	26	27	28	29	30
35	22	68	61	186	2626	2492	890	3732	9740

Table : 21.29

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
2626	2492	890	3731	9739	2068	1859	645	997	5569

Total				
Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15
4694	4351	1535	4728	15308

Table : 21.30

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
301	352	6120	616	7389	4694	4351	1536	4728	15309

Total				
Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15
4995	4703	7656	5344	22698

Table : 21.31

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
0	0	0	0	0	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	0	0	0	0	0

Table : 21.32

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
0	0	0	0	0	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
0	0	0	0	0	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
0	0	0	0	0	0	0	0	0	0

Table : 21.33

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 : 21.34

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
0	0	0	0	0	0	0	0	0	0

Total				
Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15
0	0	0	0	0

Table : 21.35

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
0	0	0	0	0	0	0	0	0	0

Total				
Kharif	Rabi	Perennial	Other	Total
11	12	13	14	15
0	0	0	0	0

Table : 21.36

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
7920	120	11	66	192	272	328	8909

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
169	0	0	14	43	6	4	236

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
8089	120	11	80	235	278	332	9145

Table: 21.37

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 Demand	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

WATER TRANSPORT

Kerala is a land with abundant water bodies. Backwater is a wonderful gift of nature to the God's Own Country. Ashtamudy and Vembanadu lake which completes the network of waterways not only provides natural beauty but inland navigation facilities also. State Water Transport Department is the main agency who provides inland water transport facilities to the people residing in the water logged areas and to enjoy the everlasting memory of backwaters. This inland Water Transport system consists of 1895 kms of waterways. This includes navigable river, backwaters and manmade cross canals. Most of these are in Travancore-Cochin region. Of the 44 rivers in Kerala, the 41 west flowing rivers together with back waters and manmade canals form the integral part of inland navigation system.

State Water Transport Department formed during 1968 with the objectives to provide Transport facilities to the people residing in the water logged areas at cheaper rates and Cargo transportation. Construction of roads, bridges and speedy transportation-roadways shortened the operation of the department to passenger transport only-in the backwaters and ferries. But in the world of speed and hurry the advantage of this pollution free, accident free and cheaper transport system beckons least preference.

Backwaters

(1) Vembanattu lake – 52 sq.kms.
(2) Ashtamudy lake – 200 sq.kms.
(3) Ernakulam – Vypeen ferry (Cochin port & Harbour)
(4) Muhamma – Kumarakom
(5) Vaikom – Thavanakkadavu
(6) Payyannur – Parassinikkadavu

Total distance operated	–	79,00 km per day
No. of passengers carried	–	80,000 per day
No. of operating centers	–	14 stations

Station Offices

Kottayam District	- Kottayam, Changanassery & Vaikom
Capacity of boats	- 50 passenger to 150 passengers (wooden boats) Boats are constructed in the traditional way with well seasoned teak wood.
Speed of boat	- 10 to 15km per hour
Size of boats length	- 20 mtr to 35 mtrs width - 3 to 4.5 meters depth - 2mtrs weight - 5 to 15 tonns.
No. of crew for a boat	- 5 persons at a time

Source: Water Transport Department

LIST OF PANCHAYATS IN KOTTAYAM

The Panchayats in Kottayam district are:-

Erattupetta, Melukavu, Munnilavu, Poonjar, Poonjar-Thekkekara, Thalanad, Thalappalam, Theekoyi, Thidanad, Aimanam, Arpookara, Athirampuzha, Ettumanoor, Kumarakom, Neendoor,Thiruvarppu, Kaduthuruthy, Kallara, Mulakkulam, Njeezhoor, Thalayolaparampu, Velloor, Erumely, Kanjirappally, Koottikkal, Koruthodu, Manimala, Mundakkayam, Parathode, Bharananganam, Kadanadu, Karoor, Kozhuvanal, Meenachil, Mutholy, Madappally, Payippadu, Thrikkodithanam, Vakathanam, Vazhappally, Ayarkkunnam, Kurichi, Panachikkavu, Puthuppally, Vijayapuram, Akalakkunnam, Elikkulam, Kidangoor, Kooroppada, Mannarkkad, Meenadam, Pallikkathodu, Pampady, Kadaplamattom, Kanakkary, Kuruvilangadu, Manjoor, Marangattupally, Ramapuram, Uzhavoor, Veliyannoor, Chempu, Maravanthuruthu, Thalayazham, T.V.Puram, Udayanapuram, Vechoor, Chirakkadavu, Kangazha, Karukachal, Nedumkunnam, Vazhoor, Vellavoor.

HEALTH

Table: 23.1

STANDARDISED LIST OF INSTITUTIONS IN KOTTAYAM DISTRICT

Sl. No.	Institutions	Location	No.of beds	Municipalities/ Panchayaths/ Corporations
1	Gen H	Adoor	300	Adoor Municipality
2	Speciality	K.R. Narayanan Memmorial Speciality Hospital Uzhavoor	36	Uzhavoor Block Panchayath
3	DH	Kottayam	374	Kottayam Municipality
4	THQH	Kanjirapally	142	Kanjirapally Panchayath
5	THQH	Changanassery	207	Changanassery Municipality
6	TH	Pampady	75	Pampady Panchayath
7	THQH	Vaikkom	260	Vaikom Municipality
8	TH	Kuravilangadu	54	Uzhavoor Block Panchayath
9	CHC	Sachivothampuram	50	CHC Karukachal
10	CHC	Mundakkayam	60	CHC Erumely
11	CHC	Kadaplamattom	52	CHC Koodalloor
12	CHC	Thottakkadu	71	CHC Panachikad
13	CHC	Ramapuram	44	CHC Koodalloor
14	CHC	Kumarakam	50	CHC Kumarakam
15	CHC	Ullanadu	24	CHC Ullanadu
16	CHC	Edayazham	24	CHC Edayazham
17	CHC	Edayirikkapuzha	18	CHC Edayirikkapuzha
18	CHC	Edamaruk	24	CHC Edamaruk
19	CHC	Erumely	14	CHC Erumely
20	CHC	Koottickal	38	CHC Erumely
21	CHC	Koodalloor	32	CHC Koodalloor
22	CHC	Arunoottimangalam	24	CHC Arunoottimangalam
23	CHC	Thalayoraparampu	30	CHC Thalayoraparampu
24	CHC	Karuckachal	18	CHC Karuckachal
25	CHC	Paika	36	CHC Paika
26	24X7 PHC	Mundankunnu	20	PHC Mundankunnu
27	24X7 PHC	Ettumanoor	24	24X7 PHC Ettumanoor
28	24X7 PHC	Athirampuzha	46	PHC Athirampuzha
29	24X7 PHC	Aymanam	0	PHC Athirampuzha
30	24X7 PHC	Parampuzha	24	CHC Kumarakam
31	24X7 PHC	Brahmamangalam	24	CHC Edayazham
32	24X7 PHC	Erattupetta	24	CHC Edamaruk
33	24X7 PHC	Poonjar	32	CHC Edamaruk
34	24X7 PHC	Manimala	30	CHC Erumely
35	24X7 PHC	Marangattupally	26	CHC Koodalloor
36	24X7 PHC	Madapally	18	CHC Karuckachal

Sl. No.	Institutions	Location	No.of beds	Municipalities/ Panchayaths/ Corporations
37	24X7 PHC	Thrikodithanam	24	CHC Karuckachal
38	24X7 PHC	Vakathanam	24	CHC Karuckachal
39	PHC	Kooropada	0	PHC Mundankunnu
40	PHC	Meenadam	0	PHC Mundankunnu
41	PHC	Onamtherthu	0	PHC Athirampuzha
42	PHC	Ayrkunnam	0	CHC Kumarakam
43	PHC	Thiruvarppu	0	CHC Kumarakam
44	PHC	Panachikkadu	0	PHC Panachikkadu
45	PHC	Nattakom	0	PHC Panachikkadu
46	PHC	Kadanadu	6	CHC Ullanadu
47	PHC	Karoor	0	CHC Ullanadu
48	PHC	Meenachal	24	CHC Ullanadu
49	PHC	Mutholi	0	CHC Ullanadu
50	PHC	Kozhuvanal	0	CHC Ullanadu
51	PHC	Maravanthuruth	0	CHC Edayazham
52	PHC	Udayanapuram	0	CHC Edayazham
53	PHC	TV Puram	0	CHC Edayazham
54	PHC	Thalayazham	0	CHC Edayazham
55	PHC	Vazhoor	0	CHC Edayirikkapuzha
56	PHC	Vellavor	0	CHC Edayirikkapuzha
57	PHC	Nedunkunnam	0	CHC Edayirikkapuzha
58	PHC	G.V.Raja Poonjar	32	CHC Edamaruk
59	PHC	Thalanadu	0	CHC Edamaruk
60	PHC	Moonilavu	0	CHC Edamaruk
61	PHC	Thidanadu	0	CHC Edamaruk
62	PHC	Thalappalam	0	CHC Edamaruk
63	PHC	Teekoy	0	CHC Edamaruk
64	PHC	Kalaketty	0	CHC Erumely
65	PHC	Vizhikkathodu	0	CHC Erumely
66	PHC	Karikkattoor	0	CHC Erumely
67	PHC	Parathodu	0	CHC Erumely
68	PHC	Parathanam	0	CHC Erumely
69	PHC	Kanakkary	0	CHC Koodalloor
70	PHC	Veliyannoor	0	Uzhavoor (K.R. Narayanan Memmorial Speciality Hosp.)
71	PHC	Kattampak	0	CHC Arunoottimangalam
72	PHC	Peruva	0	CHC Arunoottimangalam
73	PHC	Velloor	0	CHC Arunoottimangalam
74	PHC	Kallara	0	CHC Thalayolaparampu
75	PHC	Kaduthuruthy	0	CHC Thalayolaparampu
76	PHC	Kuruppanthara	0	CHC Thalayolaparampu
77	PHC	Paippad	0	CHC Karuckachal
78	PHC	Vazhapally	0	CHC Karuckachal
79	PHC	Pallickathodu	0	CHC Paika

Source:DHS

Table: 23.2

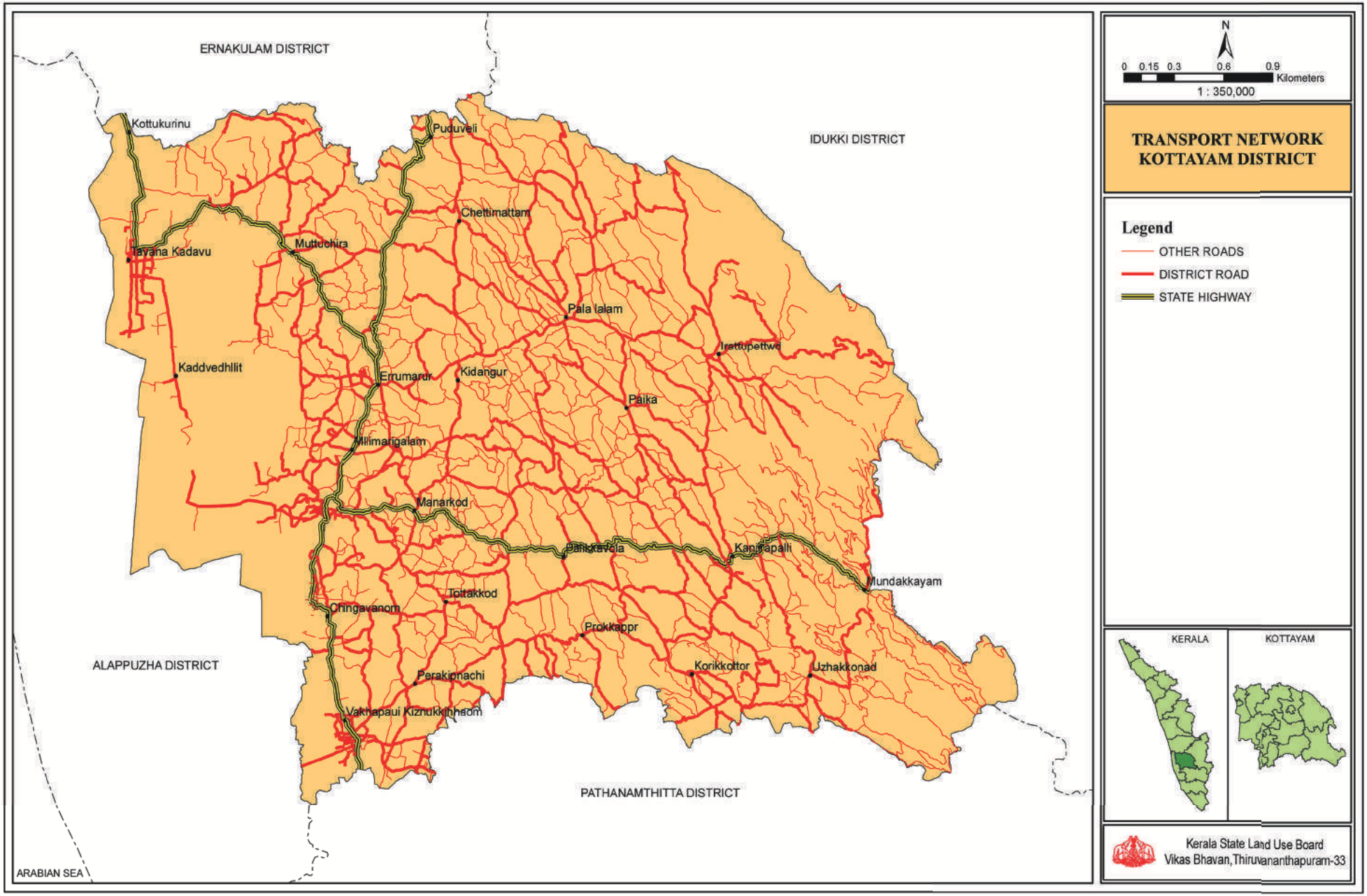
NEWLY REGISTERED VEHICLES FOR THE YEAR 2010-11

Sl. No.	Classification of Vehicles	Total Number
1	Multiaxied Articulated Vehicles	12
2	Trucks and Lorries	219
3	Four Wheelers	2135
4	Three Wheelers	459
	TOTAL	**2825**
5	Stage Carriage	145
6	Contract Carriage	261
7	Private Service Vehicles	18
8	Other Buses	99
	TOTAL	**523**
9	Motor Cabs	1232
10	Maxi Cabs/Taxi	0
11	Other Taxis	1
	TOTAL	**1233**
12	LMV 3 Seater	3736
13	LMV 4 to 6 Seater	0
14	Motor Cycle Hire	0
	TOTAL	**3736**
	Other TVs	37
	TOTAL TRANSPORT	**8354**
15	Scooters	0
16	Mopads	0
17	Motor Cycles including above & below 95cc	19783
	TOTAL	**19783**
18	Cars	13042
19	Jeeps	0
20	Omni Buses	7
21	Tractors	35
22	Trailors	0
23	Others	610
	TOTAL	**13694**
	Total Non Transport	**33477**
	GRAND TOTAL	**41831**

Source: Economic Review 2011

Health Institutions of Kottayam District

Kerala State Remote Sensing and Environment Centre


ERNAKULAM DISTRICT
IDUKKI DISTRICT
ALAPPUZHA DISTRICT
PATHANAMTHITTA DISTRICT
ARABIAN SEA
Kottukurinu
Puduveli
Chettimattam
Tayana Kadavu
Muttuchira
Pala lalam
Irattupettwe
Kaddvedhllit
Errumarur
Kidangur
Paika
Mlimarigalam
Manarkod
Panikkavila
Kanjirapalli
Mundakkayam
Tottakkod
Chingavanom
Prokkappr
Korikkottor
Uzhakkonad
Perakipnachi
Vakhapaui Kiznukkihhaom
N
0 0.15 0.3 0.6 0.9
Kilometers
1 : 350,000
TRANSPORT NETWORK
KOTTAYAM DISTRICT
Legend
OTHER ROADS
DISTRICT ROAD
STATE HIGHWAY
KERALA
KOTTAYAM
Kerala State Land Use Board
Vikas Bhavan, Thiruvananthapuram-33