

**JOSE ISSAC I.A.S.**

*Commissioner*



**KERALA STATE LAND USE BOARD**

Vikas Bhavan, Thiruvananthapuram-695033

e-mail : joseissac55@gmail.com

Ph: 91471 2307833 (P), 2302231, 2307830

Fax : 91471 2307838

## **PREFACE**

Land use planning is a process of determining suitable future action through specific and systematic evaluation of land resources, water and biomass. Kerala State Land Use Board is generating various spatial and non spatial data on natural resources management and manmade activities where we live in. This publication, Natural Resources Data Bank will provide a better understanding of the resources of the district and could be effectively used for various development and welfare activities, especially in the context of decentralized planning process.

Though many gaps are there in the publication, I hope this publication would be much helpful for, planning at microlevel

Thiruvananthapuram  
08-02-2012

A handwritten signature in blue ink, consisting of a large, stylized initial 'J' followed by a horizontal line and a smaller signature.

**JOSE ISSAC I.A.S.**  
Land Use Commissioner

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

## GENERAL INFORMATION

Ernakulam District is one of the most developed districts in the State. Kochi, the “Queen of Arabian Sea” is often described as the industrial and commercial capital of Kerala. This district was formed in 1958 by carving the regions from Thrissur and Kottayam district. The district comprises the area of the east while Travancore, Cochin and Malabar states. Kochi, Kanayannur, Paravoor, Aluva, Kunnathunadu, Muvattupuzha and Kothamangalam are the seven taluks of this district.

**Location:** The district is bounded by 30 Kms. Coastal belt of Arabian Sea on the West, Kottayam and Alappuzha district on the South, Idukki on the East and Thrissur on the North. It is accounted to 38 Kms, North-South and 48 Kms, East-West between 9<sup>0</sup> 42'30" N to 10<sup>0</sup> 18'00" N latitude and 76<sup>0</sup> 12' 00" to 76<sup>0</sup> 36' 00"E longitude.

**Area:** The area of the district accounts to 7.89% of the total area of the state with 3068 Sq .Km.

**Topography:** The district can be divided into three natural divisions - High land, Middle land and Lowland. The low land space division includes the entire Paravoor and Kochi Taluk and Western part of Kanayannur taluk. 'Aluva, Muvattupuzha, Kothamangalam and the eastern portion of the Kanayannur taluk come under the mid land region. The major part of the Kunnathunadu taluk is in the mid land region and the remaining portion is in the high land region.

**Climate and Rainfall:** The district has a tropical humid climate with almost uniform temperature throughout the year. The average temperature has been 30.5<sup>0</sup> Celsius minimum. The district receives an annual rainfall ranging from between 250 to 360 cm.

**Rivers:** The most important rivers in the district are Periyar and Muvattupuzha. The Periyar is the longest river in the district, stretched over with a length of 244 Kms. The river plays a prominent role in the development of agricultural, industrial and commercial sector of the district. Another important river of the district is Muvattupuzha, which is formed by the union of three rivers such as Kaliyar, Thodupuzhayar and Kothamangalam.

**Backwaters:** The district is blessed with an attractive network of canals and backwaters such as Vembanad and Kodungallor Kayals stretch along the western and north eastern coast of the district and many streams and rivulets empty themselves to the backwaters. The Vembanad Kayal is a large spacious lake with a length of 82 Kms and maximum of 40 Kms. extending to an area of 205 Sq. Km.

**Forest:** The Malayattoor high range and northern and northeastern tip of the Muvattupuzha and Kothamangalam Taluk formed the forest area of the district. Area under forest is 823 Sq.Km.

**Mineral resources:** China clay noticed at Manjummel and west of Thrikkakara temple. Graphite at Peringala, Nagapuzha, Memadangu and Koothattukulam areas, Iron ore and Laterite etc., are the important mineral resource of the district.

**Soil:** Laterite soil, sandy loam and alluvial soil are the three types of soil of the district. In Muvattupuzha, Kothamangalam, Kunnathunadu and part of Aluva possess laterite soil whereas sandy loam occurs in Paravoor, Kochi and Kanayannur taluk. The alluvial soil is noticed in parts of Aluva and Kunnathunadu Taluks.

**Population:** The district ranks 3<sup>rd</sup> in the population. First being Malappuram followed by Thiruvananthapuram.

**Agriculture:** The agriculture provides a significant of employment of the district. Coconut is the principal crop grown followed by rubber, paddy and tapioca. Activities allied to agriculture such as dairy, poultry and fishery also play a very important role in the economy of the district.

**Irrigation:** 29.40% of cultivated area is irrigated in the district. Rivers like Muvattupuzha and Periyar offer ample irrigation potential.

**Electricity:** All the villages in the district are electrified. The district consumes major share of the power in the state. The Bramhapuram Diesel Power Plant and Pathalam Naphta Plant are in the district.

**Industry:** Availability of electricity, fresh water, fairly long coastline, the Kochi and Kodungalloor backwaters, good banking facility, proximity to Kochi port, presence of Kochi harbour terminal, International Air port etc are the factors which accelerated the industrial growth in the district. There are 3961 micro, small or medium



enterprises in Ernakulam District filing between 02/10/2006 and 31/03/2011. In addition to this an export-processing zone is situated at Kakkanad.

**Infrastructure:** The district has a very good transport and communication network. One of the all season ports of the country is situated at Kochi. There is one international airport at Nedumbassery; there is also one fishing harbour, which can accommodate more than thousand fishing boats. Telephone and Internet facilities are available throughout the district. The district is well connected by road, rail and air with the rest of the State and the whole country.

**Literacy and Education:** Eranakulam district is the first district in the whole country to have attained cent percent literacy by 1990.

**Economy:** Even though significant developments have taken place in industrial and tertiary sectors, the district still have a large number of people engaged in agriculture and allied activities. Dense population, urbanization, land reforms, change in family systems, etc., have resulted in the fragmentation of land. Hence a shift in the economic activity from agriculture to other sectors is taking place.

#### **Tourist spots:**

**Bolghatty place:** A picturesque island with a palace turned tourist hotel, which was built in 1744 by Dutch Government.

**Wellington Island:** Airport, harbour, headquarters of several Government departments are on this island.

**Museum:** Parikshith Thampuran Museum, museum of Kerala history, Hill place museum.

**Synagogue:** The jewel of Kochi's physique stands testimony to the tolerance and hospitality of local rulers of Kerala, built in 1568.

**Dutch Palace:** A Portuguese contribution to the King of Kochi in 1586, named after Dutch when they rebuilt the palace later.

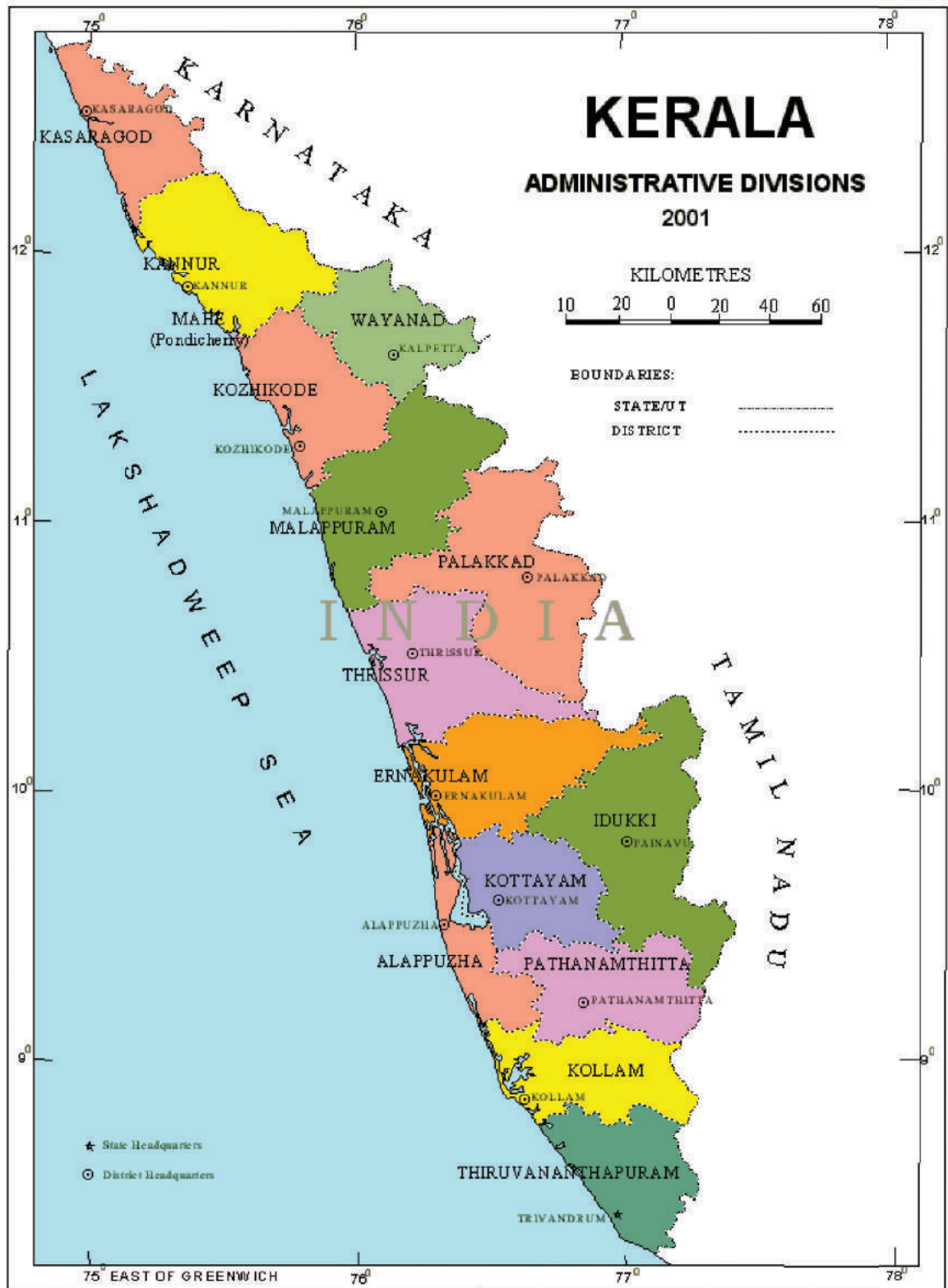
**Fort Kochi:** The first foreign church in India. Vasco De Gama was buried here. Later remains were exhumed out and taken to Portugal.

**Chinese fishing Nets:** An enticing scene, became trademark of Kochi.

**Kalady:** 45 Km from Kochi, birthplace of Sankaracharya, the Hindu philosopher.

**Kodanadu:** Elephant camp under forest department.

**Bird Sanctuary:** Thattekadu



Based upon Survey of India map with the permission of the Surveyor General of India. © Government of India copyright, 2001  
The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.



## KERALA AT A GLANCE

Location : North Latitude between 8° 18' and 12° 48'  
East Longitude between 74° 52' and 77° 22'

Area : 38863 sq. km.  
Forests : 11309.4172 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** : 41 Nos  
West flowing : 3 Nos  
East flowing

### Administration

Districts : 14 Nos  
Taluks : 63 Nos  
Revenue Villages : 1478 Nos  
Grama Panchayats : 978 Nos  
Corporations : 5 Nos  
Municipalities : 60 Nos

Community Development Blocks : 152 Nos  
Average Annual Rainfall : 2900 mm  
Cultivated Area (million hectares) : 2.292 mh  
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

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 (per cent)	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	
Urban population (lakhs)	76.80	82.67	
Growth of population (per cent)	13.88	9.43	4.86
Life Expectancy (years)	68	-	
Infant mortality (per 1000)	22	16*	
Birth Rate (per 1000)	19.8	18.3	

Source: Census Report

Table: 1.2

## ERNAKULAM AT A GLANCE

### General Features

**Date of Formation**                      **1st April, 1958.**

**District Head Quarters**              **Kakkanad**

### Administrative set-up

Sl.No.	Particulars	Ernakulam	State
1	Number of Revenue Divisions	2	21
2	Number of Taluks	7	63
3	Number of Revenue Villages	124	1478
4	Number of Corporations	1	5
5	Number of Corporation Wards	74	359
6	Number of Municipalities	11	60
7	Number of Municipality Wards	369	2216
8	Number of Block Panchayat	14	152
9	Number of Block Panchayat Wards	185	2095
10	Number of Grama Panchayat	84	978
11	Number of Grama Panchayat Wards	1369	16680
12	Number of Assembly Constituencies	14	140
13	Number of Parliament Constituencies	2	20
15	Number of District Panchayat Wards	26	332

Table: 1.3

## Geographical particulars

1	Total Area (Sq.Km)	3068	38863
2	Wet Area	58892	462797
3	Dry Area	150755	2273603
4	Forest Area (Sq.Km)	823	11309
5	Length of Coastal Line (in Kms.)	46	590

Table: 1.4

**Demographic Particulars**

SI.No.	Particulars	Ernakulam	State
1	Total Population (2001 Census)	3105798	31841374
	Male	1538397	15468614
	Female	1567401	16372760
2	Total Rural Population	2206679	23574449
	Male	1093595	11451282
	Female	1113084	12123167
3	Total Urban Population	899119	8266925
	Male	444802	4017332
	Female	454317	4249593
4	Total SC Population	263518	3123941
	Male	129706	1525114
	Female	133812	1598827
5	Total SC Rural Population	220746	2553725
	Male	108750	1247537
	Female	111996	1306188
6	Total SC Urban Population	42772	570216
	Male	20956	277577
	Female	21816	292639
7	Total ST Population	10046	364189
	Male	5079	180169
	Female	4967	184020
8	Total ST Rural Population	8109	350019
	Male	4105	173267
	Female	4004	176752
9	Total ST Urban Population	1937	14170
	Male	974	6902
	Female	963	7268
10	Total Number of Households	693161	6726356
	Rural Households	492853	5010259
	Urban Households	200308	1716097
11	Religion wise Population		
	Hindu	1444994	17883449
	Muslims	451764	7863842
	Christians	1204471	6057427
	Others	4569	36656
	Density of Population	1012	819
	Growth Rate (1991 to 2001)	9.35	9.43
	Sex Ratio	1019	1058
	Literacy Rate	93.20	90.86
	Male	95.81	94.24
	Females	90.66	87.72

Source:- Census Hand Book



Table: 1.5

**Agriculture(Ha)**

Sl.No.	Land Utilization pattern (in Ha)	Ernakulam	State
1	Total Geographical Area	306800	3886300
2	Forest Area	82300	1130900
3	Land put to non agricultural use	51133	430084
4	Barren & uncultivable land	1310	28891
5	Permanent pastures and other grazing land	12	292
6	Land under misc. tree crops	133	10193
7	Cultivable waste	7142	70092
8	Fallow other than current fallow	2984	40917
9	Current fallow	6279	68634
10	Net area sown	158203	2154885
11	Area sown more than once	55069	841408
12	Total cropped area	213272	2996293

Table: 1.6

**Animal Husbandry and Fisheries**

Sl.No.	Livestock Population	Ernakulam	State
1	Cattle	182575	2122453
2	Buffaloes	7169	64618
3	Goats	139179	1213173
4	Pigs	11988	76452
5	Sheep	-	3631
6	Duck	52547	-

Source:- Agricultural Statistics, DES.

Table: 1.7

**Minor Irrigation  
Ayacut Area Under Minor Irrigation Schemes According To  
Projects Type**

(In Ha)

Sl. No.	Water Sources	Proposed area		Achieved area	
		Ernakulam	State	Ernakulam	State
1	Well	190	8645	158	2439
2	Tube Well	809	1607	652	1195
3	Pond	1341	52025	897	33255
4	Lift Irrigation	43649	134374	17248	80292
5	Side Protection Wall	6988	97123	4620	60108
6	Minor Dam	19206	174494	12025	69930
7	Salt Water execution	2089	20896	836	11145
8	Others	17542	133998	13995	72489
	Total	91814	623162	50431	330853

Table: 1.8

**Ayacut Area Under Minor Irrigation Schemes According To  
Project Class**

(In Ha)

Sl. No.	Project Class	Proposed area		Achieved area	
		Ernakulam	State	Ernakulam	State
1	Class I	2171	36611	1662	19596
2	Class II	18799	226339	13358	99064
3	IPD Yelah	1801	35940	1519	23409
4	Lift Irrigation	43649	134374	17248	80292
5	Community Irrigation	2060	19217	1782	10744
6	Salt water Exclusion	2089	20896	836	11145
7	Others	21246	149785	14027	86603
	Total	91815	623162	50432	330853

Table: 1.9

**Labour and Housing**

Sl. No.	Working/Non working Category	Ernakulam	State
1	Total Workers Population	1117091	10283887
2	Total Agricultural Workers	52237	1021559
3	Total Population of cultivators	47886	586360
4	Total household Industry Workers	24834	275654
5	Population of non-workers	1988707	21557487

Table: 1.10

### Fisheries

Particulars			Ernakulam	State
Annual Fish Production 2004-2005	Marine	Quantity (in tonnes)	-	601863
		Value (in Lakhs)	-	262555
	Inland	Quantity (in tonnes)	4309	76451
		Value (in Lakhs)	2528	59851
No. of Beneficiaries of Savings-cum-Relief Scheme 2004-2005.		Marine	-	116808
		Inland	1375	8388

Table: 1.11

### Education

Sl.No.	Institutions	Ernakulam	State
1	Lower Primary Schools	485	6817
2	Upper Primary Schools	219	3037
3	High Schools	310	2790
4	Higher Secondary Schools	178	1664
5	Vocational Higher Secondary Schools	34	375
6	Technical Higher Secondary Schools	3	25
7	Technical Higher Schools	4	39
8	CBSE School	80	483
9	ICSE Schools	11	78
10	Kendriya Vidyalayam	6	32
11	Jawahar Navodaya	1	13
12	ITI	1	32
13	Teachers Training Institute	19	202
14	Engineering Colleges	13	84
15	Medical College	2	14
16	Pharmacy College	1	21
17	Homeo College	1	5
18	Polytechnic Colleges	4	52

Table: 1.12

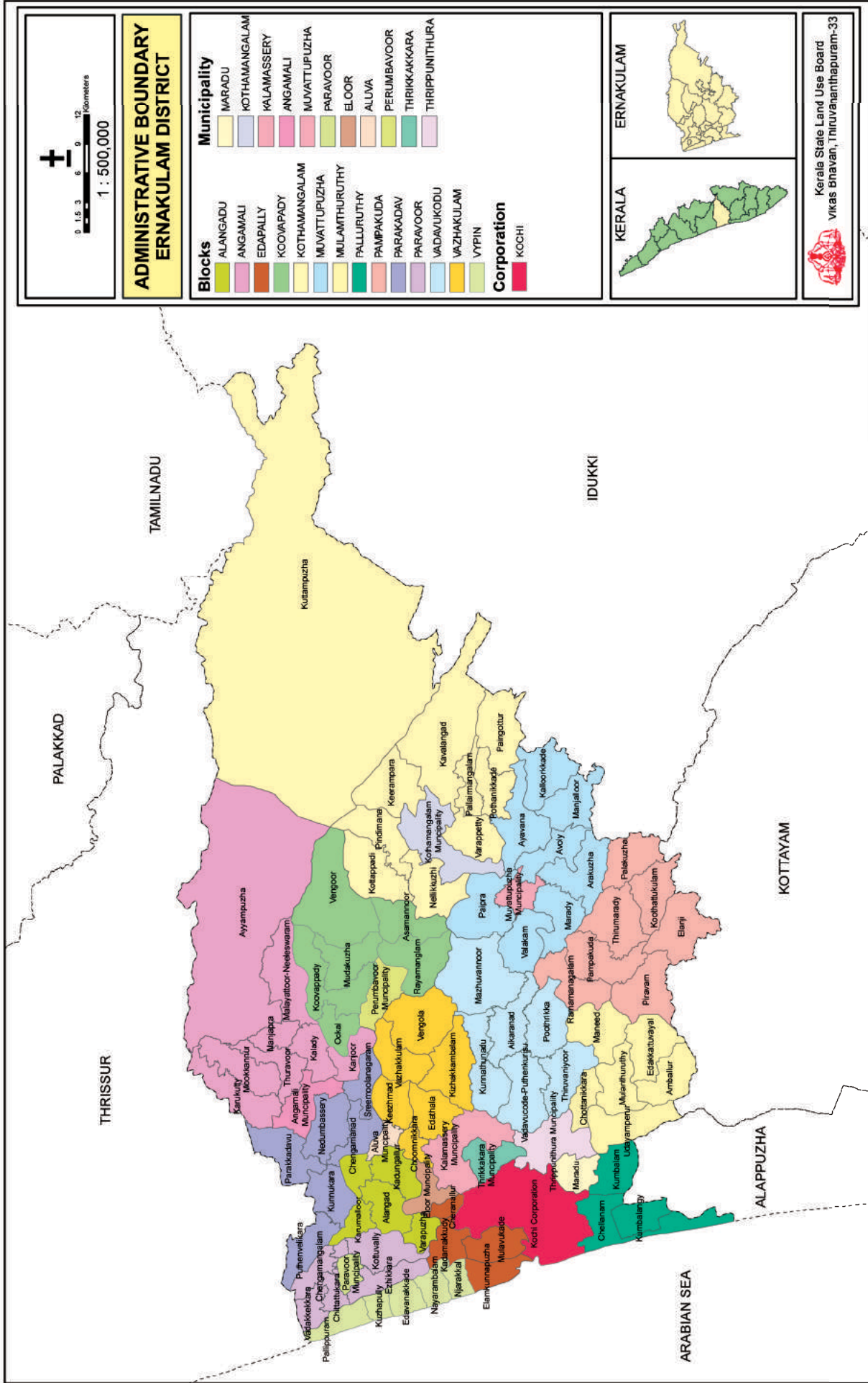
**Health**

<b>SI.No.</b>	<b>Health Institutions</b>	<b>Ernakulam</b>	<b>State</b>
1	General Hospitals	1	6
2	Women & Children Hospital	1	5
3	District Hospitals	1	11
4	Taluk HQ Hospital	6	40
5	Government Hospitals (Allopathic)	13	53
6	Primary Health Centres	77	931
7	Govt. Dispensary/Rural Dispensary	4	25
8	Mobiles Dispensary /Units	-	13
9	Police Hospital	-	5
10	Leprosy control unit/Hospitals	-	18
11	TB Centre/Clinic	1	18
12	Mental Health Centres	-	3

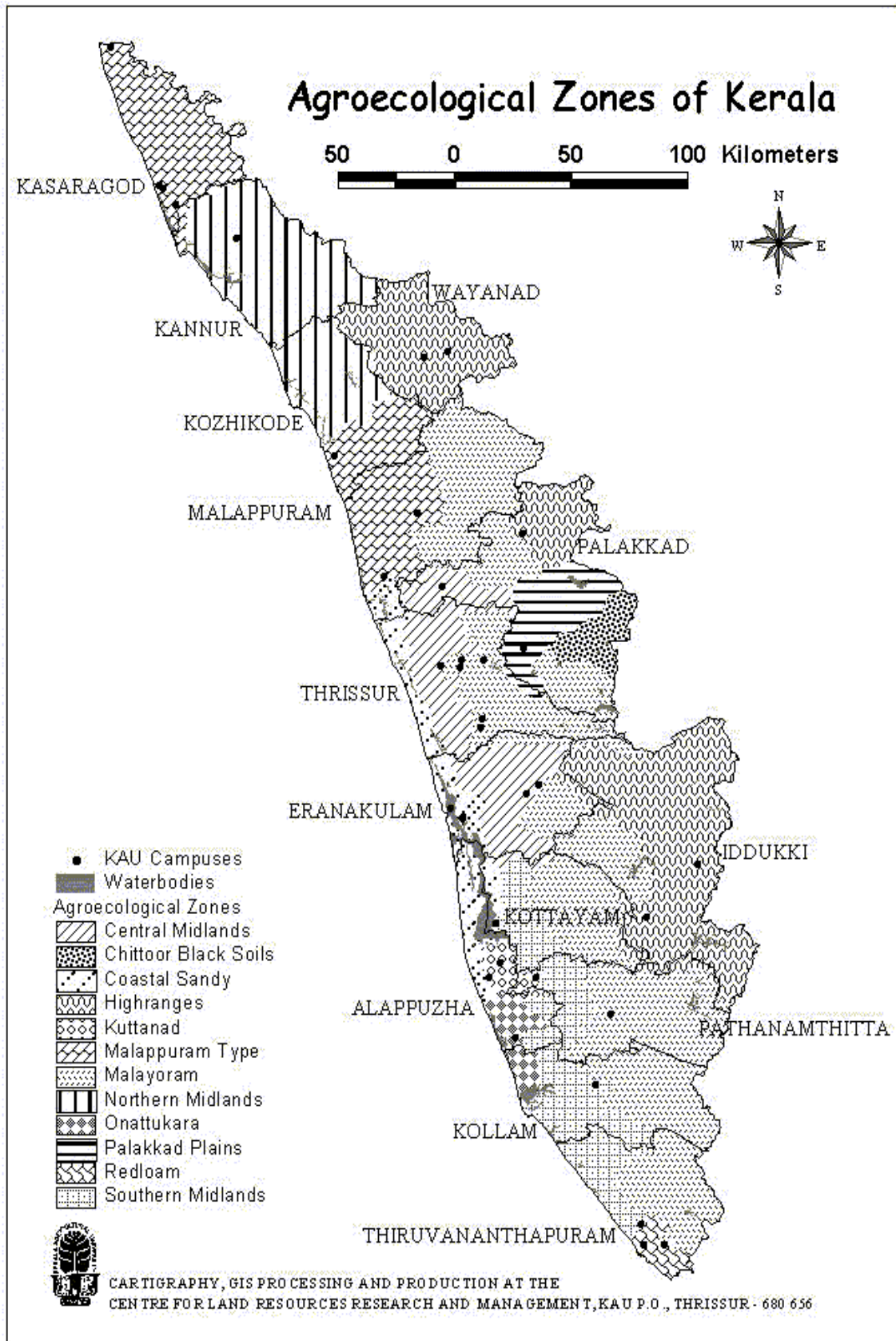
Table: 1.13

**Co-Operation and Banking**

<b>SI.No.</b>	<b>Financial Institutions</b>	<b>Ernakulam</b>
1	Number of Nationalised Banks	191
2	Number of State Bank Groups	105
3	Number of Branches of District Co-operative Banks	50
4	Number of Service Co-operative Banks and Credit Societies	185
5	Agricultural Development Bank	5















## DEMOGRAPHY

Table:- 4.1

### INDIA'S POPULATION –CENSUS 2011

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
<b>Age structure</b>	
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			
		Persons 3	Males 4	Females 5	Persons 6	Males 7	Females 8		
1	2								
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		
KERALA	38,863	3,33,87,677	1,60,21,290	1,73,66,387	33,22,247	16,95,935	16,26,312		
kasaragod	1,992	13,02,600	6,26,617	6,75,983	1,49,280	76,149	73,131		
Kannur	2,966	25,25,637	11,84,012	13,41,625	2,65,276	1,35,189	1,30,087		
Wayanad	2,131	8,16,558	4,01,314	4,15,244	89,720	45,776	43,944		
Kozhikode	2,344	30,89,543	14,73,028	16,16,515	3,23,511	1,64,800	1,58,711		
Malappuram	3,550	41,10,956	19,61,014	21,49,942	5,52,771	2,81,958	2,70,813		
Palakkad	4,480	28,10,892	13,60,067	14,50,825	2,88,366	1,46,947	1,41,419		
Thrissur	3,032	31,10,327	14,74,665	16,35,662	2,89,126	1,48,428	1,40,698		
<b>Ernakulam</b>	<b>3,068</b>	<b>32,79,860</b>	<b>16,17,602</b>	<b>16,62,258</b>	<b>2,89,281</b>	<b>1,48,047</b>	<b>1,41,234</b>		
Idukki	4,358	11,07,453	5,51,944	5,55,509	1,00,107	51,132	48,975		
Kottayam	2,208	19,79,384	9,70,140	10,09,244	1,68,563	86,113	82,450		
Alappuzha	1,414	21,21,943	10,10,252	11,11,691	1,86,022	95,565	90,466		
Pathanamthitta	2,637	11,95,537	5,61,620	6,33,917	91,501	46,582	44,919		
Kollam	2,491	26,29,703	12,44,815	13,84,888	2,38,062	1,21,484	1,16,581		
Thiruvananthapuram	2,192	33,07,284	15,84,200	17,23,084	2,90,661	1,47,777	1,42,884		

Table 4.2 (Contd.....)

India/State/ District	Number of Literates			Literacy rate (in Percentage)			Percentage decadal growth rate of population 2001-11	Sex Ratio (Number of Females per 1000 Males) 2011	Sex Ratio 0-6 population 2011
	Persons 9	Males 10	Females 11	Persons 12	Males 13	Females 14			
INDIA	77,84,54,120	44,42,03,762	33,42,50,358	74.04	82.14	65.46	17.64	940	914
KERALA	2,82,34,227	1,37,55,888	1,44,78,339	93.91	96.02	91.98	4.86	1084	959
kasaragod	10,36,289	5,17,031	5,19,258	89.95	93.93	86.13	8.18	1079	960
Kannur	21,56,575	10,22,972	11,33,603	95.41	97.54	93.57	4.84	1133	962
Wayanad	6,49,186	3,30,093	3,19,093	89.32	92.84	85.94	4.6	1035	960
Kozhikode	26,34,493	12,76,384	13,58,109	95.24	97.57	93.16	7.31	1097	963
Malappuram	33,28,658	16,08,229	17,20,429	93.55	95.78	91.55	13.39	1096	960
Palakkad	22,32,190	11,19,360	11,12,830	88.49	92.27	84.99	7.39	1067	962
Thrissur	26,89,229	12,86,141	14,03,088	95.32	96.98	93.85	4.58	1109	948
<b>Ernakulam</b>	<b>28,61,509</b>	<b>14,27,572</b>	<b>14,33,937</b>	<b>95.68</b>	<b>97.14</b>	<b>94.27</b>	<b>5.6</b>	<b>1028</b>	<b>954</b>
Idukki	9,28,774	4,74,988	4,53,786	92.2	94.84	89.59	1.93	1006	958
Kottayam	17,45,694	8,59,038	8,86,656	96.4	97.14	95.67	1.32	1040	957
Alappuzha	18,63,558	8,95,476	9,68,082	96.26	97.9	94.8	0.61	1100	947
Pathanamthitta	10,70,120	5,03,171	5,66,949	96.93	97.7	96.26	3.12	1129	964
Kollam	22,42,757	10,76,509	11,66,248	93.77	95.83	91.95	1.72	1113	960
Thiruvananthapuram	27,95,195	13,58,924	14,36,271	92.66	94.6	90.89	2.25	1088	967

Source:- Census Report 2011



**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	Literacy Rate			Sex ratio of population in the age-group 0-6	Sex ratio of child population in the age-group 0-6	Sex ratio of population in the age-group 15-64	Sex ratio of population in the age-group 65+	Percent share of urban population	
		Persons	Males <sup>#</sup>	Females		Persons	Males <sup>#</sup>	Females						Persons
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	83,30,87,862	42,79,17,052	40,51,70,610	17.19	14.11	14.32	13.90	69.91	78.57	58.75	947	919	
	U	37,71,05,760	19,58,07,196	18,12,98,564	18.12	10.93	11.07	10.78	84.98	89.87	79.92	926	902	
KERALA	T	3,33,87,877	1,60,21,290	1,73,66,387	4.88	9.95	10.89	9.36	93.91	96.02	91.98	1084	989	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	988	
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	10.56	11.42	9.70	95.41	97.54	93.57	1133	962	65.05
	R	8,82,745	4,26,243	4,56,502	-26.20	10.46	11.07	9.89	93.88	96.50	91.48	1071	956	
	U	16,42,892	7,57,769	8,85,123	35.45	10.53	11.61	9.60	96.23	98.12	94.64	1168	985	
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	10.62	91.63	94.58	88.87	1052	985	
Kozhikode District	T	30,89,543	14,73,028	16,16,515	7.31	10.47	11.19	9.82	95.24	97.97	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	981	
	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	93.85	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	94.86	96.81	92.74	1099	989	
Palakkad District	T	28,10,892	13,60,067	14,50,825	7.39	10.26	10.80	9.75	88.49	92.27	84.99	1067	962	24.09
	R	21,33,699	10,31,940	11,01,759	-5.63	10.39	10.94	9.88	87.23	91.27	83.70	1068	964	
	U	6,77,193	3,28,127	3,49,066	89.92	9.84	10.37	9.34	92.45	95.41	89.40	1064	968	
Thrissur District	T	31,10,327	14,74,665	16,35,662	4.58	9.90	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	985	
	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	32,79,960	16,17,602	16,62,268	5.60	8.82	9.15	8.50	95.88	97.14	94.27	1028	954	95.4
	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	68.07
	U	22,32,664	10,99,562	11,33,002	51.15	9.00	9.35	8.65	96.32	97.70	94.98	1030	964	
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	-8.67	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	987	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	987	
	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	968	
Alappuzha District	T	21,21,943	10,10,252	11,11,591	0.61	8.77	9.46	8.14	96.28	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	164.59	9.09	9.73	8.50	93.38	95.46	91.52	1097	968	
Thiruvananthapuram District	T	33,07,284	15,64,200	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**

No. of Districts	2011	
	2001	2011
No. of Sub-Districts (Talukas)	14	14
No. of Towns	63	63
No. of Villages	1,364	1,018
Percentage of Urban population	2001	2011
	25.96	47.72

**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)
STe	60	60	-2%
CTs	99	461	366%
Total	159	520	227%





**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\*

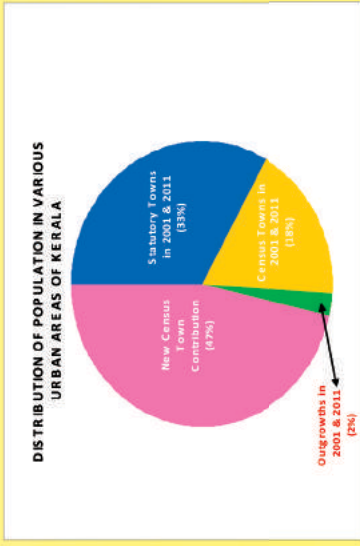
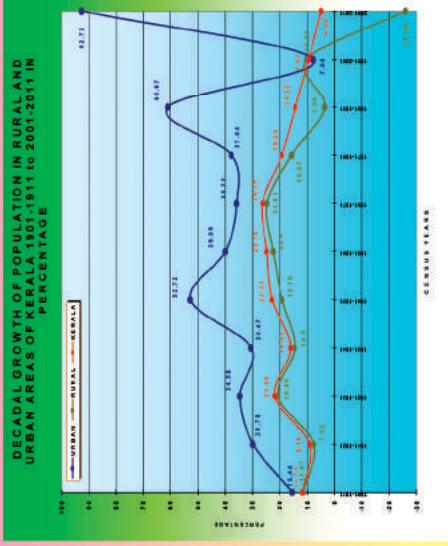
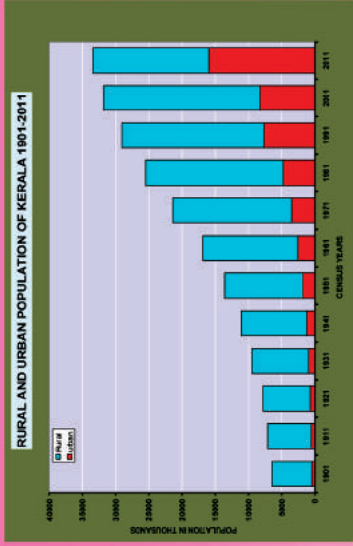
**Census Town (CT):** Places that satisfy the following criteria are termed as Census Towns (CTs). (a) A minimum population of 5000 (b) At least 75% of the male main working population engaged in non-agricultural pursuits (c) A density of population of at least 400 per sq.km No. of CTs in Kerala: 461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

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



**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.rg@cenusindia.gov.in](mailto:dco-ker.rg@cenusindia.gov.in)**



## METEOROLOGY

Table: 5.1

### RAIN FALL DISTRIBUTION

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Actual	Normal	Deviation
<b>1997</b>	6	1	48	86	129	551	919	472	422	329	384	143	3490	3250	240
State Average (Total/14)	3	4	37	62	133	562	942	521	290	283	285	92	3213	3052	161
<b>1998</b>	0	2	5	63	192	700	606	367	712	521	99	50	3317	3250	67
State Average (Total/14)	8	1	11	65	171	725	601	365	516	439	129	84	3115	3052	63
<b>1999</b>	0	18.1	20.6	125.8	606	649	645	171	82	643	76	16	3052.5	3250	-197.5
State Average (Total/14)	2	24	22	124	459	614	657	250	86	545	71	5	2859	3052	-193
<b>2000</b>	18	78	23	86	159	668	365	699	402	223	87	50	2858	2987.6	-129.6
State Average (Total/14)	14	68	23	99	130	649	336	580	249	216	81	70	2515	2919	-404
<b>2001</b>	15	62	0	133	326	1067	770	337	262	409	192	14	3587	2988	599
State Average (Total/14)	20	29	7	113	247	709	587	348	231	320	178	11	2800	2929	-129
<b>2002</b>	4	8	8	108	570	516	370	585	119	463	265	2	3018	2988	30
State Average (Total/14)	7	10	35	117	341	491	319	435	94	519	148	2	2518	2929	-411
<b>2003</b>	0	46	72	143	144	542	593	407	102	448	70	26	2593	3157	-564
State Average (Total/14)	1	50	71	139	93	571	530	345	94	396	82	10	2380	2948	-568

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Actual	Normal	Deviation
<b>2004</b>	3	8	37	87	712	650	421	425	215	507	136	0	3201	3580	-379
State Average (Total/14)	3	8	38	114	622	665	373	405	197	327	119	2	2877	3092	-215
<b>2005</b>	52	1	8	240	122	841	820	355	473	279	196	20	3407	3578	-171
State Average (Total/14)	21	6	27	225	136	628	789	274	400	249	194	62	3011	3091	-80
<b>2006</b>	13	0	62	43	629	654	584	498	506	478	394.5	3	3864	3577.8	286
State Average (Total/14)	10	1	75	71	525	574	551	388	475	380	219	2	3271	3091	180
<b>2007</b>	2	1	9	148	194	815	1133	480	667	522	66.1	10	4047	3577.8	469
State Average (Total/14)	0	7	8	152	210	729	953	492	534	357	101	11	3554	3091	463
<b>2008</b>	3.0	30.8	319.6	129.1	137.7	455.1	539.0	326.2	555.1	304.3	37.4	36.9	NA	NA	NA
State Average (Total/14)	0.8	29.7	215.9	103.7	78.5	477.9	508.6	347.8	343.9	354.2	56.8	16.1	NA	NA	NA
<b>2009</b>	10.4		9.2	89.5	315.7	615.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
State Average (Total/14)	3.2	1.3	9.7	67.8	190.4	433.5	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source:- Agricultural Statistics, DES

Table:- 5.2

**DISTRICT WISE ANNUAL AVERAGE RAINFALL(in mm.)**

Sl. No.	District	2003	2004	2005	2006	2007	2008
1	Thiruvananthapuram	1567	1911	2112	2310.6	2052.1	1923
2	Kollam	2025	2427	2532	2830.8	2742.7	2495
3	Pathanamthitta	2575	2922	3319	3014.6	3302.8	2840
4	Alappuzha	2328	2804	2598	3012.5	3113.1	2992
5	Kottayam	2780	2910	3389	3746.1	3490.7	3208
6	Idukki	3152	3835	5757	4074.6	4499.9	3769
7	Ernakulam	2593	3201	3407	3864.2	4046.7	3578
8	Thrissur	2248	2928	2851	3499.7	3960.2	3074
9	Palakkad	1728	2227	2647	2670.8	3267.1	2472
10	Malappuram	2206	2644	2638	3358.4	3527.9	2850
11	Kozhikode	2274	3333	2347	3751..2	4701.4	3671
12	Wayanad	1915	2608	3203	2707.4	3083	3409
13	Kannur	2865	3370	2845	3475.1	4112.9	3374
14	Kasaragod	3064	3157	2504	3473.9	3850.6	3613

Source : Statistics for Planning 2008

Table:- 5.3

**DETAILS OF RAIN FALL RECORDED IN THE RAIN GAUGE DURING 2007-2008(mm)**

Sl. No.	Division / Centre	April	May	June	July	August	Sep	October	Nov	Dec	Jan	February	March
1	Thenmala	159.85	291.80	311.45	452.66	261.45	302.75	316.25	112.20	52.55	-	113.80	173.45
2	Achencoil	4.00	10.00	13.50	13.00	11.00	15.00	10.00	9.50	-	2.00	10.00	6.50
3	Konni	378.00	236.00	587.00	778.00	308.00	467.70	595.40	198.00	16.20	-	97.00	163.40
4	Munnar	13.86	6.00	66.62	105.50	66.32	53.42	49.78	18.37	6.87	-	3.78	20.83
5	Thrissur	5.77	17.19	75.73	120.30	48.02	53.31	35.47	5.14	1.33	-	3.10	14.12
6	Vazhachal	166.96	359.30	776.67	1,521.04	763.23	726.38	348.37	174.75	24.40	-	51.00	104.30
7	Chalakkudy	6.12	14.45	51.44	97.19	48.63	50.29	43.42	5.38	2.22	-	2.61	24.84
8	Malayattoor	164.07	194.44	608.16	859.44	373.84	519.90	416.34	252.77	56.41	13.99	13.11	174.44
9	Palakkad	3.91	2.01	28.51	21.97	19.34	15.48	19.76	3.23	2.49	0.61	2.02	0.96
10	Mannarkkad	156.00	275.00	736.00	1,100.00	553.00	556.00	329.00	111.00	16.00	-	27.00	286.00
11	Nilambur North	2.23	8.03	23.03	46.12	20.72	19.02	4.83	0.28	0.25	-	0.51	4.09
12	Kannur	74.80	74.00	388.85	568.50	325.15	319.75	71.80	107.40	30.00	-	-	1,907.85
13	Wildlife Division, Thiruvananthapura	96.00	510.00	362.00	353.00	389.00	498.00	517.00	377.00	158.00	45.00	84.00	35.00
14	Periyar East, Thekkady	111.83	250.41	261.02	335.16	223.06	347.24	545.44	269.21	29.32	23.99	5.65	7.21
15	Eravikulam, Munnar	-	106.50	66.05	59.00	92.00	103.90	144.90	43.20	95.02	51.00	-	111.02
16	Periyar West Peerumadu	49.30	608.10	315.51	1,367.50	872.30	1,324.80	1,137.40	476.15	51.40	15.00	54.30	254.00
17	Silent Valley	169.98	308.80	1,693.55	2,402.98	1,378.08	1,000.78	412.55	63.53	16.27	9.00	47.20	186.80
18	Aralam	-	116.00	980.00	1,075.00	670.00	520.00	230.00	110.00	37.00	-	-	-
19	Wildlife Wayanad	165.35	84.53	312.90	636.75	426.31	299.54	144.54	59.50	15.00	25.00	29.34	182.34
20	Sendurney	-	-	-	-	-	-	-	-	-	-	-	-
21	Parambikulam	155.00	260.00	684.00	785.00	621.00	520.00	446.00	24.00	113	24	-	102

Source: Forest Statistics

Table:- 5.4

**MEAN MONTHLY HUMIDITY DURING THE YEAR 2005-2007(in %)**

Year	Jan		Feb		March		April		May		June		July		Aug		Sep		Oct		Nov		Dec		
	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	8.30 A.M.	5.30 P.M.	
<b>2005</b>	82	64	84	61	80	64	84	66	83	67	92	81	92	87	87	87	76	87	78	89	80	85	71	83	69
<b>2006</b>	78	61	82	56	82	66	82	63	82	74	89	84	94	88	91	81	90	79	90	77	87	74	68	53	
<b>2007</b>	73	55	80	56	82	66	80	66	79	69	90	80	94	85	91	84	93	86	88	76	84	70	78	63	

Table:- 5.5

**MONTHLY MEAN MINIMUM-MAXIMUM TEMPERATURE ( ° C) for the year 2007**

Stations	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
TVPM City	21.8	33.0	22.4	33.1	24.1	34.1	25.3	33.8	25.2	32.8	24	31.2	23.5	30.2	23.9	30.7	23.7	30.7	23.4	31.2	23.0	32.0	22.7	32.2	
Kozhikode City	22.8	33.1	23.7	33.1	25.9	33.7	26.3	34.7	25.7	33.2	24.6	30.4	24	29.1	23.7	29.4	24.0	30.0	24.1	31.4	23.3	32.7	23.4	32.8	
Velanikkara	22.0	32.5	22.2	34.2	24.4	36.0	25.0	35.7	24.7	32.7	23.5	30.0	22.9	28.4	22.9	29.0	23.0	29.4	22.5	30.5	21.6	31.7	22.6	36.6	
Alappuzha	21.6	31.8	22.5	31.7	24.9	32.5	24.5	32.8	25	32.3	23	29.2	22	28.4	22.4	29.1	22.9	30.0	22.9	30.9	22.7	31.4	22.1	32.1	
Thiruvananthapuram AP	22.4	31.3	22.9	31.5	24.9	32.5	25.6	33.0	25.6	32.3	23.9	30.7	23.4	29.7	24.1	30.0	23.9	30.2	23.7	30.2	23.4	30.9	22.9	31.3	
Kannur	20.6	33.5	21.5	34.3	24.3	34.9	25.2	35.7	25	34.2	23.2	30.4	22.5	29.7	22.4	29.9	22.9	30.5	22.8	31.8	21.7	33.9	22.8	33.4	
Punalur	19.9	35.2	20.5	36.0	22.4	38.0	24.3	36.1	24.3	34.7	23.2	31.9	22.8	29.7	23.1	31.6	23.0	31.3	23.1	30.5	22.3	31.7	21.8	31.0	
Kozhikode AP	21.8	33.0	22.5	33.0	25.0	33.9	25.2	34.3	25	32.9	23.6	29.7	22.7	28.1	22.7	29.0	22.8	29.2	22.8	30.9	22.3	32.9	22.0	33.0	
Kottayam	21.3	33.7	21.9	33.8	24.4	34.7	24.1	33.9	24.4	32.6	23.4	30.2	22.7	28.7	23.1	30.0	23.1	30.0	22.7	31.0	22.5	31.9	21.7	32.4	
Palakkad	21.8	32.1	21.9	34.2	24.5	38.4	Data not available																		
Kochi	22.5	32.3	23.4	32.3	25.9	33.0	25.6	33.4	25.5	32.4	23.8	30.2	23.1	29.3	23.6	29.5	23.5	29.7	23.5	31.3	23.3	31.3	23.1	31.8	

Source: Farm Guide



## **GEOLOGY & GEOMORPHOLOGY**

Ernakulam is having a coastline of about 30 kms. It is bounded by the Lakshadweep sea in the west. Kottayam and Alappuzha districts in the south, Idukki in the east and Thrissur in the north. Its maximum length in an East West direction is about 48 km and the maximum width in North South direction is about 38 KM and the district has a total area of 3068 KM<sup>2</sup>. The district is situated between 9<sup>o</sup> 42'30" N to 10<sup>o</sup> 18' 00" N latitude and 76<sup>o</sup> 12' 00" to 76<sup>o</sup> 46' 00" E longitude.. The district is divided into three physiographic zones from west to east, the coastal plain, midland and highland regions. Kochi, the district headquarters is one of the major business and trade centers of Kerala.

Geologically two distinct litho units are discernible in the area. The eastern part is occupied by the hard rocks representing Precambrian metamorphosed rocks while the coastal tract in the west is covered by soft rock or the unconsolidated coastal alluvium.

### **GEOLOGY**

Major part of the district is occupied by charnokite and migmatite groups of rocks of precmbrian age. The charnokite group is composed of pyroxene granulite, magnetic quartzite and charnokite. Charnokite, which is very widely distributed, is coarse grained, granulitic and dark coloured. Pyroxene granulite and magnetic quartzite occur as linear bands. Calc- gneiss and quartzite of khondalite group are the oldest rocks of the area and they are seen as linear lensoidal bodies within the charnokites. The migmatite group includes biotite gneiss and quartzite in abundance. These older rocks are intruded by both acid (syenite) and basic (Gabbro and dolerite) intrusives. Patchy outcrops of warkallai beds, consisting of pebble bed, grit, friable sandstone and variegated clay is seen in the western part around Edapalli, Kalamasseri areas. Both the warkallai beds as well as the basement rocks are subjected to intense lateralization, which is confined to the midland region only. The coastal tract is covered by Quaternary sediments like beach sand, palaeo beach ridge deposits (sand), flood plain deposits (sand, silt, clay) and total deposits (clay, mud).

The main rock types in the district are charnockites gneisses, intrusive, laterite, grit, alluvium, beach sands and soil.

The charnockites are coarse grained granulate rocks and are generally dark colored. The foliation is not very well marked and the rock is massive. The gneisses include rocks showing well defined foliation like granite-silminate gneisses, calcic-gneisses, granite-gneiss, migmatites etc. The intrusives are of granite, pegmatite dolorite and gabbro types cutting across the gneisses and charnockites. Grits considered to be of Warkalli age (tertiary) are seen lying above the crystalline and the contact is marked by the zone of Kaolanisation. Laterites are seen as a capping over all types of rocks. Alluvium is noticed along the Nala and river channels. Beach sands are noticed all along the coast. Soil is noticed as the disintegration product of the hills and as transported material on the natural depressions.

## **PHYSIOGRAPHY**

The district has three well defined units- High lands, Midlands and Lowlands. The last two units form the major portion of the district while the high lands are restricted to the eastern and northern part of the district. In the eastern portion, the hill near Mullaringad is 1100 feet high. Near Kondimarton and 8 KM south-west of it, hills of 897' and 1008' high respectively are noticed. In the northern portion, Kurisumudi (1274'), Kattanna (1502') and Karathulimudi hills are seen. The low land lies between the backwater and sea, while the midland occupies the area in between the low land and the highland.

The main rivers in the district are Periyar and Muvattupuzha, which drain into the Arabian Sea. The Periyar flowsthrough all the taluks except Cochin. The Chalakudy flows through the northern boundary of Alwaye taluk and joins the Periyar at Alanthikara. The Muvattupuzha river is formed by the confluence of three rivers, viz. Thodupuzha kalli and Kothamangalam hence the name Muvattupuzha. During rainy season the rivers are full and the low lying areas are affected by heavy floods but in summer season they have very little water. Kodungallur Kayal and Varapuzha Kayal are seen in the northern and southern parts of the district. Major portion of Vembanad lake falls in this district. There are a number of tanks in the district for storing water in summer.

## **MINERAL RESOURCES**

The economic minerals of the district include magnetic iron ores, glass sand, limeshell, clays, graphites and building stones. Iron ores are found in isolated patches in Muvattupuzha and Kunnathunnad taluks. Glass sands occur at Eeroor,

Puthiyakavu, Panangad and neighbouring places and at Palluruthy. Lime shell exploited from Varapuzha and Kodungallur lakes is used for lime burning. Extensive deposits of clay suitable for the manufacture of tiles occur in Aluva and Kanayannur taluks and they are exploited for the manufacture of tiles and bricks. Fairly good quality of china clay is found at Amballur and Mulanthuruthy. Ball clays suitable for the manufacture of stone ware occur in Irumbanam while graphite occur in certain parts of Kunnathunnad taluk. The crystalline rocks occur in many parts of the district are used for the building purposes and also as road metals.

The mineral found in the district are graphite, clay, peat and building stones. Graphite is found in association with the khondalite group of rocks. Good deposits of graphite are noticed in places like Avoli, Peringazha, Memadanju and Kuthattukulam. Iron-ore is reported from Mayalam and Nadayaram areas. The district has fairly good resource of chine clay, fire clay and tile/ brick clay also. China clay of primary origin is reported from Amballoor and other area. Good deposits of tile clay are noticed along the flood plains in Kalady, Parur and Neythodu areas. A peat horizon of .3 m thickness is reported from near Trpunithura found in association with the Quarternary sediments. Charnockite is widely quarried and used as building stones.

**GRAPHITE:-** Graphite occurs at Perungala, Nagapuzha, Memadangu and Kuthattukulam areas. Parts of Piralimattom occurrence also falls in this district. Graphite occurs in the form of lenses, veins and disseminations in the biotite gneisses. In Perungala area, it is of good flaky variety. The reserve is 36,000 tonnes with 15.34 % graphite. In Nagapuzha, the graphite zone has been traced over a length of over 1 KM. At Memadangu, the graphite is of impersistant occurrence. In Kuthattukulam the graphite zone is 30m wide and 400 m in the strike length. In the Piralimattam graphite is noticed over a strike length of 25-80 m. The reserve is 35,000 tonnes with 16.87 of graphite.

**BUILDING STONE:-** The charnockites and gneisses are quarried for building stones. The softer variety of laterite are cut into block and used as bricks. The beach and river sand is used as mixing material for constructional purposes.

## **GEOMORPHOLOGY AND GEOHYDROLOGY**

Like other parts of the State, this district is also divided into three physiographic zones as the coastal plain in the western part, midlands in the central part and highlands in the eastern part. The coastal plain is a low lying area, with a maximum elevation of around 10m, characterized by backwater bodies, marshy lands, sandy flats and alluvial plains, which are liable for flooding during the

monsoon. The midland region has a rolling topography with low hills and narrow valleys. The hills are generally covered with laterite or laterite soils and the valleys are alluvial. The region has very gentle to moderate slope from east to west. The eastern most part is a rugged terrain with steep sloped hills and small summits. It actually forms the foothills of the Western Ghats. Elevation of this terrain is generally more than 300m above MSL. As the area is covered by forest soil. thick forest and cultivation of cash crops like rubber and pepper can be seen in the area.

The district is endowed with good water resources as the rainfall is one of the highest in India and also two rivers Muvattupuzha and Periyar are flowing in the district. Potential aquifers occur all along the coastal alluvium, whose thickness varies from a few meters to 100m. Depth to water table is 0-3m. Ground water development in the area is mainly by means of dug wells. Laterites are the potential aquifers for groundwater. But the problem with laterites is ground water drains off immediately after the rainy season. In crystalline ground water occurs in the weathered and partly weathered, fractured and joined rocks. Bore wells dug in potential fracture zones gives high yields. There are about 55 National Hydrographic Stations in the district.

## **GEOTECHNICAL CHARACTERISTICS AND NATURAL HAZARDS**

The coastal alluvium, riverine alluvium, brown hydromorphic soils and acid saline are soft and unconsolidated material. Their compressive strength varies from 1-4 Kg/ cm<sup>2</sup>, while the laterite soil shows fairly good foundation characteristics and compressive strength ranging from 50-500 Kg/cm<sup>2</sup>. The foundation characteristic is fairly good in laterite terrain. Two major west flowing rivers viz, Muvattupuzha and Periyar are flowing in the district. Investigations are being carries out to locate irrigation project in the district on these rivers.

Table: 6.1

**GEOLOGY DETAILS**

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)	
<b>ALANGODU</b>	Alangad	Charnockite group of rocks	984.99	
		Migmatite Complex	108.83	
		Sand and Silt	796.85	
				<b>1890.67</b>
	Kadungallur	Charnockite group of rocks	1638.56	
		Migmatite Complex	84.88	
		Sandstone and clay with lignite interc	1.77	
				<b>1725.21</b>
	Karumalloor	Alkaline Rocks	18.04	
		Charnockite group of rocks	656.21	
		Migmatite Complex	723.22	
		Sand and Silt	600.19	
		Tank/WB/River	40.27	
				<b>2037.92</b>
	Varapuzha	Sand and Silt	933.24	
		Tank/WB/River	8.14	
				<b>941.38</b>
				<b>6595.19</b>
	<b>Aluva Municipality</b>			0.00
		Charnockite group of rocks	513.25	
		Migmatite Complex	29.15	
		Sand and Silt	152.42	
			<b>694.81</b>	
			<b>694.81</b>	
<b>ANGAMALI</b>			0.00	
	Ayyampuzha	Basic Rocks	976.77	
		Charnockite group of rocks	19272.37	
		Migmatite Complex	2657.06	
		Penisular Gneissic Complex	1483.87	
				<b>24390.07</b>
	Kalady	Basic Rocks	120.84	
		Charnockite group of rocks	1580.77	
				<b>1701.61</b>
	Kanjoor	Basic Rocks	12.32	
		Charnockite group of rocks	1185.32	
		Khondalite Group of rocks	16.18	
		Sand and Silt	159.53	
				<b>1373.35</b>
	Karukutty	Basic Rocks	189.57	
Charnockite group of rocks		2498.53		
Migmatite Complex		16.15		
			<b>2704.25</b>	

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)
<b>Angamali Municipality</b>	Malayattoor-Neeleswaram	Basic Rocks	262.80
		Charnockite group of rocks	2868.33
		Migmatite Complex	88.42
			<b>3219.54</b>
	Manjapra	Basic Rocks	43.54
		Charnockite group of rocks	1028.81
			<b>1072.35</b>
	Mookkannur	Basic Rocks	187.92
		Charnockite group of rocks	2223.10
		Migmatite Complex	33.27
			<b>2444.29</b>
	Thuravoor	Basic Rocks	158.55
		Charnockite group of rocks	1552.94
			<b>1711.50</b>
			<b>38616.95</b>
		0.00	
		Alkaline Rocks	28.30
		Basic Rocks	106.31
		Charnockite group of rocks	1767.95
		Migmatite Complex	162.57
			<b>2065.14</b>
			<b>2065.14</b>
<b>EDAPALLY</b>			0.00
	Cheranallur	Sand and Silt	533.33
			<b>533.33</b>
	Elamkunnappuzha	Sand and Silt	1128.03
		Tank/WB/River	269.05
			<b>1397.08</b>
	Kadamakkudy	Sand and Silt	759.44
		Tank/WB/River	579.72
			<b>1339.16</b>
	Mulavukade	Sand and Silt	642.34
		Tank/WB/River	1147.38
			<b>1789.72</b>
			<b>5059.29</b>
<b>Eloor Municipality</b>			0.00
	Eloor	Charnockite group of rocks	787.31
		Sand and Silt	458.44
		Sandstone and clay with lignite interc	81.81
			<b>1327.56</b>
			<b>1327.56</b>
<b>Kalamassery Municipality</b>			0.00
		Charnockite group of rocks	2790.61

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)
<b>Kochi Corporation</b>		Sand and Silt	825.29
		Sandstone and clay with lignite interc	201.27
			<b>3817.17</b>
			<b>3817.17</b>
			0.00
		Sand and Silt	7043.53
		Tank/WB/River	1590.73
			<b>8634.26</b>
			<b>8634.26</b>
		<b>KOOVAPADY</b>	
Asamannoor			
Basic Rocks	274.94		
Charnockite group of rocks	1694.93		
Migmatite Complex	213.87		
	<b>2183.74</b>		
Koovappady			
Basic Rocks	197.40		
Charnockite group of rocks	3183.02		
	<b>3380.43</b>		
Mudakuzha			
Basic Rocks	255.92		
Charnockite group of rocks	1937.40		
	<b>2193.32</b>		
Ockal			
Basic Rocks	84.48		
Charnockite group of rocks	1253.60		
Sand and Silt	5.54		
	<b>1343.62</b>		
Rayamanglam			
Basic Rocks	346.51		
Charnockite group of rocks	2287.44		
Migmatite Complex	331.94		
	<b>2965.89</b>		
Vengoor			
Basic Rocks	60.14		
Charnockite group of rocks	4979.45		
Migmatite Complex	784.60		
	<b>5824.19</b>		
	<b>17891.18</b>		
<b>KOTHAMANGALAM</b>			0.00
		Kavalangad	
		Basic Rocks	6.95
		Charnockite group of rocks	75.16
		Khondalite Group of rocks	60.08
		Migmatite Complex	7660.77
			<b>7802.96</b>
		Keerampara	
		Charnockite group of rocks	1438.76
		Khondalite Group of rocks	18.04
Migmatite Complex	1550.64		
Penisular Gneissic Complex	83.17		
	<b>3090.61</b>		

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)
Kothamangalam Municipality	Kottappadi	Basic Rocks	56.76
		Charnockite group of rocks	2750.80
		Migmatite Complex	287.94
			<b>3095.50</b>
	Kuttampuzha	Basic Rocks	801.29
		Charnockite group of rocks	8672.58
		Migmatite Complex	3272.35
		Pegmatite/Aplite/Quartz vein	40.11
		Penisular Gneissic Complex	51744.27
		Sand and Silt	219.79
			<b>64750.39</b>
	Nellikuzhi	Basic Rocks	351.15
		Charnockite group of rocks	2232.49
		Migmatite Complex	82.46
			<b>2666.11</b>
	Paingottur	Basic Rocks	21.15
		Charnockite group of rocks	85.36
		Khondalite Group of rocks	31.98
		Migmatite Complex	2891.60
			<b>3030.08</b>
	Pallairmangalam	Basic Rocks	69.54
		Charnockite group of rocks	325.54
		Migmatite Complex	881.51
			<b>1276.58</b>
	Pindimana	Basic Rocks	26.90
		Charnockite group of rocks	2160.93
		Migmatite Complex	339.48
			<b>2527.31</b>
	Pothanikkade	Basic Rocks	69.96
		Charnockite group of rocks	66.27
Migmatite Complex		1673.12	
		<b>1809.35</b>	
Varappetty	Basic Rocks	57.42	
	Charnockite group of rocks	801.65	
	Migmatite Complex	1348.39	
		<b>2207.46</b>	
		<b>92256.35</b>	
		0.00	
		Basic Rocks	202.92
		Charnockite group of rocks	1809.15
		Migmatite Complex	1859.73
			<b>3871.80</b>
			<b>3871.80</b>



BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)
<b>Maradu Municipality</b>	Maradu	Sand and Silt	0.00
		Tank/WB/River	1233.60
			197.17
			<b>1430.77</b>
			<b>1430.77</b>
<b>MOOVATTUPUZHA</b>	Arakuzha	Basic Rocks	0.00
		Charnockite group of rocks	211.84
		Khondalite Group of rocks	2100.46
		Migmatite Complex	55.12
			546.79
			<b>2914.21</b>
	Avoly	Basic Rocks	130.62
		Charnockite group of rocks	1016.20
		Khondalite Group of rocks	62.30
		Migmatite Complex	734.20
			<b>1943.32</b>
	Ayavana	Basic Rocks	279.26
		Charnockite group of rocks	2230.06
		Khondalite Group of rocks	117.51
		Migmatite Complex	362.35
			<b>2989.18</b>
	Kalloorkkade	Basic Rocks	187.17
		Charnockite group of rocks	2153.89
		Khondalite Group of rocks	181.98
		Migmatite Complex	76.15
			<b>2599.19</b>
	Manjalloor	Basic Rocks	156.99
		Charnockite group of rocks	2183.61
			<b>2340.60</b>
	Marady	Basic Rocks	507.87
		Charnockite group of rocks	1648.44
		Khondalite Group of rocks	23.79
		Migmatite Complex	105.35
			<b>2285.44</b>
	Paipra	Basic Rocks	152.00
		Charnockite group of rocks	2637.64
		Khondalite Group of rocks	31.21
Migmatite Complex		464.29	
		<b>3285.14</b>	
Valakam	Basic Rocks	409.23	
	Charnockite group of rocks	1914.68	
		<b>2323.92</b>	
		<b>20680.99</b>	

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)	
<b>MULANTHURUTHY</b>	Amballur	Charnockite group of rocks	0.00	
		Laterite	191.95	
		Sand and Silt	19.76	
				<b>2077.04</b>
				<b>2288.75</b>
	Chottanikkara	Charnockite group of rocks	970.58	
		Sand and Silt	224.62	
				<b>1195.20</b>
	Edakkattuvayal	Charnockite group of rocks	2095.51	
		Laterite	302.13	
		Sand and Silt	145.41	
				<b>2543.05</b>
	Maneed	Charnockite group of rocks	2629.64	
				<b>2629.64</b>
	Mulanthuruthy	Charnockite group of rocks	1632.25	
		Laterite	81.40	
		Sand and Silt	583.86	
				<b>2297.51</b>
	Udayamperur	Charnockite group of rocks	39.76	
		Laterite	3.18	
		Sand and Silt	1471.66	
Tank/WB/River		1221.45		
			<b>2736.05</b>	
			<b>13690.19</b>	
<b>Muvattupuzha Municipality</b>			0.00	
		Basic Rocks	36.52	
		Charnockite group of rocks	780.80	
		Khondalite Group of rocks	22.71	
		Migmatite Complex	342.63	
				<b>1182.67</b>
			<b>1182.67</b>	
<b>PALLURUTHY</b>			0.00	
	Chellanam	Sand and Silt	2715.68	
		Tank/WB/River	408.69	
				<b>3124.36</b>
	Kumbalam	Sand and Silt	955.93	
		Tank/WB/River	959.39	
				<b>1915.32</b>
	Kumbalangy	Sand and Silt	1565.82	
				<b>1565.82</b>
			<b>6605.50</b>	
<b>PAMPAKUDA</b>			0.00	
	Elanji	Basic Rocks	142.25	

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)
PARAKADAV	Koothattukulam	Charnockite group of rocks	2897.54
			<b>3039.79</b>
		Basic Rocks	87.33
	Palakuzha	Charnockite group of rocks	2042.93
		Khondalite Group of rocks	137.63
			<b>2267.90</b>
		Basic Rocks	493.20
		Charnockite group of rocks	1764.94
	Pampakuda	Khondalite Group of rocks	29.15
			<b>2287.29</b>
		Basic Rocks	180.95
	Piravam	Charnockite group of rocks	2569.40
		Khondalite Group of rocks	86.47
			<b>2836.83</b>
	Ramamanagalam	Basic Rocks	70.35
		Charnockite group of rocks	2893.26
		Laterite	35.00
		<b>2998.60</b>	
	Thirumarady	Basic Rocks	226.59
		Charnockite group of rocks	2164.47
			<b>2391.06</b>
	Chengamanad	Basic Rocks	389.89
		Charnockite group of rocks	2640.23
		Khondalite Group of rocks	67.10
		<b>3097.22</b>	
		<b>18918.69</b>	
		0.00	
	Kunnukara	Charnockite group of rocks	982.15
		Migmatite Complex	369.88
		Sand and Silt	245.45
		<b>1597.48</b>	
	Nedumbassery	Charnockite group of rocks	103.31
Migmatite Complex		1752.73	
Sand and Silt		136.62	
	<b>1992.67</b>		
Parakkadavu	Alkaline Rocks	4.01	
	Charnockite group of rocks	1467.91	
	Migmatite Complex	896.33	
	<b>2368.24</b>		
Puthenvelikara	Basic Rocks	12.65	
	Charnockite group of rocks	359.75	
	Migmatite Complex	2148.54	
	<b>2520.94</b>		
	83.22		
	1123.92		

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)
<b>PARAVOOR</b>		Sand and Silt	514.43
		Tank/WB/River	233.56
	Sreemoolanagaram		<b>1955.13</b>
		Charnockite group of rocks	1187.64
		Sand and Silt	207.53
			<b>1395.17</b>
	Chengamangalam		<b>11829.63</b>
			0.00
	Chittattukara	Sand and Silt	656.66
		Tank/WB/River	456.40
	Ezhikkara		<b>1113.07</b>
			950.11
	Kottuvally	Sand and Silt	54.20
		Tank/WB/River	<b>1004.31</b>
Vadakkekkara	Sand and Silt	988.00	
	Tank/WB/River	635.32	
Paravoor Municipality		<b>1623.32</b>	
		1997.36	
Perumbavoor Municipality		207.96	
		<b>2205.33</b>	
Thrikkakara Municipality		788.86	
		252.14	
Thrikkakara Municipality		<b>1041.00</b>	
		<b>6987.02</b>	
Thrikkakara Municipality		0.00	
		802.97	
Thrikkakara Municipality		<b>802.97</b>	
		<b>802.97</b>	
Thrikkakara Municipality		0.00	
		263.01	
Thrikkakara Municipality		1432.96	
		127.05	
Thrikkakara Municipality		4.81	
		<b>1827.83</b>	
Thrikkakara Municipality		<b>1827.83</b>	
		0.00	
Thrikkakara Municipality		533.15	
		1008.72	
Thrikkakara Municipality		4.07	
		<b>1545.94</b>	
Thrikkakara Municipality		<b>1545.94</b>	
		<b>1545.94</b>	

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)
<b>Thrippunithura Municipality</b>			0.00
		Charnockite group of rocks	450.50
		Sand and Silt	2503.81
		Tank/WB/River	13.91
			<b>2968.22</b>
<b>VADAVUKODU</b>			0.00
	Aikaranad	Basic Rocks	38.45
		Charnockite group of rocks	2386.51
			<b>2424.96</b>
	Kunnathunadu	Basic Rocks	18.91
		Charnockite group of rocks	2792.92
		Khondalite Group of rocks	1.61
		Laterite	38.37
		Migmatite Complex	79.00
			<b>2930.81</b>
	Mazhuvannoor	Basic Rocks	393.27
		Charnockite group of rocks	4549.01
			<b>4942.28</b>
	Poothrikka	Basic Rocks	8.61
		Charnockite group of rocks	2644.88
			<b>2653.48</b>
	Thiruvaniyoor	Charnockite group of rocks	2534.95
		Laterite	89.30
			<b>2624.26</b>
	Vadavucode-Puthenkurisu	Charnockite group of rocks	2778.85
		Laterite	110.03
		Sand and Silt	247.78
			<b>3136.66</b>
			<b>18712.45</b>
<b>VAZHAKULAM</b>			0.00
	Choornnikkara	Charnockite group of rocks	808.47
			<b>808.47</b>
	Edathala	Basic Rocks	0.04
		Charnockite group of rocks	1991.82
			<b>1991.86</b>
	Keezhmad	Charnockite group of rocks	1520.76
		Khondalite Group of rocks	17.50
		Sand and Silt	153.11
			<b>1691.36</b>
	Kizhakkambalam	Basic Rocks	92.31
		Charnockite group of rocks	2844.20
Khondalite Group of rocks		6.71	

BLOCK	PANCHAYAT	ROCK-TYPE	AREA (Ha)
VYPIN	Vazhakkulam	Migmatite Complex	90.51
			<b>3033.73</b>
		Basic Rocks	95.74
		Charnockite group of rocks	1883.05
		Khondalite Group of rocks	34.42
		Sand and Silt	86.23
		<b>2099.45</b>	
	Vengola	Basic Rocks	111.47
		Charnockite group of rocks	3282.66
		Khondalite Group of rocks	24.49
		Migmatite Complex	123.35
		<b>3541.97</b>	
		<b>13166.84</b>	
		0.00	
	Edavanakkade	Sand and Silt	935.18
		Tank/WB/River	123.22
		<b>1058.40</b>	
	Kuzhappully	Sand and Silt	490.45
		Tank/WB/River	169.30
		<b>659.75</b>	
	Nayarambalam	Sand and Silt	969.28
		Tank/WB/River	115.60
		<b>1084.89</b>	
Njarakkal	Sand and Silt	681.35	
	Tank/WB/River	152.20	
	<b>833.55</b>		
Pallippuram	Sand and Silt	1012.03	
	Tank/WB/River	344.65	
	<b>1356.68</b>		
	<b>4993.27</b>		
	<b>District Total</b>	<b>306800.00</b>	

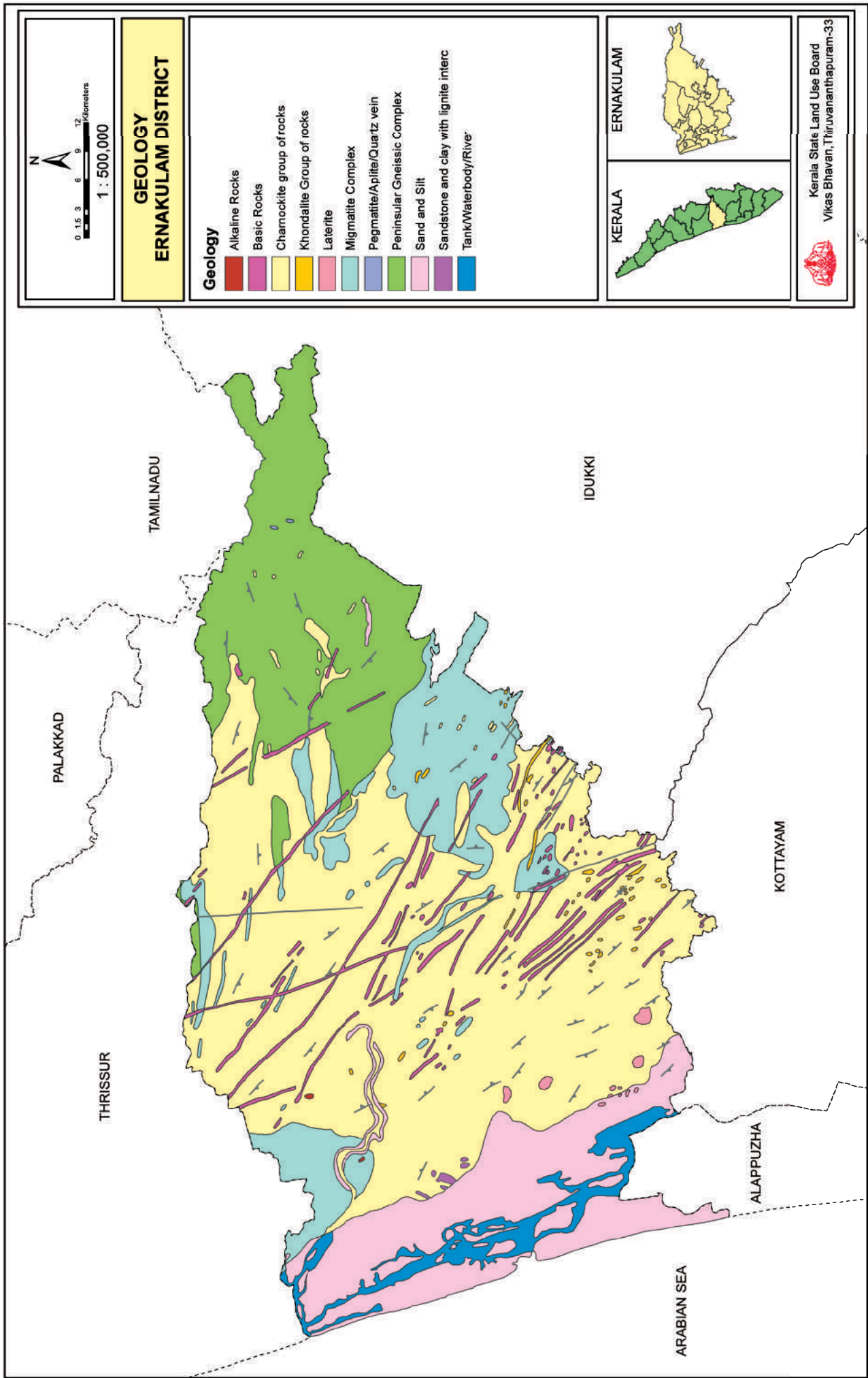






Table: 6.2

**GEOMORPHOLOGY DETAILS**

<b>BLOCK</b>	<b>PANCHAYAT</b>	<b>DISCR-L3</b>	<b>AREA (Ha)</b>
ALANGODU	Alangad	Coastal Plain	1041.93
		Mud flat(Coastal Plain)	771.43
		Water Body	77.31
			<b>1890.67</b>
	Kadungallur	Channel bar(Flood Plain)	0.30
		Coastal Plain	707.16
		Lower Plateau (Lateritic) - Dissected	121.82
		Mud flat(Coastal Plain)	710.98
		Valley Fill	90.55
		Water Body	94.41
			<b>1725.21</b>
	Karumalloor	Channel bar(Flood Plain)	13.28
		Coastal Plain	991.92
		Lower Plateau (Lateritic) - Dissected	2.08
		Marshy	17.47
		Mud flat(Coastal Plain)	781.39
		Point bar(Flood Plain)	21.43
		Stabilized channel bar (Flood Plain)	12.49
		Swale(Coastal Plain)	26.76
		Valley Fill	0.56
		Water Body	170.54
		<b>2037.92</b>	
	Varapuzha	Coastal Plain	570.63
		Mud flat(Coastal Plain)	253.72
		Water Body	117.04
		<b>941.38</b>	
		<b>6595.19</b>	
Aluva Municipality		0.00	
	Coastal Plain	190.79	
	Lower Plateau (Lateritic) - Dissected	340.22	
	Mud flat(Coastal Plain)	25.00	
	Point bar(Flood Plain)	30.75	
	Valley Fill	44.90	
	Water Body	63.16	
	<b>694.81</b>		
	<b>694.81</b>		

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
ANGAMALI	Ayyampuzha	Residual Mount(Pediment)	0.00
		Channel bar(Flood Plain)	110.36
		Denudational Hills	11.70
		Denudational Structural Hills	1239.26
		Linear ridge(Piedmont Zone)	10402.99
		Lower Plateau (Lateritic) - Dissected	66.96
		Piedmont Zone	7.50
		Point bar(Flood Plain)	10437.01
		Residual Hill	7.53
		Valley	854.10
		Valley Fill	27.98
		Water Body	1085.67
			139.01
			<b>24390.07</b>
	Kalady	Lower Plateau (Lateritic) - Dissected	819.73
		Piedmont Zone	57.82
		Point bar(Flood Plain)	0.81
		Valley Fill	802.51
		Water Body	20.74
		<b>1701.61</b>	
	Kanjoor	Lower Plateau (Lateritic) - Dissected	813.55
		Point bar(Flood Plain)	46.32
		Valley Fill	410.51
		Water Body	102.96
		<b>1373.35</b>	
	Karukutty	Residual Mount(Pediment)	8.44
		Channel bar(Flood Plain)	0.62
		Linear ridge(Lower Plateau)	6.39
		Lower Plateau (Lateritic) - Dissected	1790.86
		Piedmont Zone	100.81
		Point bar(Flood Plain)	0.11
		Residual Mount	52.34
		Valley Fill	727.84
		Water Body	16.84
		<b>2704.25</b>	
	Neeleswaram	Residual Mount(Pediment)	25.06
		Channel bar(Flood Plain)	0.06
		Piedmont Zone	1906.67
		Point bar(Flood Plain)	22.29
		Residual Hill	519.40
		Valley Fill	642.25
		Water Body	103.81
		<b>3219.54</b>	

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)	
Angamali Municipality	Manjapra	Lower Plateau (Lateritic) - Dissected	627.92	
		Piedmont Zone	0.90	
		Valley Fill	443.53	
				<b>1072.35</b>
	Mookkannur	Linear ridge(Lower Plateau)	57.64	
		Lower Plateau (Lateritic) - Dissected	1323.78	
		Piedmont Zone	374.51	
		Valley Fill	688.37	
				<b>2444.29</b>
	Thuravoor	Lower Plateau (Lateritic) - Dissected	958.11	
		Valley Fill	753.39	
				1711.50
				<b>38616.95</b>
				0.00
			Lower Plateau (Lateritic) - Dissected	1180.09
		Valley Fill	859.16	
		Water Body	25.88	
			<b>2065.14</b>	
			<b>2065.14</b>	
EDAPALLY			0.00	
	Cheranallur	Coastal Plain	397.38	
		Mud flat(Coastal Plain)	60.72	
		Swale(Coastal Plain)	38.47	
		Valley Fill	1.09	
		Water Body	35.67	
				<b>533.33</b>
	Elamkunnappuzha	Beach(Coastal Plain)	12.63	
		Coastal Plain	738.06	
		Mud flat(Coastal Plain)	391.68	
		Swale(Coastal Plain)	2.34	
		Water Body	252.37	
				<b>1397.08</b>
	Kadamakkudy	Coastal Plain	253.78	
		Mud flat(Coastal Plain)	453.36	
Water Body		632.02		
			<b>1339.16</b>	
Mulavukade	Coastal Plain	436.63		
	Marshy	114.59		
	Mud flat(Coastal Plain)	93.87		
	Water Body	1144.64		
			<b>1789.72</b>	
			<b>5059.29</b>	

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
Eloor Municipality	Eloor		0.00
		Coastal Plain	951.83
		Lower Plateau (Lateritic) - Dissected	0.14
		Mud flat(Coastal Plain)	269.28
		Swale(Coastal Plain)	7.18
		Valley Fill	1.53
		Water Body	97.61
			<b>1327.56</b>
Kalamassery Municipality			0.00
		Coastal Plain	0.09
		Lower Plateau (Lateritic) - Dissected	2529.85
		Mud flat(Coastal Plain)	1.40
		Valley Fill	1261.20
		Water Body	24.63
			<b>3817.17</b>
			<b>3817.17</b>
Kochi Corporation			0.00
		Beach(Coastal Plain)	0.01
		Coastal Plain	5707.48
		Lower Plateau (Lateritic) - Dissected	1.18
		Marshy	0.31
		Mud flat(Coastal Plain)	775.37
		Swale(Coastal Plain)	389.34
		Valley Fill	3.51
		Water Body	1757.06
			<b>8634.26</b>
KOOVAPADY	Asamannoor		0.00
		Lower Plateau (Lateritic) - Dissected	1819.58
		Residual Hill	33.55
		Residual Mount	26.12
		Valley Fill	304.48
		<b>2183.74</b>	
	Koovappady	Lower Plateau (Lateritic) - Dissected	1968.06
		Piedmont Zone	0.60
		Point bar(Flood Plain)	68.68
		Stabilized channel bar (Flood Plain)	10.71
		Valley Fill	1184.19
	Water Body	148.19	
		<b>3380.43</b>	
	Mudakuzha	Lower Plateau (Lateritic) - Dissected	1454.58
		Residual Mount	20.40
Valley Fill		718.34	
	<b>2193.32</b>		

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
KOTHAMANGALAM	Ockal	Channel bar(Flood Plain)	10.58
		Lower Plateau (Lateritic) - Dissected	605.08
		Piedmont Zone	1.06
		Point bar(Flood Plain)	65.03
		Stabilized channel bar (Flood Plain)	11.69
		Valley Fill	504.18
		Water Body	146.00
			<b>1343.62</b>
	Rayamanglam	Lower Plateau (Lateritic) - Dissected	2083.02
		Residual Hill	289.68
		Residual Mount	4.15
		Valley Fill	589.03
		<b>2965.89</b>	
	Vengoor	Channel bar(Flood Plain)	106.01
		Piedmont Zone	231.98
		Point bar(Flood Plain)	37.58
		Residual Hill	59.29
		Residual Mount	56.70
		Stabilized channel bar (Flood Plain)	5.57
		Valley Fill	965.17
		Water Body	340.25
		<b>5824.19</b>	
		<b>17891.18</b>	
		0.00	
	Kavalangad	Channel bar(Flood Plain)	2.17
		Denudational Structural Hills	1433.81
		Linear ridge(Lower Plateau)	42.63
		Lower Plateau (Lateritic) - Dissected	2719.30
		Piedmont Zone	2168.35
		Residual Hill	530.55
		Residual Mount	53.98
		Valley	118.65
		Valley Fill	582.55
		Water Body	150.98
			<b>7802.96</b>
	Keerampara	Linear ridge(Lower Plateau)	1.66
		Lower Plateau (Lateritic) - Dissected	2255.63
		Piedmont Zone	4.18
		Residual Hill	339.81
		Residual Mount	14.88
		Valley Fill	339.56
	Water Body	134.90	
		<b>3090.61</b>	

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
	Kottappadi	Lower Plateau (Lateritic) - Dissected	2552.35
		Residual Hill	40.33
		Valley Fill	502.82
			<b>3095.50</b>
	Kuttampuzha	Channel bar(Flood Plain)	5.38
		Denudational Hills	1457.03
		Denudational Structural Hills	50675.16
		Piedmont Zone	11537.96
		Point bar(Flood Plain)	3.87
		Residual Mount	36.68
		Valley	91.68
		Valley Fill	198.74
		Water Body	743.87
			<b>64750.39</b>
	Nellikuzhi	Lower Plateau (Lateritic) - Dissected	2057.81
		Residual Hill	15.34
		Residual Mount	2.69
		Valley Fill	590.27
			<b>2666.11</b>
	Paingottur	Denudational Structural Hills	245.15
		Lower Plateau (Lateritic) - Dissected	873.57
		Piedmont Zone	1469.67
		Residual Mount	14.88
		Valley Fill	409.06
		Water Body	17.75
			<b>3030.08</b>
	Pallairmangalam	Lower Plateau (Lateritic) - Dissected	978.50
		Valley Fill	298.08
			<b>1276.58</b>
	Pindimana	Channel bar(Flood Plain)	18.54
		Lower Plateau (Lateritic) - Dissected	2075.70
		Piedmont Zone	2.50
		Point bar(Flood Plain)	3.08
		Valley Fill	361.78
		Water Body	65.70
			<b>2527.31</b>
	Pothanikkade	Lower Plateau (Lateritic) - Dissected	1402.32
		Valley Fill	399.57
		Water Body	7.46
			<b>1809.35</b>
	Varappetty	Lower Plateau (Lateritic) - Dissected	1727.00
		Valley Fill	474.29
		Water Body	6.17
			<b>2207.46</b>
			<b>92256.35</b>

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)	
Kothamangalam Municipality			0.00	
		Lower Plateau (Lateritic) - Dissected	3194.45	
		Valley Fill	665.61	
		Water Body	11.74	
		<b>3871.80</b>		
		<b>3871.80</b>		
Maradu Municipality	Maradu		0.00	
		Coastal Plain	883.75	
		Marshy	10.73	
		Mud flat(Coastal Plain)	273.45	
		Water Body	262.84	
		<b>1430.77</b>		
		<b>1430.77</b>		
MOVATTUPUZHA	Arakuzha		0.00	
		Linear ridge(Lower Plateau)	69.49	
		Lower Plateau (Lateritic) - Dissected	5.34	
		Piedmont Zone	2126.32	
		Residual Hill	44.41	
		Residual Mount	70.58	
		Valley Fill	546.62	
		Water Body	51.45	
			<b>2914.21</b>	
	Avoly		Linear ridge(Lower Plateau)	16.41
			Lower Plateau (Lateritic) - Dissected	1468.71
			Piedmont Zone	1.34
			Valley Fill	384.75
			Water Body	72.10
			<b>1943.32</b>	
	Ayavana		Lower Plateau (Lateritic) - Dissected	2352.54
			Point bar(Flood Plain)	3.11
			Residual Mount	8.64
			Valley Fill	547.12
			Water Body	77.77
			<b>2989.18</b>	
	Kalloorkkade		Lower Plateau (Lateritic) - Dissected	2192.01
			Piedmont Zone	2.88
			Residual Mount	91.12
			Valley	13.45
			Valley Fill	290.45
			Water Body	9.28
		<b>2599.19</b>		

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)	
MULANTHURUTHY	Manjalloor	Linear ridge(Lower Plateau)	72.04	
		Lower Plateau (Lateritic) - Dissected	1807.12	
		Residual Hill	122.28	
		Residual Mount	7.67	
		Valley Fill	301.92	
		Water Body	29.57	
		<b>2340.60</b>		
	Marady	Lower Plateau (Lateritic) - Dissected	5.13	
		Piedmont Zone	1539.30	
		Point bar(Flood Plain)	24.02	
		Residual Hill	80.78	
		Residual Mount	50.00	
		Valley Fill	542.70	
		Water Body	43.50	
	<b>2285.44</b>			
	Paipra	Lower Plateau (Lateritic) - Dissected	2657.19	
		Point bar(Flood Plain)	1.80	
		Residual Hill	34.58	
		Residual Mount	7.97	
		Valley Fill	574.89	
		Water Body	8.71	
	<b>3285.14</b>			
	Valakam	Lower Plateau (Lateritic) - Dissected	1532.08	
		Piedmont Zone	4.51	
		Point bar(Flood Plain)	32.22	
		Residual Mount	11.17	
		Valley Fill	703.35	
		Water Body	40.60	
	<b>2323.92</b>			
				<b>20680.99</b>
	Amballur	Coastal Plain	11.98	
		Lower Plateau (Lateritic) - Dissected	1336.28	
		Mud flat(Coastal Plain)	663.62	
		Valley Fill	208.11	
		Water Body	68.77	
	<b>2288.75</b>			
	Chottanikkara	Coastal Plain	137.29	
		Lower Plateau (Lateritic) - Dissected	739.98	
		Mud flat(Coastal Plain)	137.26	
		Valley Fill	172.76	
Water Body		7.91		
<b>1195.20</b>				
Edakkattuvayal	Lower Plateau (Lateritic) - Dissected	2069.39		
	Mud flat(Coastal Plain)	32.28		
	Valley Fill	438.17		
	Water Body	3.20		
<b>2543.05</b>				



BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
Muvattupuzha Municipality	Maneed	Lower Plateau (Lateritic) - Dissected	2074.95
		Point bar(Flood Plain)	7.65
		Valley Fill	533.09
		Water Body	13.95
			<b>2629.64</b>
	Mulanthuruthy	Coastal Plain	365.35
		Lower Plateau (Lateritic) - Dissected	1340.63
		Mud flat(Coastal Plain)	185.38
		Valley Fill	384.37
		Water Body	21.78
			<b>2297.51</b>
	Udayamperur	Coastal Plain	952.92
		Lower Plateau (Lateritic) - Dissected	37.16
		Mud flat(Coastal Plain)	476.99
		Water Body	1268.98
		<b>2736.05</b>	
		<b>13690.19</b>	
			0.00
		Lower Plateau (Lateritic) - Dissected	581.28
	Piedmont Zone	348.87	
	Point bar(Flood Plain)	11.99	
	Valley Fill	200.94	
	Water Body	39.59	
		<b>1182.67</b>	
		<b>1182.67</b>	
PALLURUTHY			0.00
	Chellanam	Beach(Coastal Plain)	0.01
		Coastal Plain	1204.75
		Mud flat(Coastal Plain)	1020.78
		Water Body	898.83
		<b>3124.36</b>	
	Kumbalam	Coastal Plain	666.29
		Mud flat(Coastal Plain)	324.91
		Water Body	924.12
		<b>1915.32</b>	
	Kumbalangy	Coastal Plain	409.25
		Mud flat(Coastal Plain)	405.08
		Water Body	751.49
	<b>1565.82</b>		
	<b>6605.50</b>		
PAMPAKUDA			0.00
	Elanji	Lower Plateau (Lateritic) - Dissected	2559.78
		Residual Mount	55.08
		Valley Fill	424.92
	<b>3039.79</b>		

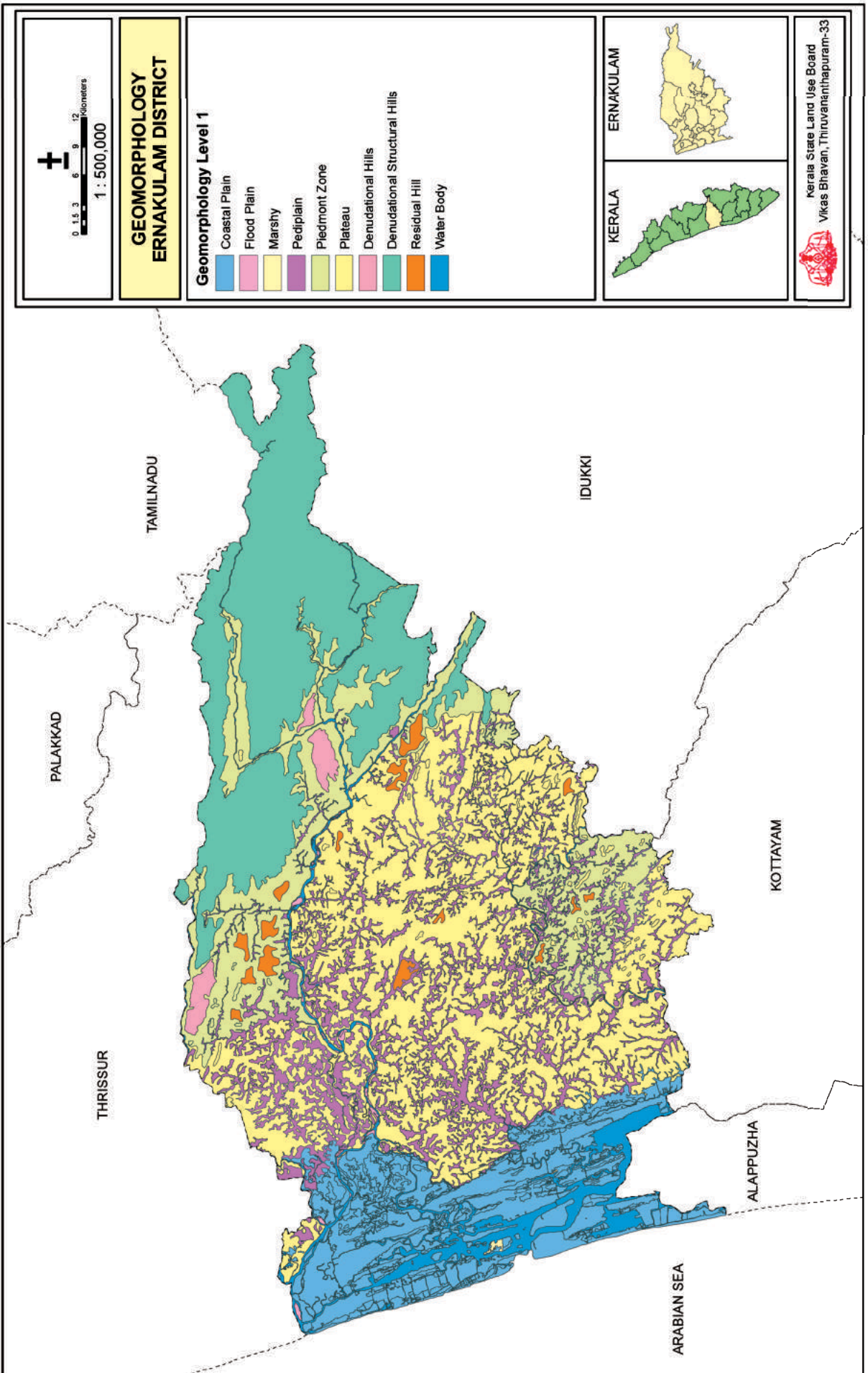
BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
PARAKADAV	Koothattukulam	Lower Plateau (Lateritic) - Dissected	909.00
		Piedmont Zone	883.08
		Residual Mount	36.57
		Valley	3.24
		Valley Fill	436.01
			<b>2267.90</b>
	Palakuzha	Lower Plateau (Lateritic) - Dissected	0.03
		Piedmont Zone	1875.34
		Residual Mount	110.24
		Valley	10.38
		Valley Fill	291.30
			<b>2287.29</b>
	Pampakuda	Lower Plateau (Lateritic) - Dissected	545.41
		Piedmont Zone	1556.46
		Residual Mount	87.27
		Valley Fill	647.68
			<b>2836.83</b>
	Piravam	Lower Plateau (Lateritic) - Dissected	2159.86
		Piedmont Zone	4.60
		Point bar(Flood Plain)	45.97
		Residual Mount	26.31
		Valley Fill	669.26
		Water Body	92.61
			<b>2998.60</b>
	Ramamanagalam	Lower Plateau (Lateritic) - Dissected	52.64
		Piedmont Zone	1420.78
		Point bar(Flood Plain)	78.98
		Residual Hill	71.95
		Residual Mount	29.52
		Valley Fill	674.32
		Water Body	62.88
			<b>2391.06</b>
	Thirumarady	Lower Plateau (Lateritic) - Dissected	234.50
Piedmont Zone		1853.93	
Residual Hill		30.70	
Residual Mount		122.36	
Valley Fill		855.73	
		<b>3097.22</b>	
		<b>18918.69</b>	
		0.00	
Chengamanad	Channel bar(Flood Plain)	3.69	
	Coastal Plain	166.56	
	Lower Plateau (Lateritic) - Dissected	527.84	
	Point bar(Flood Plain)	56.58	
	Stabilized channel bar (Flood Plain)	1.68	
	Valley Fill	723.29	
	Water Body	117.84	
		<b>1597.48</b>	

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
PARAVOOR	Kunnukara	Channel bar(Flood Plain)	8.19
		Coastal Plain	678.15
		Lower Plateau (Lateritic) - Dissected	0.31
		Mud flat(Coastal Plain)	789.37
		Point bar(Flood Plain)	13.43
		Swale(Coastal Plain)	4.10
		Valley Fill	321.57
		Water Body	177.55
			<b>1992.67</b>
	Nedumbassery	Coastal Plain	27.04
		Lower Plateau (Lateritic) - Dissected	1084.48
		Valley Fill	1234.44
		Water Body	22.29
			<b>2368.24</b>
	Parakkadavu	Coastal Plain	223.24
		Lower Plateau (Lateritic) - Dissected	1503.34
		Point bar(Flood Plain)	10.76
		Valley Fill	724.80
		Water Body	58.80
			<b>2520.94</b>
	Puthenvelikara	Channel bar(Flood Plain)	8.61
		Coastal Plain	141.07
		Lower Plateau (Lateritic) - Dissected	979.67
		Marshy	0.30
		Mud flat(Coastal Plain)	242.98
		Stabilized channel bar (Flood Plain)	25.86
		Valley Fill	256.51
		Water Body	300.13
			<b>1955.13</b>
	Sreemoolanagaram	Channel bar(Flood Plain)	18.60
		Lower Plateau (Lateritic) - Dissected	720.28
		Point bar(Flood Plain)	21.14
		Valley Fill	533.85
		Water Body	101.30
			<b>1395.17</b>
			<b>11829.63</b>
	Chengamangalam	Coastal Plain	0.00
		Lower Plateau (Lateritic) - Dissected	842.31
		Mud flat(Coastal Plain)	78.83
		Water Body	0.17
			191.76
			<b>1113.06</b>
	Chittattukara	Coastal Plain	868.75
		Mud flat(Coastal Plain)	67.53
		Water Body	68.03
			<b>1004.31</b>
	Ezhikkara	Coastal Plain	538.85
Mud flat(Coastal Plain)		560.19	
Water Body		524.28	
		<b>1623.32</b>	

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
Paravoor Municipality	Kottuvally	Coastal Plain	1296.22
		Mud flat(Coastal Plain)	584.64
		Swale(Coastal Plain)	17.30
		Water Body	307.17
			<b>2205.33</b>
	Vadakkekkara	Channel bar(Flood Plain)	61.28
		Coastal Plain	810.21
		Water Body	169.51
			<b>1041.00</b>
			<b>6987.02</b>
			0.00
	Perumbavoor Municipality	Coastal Plain	776.03
		Mud flat(Coastal Plain)	3.66
		Water Body	23.28
			<b>802.97</b>
		<b>802.97</b>	
Thrikkakara Municipality			0.00
	Lower Plateau (Lateritic) - Dissected	1199.54	
	Point bar(Flood Plain)	0.23	
	Residual Hill	79.60	
	Valley Fill	526.70	
	Water Body	21.76	
		<b>1827.83</b>	
	<b>1827.83</b>		
Thrippunithura Municipality			0.00
	Coastal Plain	1.25	
	Lower Plateau (Lateritic) - Dissected	1061.07	
	Mud flat(Coastal Plain)	3.97	
	Valley Fill	447.69	
	Water Body	31.96	
	<b>1545.94</b>		
	<b>1545.94</b>		
VADAVUKODU			0.00
	Aikaranad	Coastal Plain	1791.48
		Lower Plateau (Lateritic) - Dissected	0.28
		Mud flat(Coastal Plain)	930.72
		Valley Fill	24.86
Water Body		220.88	
	<b>2968.22</b>		
	<b>2968.22</b>		
		0.00	
	Lower Plateau (Lateritic) - Dissected	1879.81	
	Point bar(Flood Plain)	0.01	
	Residual Mount	25.33	
	Valley Fill	519.82	
		<b>2424.96</b>	

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
VAZHAKULAM	Kunnathunadu	Lower Plateau (Lateritic) - Dissected	1979.30
		Valley Fill	951.51
			<b>2930.81</b>
	Mazhuvannoor	Lower Plateau (Lateritic) - Dissected	3549.41
		Valley Fill	1392.87
			<b>4942.28</b>
	Poothrikka	Lower Plateau (Lateritic) - Dissected	1834.54
		Point bar(Flood Plain)	3.90
		Residual Mount	26.29
		Valley Fill	782.56
		Water Body	6.18
			<b>2653.48</b>
	Thiruvaniyoor	Coastal Plain	0.00
		Lower Plateau (Lateritic) - Dissected	1871.93
		Mud flat(Coastal Plain)	0.47
		Valley Fill	748.57
		Water Body	3.28
		<b>2624.26</b>	
	Puthenkurisu	Coastal Plain	8.52
		Lower Plateau (Lateritic) - Dissected	2282.91
		Mud flat(Coastal Plain)	0.42
		Valley Fill	823.75
		Water Body	21.06
		<b>3136.66</b>	
			<b>18712.45</b>
			0.00
	Choorunnikkara	Channel bar(Flood Plain)	4.37
		Coastal Plain	2.27
		Lower Plateau (Lateritic) - Dissected	467.08
		Mud flat(Coastal Plain)	0.93
		Valley Fill	296.25
		Water Body	37.57
		<b>808.47</b>	
Edathala	Lower Plateau (Lateritic) - Dissected	1461.90	
	Valley Fill	529.95	
		<b>1991.86</b>	
Keezhmad	Channel bar(Flood Plain)	5.11	
	Lower Plateau (Lateritic) - Dissected	1106.88	
	Point bar(Flood Plain)	43.16	
	Valley Fill	498.47	
	Water Body	37.74	
	<b>1691.36</b>		
Kizhakkambalam	Lower Plateau (Lateritic) - Dissected	1865.86	
	Valley Fill	1167.87	
		<b>3033.73</b>	

BLOCK	PANCHAYAT	DISCR-L3	AREA (Ha)
VYPIN	Vazhakkulam	Channel bar(Flood Plain)	0.47
		Lower Plateau (Lateritic) - Dissected	1447.84
		Point bar(Flood Plain)	13.32
		Valley Fill	604.71
		Water Body	33.11
			<b>2099.45</b>
	Vengola	Lower Plateau (Lateritic) - Dissected	2698.22
		Valley Fill	843.75
			<b>3541.97</b>
			<b>13166.84</b>
	Edavanakkade	Coastal Plain	0.00
		Mud flat(Coastal Plain)	541.51
		Swale(Coastal Plain)	343.51
		Water Body	19.61
			153.77
			<b>1058.40</b>
	kuzhappully	Coastal Plain	308.71
		Mud flat(Coastal Plain)	202.82
		Swale(Coastal Plain)	49.50
		Water Body	98.73
			<b>659.75</b>
	Nayarambalam	Coastal Plain	565.46
		Mud flat(Coastal Plain)	372.67
		Water Body	<b>146.76</b>
			1084.89
	Njarakkal	Coastal Plain	536.90
		Mud flat(Coastal Plain)	157.38
Water Body		139.27	
		<b>833.55</b>	
Pallippuram	Beach(Coastal Plain)	0.00	
	Coastal Plain	947.60	
	Mud flat(Coastal Plain)	296.96	
	Swale(Coastal Plain)	4.03	
	Water Body	108.09	
		<b>1356.68</b>	
		<b>4993.27</b>	
		<b>District Total</b>	<b>306800.00</b>







## PHYSIOGRAPHY

Based on the general, physical features, the district consists of three natural divisions, viz. lowland, midland and highland. The lowland region falls in Parur and Cochin taluks and western portion of Kanayannur taluk. The midland region which constitutes the central belt covers the major portion of Aluva, Kunnathunnad, Kothamangalam and Muvattupuzha taluks and eastern region of Kanayannur taluk. Hilly tract is along the eastern portion of Aluva, Kunnathunnad and Kothamangalam taluks which borders the Western Ghats. There are few outlying small hills in Aluva taluk, some of which are above 800 feet high above MSL. There are some hilly areas in Parur and Kanayannur taluk also. The terrain of Mulanthuruthy, Amballur, Edakkattuvayal, Kaipattur, Keecheri, Trikkakkara South and Trikkakkara North villages of Kanayannur taluk and south eastern border of Parur taluk are hilly, the highest ranging between 100 to 300 feet above MSL. The district has less than 90 sq. km. of area under forests which accounts for 3.53 percent of the total area of the district. The forest of this district falls under Chalakudy, Malayattur and Munnar divisions.

Table: 7.1

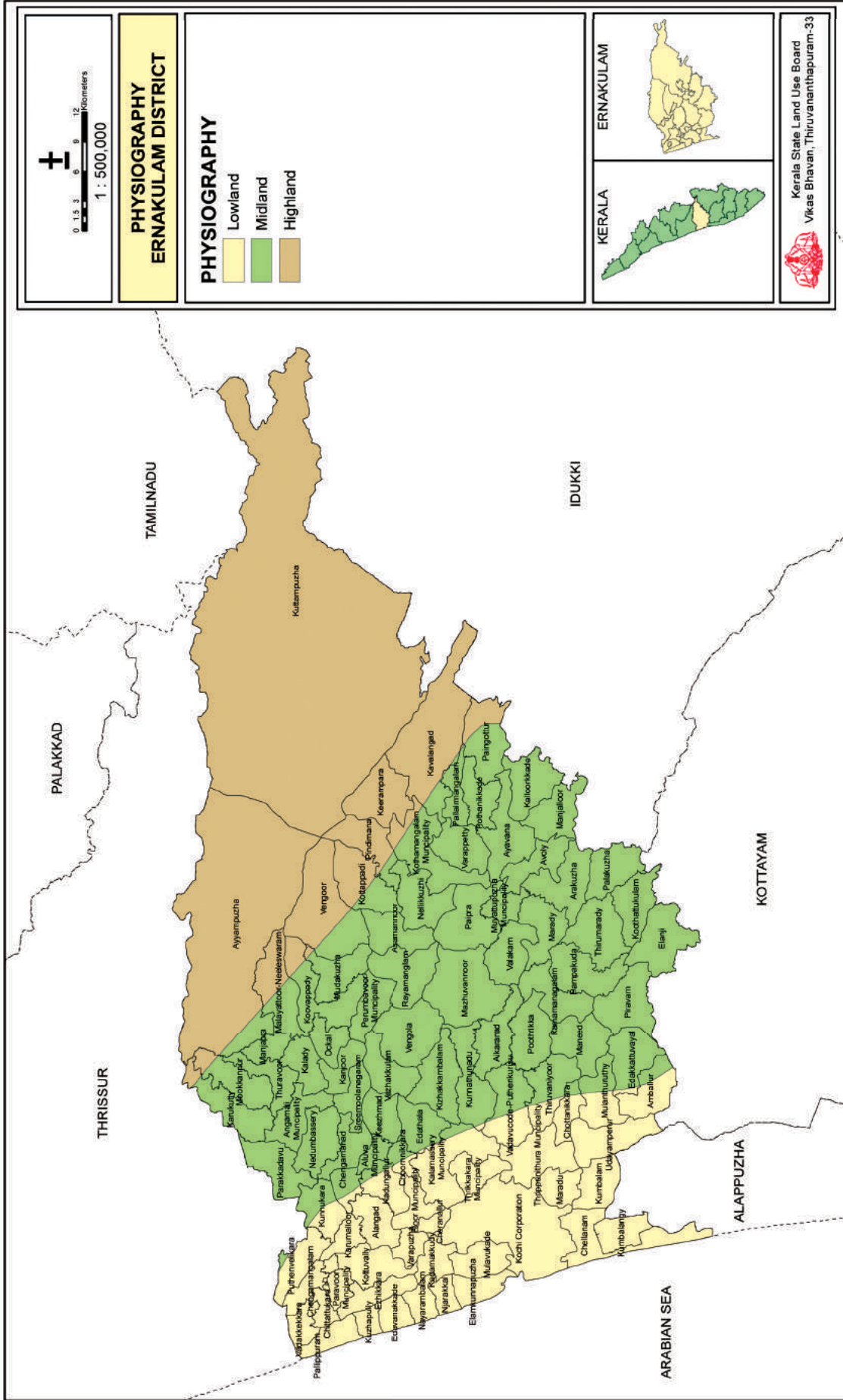
**PHYSIOGRAPHY DETAILS**

Area in Hectares

Sl.No.	District/Taluk/Village	Low land	Mid land	High land
<b>I</b>	<b>Aluva Taluk</b>			
1	Parakkadavu	-	2466	-
2	Kothakulangara North	-	4050	-
3	Manhapara	-	7321	-
4	Malayattur	-	1338	-
5	Manikkamangalam	-	2082	-
6	Kothakulangara South (P)	-	740	-
7	Chengamanadu	-	3829	-
8	Chewwara	-	828	-
9	Vadakkumbhagam	-	719	-
10	Kizhakkumbhagam	-	713	-
11	Thekkumbhagam	-	613	-
12	Aluva (P)	-	4807	-
13	Angamali (M)	-	2405	-
14	Aluva (M)	-	718	-
	<b>Total</b>	-	<b>32629</b>	-
<b>II</b>	<b>Parur Taluk</b>			
1	Vadakkekara Town	1671	-	-
2	Chennamangalam Town	1083	-	-
3	Puthenvelikkara	2550	-	-
4	Ayiroor	3166	-	-
5	Parur ezathikara (P)	1927	-	-
6	Kottuvally Town	2100	-	-
7	Alangad	2102	-	-
8	Kodugallur	1588	-	-
9	Parur (M)	903	-	-
10	Elur Town	2073	-	-
	<b>Total</b>	<b>19163</b>	-	-
<b>III</b>	<b>Kochi Taluk</b>			
1	Kuzhupilli	1269	-	-
2	2. Pallippuram	1152	-	-
3	3. Edavanakkad	1124	-	-
4	4. Elamkunnappuzha (P)	1166	-	-
5	5. Nayarambalam	1219	-	-
6	6. Cheriya Kadavu Town	413	-	-

Sl.No.	District/Taluk/Village	Low land	Mid land	High land
7	7. Kumbalangi	2114	-	-
8	8. Chellanam	811	-	-
9	9. Njarakkal	860	-	-
10	10. Cochin Corporation (P)	3958	-	-
	<b>Total</b>	<b>14086</b>	-	-
<b>IV</b>	<b>Kanayannur Taluk</b>			
1	Kadamakkudi	1291	-	-
2	Mulavekkadu (P)	1927	-	-
3	Cheranallur (P)	1059	-	-
4	Thrikkakara Town	2746	-	-
5	Thiruvankulam	1049	-	-
6	Kureekkad	530	-	-
7	Maradu	1235	-	-
8	Kumbalam	2078	-	-
9	Manakkunnam	2486	-	-
10	Kochi Corporation (P)	5530	-	-
11	Thripunithara (M)	1869	-	-
12	Kalamasseri Town	2700	-	-
13	Kanayannur	-	738	-
14	Mulanthuruthy	-	2147	-
15	Idakkattuvayal	-	1807	-
16	Amballoor	-	1082	-
17	Keecheri	-	506	-
18	Kulayettikara	-	671	-
19	Kaipattur	-	820	-
	<b>Total</b>	<b>24500</b>	<b>4692</b>	-
<b>V</b>	<b>Kunnathunadu Taluk</b>			
1	Perumbavoor (P)	-	1418	-
2	2. Cheranallur	-	3668	-
3	3. Vengoor West	-	2197	-
4	4. Vengoor East	-	5491	-
5	5. Asamannur	-	2127	-
6	6. Rayamangalam	-	2988	-
7	7. Vengola	-	3564	-
8	8. Vazhakkulam	-	1964	-
9	9. Kizhakkambalam	-	3157	-
10	10. Mazhuvannur	-	4911	-
11	11. Kunnathunadu	-	2686	-
12	12. Chemmanad	-	5629	-
13	13. Vaduvucode	-	250	-

Sl.No.	District/Taluk/Village	Low land	Mid land	High land
14	14. Ayikkaranad North	-	2564	-
15	15. Ayikkaranad South	-	2553	-
16	16. Perumbavoor Town	-	1359	-
	Outside Village	-	-	21243
	<b>Total</b>	-	<b>46526</b>	<b>21243</b>
<b>VI</b>	<b>Kothamangalam Taluk</b>			
1	Kottappady	-	3194	-
2	Pindimana	-	2576	-
3	Keerampara	-	3279	-
4	Kadavoor	-	2350	-
5	Kuttamangalam	-	6003	-
6	Poothanikkad	-	2434	-
7	Varapetty	-	2152	-
8	Kothamangalam (M)	-	3745	-
9	Eramallur	-	2761	-
	<b>Total</b>	-	<b>28494</b>	-
<b>VII</b>	<b>Muvattupuzha Taluk</b>			
1	Mulavoor	-	2646	-
2	Velloorkunnam(P)	-	835	-
3	Eranallur	-	3390	-
4	Muvattupuzha (P)	-	1860	-
5	Arakkuzha	-	2735	-
6	Valakam	-	2109	-
7	Marady (P)	-	1793	-
8	Memuri	-	2294	-
9	Ramamangalam	-	1408	-
10	Meenad	-	2619	-
11	Piravam	-	2936	-
12	Onakkur	-	2187	-
13	Thirumaradi	-	2924	-
14	Palakuzha	-	2265	-
15	Koothattukulam	-	2318	-
16	Elanji	-	2948	-
17	Kalloorkad	-	2419	-
18	Manjallur	-	2348	-
19	Muvattupuzha (M)	-	1318	-
	<b>Total</b>	-	<b>43352</b>	-





## SOILS

Forest or hilly soils are found in the highland region particularly in the eastern and north-eastern part of the Kothamangalam taluk, in the eastern most part of the Muvattupuzha taluk and in the north-eastern part of the Aluva taluk. It is characterised by the surface layer of organic matter derived from the forest growth and they are very rich in nitrogen but very low in phosphate content. Laterite soil is mainly concentrated in the midland region which has undulating valleys broken intermittently by isolated hills and plains. This fertile tract has also small patches of rock and black soils are found in this region. The laterite soil is formed by the weathering mainly of acidic rock under alternate wet and dry tropical condition. This soil varies in depth from 1.5 m to 3 m and may have kaolin clay beneath. This region has rich agricultural produces like paddy, tapioca, cashew, pepper, ginger, rubber, etc. Sandy soil is found in the lowland regions, vary in texture from sandy loam to pure sand and they are highly porous with low retentive capacity. They are deficient in all the major plant foods and lime. Peaty or Kari soil is found in a small stretch in Kanayannur taluk. They are clay soils with poor aeration and drainage and are characterised by deep black colour with extremely high content of organic matter and very high acidity. Coconut and paddy are extensively grown in the lowland region. These soils are subject to periodical inundation with salt water and are highly acidic in reaction.

Table: 8.1

**SOIL TYPES IN ERNAKULAM (OLD LOCAL TERMINOLOGY)**

SI .No.	District	Type of Soil	Details of location
1	Ernakulam	Laterite soil	Muvatupuzha, Kothamangalam and part of Aluva and Kunnathunad taluks
		Sandy loam	Parur, Kochi and Kanayannur taluks
		Alluvial Soil	Parts of Aluva and Kunnathunad taluks

Table: 8.2

**SOILS IN ERNAKULAM**

Soils Mapping Unit No.	Description Major soils	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; associated with very deep, moderately well drained, sandy soils.	Mixed, Aquic Ustipsamments Mixed, Typic Ustipsamments	Fine – loamy, mixed, typic Dystropepts Coarse-loamy, mixed Aquic Ustorthents
K 02	Very deep somewhat excessively drained, sandy soils with moderately deep water table on very gently sloping beaches, with slight erosion; associated with very deep, moderately well drained, sandy soils with moderately shallow water table.	Mixed, Typic Ustipsamments Mixed, Aquic Ustipsament	Coarse-loamy, Mixed, Aquic Ustorthents Fine, Mixed, Aeric Tropaquepts
K 04	Very deep, very poorly drained, clayey soils with shallow water table on level submerged lands, swamps and marshes; associated with very deep, very poorly drained, sulphide-rich, saline, clayey soils with very shallow water table.	Fine, Mixed Typic Tropaquepts Fine, Mixed, Typic Sulfaquents	Fine-loamy, 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, Aerie Tropaquepts	Fine, Mixed, Typic Tropaquepts, Fine-loamy, Mixed Ustic Kanhaplohumults
K 07	Very deep, well drained, gravelly clay soils on gently sloping coastal laterities, with moderate erosion; associated with very deep, well drained, gravelly clay soils with moderate surface gravelliness.	Clayey-skeletal, Kaolinitic, Typic Kandistults Clayey-skeletal, Kaolinitic, Typic Kanhaplustult	Loamy-skeletal, Mixed, Ustoxic Dystropepts Clayey, Kaolinitic, Typic Kandistults
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, Kaolinitic, 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, well drained, gravelly clay soils on gentle slopes.	Clayey-skeletal, Kaolinitic, Oxic Humitropepts, Clayey-skeletal, Kaolinitic, Ustic Haplohumults	Clayey-skeletal, Kaolinitic, Ustic Kandihumults Fine-loamy, mixed, Typic Kandistults
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 on gentle slopes.	Clayey, Kaolinitic, Ustic Kandihumults Clayey, kaolinitic, Typic Kanhaplustults	Fine, Mixed, Typic Dystropepts Clayey-skeletal, Kaolinitic, Oxic Humitropepts
K31	Very deep, well drained, gravelly loam soils on steeply sloping medium hills with thick vegetation, with moderate erosion; associated with very deep, well drained, clayey soils on moderate slopes.	Fine-loamy, mixed, Ustic Humitropepts Clayey, Mixed, ustic Palehumults	Rock land Clayey, Mixed, Ustic Haplohumults

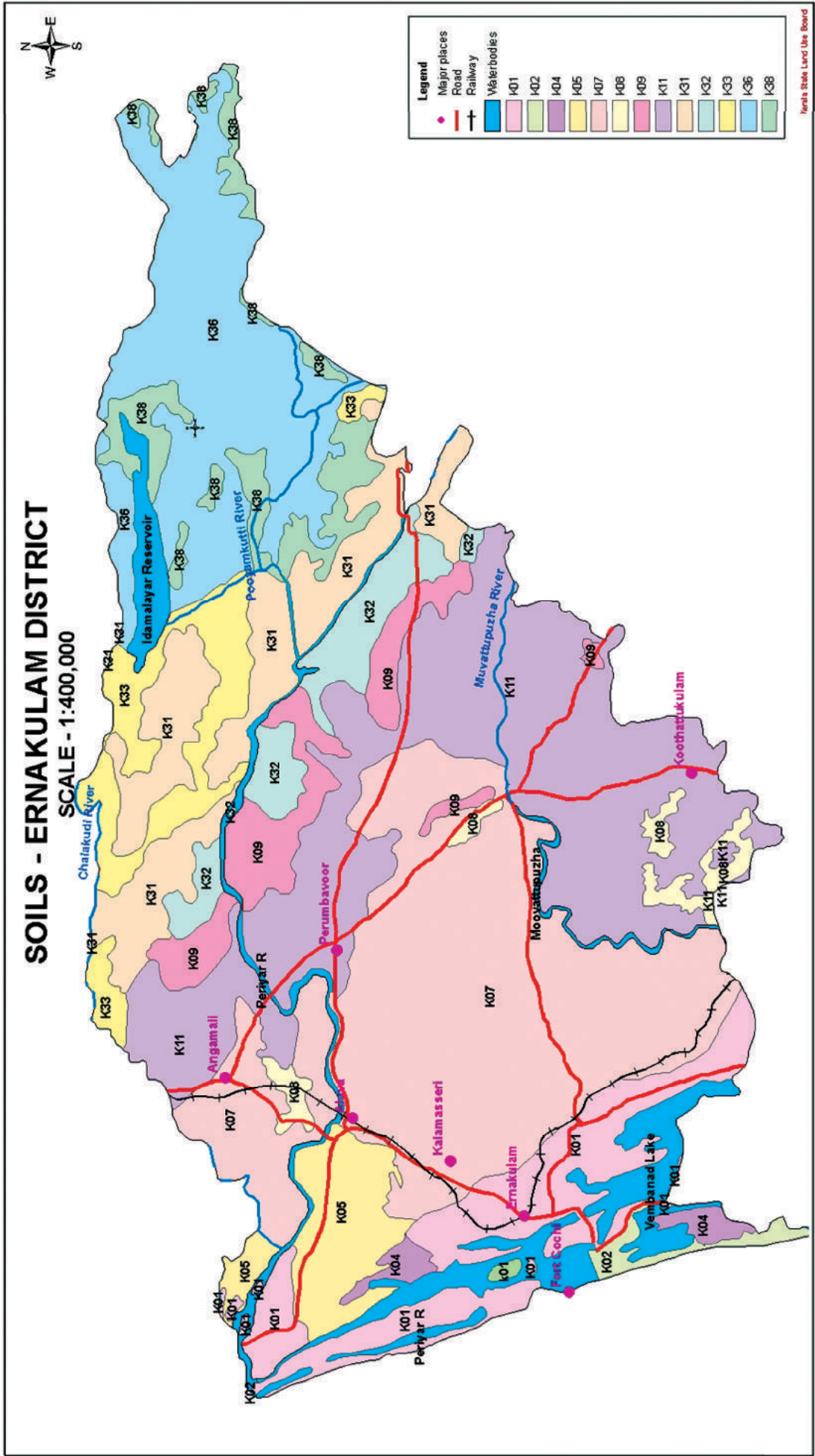
K32	Deep, Welldrained, loamy soils on gently sloping low hills with isolated hillocks, with moderate erosion; associated with deep, welldrained, loamy soils with coherent material at 100 to 150cm on moderate slopes, severely eroded.	Fine-loamy, mixed Ustic Humltropepts Fine-loamy, mixed Ustic Haplohumults	Fine, Mixed, Ustic Humitropepts Clayey-skeletal, Mixed, Ustic Humitropepts
K 33	Deep, Welldrained, gravelly clay soils on moderately sloping medium hills with thin vegetation, with severe erosion; associated with rock outcrop.	Fine, Kaolinitic Oxic Humitropepts Rock land	Fine-loamy, mixed, Ustic Palehumults
K 36	Very deep, welldrained, clayed soils on moderately steeply sloping high hills with thick vegetation, with moderate erosion; associated with deep, welldrained, gravelly loam soils on gentle slopes.	Clayey, mixed, Ustic Haplohumults Fine-loamy, mixed oxic Humitropepts	Fine mixed, Ustic Humitropepts Rock Land
K 38	Very deep, welldrained, clayey soils on moderately steeply sloping high hills with thin vegetation, with moderate erosion; associated with rock outcrops.	Clayey, mixed, Ustic Palehumults Rock land	Fine, Mixed, Ustic Humitropepts Fine-loamy, Mixed, Ustic Humitropepts

Table: 8.3

**Legend for the Soil Maps of districts in Kerala**

Sl.No.	Map symbol	Depth	Texture	Slope	Drainage
1	K 01	vd	s	vg	mw
2	K02	vd	s	vg	e
3	K03	vd	c	vg	vp
4	K04	vd	c	vg	vp
5	K05	vd	c	vg	i
6	K06	vd	l	vg	mw
7	K07	vd	gc	g	w
8	K08	vd	c	vg	mw
9	K09	vd	gc	ms	w
10	K10	vd	gc	g	w
11	K11	vd	gc	g	w
12	K12	vd	gc	g	w
13	K13	d	gc	g	w
14	K14	ms	gl	g	w
15	K15	vd	l	vg	p
16	K16	vd	l	vg	i
17	K17	vd	l	vg	mw
18	K18	vd	c	g	w
19	K19	vd	c	m	w
20	K20	d	gc	s	e
21	K21	md	gc	m	e
22	K22	vd	c	g	w
23	K23	ms	gc	vg	w
24	K24	d	gl	ms	w
25	K25	vd	gc	m	w
26	K26	vd	c	ms	w
27	K27	vd	l	g	w
28	K28	md	gl	g	w
29	K29	vd	l	g	w
30	K30	vd	c	m	w
31	K31	vd	gl	s	w
32	K32	d	l	g	w
33	K33	d	gc	rn	w
34	K34	vd	l	vg	i
35	K35	d	gc	m	w
36	K36	vd	c	ms	w
37	K37	vd	c	m	w
38	K38	vd	c	ms	w

<b>Depth</b>		<b>Texture</b>	
d	deep	s	sandy
vd	very deep	gc	gravelly clay
md	moderately deep	c	clay
ms	moderately shallow	l	loam
		gl	gravelly loam
<b>Slope</b>		<b>Drainage</b>	
g	gentle	mw	moderately well drained
vg	very gentle	w	well
m	moderate	e	excessive
s	steep	i	imperfectly
ms	moderately Steep	vp	very poor
		p	poor





## WATER RESOURCES

In most developing countries, agriculture is the dominant user of water, accounting for more than 85% of all water use. Agriculture water use rises 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 the 1970's and 1980's investment typically involved large irrigation and drainage projects with considerable infrastructure development. In the 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 river basins are best managed and developed as an integrated whole. 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, 13 storages and 5 are barrages.

### Live storage capacities of Irrigation Reservoirs

The live storage position of the reservoirs during the beginning and end of the monsoon period during 2008 to 2010 are given in the following table.

Table: 9.1

(Mm<sup>3</sup>)

Sl. No.	Item	2008	2009	2010
1	Storage at the beginning of the Monsoon	452	392	531
2	Storage at the end of the Monsoon	1156	1180	1213
3	Increase due to Monsoon	704	788	682
4	Average for 10 years			
	(I) at the beginning of the monsoon	405	429	410
	(ii) at the end of the monsoon	1110	1096	1097
	(iii) increase in monsoon storage	705	667	688

## RIVERS IN ERNAKULAM

### 1. The Chalakkudy River:

It is formed by the confluence of five streams, the Parambikulam, the Kuriarkutty, the Sholayar, the Karappara and the Anakkayam, all of them originating from the Anamalai Hills of the Western Ghats. The length of the river is 130km. and the total drainage area is 1704sq.km. Out of this 1404 sq.km lies in Kerala State and the rest 300sq.km, in Tamilnadu.

### 2. Periyar River:

The Periyar, the longest of all the rivers in Kerala, and also the largest in potential, is formed by several streams, having their origin in the Sivagiri Group of Hills at an elevation of about +1830m above M.S.L. The length of the river from its origin to its confluence with the Arabian Sea is 244 sq. km. The river has a total drainage area of 5398 sq. km, out of which 5284 sq.km. lies within the State and the rest in Tamilnadu.

### 3. 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.

Source:- Rivers in Kerala , PWD



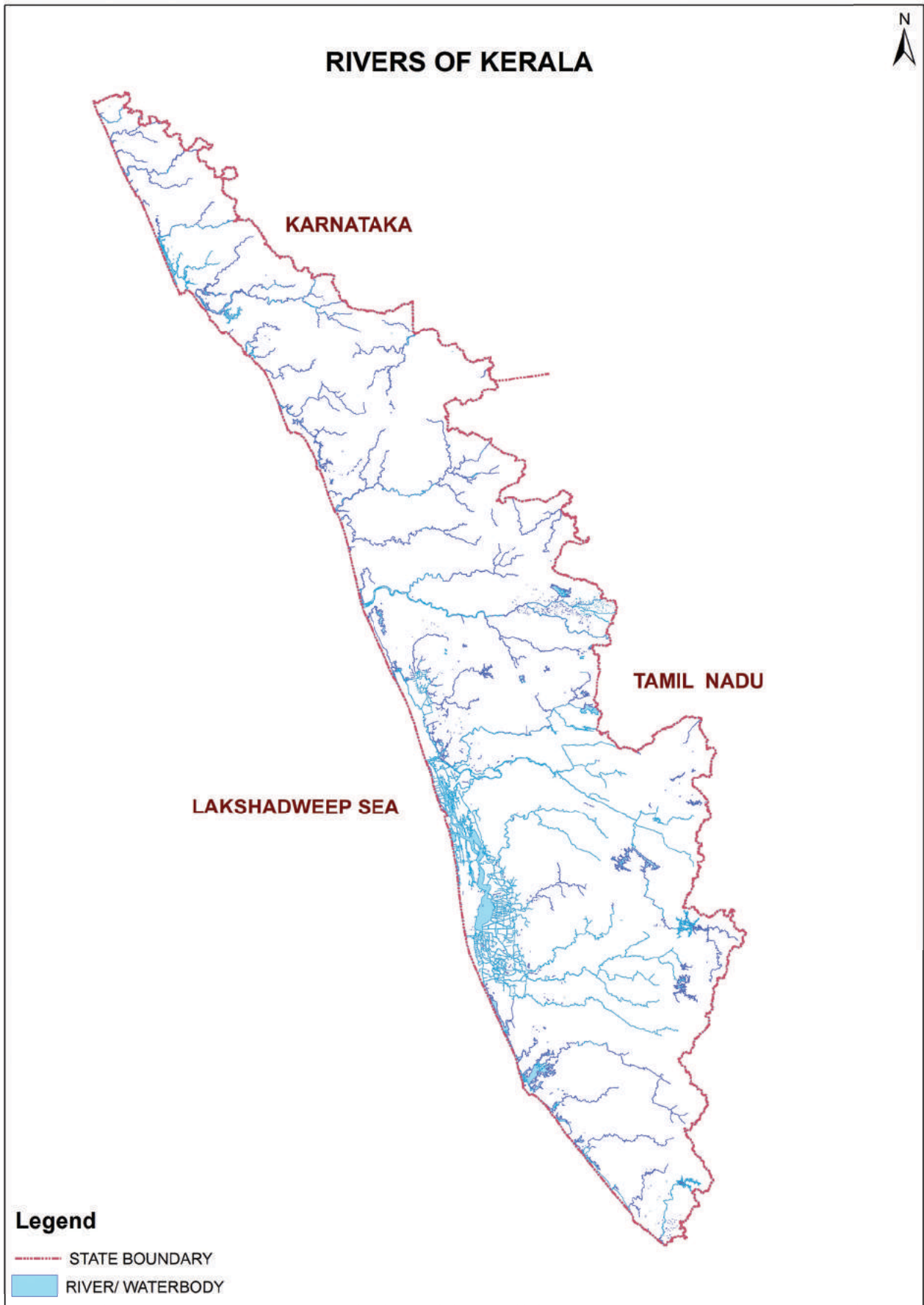




Table: 9.2

**Ground Water Dug well Statistics - Ernakulam**

SI.No.	SITE-NAME	DATE-TIME	WATER-LEVEL (m bgl)
1	Aikaranad	Apr/09	5.4
2	Alwaye	Apr/09	12.05
3	Angamali 1	Apr/09	6.38
4	Attara	Apr/09	6.8
5	Chalacka	Apr/09	2.63
6	Chellanum	Apr/09	0.71
7	Chengamanad	Apr/09	11.58
8	Chowara	Apr/09	7.15
9	Edakkatuwayal	Apr/09	12.82
10	Edapally	Apr/09	1.92
11	Edavanakad	Apr/09	0.5
12	Elur north 1	Apr/09	2.19
13	Fort cochin	Apr/09	2
14	Kalur	Apr/09	6.85
15	Kanjur	Apr/09	5.4
16	Karukutty	Apr/09	8.8
17	Kothamangalam	Apr/09	2.2
18	Kottapadi	Apr/09	3.55
19	Kottapuram 2	Apr/09	2.2
20	Kuruppampady	Apr/09	6.45
21	Kuttattukulam	Apr/09	4.12
22	Malayattur	Apr/09	7.3
23	Malipuram	Apr/09	0.95
24	Manjapara	Apr/09	5.43
25	Mannur	Apr/09	4.1
26	Mulanthuruthi	Apr/09	9.4
27	Muvattupuzha	Apr/09	7.8
28	Neriyamangalam	Apr/09	5.02
29	North Parur	Apr/09	0.92
30	Oonnukal	Apr/09	7.2
31	Palakuzha north	Apr/09	7.63
32	Perumbadavam	Apr/09	7.7
33	Perumbavur	Apr/09	2.2
34	Pothanikad	Apr/09	4.55
35	Puthankurisu-R1	Apr/09	5
36	Puthotta	Apr/09	3.38
37	Ramamangalam	Apr/09	6.9
38	Sulli-R1	Apr/09	6.95
39	Thattekad R-1	Apr/09	1.55
40	Trikkakara	Apr/09	9.05
41	Tripunithura	Apr/09	3.4
42	Valayanchirangara	Apr/09	7.62
43	Vallom 1	Apr/09	7.33
44	Varapuzha	Apr/09	2.6
45	Vazhakkulam north	Apr/09	7

Source:- Central Ground Water

Table: 9.3

## Ground Water Dug well Statistics - Ernakulam

Sl.No.	SITE-NAME	DATE-TIME	WATER-LEVEL (m bgl)
1	Aikaranad	Apr/10	5.3
2	Alwaye	Apr/10	12.97
3	Anchalpetty-R1	Apr/10	5.95
4	Angamali 1	Apr/10	6.16
5	Attara	Apr/10	4.54
6	Chalakka	Apr/10	2.9
7	Chengamanad	Apr/10	11.18
8	Chowara	Apr/10	6.23
9	Edakkatuvayal	Apr/10	11.18
10	Edapally	Apr/10	1.86
11	Elur north 1	Apr/10	1.17
12	Irumbanam 1	Apr/10	1.92
13	Kalur	Apr/10	6.07
14	Kanjur	Apr/10	6.72
15	Karukutty	Apr/10	8.43
16	Kothamangalam	Apr/10	2.35
17	Kottapadi	Apr/10	3.07
18	Kottapuram 2	Apr/10	2.44
19	Kuruppampady	Apr/10	6.07
20	Kuttattukulam	Apr/10	4.54
21	Malayattur	Apr/10	7.33
22	Malipuram	Apr/10	0.9
23	Mannur	Apr/10	6.41
24	Mulanthuruthi	Apr/10	9.12
25	Munambam-R1	Apr/10	0.79
26	Muvattupuzha	Apr/10	5.88
27	Oonnukal	Apr/10	7.6
28	Palakuzha north	Apr/10	5.84
29	Perumbadavam	Apr/10	7.72
30	Perumbavur	Apr/10	3.39
31	Pothanikad	Apr/10	4.3
32	Puthankurisu-R1	Apr/10	4.8
33	Puthotta	Apr/10	1.99
34	Ramamangalam	Apr/10	4.99
35	Sulli-R1	Apr/10	4.47
36	Thatttekad R-1	Apr/10	2.96
37	Tripunithura	Apr/10	3.22
38	Valayanchirangara	Apr/10	8.44
39	Vallom 1	Apr/10	7.51
40	Vazhakkulam north	Apr/10	6.57

Source:- Central Ground Water

Table: 9.4

**Ground Water Dug well Statistics - Ernakulam**

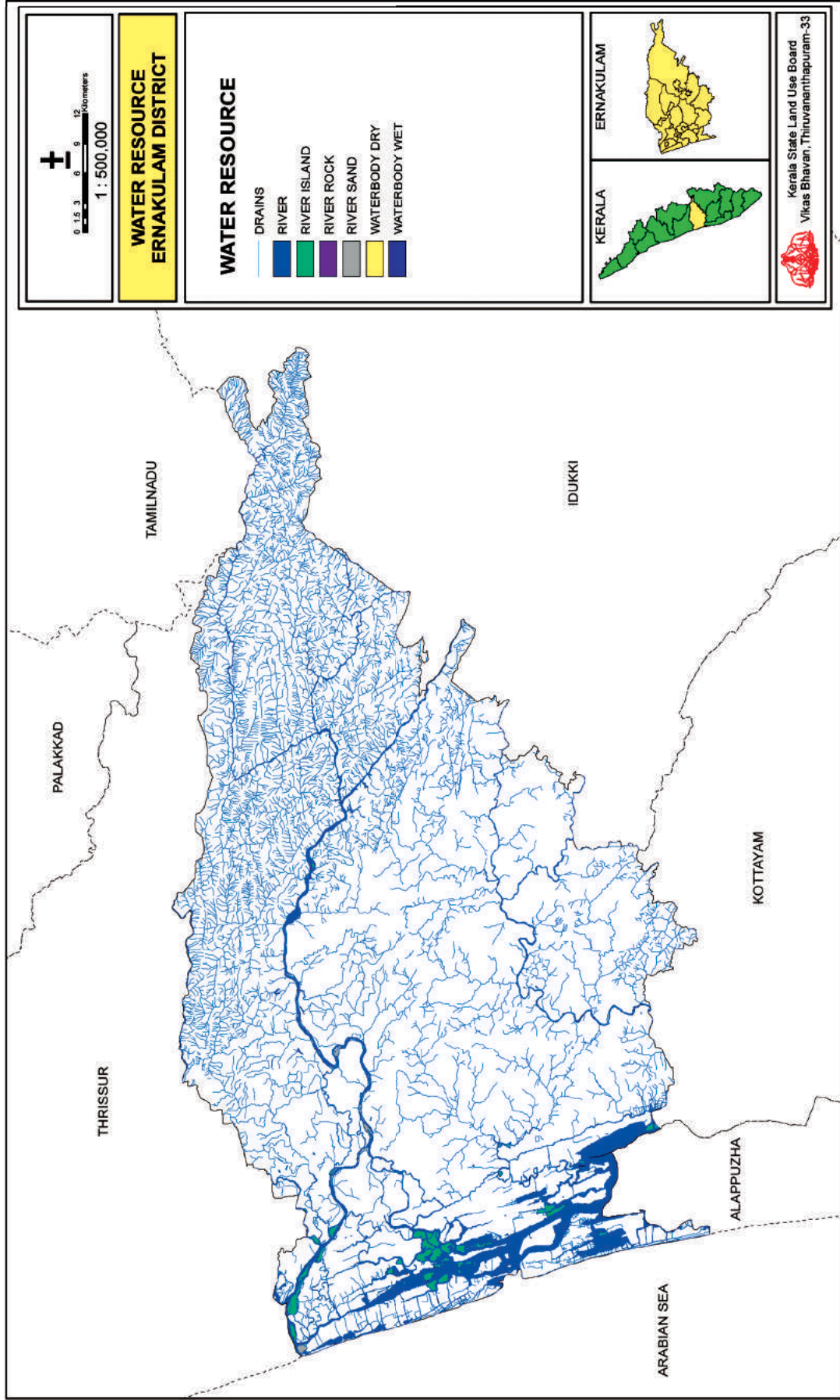
SI.No.	SITE-NAME	DATE-TIME	WATER-LEVEL (m bgl)
1	Anchalpetty-R1	Apr/11	6.05
2	Ramamangalam	Apr/11	6.67
3	Tripunithura	Apr/11	3
4	Kuttattukulam	Apr/11	3.57
5	Irumbanam 1	Apr/11	2.17
6	Edakkatuvayal	Apr/11	10.6
7	Mulanthuruthi	Apr/11	8.27
8	Puthotta	Apr/11	3.02
9	Kalur	Apr/11	6.4
10	Palakuzha north	Apr/11	6.6
11	Trikkakara	Apr/11	8.85
12	Mannur	Apr/11	4.29
13	Puthenkurisi- R1	Apr/11	5
14	Fort cochin	Apr/11	2.23
15	Edapally	Apr/11	1.56
16	Muvattupuzha	Apr/11	7.36
17	Neriyamangalam	Apr/11	3.99
18	Kothamangalam	Apr/11	1.85
19	Kuruppampady	Apr/11	6.22
20	Chellanum	Apr/11	0.91
21	Chowara	Apr/11	6.12
22	Kanjur	Apr/11	7.15
23	Vazhakkulam north	Apr/11	6.75
24	Malipuram	Apr/11	0.96
25	Edavanakad	Apr/11	0.78
26	Kottapuram 2	Apr/11	1.74
27	Varapuzha	Apr/11	2.1
28	Elur north 1	Apr/11	2.45
29	Alwaye	Apr/11	12.05
30	Valayanchirangara	Apr/11	7.47
31	Chalakka	Apr/11	2.61
32	Chengamanad	Apr/11	8.31
33	Manjapara	Apr/11	1.23
34	North Parur	Apr/11	0.9
35	Munambam-R1	Apr/11	0.8
36	Perumbavur	Apr/11	2.05
37	Vallom 1	Apr/11	6.89
38	Malayattur	Apr/11	7.38
39	Pothanikad	Apr/11	4.37
40	Thattakad R-1	Apr/11	1.38
41	Kottapadi	Apr/11	3.17
42	Oonnukal	Apr/11	6.9
43	Perumbadavam	Apr/11	7.7

Source:- Central Ground Water

Table: 9.5

Sl. No.	SITE-NAME	SAMPLING TIME	pH	EC	Na	K	Ca	Mg	ppm				NITRATE
									HCO <sub>3</sub>	CO <sub>3</sub>	Cl		
1	Anchalpetty	Apr/08		65	3.9	0.9	4	0.49			9.9	2.5	
2	Attara	Apr/08	8.08	43	2.3	0.7	3.2	0.49	9.8	0	4.3	1.4	
3	Chellanum	Apr/08		3750	490	24	60	26.82			1067	9.6	
4	Chengamanad	Apr/08	7.93	190	13	3.8	8	3.9	12	0	24	42	
5	Chowara	Apr/08	8.64	190	7.6	4.3	18	4.16	44	9.6	14	7.2	
6	Edapally	Apr/08		272	18	5.8	14	2.21			33	1.1	
7	Edavanakad	Apr/08	8.35	277	6.4	3	40	3.45	142	-99	14	1.1	
8	Elur north 1	Apr/08	8.92	193	13	1.4	14	4.15	29	17	17	0.93	
9	Irumbanam 1	Apr/08	8.88	621	62	17	26	9.76	102	17	82	2.7	
10	Kalur	Apr/08		175	6.7	2.9	13	4.27			18	40	
11	Karukutty	Apr/08		244	18	2.7	14	2.69			38	20	
12	Kottapuram 2	Apr/08		149	8.5	4	10	0.74			16	2.3	
13	Kundannur 1	Apr/08		171	10	2.9	10	2.69			20	1.8	
14	Malipuram	Apr/08		293	13	2.8	25	0.88			27	3.1	
15	Mannur	Apr/08		180	4.3	5.4	20	3.43			8.5	3.9	
16	Munambam	Apr/08		193	7.2	2.4	26	0.27			18	1.5	
17	Muvattupuzha	Apr/08		193	4.8	8.5	16	4.4			16	7.3	
18	Palakuzha north	Apr/08	8.58	176	12	5.2	9.6	2.44	29	-99	27	14	
19	Ramamangalam	Apr/08		82	3.4	1.4	6.4	0.01			8.5	3.7	
20	Thattakad	Apr/08	8.07	55	2.9	1.5	3.2	0.98	12	0	5.7	5	
21	Trikkakara	Apr/08		175	7.2	1					9.9	2.4	
22	Valayanchirangara	Apr/08	7.85	149	11	3.7	6.4	1.47	9.8	0	20	26	
23	Vallom 1	Apr/08	7.95	137	7.6	3	8.8	1.47	22	0	16	15	
24	Varapuzha	Apr/08		290	11	19	20	0.02			27	2.2	
25	Vazhakkulam north	Apr/08		160	9.5	2.7	9.6	0.98			20	8.4	

Source:- Central Ground Water Department







## **ECONOMIC MINERALS IN ERNAKULAM**

The Economic Minerals of the district includes magnetic iron ores, glass sand, lime shell, clays, and graphite and building stones. Iron ores are found in isolated patches in Muvattupuzha and Kunnathunad Taluks. They are of little commercial importance. Glass sand occurs at Eroor, Puthiyakavu, Panangal and neighboring places and at palluruthy. Lime shell exploited from Varappuzha and Kodungallur lakes is used for lime burning. Extensive deposits of clay suitable for the manufacture of tiles occur in Aluva and Kanayannur Taluks and they are exploited for the manufacture of tile bricks. Fairly good quantity of china clay is found at Amballur and Mulanthuruthy. Ball clays suitable for the manufacture of stoneware occur at Irumbanam while graphite occurs in certain patches of Kunnathunad Taluk. The crystalline rocks occurring in many parts of the district are used for building purpose and also as road metal.



Table: 10.1

**Inventory of the Mineral Resources of the State**

Sl. No.	Name of Mineral	Location	Est. reserves in (Million Tonnes)	Remarks
1	Mineral Sand	Chavara-Kayamkulam Sector, Kollam Dist. North of Kayamkulam Pozhi-Thottappalli, Alappuzha Dist.	127.00* 17.00	Total Heavy mineral Estimated Reserve
2	Gold Primary Gold	Maruda, Nilambur, Malappuram Dist., Kappil, Nilambur, Malappuram Dist., Pattumala, Attapady, Kottathara, Palakkad Dist.	0.55 0.0613 0.08 0.0067	4 g/t 4.1 g/t 12.98 g/t 14.99 g/t
3	Placer Gold	Punnapuzha and Chaliyarpuzha, Nilambur, Malappuram Dist.	30 m cu.m. 2.5 m cu.m	0.07 g/m <sup>3</sup> 0.1 g/m <sup>3</sup>
4	Iron ore	Kozhikode & Malappuram Dists.	84.00	Magnetite Oxidised: 39.0 MMT Unoxidised 45.0 MMT Fe 32.0
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
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 <sub>2</sub> Recently assessed
11	Lignite	Madayi, Kannur Dist., Nileswaram, Kadamkottumala & Kayyur, Kasargod Dist.	5.60 2.50 1.00 0.55	

Sl. No.	Name of Mineral	Location	Est. reserves in (Million Tonnes)	Remarks
12	Limestone	Pandarathu, Walayar, Palakkad Dist.	24.00	15-20 % only available now
13	Lime Shell	Vembanad lake & adjacent areas Alappuzha & Kottayam Dists. Coastal tracts of Kannur, Kasaragod Dist.& Estuaries of Periyar and Kadalundi puzha Kozhikode Dist.	4.05*	Chemical grade
14	Magnesite	Salayoor, Mulli, Palakkad Dist.	0.037*	
15	Talc/Steatite	Kozhikode & Kannur Dists.	7.94	Inferred Reserve

Source:State Mining & Geology Department

Table: 10.2

**Number of Mining Leases in the Districts of Kerala as on  
31.3.2004**

Sl. No	Name of Minerala	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
	<b>Total</b>	<b>35</b>	<b>12</b>		<b>27</b>	<b>2</b>				<b>1</b>			<b>4</b>	<b>3</b>	<b>1</b>	<b>85</b>

Source: Agricultural Statistics, DES

Table: 10.3

**Number of Quarrying Permits in force as on 31.3.2004**

Sl. No.	District	Granite Building Stone	Laterite	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	<b>Ernakulam</b>	<b>92</b>	<b>2</b>	<b>41</b>	<b>6</b>			<b>141</b>
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
	<b>Total</b>	<b>1453</b>	<b>335</b>	<b>110</b>	<b>33</b>	<b>256</b>	<b>4</b>	<b>2191</b>

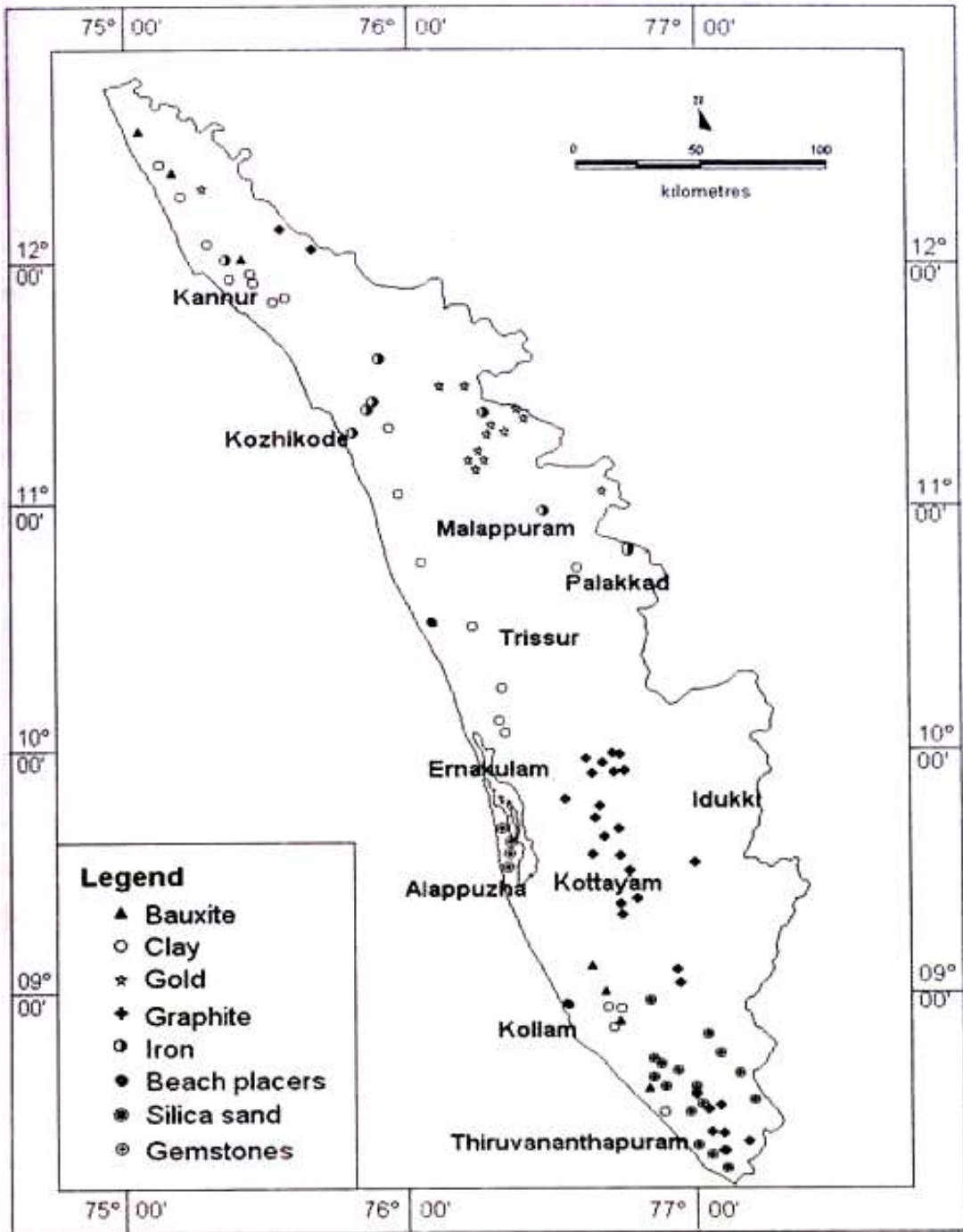
Table: 10.4

**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	<b>Ernakulam</b>	<b>38</b>					<b>38</b>
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
	<b>Total</b>	<b>291</b>	<b>2</b>	<b>1</b>	<b>37</b>		<b>331</b>

Source: State Mining &amp; Geology Department

**Mineral reserves (2000-01)**



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

Source: [www.Kerenvis.nic.in](http://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, an upto 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 scale 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 an upto 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 Colour 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 imagery 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**

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 different districts of the State 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, communication, utilities in association with water, vegetation and vacant lands. A total area of 241.79 Sq.km. which represent 7.909 % of total Geographical Area falls under this category.

#### **ii) Agricultural land**

It is defined as the land primarily used for farming and for production of food, fibre, 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. A total area of 1663.62 Sq.km. which represent 54.41 % of total Geographical Area falls under this category.

#### **iii) Forest**

It is an area (within the notified forest boundary) bearing an association predominantly of trees and other vegetation types capable of producing timber and other forest produce. 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 notified forest lands. A total area of 727.82 Sq.km. which represent 23.80 % of total Geographical Area falls under this category.

#### **iv) Wetlands**

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water table. For the purposes of this classification, wetlands must have one or more of the following three attributes 1) at least periodically, the land supports predominantly hydrophytes; 2) the substrate is predominantly undrained hydric soil;

and 3) the substrate is nonsoil and is saturated with water or covered by shallow water level at some time during the growing season of each year.

#### v) 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 two 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 and b) 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.

#### vi) Water bodies

It is an area of improduced 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 district wise area under land use/land cover categories in the State identified and mapped is furnished in Table separately.

Table showing land use/ land cover of Ernakulam district.

Table:11.1

### LAND USE / LAND COVER CATEGORIES

No.	Category	Area (Sq. Km)	Percentage
1	Built up land (urban) - commercial	5.74	0.19
2	Built up land (urban) - beaches	5.47	0.18
3	Built up land (urban) - mixed builtup	60.46	1.98
4	Built up land (rural) - residential	20.79	0.68
5	Built up land (rural) - mixed builtup	149.33	4.88
6	Paddy - viruppu + mundakan	188.88	6.18
7	Paddy reclaimed coconut	42.13	1.38
8	Paddy reclaimed rubber	0.89	0.03
9	Paddy reclaimed mixed crop	34.54	1.13
10	Paddy reclaimed banana	7.94	0.26
11	Paddy reclaimed residential	1.68	0.05
12	Paddy reclaimed mixed builtup	3.12	0.1
13	Paddy - fallow	63.34	2.07
14	Rubber	394.83	12.92

15	Coconut	0.52	0.02
16	Cashew	2.87	0.09
17	Eucalyptus	3	0.1
18	Teak	1.9	0.06
19	Mixed crop	323.99	10.6
20	Coconut dominant mixed crop	593.75	19.42
21	Mixed trees	85.01	2.78
22	Banana	2.1	0.07
23	Semi evergreen/Evergreen - Dense mixed forest	0.34	0.01
24	Semi evergreen/Evergreen - Dense mixed forest (Reserve Forest)	50.37	1.65
25	Semi evergreen/Evergreen - Dense mixed forest mainly bamboo	4.24	0.14
26	Semi evergreen/Evergreen - Dense mixed forest mainly bamboo (Reserve Forest)	497.75	16.28
27	Semi evergreen/Evergreen - Dense mixed forest mainly teak (Reserve Forest)	2.22	0.07
28	Deciduous - Open mixed forest	0.07	0
29	Deciduous - Open mixed forest (Reserve Forest)	0.22	0.01
30	Deciduous - Open mixed forest mainly teak	4.21	0.14
31	Deciduous - Open mixed forest mainly teak (Reserve Forest)	1.11	0.04
32	Deciduous - Scrub forest	106.09	3.47
33	Forest plantation - Teak (Reserve Forest)	115.84	3.79
34	Forest plantation - Eucalyptus (Reserve Forest)	41.98	1.37
35	Forest plantation - Rubber (Reserve Forest)	0.55	0.02
36	Forest plantation - Cashew (Reserve Forest)	2.83	0.09
37	Land with scrub	21.61	0.71
38	Land without scrub	4.48	0.15
39	Mining/Industrial wastelands	2.25	0.07
40	Barren rocky/sheet rock area	17	0.56
41	Degraded land under plantation crop (Rubber)	13.79	0.45
42	Degraded land under plantation crop (Eucalyptus)	2.91	0.1
43	Sands - riverine	1.41	0.05
44	Water bodies	173.53	5.68
	<b>Total</b>	<b>3068.00</b>	<b>100</b>

## PANCHAYATH RESOURCE MAPPING (PRM)

Table: 11.2

## ALANGAD BLOCK

(Area in Ha)

Sl. No.	Land use	Karumalloor	Varappuzha	Alangad	Kadungallur
1	Paddy- Virippu	7.04	0.00	82.08	10.40
2	Paddy- Mundakan	0.00	0.00	0.80	4.00
3	Paddy- Puncha	0.00	0.00	0.00	0.00
4	Paddy- Pokkali	0.00	0.00	0.00	0.00
5	Paddy- Pokkali	0.00	0.00	7.52	0.00
6	Paddy- Puncha + Virippu	0.00	0.00	1.60	0.00
7	Prawn culture	0.00	0.00	0.96	0.00
8	Paddy-Virippu + Prawn culture	23.52	0.00	0.00	0.00
9	Paddy-Pokkali + Prawn culture	0.00	205.20	0.00	0.00
10	Prawn culture	0.00	0.00	0.00	0.00
11	Paddy- Virippu + Mudakan	171.04	0.00	11.52	54.00
12	Paddy- Mudakan + Puncha	0.00	0.00	0.00	5.48
13	Paddy- Virippu+ Mudakan + Puncha	175.36	0.00	7.68	43.08
14	Paddy - Virippu+ Mudakan + Tuber Crops	0.00	0.00	0.00	0.00
15	Paddy - Virippu + Vegetables	0.00	0.00	0.00	0.00
16	Paddy - Mundakan + Vegetables	0.00	0.00	0.00	0.00
17	Paddy - Virippu+ Mudakan + Vegetables	0.00	0.00	0.00	0.00
18	Paddy - Virippu+ Tapioca	0.00	0.00	0.00	0.00
19	Paddy - Vegetables	0.00	0.00	0.00	1.44
20	Paddy- Pineapple	0.00	0.00	0.00	0.00
21	Paddy - Banana	0.00	0.00	0.00	0.00
22	Paddy - Areca nut	0.00	0.00	0.00	0.00
23	Paddy - Tapioca	0.00	0.00	0.00	0.00
24	Paddy -Mixed Crops	0.00	0.00	0.00	0.00
25	Paddy - Cocoa	0.00	0.00	0.00	0.00
<b>26</b>	<b>Paddy</b>	<b>376.96</b>	<b>205.20</b>	<b>112.16</b>	<b>118.40</b>
27	Paddy land converted to built up land	10.24	0.00	12.48	1.60
28	Paddy land converted to Coconut	12.64	0.48	1.44	2.08
29	Paddy land converted to Areca nut	0.00	0.00	0.00	0.00
30	Paddy land converted to Mixed Crops	20.32	1.68	81.44	9.64
31	Paddy land converted to Pineapple	0.00	0.00	0.00	0.00
32	Paddy land converted to Banana	0.00	0.00	2.08	25.00
33	Paddy land converted to Pineapple + Banana	0.00	0.00	0.00	0.00
34	Paddy land converted to Areca nut + Pineapple	0.00	0.00	0.00	0.00
35	Paddy land converted to Banana + Pineapple	0.00	0.00	0.00	0.00
36	Paddy land converted to Rubber	0.00	0.00	0.00	0.00

Sl. No.	Land use	Karumalloor	Varappuzha	Alangad	Kadungallur
37	Paddy land converted to Vanila	0.00	0.00	0.00	0.00
38	Paddy land converted to Rubber + Pineapple	0.00	0.00	0.00	0.00
39	Paddy land converted to Pulses	0.00	0.00	2.56	0.00
40	Paddy land converted to Pineapple + Coconut	0.00	0.00	1.44	0.00
41	Paddy land converted to Tuber Crops	0.64	0.00	1.76	2.24
42	Paddy land converted to Tuber Crops + Pineapple	0.00	0.00	0.00	0.00
43	Paddy land converted to Cultivable Waste Land	0.00	0.00	0.00	0.00
44	<b>Paddy land converted</b>	<b>43.84</b>	<b>2.16</b>	<b>103.20</b>	<b>40.56</b>
45	Coconut	124.84	5.28	8.48	36.20
46	Areca nut	0.16	1.76	0.00	0.00
47	Coconut + Areca nut	0.00	0.00	0.00	0.00
48	Areca nut + Pineapple	0.00	0.00	0.00	0.00
49	Coconut + Pineapple	0.00	0.00	0.00	0.00
50	Rubber + Pineapple	0.00	0.00	0.00	0.00
51	Pineapple + Tuber Crops	0.00	0.00	0.00	0.00
52	Pineapple	0.00	0.00	0.00	0.00
53	Banana + Pineapple	0.00	0.00	0.00	0.00
54	Banana	0.00	0.00	8.64	38.60
55	Pineapple	0.00	0.00	0.00	0.00
56	Tuber Crops	0.00	0.00	0.00	0.00
57	Mixed Crops + Pineapple	0.00	0.00	0.00	0.00
58	Pineapple	0.00	0.00	0.00	0.00
59	Vegetables	8.64	0.24	1.76	0.00
60	Paddy- Vegetables	0.00	0.00	2.40	0.00
61	Tapioca	1.76	0.00	0.00	0.00
62	Mixed crops + Coconut	0.00	0.00	4.32	0.00
63	Mixed crops	1407.76	466.14	1271.88	834.16
64	<b>Homestead</b>	<b>1543.16</b>	<b>473.42</b>	<b>1297.48</b>	<b>908.96</b>
65	Groundnut + Sesamum	0.00	0.00	0.00	0.00
66	Groundnut	0.00	0.00	0.00	0.00
67	Sugar Cane	0.00	0.00	0.00	0.00
68	Marze	0.00	0.00	0.00	0.00
69	Cotton	0.00	0.00	0.00	0.00
70	<b>Field crops</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
71	Rubber	32.28	0.64	0.00	0.00
72	Mangium	0.32	0.00	0.00	0.00
73	Vanila	0.00	0.00	0.00	0.00
74	Accasia	0.00	0.00	0.00	0.00
75	Teak	0.16	0.00	0.00	0.80
76	Cashew nut	0.00	0.00	0.00	0.00
77	<b>Plantation Crops</b>	<b>32.76</b>	<b>0.64</b>	<b>0.00</b>	<b>0.80</b>

Sl. No.	Land use	Karumalloor	Varappuzha	Alangad	Kadungallur
78	Mixed Trees	3.52	0.16	9.92	114.94
79	<b>Agroforestry</b>	<b>3.52</b>	<b>0.16</b>	<b>9.92</b>	<b>114.94</b>
80	Nutmug	0.00	0.00	0.00	0.00
81	Vanila	0.00	0.00	0.00	0.00
82	Cocoa	0.00	0.00	0.00	0.00
83	Betal vine	0.00	0.00	0.00	0.00
84	Ginger	0.00	0.00	0.00	0.00
85	<b>Spices Crops</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
86	Mangroves	0.00	0.00	0.00	0.00
87	Forest	0.00	0.00	0.00	0.00
88	Paddy land- Waste	10.56	0.72	135.04	363.96
89	Waste Land	0.00	0.00	8.80	
90	Cultivable Waste Land	47.48	0.16	15.68	6.02
91	Waste Land	0.00	0.00	0.00	0.00
92	<b>Waste Land</b>	<b>58.04</b>	<b>0.88</b>	<b>159.52</b>	<b>369.98</b>
93	Rock	0.00	0.00	0.00	0.00
94	Granite Quarry	0.00	0.00	0.00	0.00
95	Laterite Quarry	0.00	0.00	0.00	0.00
96	Clay Mines	0.00	0.00	0.00	0.00
97	Quarry	0.00	0.00	0.00	0.00
98	<b>Mines</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
99	Built up Land	46.40	15.68	2.08	163.18
100	<b>Industrial Habitation</b>	<b>46.40</b>	<b>15.68</b>	<b>2.08</b>	<b>163.18</b>
101	Clay Mines	0.00	0.00	6.56	0.00
102	Quarry	0.00	0.00	1.60	0.00
103	Sand Mines	0.00	0.00	5.60	0.00
104	<b>Mines</b>	<b>0.00</b>	<b>0.00</b>	<b>13.76</b>	<b>0.00</b>
105	River	0.00	64.62	0.00	0.00
106	Water Sources	0.00	6.00	22.56	68.56
107	<b>Water Bodies</b>	<b>0.00</b>	<b>70.62</b>	<b>22.56</b>	<b>68.56</b>
108	Prawn culture	0.00	0.00	0.00	0.00
109	Asci Culture	0.00	1.28	0.00	0.00
110	Crab Culture	0.00	0.00	0.00	0.00
111	Aqua Culture	0.00	0.00	0.00	0.16
112	<b>Aqua Culture</b>	<b>0.00</b>	<b>1.28</b>	<b>0.00</b>	<b>0.16</b>
113	Govt. Farm	0.00	0.00	0.00	0.00
114	Sea eroded Land	0.00	0.00	0.00	0.00
115	River filled Land	0.00	3.96	0.00	0.00
116	Marshy Land	0.32	0.00	64.32	20.46
117	<b>Others</b>	<b>0.32</b>	<b>3.96</b>	<b>64.32</b>	<b>20.46</b>
118	<b>Total</b>	<b>2105.00</b>	<b>774.00</b>	<b>1785.00</b>	<b>1806.00</b>

Table: 11.3

**ANGAMALI BLOCK**

(Area in Ha)

Sl. No.	Land Use	Mukkannur	Thuravur	Manjapra	Karukutty	Ayyampuzha	Kanjoor	Kalady	Malayattoor Neeleswaram	Total
1	Paddy- Virippu	0.00	0.75	7.75	33.50	0.00	0.00	0.00	0.00	<b>42.00</b>
2	Paddy- Mundakan	0.00	0.00	0.00	0.00	0.00	0.00	10.75	0.00	<b>10.75</b>
3	Paddy- Puncta	0.00	0.00	0.00	85.00	0.00	0.00	0.00	0.00	<b>85.00</b>
4	Paddy- Virippu + Mundakan	0.00	181.50	37.38	75.63	42.50	54.25	158.25	25.00	<b>574.51</b>
5	Paddy- Mundakan + Puncta	0.00	0.00	20.13	11.25	43.00	0.00	5.00	0.00	<b>79.38</b>
6	Paddy- Virippu + Mundakan+ Puncta	167.50	219.50	100.00	213.12	24.00	48.50	191.15	121.50	<b>1085.27</b>
7	Paddy- Virippu + Vegetables	0.00	0.00	0.00	0.00	20.00	0.00	4.75	0.00	<b>24.75</b>
8	Paddy- Virippu + Mundakan + Vegetables	2.25	0.00	45.63	2.25	0.00	2.50	0.00	0.00	<b>52.63</b>
9	Paddy- Virippu + Vegetables + Banana						0.00	0.00	11.00	<b>11.00</b>
10	Paddy- Paddy - Pineapple	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.50</b>
11	Paddy -Banana + Pineapple	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	<b>25.00</b>
12	Paddy -Tuber Crops				0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
13	Paddy land converted to Tuber Crops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
14	Paddy land converted to Tuber Crops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
15	Paddy land converted to Tuber Crops	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
16	Paddy -Brick Klin						0.00	0.00	0.00	<b>0.00</b>
17	<b>Paddy</b>	<b>170.25</b>	<b>401.75</b>	<b>210.89</b>	<b>445.75</b>	<b>129.50</b>	<b>105.25</b>	<b>369.90</b>	<b>157.50</b>	<b>1990.79</b>
18	Paddy land converted to built up land	2.25	5.50	7.50	0.75	0.00	12.50	86.50	0.00	<b>115.00</b>
19	Paddy land converted to Coconut	5.75	19.50	0.00	24.63	2.00	3.25	3.25	0.00	<b>58.38</b>



Sl. No.	Land Use	Mukkannur	Thuravur	Manjapra	Karukutty	Ayyampuzha	Kanjoor	Kalady	Malayattoor Neeleswaram	Total
20	Paddy land converted to Areca nut	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
21	Paddy land converted to Mixed Crops	31.75	48.75	15.88	37.45	15.00	18.25	33.00	107.75	307.83
22	Paddy land converted to Banana	40.50	4.00	3.00	9.00	24.25	1.75	5.50	5.00	93.00
23	Paddy land converted to Rubber	0.25	2.25	0.00	0.00	0.00	1.25	0.00	0.00	3.75
24	Paddy land converted to Vanila	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.63
25	Paddy land converted to Tuber Crops	0.00	0.00	0.00	10.25	0.00	0.50	1.75	0.50	13.00
<b>26</b>	<b>Paddy land converted</b>	<b>80.50</b>	<b>81.00</b>	<b>27.01</b>	<b>82.08</b>	<b>41.25</b>	<b>37.50</b>	<b>130.00</b>	<b>113.25</b>	<b>592.59</b>
27	Coconut	20.25	0.50	0.00	20.75	0.00	11.50	17.75	0.00	70.75
28	Areca nut	1.25	0.00	0.00	0.00	0.00	0.00	2.00	1.50	4.75
29	Coconut + Arecanut	0.00	0.00	0.00	0.00	12.50	0.00	0.00	0.00	12.50
30	Pineapple	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
31	Banana	2.25	4.25	10.65	0.00	0.00	13.25	3.25	0.00	33.65
32	Banana + Tuber Crops	0.00	0.00	0.00	0.00	0.75	0.00	0.00	0.00	0.75
33	Tapioca	1.75	0.00	0.00	8.50	0.00	0.00	0.25	0.00	10.50
34	Tuber Crops	3.75	0.75	0.00	0.00	0.00	8.75	0.00	0.00	13.25
35	Vegetables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	Mixed Crops	1053.00	793.75	327.69	2187.25	503.00	758.25	846.00	688.25	7157.19
<b>37</b>	<b>Homestead</b>	<b>1092.25</b>	<b>799.25</b>	<b>338.34</b>	<b>2216.50</b>	<b>516.25</b>	<b>791.75</b>	<b>869.25</b>	<b>689.75</b>	<b>7313.34</b>
38	Rubber	822.75	212.00	75.03	534.80	1028.50	46.00	124.00	244.50	3087.58
39	Teak	0.75	0.25	0.00	0.00	3.75	0.00	0.00	0.00	4.75
40	Cashew + Rubber + Teak + Mixed Trees	0.00	0.00	0.00	0.00	1180.00	0.00	0.00	0.00	1180.00
41	Mangium				0.00	0.00	0.00	0.00	0.00	0.00
42	Oil Palm	0.00	0.00	0.00	0.00	400.00	0.00	0.00	0.00	400.00
43	Cashew	0.25	0.00	0.00	0.25	139.75	0.00	0.00	187.75	328.00

Sl. No.	Land Use	Mukkannur	Thuravur	Manjapra	Karukutty	Ayyampuzha	Kanjoor	Kalady	Malayattoor Neeleswaram	Total
<b>44</b>	<b>Plantation Crops</b>	<b>823.75</b>	<b>212.25</b>	<b>75.03</b>	<b>535.05</b>	<b>2752.00</b>	<b>46.00</b>	<b>124.00</b>	<b>432.25</b>	<b>5000.33</b>
45	Mixed Trees	12.25	0.00	11.00	0.00	2.00	0.00	54.50	10.50	90.25
46	Agroforestry	12.25	0.00	11.00	0.00	2.00	0.00	54.50	10.50	90.25
47	Nutmug	0.00	0.00	0.00	0.00	0.00	124.00	0.00	0.00	124.00
48	Vanila	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>49</b>	<b>Spices Crops</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>124.00</b>	<b>0.00</b>	<b>0.00</b>	<b>124.00</b>
50	Forest	0.00	0.00	0.00	0.00	933.75	0.00	0.00	1102.00	2035.75
51	Paddy- Waste Land	5.25	12.00	0.00	25.00	0.00	0.50	37.00	0.00	79.75
52	Cultivable Waste Land	17.25	7.50	3.25	8.62	0.00	0.00	6.25	21.25	64.12
53	Waste Land	6.50	0.00	0.00	4.25	0.00	0.00	6.50	10.00	27.25
<b>54</b>	<b>Waste Land</b>	<b>29.00</b>	<b>19.50</b>	<b>3.25</b>	<b>37.87</b>	<b>933.75</b>	<b>0.50</b>	<b>49.75</b>	<b>1133.25</b>	<b>2206.87</b>
55	Rock	15.25	0.00	0.00	18.75	151.25	0.00	0.00	1.00	186.25
56	Laterite Quarry	0.00	0.00	0.00	0.00	0.00	1.75	1.50	0.00	3.25
57	Clay Mines	0.00	0.00	3.50	0.00	0.00	0.00	0.00	0.00	3.50
58	Quarry	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.50
<b>59</b>	<b>Mines</b>	<b>15.25</b>	<b>0.00</b>	<b>4.00</b>	<b>18.75</b>	<b>151.25</b>	<b>1.75</b>	<b>1.50</b>	<b>1.00</b>	<b>193.50</b>
60	Railway				0.00	0.00	0.00	0.00	0.00	0.00
61	Built up Land	5.75	5.50	7.00	7.25	30.00	96.75	51.75	0.00	185.75
<b>62</b>	<b>Industrial Habitation</b>	<b>5.75</b>	<b>5.50</b>	<b>7.00</b>	<b>7.25</b>	<b>30.00</b>	<b>96.75</b>	<b>51.75</b>	<b>0.00</b>	<b>185.75</b>
63	Channel	0.00	8.75	0.00	0.00	0.00	0.00	0.00	0.00	8.75
64	Water Resources	0.00	0.00	43.48	1.25	300.00	228.50	13.25	270.50	856.98
<b>65</b>	<b>Water Bodies</b>	<b>0.00</b>	<b>8.75</b>	<b>43.48</b>	<b>1.25</b>	<b>300.00</b>	<b>228.50</b>	<b>13.25</b>	<b>270.50</b>	<b>865.73</b>
66	Paddy-Water Logging	0.00	0.00	0.00	12.50	0.00	0.00	0.00	0.00	12.50
67	Unsurveyed Forest	0.00	0.00	0.00	0.00	18690.00	0.00	0.00	614.00	19304.00
68	Marshy Land	0.00	0.00	0.00	0.00	0.00	0.00	4.50	0.00	4.50
<b>69</b>	<b>Others</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>12.50</b>	<b>18690.00</b>	<b>0.00</b>	<b>4.50</b>	<b>614.00</b>	<b>19321.00</b>
<b>70</b>	<b>Total</b>	<b>2229.00</b>	<b>1528.00</b>	<b>720.00</b>	<b>3357.00</b>	<b>23546.00</b>	<b>1432.00</b>	<b>1668.40</b>	<b>3422.00</b>	<b>37902.40</b>

Table: 11.4

**EDAPPALLY BLOCK**

(Area in Ha)

Sl. No.	Land Use	Kadamakkudy	Cheranallur	Mulavukadu	Elamkunnappuzha	Total
1	Paddy- Virippu	0.00	0.00	0.00	0.00	<b>0.00</b>
2	Paddy-Pokkaly	9.25	36.32			<b>45.57</b>
3	Pokkaly + Prawn Culture	489.25	0.00			<b>489.25</b>
4	Pokkaly + Asci Culture		186.72			<b>186.72</b>
5	Prawn Culture	9.25	0.00	245.00	90.75	<b>345.00</b>
6	Prawn Culture + Asci Culture		0.00	240.25	49.00	<b>289.25</b>
7	Pokkaly +Prawn Culture + Asci Culture				7.50	<b>7.50</b>
8	Paddy- Virippu + Mudakan	0.00	0.00			<b>0.00</b>
9	Paddy- Virippu + Mudakan + Puncha	0.00	0.00			<b>0.00</b>
10	Paddy land converted to Orchid	0.00	0.00			<b>0.00</b>
<b>11</b>	<b>Paddy</b>	<b>507.75</b>	<b>223.04</b>	<b>485.25</b>	<b>147.25</b>	<b>730.79</b>
12	Paddy land converted to built up land	0.00	3.20			<b>3.20</b>
13	Paddy land converted to Coconut	0.63	0.00			<b>0.63</b>
14	Paddy land converted to Mixed Crops	2.00	29.12		15.75	<b>46.87</b>
15	Paddy land converted to Rubber		2.24			<b>2.24</b>
16	Paddy land converted to Banana	0.00	0.00			<b>0.00</b>
<b>17</b>	<b>Paddy land converted</b>	<b>2.63</b>	<b>34.56</b>	<b>0.00</b>	<b>15.75</b>	<b>52.94</b>
18	Coconut	19.50	85.46	119.75	23.75	<b>248.46</b>
19	Banana	0.13	0.00			<b>0.13</b>
20	Tuber Crops		4.00			<b>4.00</b>
21	Mixed Crops	276.50	442.40	5.50	650.75	<b>1375.15</b>
<b>22</b>	<b>Plantation</b>	<b>296.13</b>	<b>531.86</b>	<b>125.25</b>	<b>674.50</b>	<b>1627.74</b>
23	Rubber	0.00	3.20			<b>3.20</b>

Sl. No.	Land Use	Kadamakkudy	Cheranallur	Mulavukadu	Elamkunnappuzha	Total
24	Teak	0.00	0.00			0.00
<b>25</b>	<b>Plantation Crops</b>	<b>0.00</b>	<b>3.20</b>			<b>3.20</b>
26	Mixed Trees	16.25	0.00	365.00		381.25
<b>27</b>	<b>Agroforestry</b>	<b>16.25</b>	<b>0.00</b>	<b>365.00</b>	<b>0.00</b>	<b>381.25</b>
28	Mangroves				84.25	84.25
29	Paddy- Waste Land	22.25	0.00	0.00	0.00	22.25
30	Cultivable Waste Land	3.25	44.88	58.50	1.00	107.63
31	Waste Land	0.75	0.00	0.00	0.00	0.75
<b>32</b>	<b>Waste Land</b>	<b>26.25</b>	<b>44.88</b>	<b>58.50</b>	<b>85.25</b>	<b>214.88</b>
33	Quarry	0.00	0.00			0.00
<b>34</b>	<b>Mines</b>	<b>0.00</b>	<b>0.00</b>			<b>0.00</b>
35	Built up Land	0.25	0.00	16.00	26.50	42.75
<b>36</b>	<b>Industrial Habitation</b>	<b>0.25</b>	<b>0.00</b>	<b>16.00</b>	<b>26.50</b>	<b>42.75</b>
37	Water Logging		20.80			20.80
38	Lake			871.50	119.00	990.50
39	Water Sources	490.24	195.86			686.10
<b>40</b>	<b>Water Bodies</b>	<b>490.24</b>	<b>216.66</b>	<b>871.50</b>	<b>119.00</b>	<b>1697.40</b>
41	Asci Culture	0.00	0.00		11.50	11.50
<b>42</b>	<b>Aqua Culture</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>11.50</b>	<b>11.50</b>
43	Govt. Farm	0.00	0.00			0.00
44	Sea eroded Land	0.00	0.00			0.00
45	Waste dumping Land		4.80			4.80
46	Marshy Land	2.50	0.00		86.25	88.75
<b>47</b>	<b>Others</b>	<b>2.50</b>	<b>4.80</b>	<b>0.00</b>	<b>86.25</b>	<b>93.55</b>
	<b>Total</b>	<b>1342.00</b>	<b>1059.00</b>	<b>1921.50</b>	<b>1154.50</b>	<b>4844.50</b>

Table: 11.5

**KOOVAPPADY BLOCK**

(Area in Ha)

SI.No.	Land Use	Asamannoor	Koovappady	Mudakuzha	Ockal	Raya mangalam	Vengoor	Total
1	Paddy- Virippu	0.000	26.50	0.00	2.00	0.00	0.00	28.50
2	Paddy- Mundakan	0.00	8.500	0.00	0.00	0.00	0.00	8.50
3	Prawn Culture	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Paddy- Virippu + Mundakan	82.25	96.50	0.00	32.50	10.75	0.00	222.00
5	Paddy- Mudakan+ Puncta	0.00	3.75	0.00	14.75	49.75	0.00	68.25
6	Paddy- Mundakan + Vegetables	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Paddy- Mundakan+ Tapioca	0.00	0.00	0.00	4.00	0.00	0.00	4.00
8	Paddy- Virippu + Tapioca	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Paddy- Cocoa	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Paddy	281.75	485.00	461.75	208.25	509.50	300.00	2246.25
11	Paddy land converted to built up land	0.00	12.00	1.00	4.25	8.00	0.00	25.25
12	Paddy land converted to Coconut	5.00	3.00	13.75	1.25	0.25	0.00	23.25
13	Paddy land converted to Areca nut	12.75	4.00	20.00	0.00	34.00	0.00	70.75
14	Paddy land converted to Pineapple	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Paddy land converted to Areconut + Banana + Pineapple	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Paddy land converted to Mixed Trees	0.00	1.25	0.00	0.00	0.00	0.00	1.25
17	Paddy land converted to Tapioca	0.00	0.00	9.25	0.00	0.00	0.00	9.25
18	Paddy land converted to Pineapple	0.00	0.00	0.00	0.00	4.25	0.00	4.25
19	Paddy land converted to Cultivable Waste Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	Paddy land converted	101.50	122.50	82.50	55.00	97.00	0.00	458.50
21	Coconut	19.25	32.75	8.00	0.00	8.50	466.25	534.75
22	Pineapple + Tuber Crops	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	Banana + Pineapple	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Banana	0.00	15.25	0.00	0.19	2.25	0.00	17.69
25	Banana + Tapioca	0.00	0.00	0.00	20.00	0.00	0.00	20.00
26	Vegetables	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Sl.No.	Land Use	Asamannoor	Koovappady	Mudakuzha	Ockal	Raya mangalam	Vengoor	Total
27	Mixed Crops	873.00	1654.00	822.00	799.31	1948.50	1961.75	8058.56
28	Field crops	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	Rubber	813.50	421.75	607.50	42.50	1015.25	1157.50	4058.00
30	Cashew					0.25		0.25
31	Cashew	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	Plantation Crops	813.75	426.50	611.25	44.50	1024.25	1162.50	4082.75
33	Mixed Trees	7.00	84.00	130.75	0.00	15.50	40.00	277.25
34	Vanila	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	Cocoa	0.25	3.75	0.00	0.00	0.50	0.00	4.50
36	Ginger					0.75		0.75
37	Vanila	0.00	0.00	0.00	0.13	0.00	0.00	0.13
38	Nutmug	0.00	0.00	0.00	0.75	1.25	0.00	2.00
39	Ginger	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	Mangroves	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	Forest	0.00	59.25	0.00	0.00	0.00	20000.00	20059.25
42	Paddy- Waste Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43	Cultivable Waste Land	18.00	8.50	0.00	3.87	18.75	14.50	63.62
44	Waste Land	10.50	10.00	6.50	3.00	8.50	0.00	38.50
45	Waste Land	28.50	94.25	7.00	6.87	27.75	20014.50	20178.87
46	Quarry	0.00	0.00	31.00	0.00	0.00	0.00	31.00
47	Laterite	0.00	0.00	0.00	0.00	0.75	0.00	0.75
48	Quarry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	Mines	9.25	29.25	43.75	0.00	0.75	45.00	128.00
50	Built up Land	6.75	48.75	16.25	7.50	23.75	0.00	103.00
51	Industrial Habitation	6.75	48.75	16.25	7.50	23.75	0.00	103.00
52	Water bodies	5.00	113.75	0.00	135.00	11.50	811.00	1076.25
53	Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	<b>2157.00</b>	<b>3118.00</b>	<b>2197.00</b>	<b>1280.00</b>	<b>3677.00</b>	<b>24801.00</b>	<b>37230.00</b>

Table: 11.6

**KOTHAMANGALAM BLOCK**

(Area in Ha)

Sl. No.	Land use	Paigottur	Nellikuzhi	Pindimana	Kottappadi	Kavalan gade	Varappetty	Keerampara	Pothanikade	Pallarimangalam	Kuttampuzha	Total
1	Paddy- Virippu	0.00	0.96	0.00	0.00	7.84	0.00	3.04	0.00	6.84	73.00	18.68
2	Paddy- Mundakan	0.00	0.00	30.80	0.00	0.64	6.72	0.00	0.00	0.00	28.00	38.16
3	Paddy- Virippu + Mundakan	108.96	15.76	30.96	83.52	173.14	127.36	142.76	74.40	109.70	12.00	866.56
4	Paddy- Mudakan+ Punched	0.00	34.08	11.36	0.00	142.56	0.00	0.00	0.00	0.00	0.00	188.00
5	Paddy- Virippu + Mundakan+ Punched	0.00	368.20	120.08	185.88	0.00	6.88	16.24	0.00	0.00	0.50	697.28
6	Paddy- Virippu + Mundakan+ Vegetables	0.00	0.00	0.00	0.00	70.08	0.00	0.00	0.00	0.00	0.00	70.08
7	Paddy - Pineapple	8.80	29.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.52
8	Paddy -Waste Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00
9	Paddy - Rubber	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.32
<b>10</b>	<b>Paddy</b>	<b>117.76</b>	<b>448.72</b>	<b>193.20</b>	<b>269.72</b>	<b>394.26</b>	<b>140.96</b>	<b>162.04</b>	<b>74.40</b>	<b>116.54</b>	<b>115.50</b>	<b>2033.10</b>
11	Paddy land converted to built up land	0.00	1.76	0.00	5.00	0.00	0.00	0.64	0.00	1.12	0.00	8.52
12	Paddy land converted to Coconut	9.44	2.88	4.00	9.60	49.60	5.44	2.88	24.64	18.36	2.00	128.84
13	Paddy land converted to Areca nut	39.04	0.00	0.96	6.12	35.36	0.86	0.00	3.68	2.24	23.00	111.26
14	Paddy land converted to Mixed Crops	49.44	61.96	10.24	50.88	92.00	30.88	10.16	82.88	5.12	77.50	471.06
15	Paddy land converted to Mixed Trees	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.00	1.28
16	Paddy land converted to Pineapple	0.00	0.00	1.28	0.00	0.00	19.04	14.25	7.36	0.00	0.50	42.43
17	Paddy land converted to Banana	7.68	0.00	1.12	6.56	0.00	4.80	14.16	7.20	1.92	10.00	53.44
18	Paddy land converted to Coconut + Banana	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.96
19	Paddy land converted to Pineapple + Coconut	0.00	0.00	0.00	0.00	0.00	0.00	3.84	0.00	0.00	0.00	3.84

Sl. No.	Land use	Paigottur	Nellikuzhi	Pindimana	Kottappadi	Kavalan-gade	Varappetty	Keerampara	Pothanikade	Pallarimangalam	Kuttampuzha	Total
20	Paddy land converted to Rubber	21.76	13.96	83.44	23.04	41.32	16.80	8.96	26.88	51.44	0.00	<b>287.60</b>
21	Paddy land converted to Rubber + Areca nut	0.00	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>1.60</b>
22	Paddy land converted to Rubber + Pineapple	0.00	0.00	0.00	0.00	0.00	0.00	20.80	0.00	0.00	0.00	<b>20.80</b>
23	Paddy land converted to Tuber Crops	0.32	18.28	0.00	0.00	0.00	0.48	1.28	0.00	11.48	0.00	<b>31.84</b>
24	Paddy land converted to Vegetables	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.96</b>
25	Paddy land converted to Tapioca	0.00	0.00	0.00	0.00	0.00	4.80	0.00	1.92	0.00	0.00	<b>6.72</b>
<b>26</b>	<b>Paddy land converted</b>	<b>127.68</b>	<b>98.84</b>	<b>103.60</b>	<b>101.20</b>	<b>218.28</b>	<b>83.10</b>	<b>77.93</b>	<b>154.56</b>	<b>92.96</b>	<b>113.00</b>	<b>1171.15</b>
27	Coconut	15.36	26.36	9.92	2.72	114.64	8.96	60.93	11.36	13.76	78.50	<b>342.51</b>
28	Areca nut	2.88	11.86	1.12	12.00	6.72	14.08	8.48	6.40	0.00	78.00	<b>141.54</b>
29	Rubber + Coconut	0.00	0.00	0.00	0.00	0.00	0.00	6.56	0.00	0.00	0.00	<b>6.56</b>
30	Rubber + Pineapple	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.00	0.00	0.00	<b>1.28</b>
31	Pineapple	28.96	31.12	9.48	7.52	58.88	22.40	33.83	15.84	23.28	53.50	<b>284.81</b>
32	Banana	24.80	12.88	5.60	2.08	10.24	5.12	4.64	1.44	2.24	7.50	<b>76.54</b>
33	Tapioca	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.00	0.00	13.50	<b>13.98</b>
34	Tuber Crops	1.92	8.14	2.56	0.00	3.84	1.76	3.68	1.28	1.92	9.00	<b>34.10</b>
35	Vegetables	0.00	0.00	4.80	0.00	0.00	0.32	0.00	0.00	0.00	0.00	<b>5.12</b>
36	Mixed Crops	530.12	681.64	830.16	488.48	574.88	773.92	681.87	269.20	288.24	1655.00	<b>6773.51</b>
<b>37</b>	<b>Homestead</b>	<b>604.04</b>	<b>772.00</b>	<b>863.64</b>	<b>512.80</b>	<b>769.20</b>	<b>826.56</b>	<b>801.75</b>	<b>305.52</b>	<b>329.44</b>	<b>1895.00</b>	<b>7679.95</b>
38	Bamboo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.00	<b>62.00</b>
39	Fodder	0.00	0.00	0.00	0.00	2.88	0.00	0.00	0.00	0.00	136.00	<b>138.88</b>
<b>40</b>	<b>Field Crops</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2.88</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>198.00</b>	<b>200.88</b>
41	Rubber	1551.20	835.52	1244.08	1455.20	1718.66	1022.24	1069.09	1126.48	881.32	1072.50	<b>11976.29</b>
42	Teak	3.40	23.60	4.00	1.12	0.00	0.00	308.00	1.28	0.00	0.00	<b>341.40</b>
43	Cashew	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.60	0.00	16.00	<b>17.60</b>
<b>44</b>	<b>Plantation Crops</b>	<b>1554.60</b>	<b>859.12</b>	<b>1248.08</b>	<b>1456.32</b>	<b>1718.66</b>	<b>1022.24</b>	<b>1377.09</b>	<b>1129.36</b>	<b>881.32</b>	<b>1088.50</b>	<b>12335.29</b>



Sl. No.	Land use	Paigottur	Nellikuzhi	Pindimana	Kottappadi	Kavalan-gade	Varappetty	Keerampara	Pothanikade	Pallarimangalam	Kuttampuzha	Total
45	Mixed Trees	4.96	261.44	8.16	44.48	456.68	11.04	51.50	9.76	84.38	240.00	1172.40
<b>46</b>	<b>Agroforestry</b>	<b>4.96</b>	<b>261.44</b>	<b>8.16</b>	<b>44.48</b>	<b>456.68</b>	<b>11.04</b>	<b>51.50</b>	<b>9.76</b>	<b>84.38</b>	<b>240.00</b>	<b>1172.40</b>
47	Cardamum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.00	42.00
48	Coffee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.00	38.00
49	Cocoa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	7.00
50	Pepper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.00	21.00
51	Vanila	0.00	0.00	0.00	0.00	48.80	0.00	0.00	0.00	0.00	3.00	51.80
<b>52</b>	<b>Spices Crops</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>48.80</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>111.00</b>	<b>159.80</b>
53	Forest	404.00	0.00	0.00	768.04	2270.00	0.00	0.00	0.00	0.00	0.00	3442.04
54	Protected Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50450.50	50450.50
<b>55</b>	<b>Forest</b>	<b>404.00</b>	<b>0.00</b>	<b>0.00</b>	<b>768.04</b>	<b>2270.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>50450.50</b>	<b>53892.54</b>
56	Cultivable Waste Land	22.24	11.04	0.00	1.12	0.00	0.48	1.12	0.00	28.88	16.00	64.88
57	Waste Land	0.00	17.44	4.80	34.88	1.92	0.00	4.96	5.60	0.48	10.00	70.08
<b>58</b>	<b>Waste Land</b>	<b>22.24</b>	<b>28.48</b>	<b>4.80</b>	<b>36.00</b>	<b>1.92</b>	<b>0.48</b>	<b>6.08</b>	<b>5.60</b>	<b>29.36</b>	<b>26.00</b>	<b>160.96</b>
59	Rock	0.00	0.00	34.72	0.00	31.04	6.08	228.00	0.00	7.20	0.00	307.04
60	Quarry	11.52	18.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00	61.92
61	Quarry	0.00	0.00	0.00	0.00	5.60	56.66	4.16	0.00	0.00	0.00	66.42
<b>62</b>	<b>Mines</b>	<b>11.52</b>	<b>18.40</b>	<b>34.72</b>	<b>0.00</b>	<b>36.64</b>	<b>62.74</b>	<b>232.16</b>	<b>0.00</b>	<b>7.20</b>	<b>32.00</b>	<b>435.38</b>
63	Built up Land	3.20	14.56	2.56	5.44	34.80	2.88	14.40	34.80	8.32	19.50	140.46
<b>64</b>	<b>Industrial Habitation</b>	<b>3.20</b>	<b>14.56</b>	<b>2.56</b>	<b>5.44</b>	<b>34.80</b>	<b>2.88</b>	<b>14.40</b>	<b>34.80</b>	<b>8.32</b>	<b>19.50</b>	<b>140.46</b>
65	Lake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66	Water Sources	0.00	1.44	118.24	0.00	38.88	0.00	118.13	0.00	32.48	18.00	327.17
<b>67</b>	<b>Water Bodies</b>	<b>0.00</b>	<b>1.44</b>	<b>118.24</b>	<b>0.00</b>	<b>38.88</b>	<b>0.00</b>	<b>118.13</b>	<b>0.00</b>	<b>32.48</b>	<b>18.00</b>	<b>327.17</b>
68	Marshy Land	0.00	0.00	0.00	0.00	0.00	0.00	32.92	0.00	0.00	0.00	32.92
<b>69</b>	<b>Others</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>32.92</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>32.92</b>
	<b>Total</b>	<b>2850.00</b>	<b>2503.00</b>	<b>2577.00</b>	<b>3194.00</b>	<b>5991.00</b>	<b>2150.00</b>	<b>2874.00</b>	<b>1714.00</b>	<b>1582.00</b>	<b>54307.00</b>	<b>79742.00</b>

Table: 11.7

**MUVATTUPUZHA BLOCK**

(Area in Ha)

Sl.No.	Land use	Avoly	Arakuzha	Valakam	Paipra	Kalloor kkade	Ayavana	Manja lloor	Marady	Total
1	Paddy- Virippu	23.52	6.00	16.00	0.00	0.00	0.00	9.60	4.00	<b>59.12</b>
2	Paddy- Mundakan	9.44	0.00	0.36	0.48	0.00	0.00	0.00	12.32	<b>22.60</b>
3	Paddy- Virippu + Puncha	0.00	0.00	0.00	0.00	0.00	2.56	0.00	3.84	<b>6.40</b>
4	Paddy- Virippu + Mundakan	66.88	31.60	62.84	95.36	144.64	77.60	92.16	44.32	<b>615.40</b>
5	Paddy- Mundakan + Puncha	0.96	0.00	89.88	1.44	0.00	0.00	0.00	21.76	<b>114.04</b>
6	Paddy- Virippu + Mundakan+ Puncha	0.00	1.60	25.20	47.04	0.00	7.68	0.00	0.00	<b>81.52</b>
7	Paddy- Virippu + Mundakan + Tuber Crops	5.76	0.00	0.00	0.00	0.00	0.00	0.00	1.28	<b>7.04</b>
8	Paddy- Virippu + Vegetables	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	<b>0.24</b>
9	Paddy- Mudakan + Vegetables	0.00	0.00	2.76	0.00	0.00	0.00	0.00	0.00	<b>2.76</b>
10	Paddy- Virippu + Mundakan+ Vegetables	0.00	0.00	2.81	14.08	0.00	0.00	3.84	0.00	<b>20.73</b>
11	Paddy- Virippu + Tapioca	0.00	0.00	1.20	0.00	0.00	0.00	0.00	9.92	<b>11.12</b>
12	Paddy land converted to Pineapple	0.00	40.24	0.00	0.00	6.88	0.00	0.00	1.28	<b>48.40</b>
13	Paddy land converted to Banana					0.00	0.00	0.00	0.80	<b>0.80</b>
14	Paddy - Areca nut	0.00	0.00	11.36	0.00	4.8	0.00	0.00	0.00	<b>16.16</b>
15	Paddy - Tapioca	0.00	0.00	42.56	0.00	0.00	0.00	0.00	0.00	<b>42.56</b>
16	Paddy - Mixed Crops	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	<b>0.96</b>
17	Paddy - Cocoa	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	<b>0.32</b>

Sl.No.	Land use	Avoly	Arakuzha	Valakam	Paipra	Kalloor kkade	Ayavana	Manja lloor	Marady	Total
18	<b>Paddy</b>	<b>106.56</b>	<b>79.44</b>	<b>256.49</b>	<b>158.40</b>	<b>156.32</b>	<b>87.84</b>	<b>105.60</b>	<b>99.52</b>	<b>1050.17</b>
19	Paddy land converted to built up land	4.64	0.00	0.00	10.08	0.00	3.36	8.80	0.00	<b>26.88</b>
20	Paddy land converted to Coconut	2.88	0.00	1.76	5.60	32.16	8.00	0.00	0.00	<b>50.40</b>
21	Paddy land converted to Areca nut	19.36	0.00	8.56	3.84	0.00	7.68	14.08	3.20	<b>56.72</b>
22	Paddy land converted to Mixed Crops	58.96	128.51	6.88	18.72	94.08	105.08	115.44	40.48	<b>568.15</b>
23	Paddy land converted to Pineapple	22.08	0.00	0.00	11.36	0.00	50.72	0.00	0.64	<b>84.80</b>
24	Paddy land converted to Banana	0.00	11.82	0.48	9.76	19.84	2.88	10.88	1.92	<b>57.58</b>
25	Paddy land converted to Pineapple + Banana	19.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>19.52</b>
26	Paddy land converted to Areconut + Pineapple	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>1.60</b>
27	Paddy land converted to Areconut + Banana + Pineapple	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>3.20</b>
28	Paddy land converted to Areconut + Banana +Pinapple	1.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>1.28</b>
29	Paddy land converted to Rubber	15.36	40.39	0.40	4.32	36.00	39.20	41.48	9.16	<b>186.31</b>
30	Paddy land converted to Vanila						0.64	0.00	0.00	<b>0.64</b>
31	Paddy land converted to Rubber + Pineapple	2.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>2.56</b>
32	Paddy land converted to Tuber Crops	0.96	6.90	0.00	9.76	0.00	4.64	0.00	10.56	<b>32.82</b>
33	Paddy land converted to built up land + Tuber Crops + Pineapple	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>1.44</b>
34	Paddy land converted to Cultivable Waste Land	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00	<b>0.96</b>

Sl.No.	Land use	Avoly	Arakuzha	Valakam	Paipra	Kalloor kkade	Ayavana	Manja lloor	Marady	Total
35	<b>Paddy land converted</b>	<b>153.84</b>	<b>187.62</b>	<b>18.08</b>	<b>74.40</b>	<b>182.08</b>	<b>222.20</b>	<b>190.68</b>	<b>65.96</b>	<b>1094.86</b>
36	Coconut	5.28	3.00	5.36	20.64	11.40	11.68	26.28	71.52	<b>155.16</b>
37	Areca nut	4.00	33.60	8.97	6.72	6.72	1.92	4.16	32.64	<b>98.73</b>
38	Coconut + Areca nut	0.00	0.00	0.00		0.00	0.00	0.00	0.00	<b>0.00</b>
39	Areca nut+ Pineapple	0.00	0.00	0.00	1.44	0.00	0.00	0.00	0.00	<b>1.44</b>
40	Coconut + Pineapple	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>1.60</b>
41	Rubber + Pineapple	0.00	0.00	0.00	6.40	0.00	0.00	0.00	119.68	<b>126.08</b>
42	Pineapple + Tuber Crops	3.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>3.32</b>
43	Pineapple	9.44	35.12	14.96	47.52	116.56	34.72	148.72	82.48	<b>489.52</b>
44	Banana + Pineapple					0.00	0.00	0.00	3.2	<b>3.20</b>
45	Banana	4.16	9.00	1.48	15.84	0.00	0.32	1.28	8.16	<b>40.24</b>
46	Vanila							7.20		<b>7.20</b>
47	Tapioca	0.00	0.00	5.31	0.00	0.00	0.00	0.00	0.00	<b>5.31</b>
48	Tuber Crops					8.80	0.00	1.92	3.20	<b>13.92</b>
49	Pineapple + Tuber Crops					0.00	0.00	56.96	56.16	<b>113.12</b>
50	Vegetables	0.32	0.00	0.00	0.48	0.00	0.00	0.00	0.00	<b>0.80</b>
51	Mixed Crops	816.64	652.56	859.99	812.64	1306.88	740.40	638.08	445.28	<b>6272.47</b>
52	<b>Homestead</b>	<b>844.76</b>	<b>733.28</b>	<b>896.07</b>	<b>911.68</b>	<b>1450.36</b>	<b>789.04</b>	<b>884.60</b>	<b>822.32</b>	<b>7332.11</b>
53	Rubber	557.52	1747.88	1097.48	1944.56	1832.64	1691.28	818.92	954.40	<b>10644.68</b>
54	Teak	0.00	6.34	0.00	0.00	0.00	8.16	0.00	1.76	<b>16.26</b>
55	Cashew	2.40	0.00	0.80	0.00	10.80	0.00	0.00	1.28	<b>15.28</b>
56	<b>Plantation Crops</b>	<b>559.92</b>	<b>1754.22</b>	<b>1098.28</b>	<b>1944.56</b>	<b>1843.44</b>	<b>1699.44</b>	<b>818.92</b>	<b>957.44</b>	<b>10676.22</b>
57	Mixed Trees	18.56	46.12	0.16	58.24	33.12	10.40	38.00	114.24	<b>318.84</b>

Sl.No.	Land use	Avoly	Arakuzha	Valakam	Paipra	Kalloor kkade	Ayavana	Manja lloor	Marady	Total
<b>58</b>	<b>Agroforestry</b>	<b>18.56</b>	<b>46.12</b>	<b>0.16</b>	<b>58.24</b>	<b>33.12</b>	<b>10.40</b>	<b>38.00</b>	<b>114.24</b>	<b>318.84</b>
59	Nutmug	0.00	12.20	13.76	0.00	0.00	0.00	0.00	0.00	<b>25.96</b>
60	Cocoa	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00	<b>0.48</b>
<b>61</b>	<b>Spices Crops</b>	<b>0.00</b>	<b>12.20</b>	<b>14.88</b>	<b>0.00</b>	<b>0.00</b>	<b>1.28</b>	<b>0.00</b>	<b>0.00</b>	<b>28.36</b>
62	Paddy- Waste Land	6.88	10.00	2.32	0.00	0.64	0.00	0.00	4.48	<b>24.32</b>
63	Cultivable Waste Land	1.76	5.32	7.76	9.28	36.56	5.44	71.08	8.64	<b>145.84</b>
64	Cultivable Waste Paddy Land	0.00	0.00	0.00	0.00	0.00	0.00	0.80		<b>0.80</b>
65	Waste Land	22.40	51.90	0.00	5.76	8.64	9.92	11.68	15.52	<b>125.82</b>
<b>66</b>	<b>Waste Land</b>	<b>31.04</b>	<b>67.22</b>	<b>10.08</b>	<b>15.04</b>	<b>45.84</b>	<b>15.36</b>	<b>83.56</b>	<b>28.64</b>	<b>296.78</b>
67	Rock	22.88	0.00	0.40	14.88	43.68	17.92	114.88	37.52	<b>252.16</b>
68	Quarry	0.00	0.00	0.00	0.00	0.00	0.00	0.80		<b>0.80</b>
69	Granite Quarry	0.00	0.00	1.48	0.00	0.00	0.00	0.00	0.00	<b>1.48</b>
70	Laterite Quarry	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.00	<b>0.56</b>
71	Clay Mines	0.00	0.00	1.76	0.00	0.00	0.00	0.00	0.00	<b>1.76</b>
72	Quarry	4.52	0.00	0.00	0.00	0.00	4.48	0.00	0.00	<b>9.00</b>
<b>73</b>	<b>Mines</b>	<b>27.40</b>	<b>0.00</b>	<b>4.20</b>	<b>14.88</b>	<b>43.68</b>	<b>22.40</b>	<b>115.68</b>	<b>37.52</b>	<b>265.76</b>
74	Built up land	8.00	4.50	20.76	17.60	128.16	5.44	12.64	4.16	<b>201.26</b>
<b>75</b>	<b>Industrial Habitation</b>	<b>8.00</b>	<b>4.50</b>	<b>20.76</b>	<b>17.60</b>	<b>128.16</b>	<b>5.44</b>	<b>12.64</b>	<b>4.16</b>	<b>201.26</b>
76	Water Sources	109.92	51.40	53.00	19.20	12.00	93.60	52.32	0.48	<b>391.92</b>
<b>77</b>	<b>Water Bodies</b>	<b>109.92</b>	<b>51.40</b>	<b>53.00</b>	<b>19.20</b>	<b>12.00</b>	<b>93.60</b>	<b>52.32</b>	<b>0.48</b>	<b>391.92</b>
78	Marshy Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.72	<b>6.72</b>
<b>79</b>	<b>Others</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>6.72</b>	<b>6.72</b>
	<b>Total</b>	<b>1860.00</b>	<b>2936.00</b>	<b>2372.00</b>	<b>3214.00</b>	<b>3895.00</b>	<b>2947.00</b>	<b>2302.00</b>	<b>2137.00</b>	<b>21663.00</b>

Table: 11.8

**MULANTHURUTHY BLOCK**

(Area in Ha)

Sl.No.	Land use	Udayam perur	Mulanth uruthy	Chottani kkara	Edakkattu vayal	Amballur	Maneed	Total
1	Paddy- Virippu	0.00	74.75	0.00	9.00	26.75	0.80	<b>111.30</b>
2	Paddy- Mundakan	0.00	0.00	0.00	12.50	0.00	8.20	<b>20.70</b>
3	Paddy- Puncha	0.00	0.00	0.00	149.25	134.75	0.00	<b>284.00</b>
4	Paddy- Virippu + Mudakan	40.25	220.25	0.00	81.75	131.25	218.70	<b>473.50</b>
5	Paddy- Mundakan + Puncha	0.00	0.00	0.00	8.75	0.00	94.70	<b>103.45</b>
6	Paddy- Virippu + Mundakan + Puncha	0.00	0.00	0.00	0.00	0.00	7.70	<b>7.70</b>
7	Paddy- Virippu + Vegetables	0.00	0.00	0.00	2.75	0.00		<b>2.75</b>
8	Paddy Land -Pineapple	0.00	0.00	0.00	0.00	0.00	5.10	<b>5.10</b>
9	Paddy Land - Banana	0.00	0.00	0.00	0.00	0.00	1.60	<b>1.60</b>
10	Paddy- Virippu+ Mundakan + Vegetables	0.00	0.00	0.00	33.00	0.00		<b>33.00</b>
11	Prawn culture	32.25	0.00	0.00	0.00	0.00		<b>32.25</b>
12	Asci Culture	1.13	0.00	0.00	0.00	0.00		<b>1.13</b>
13	Pokkali + Prawn culture	89.75	0.00	0.00	0.00	0.00		<b>89.75</b>
14	Paddy land - Marshy land	0.00	3.50	0.00	0.00	0.00		<b>3.50</b>
<b>15</b>	<b>Paddy</b>	<b>163.38</b>	<b>298.50</b>	<b>0.00</b>	<b>297.00</b>	<b>292.75</b>	<b>336.80</b>	<b>1169.73</b>
16	Paddy land converted to built up land	31.88	1.00	0.00	2.75	5.25	1.00	<b>41.88</b>
17	Paddy land converted to Coconut	3.76	9.00	0.00	11.00	42.25	6.10	<b>72.11</b>
18	Paddy land converted to Coconut + Areca nut	0.00	0.00	0.00	0.00	4.50	4.40	<b>8.90</b>

Sl.No.	Land use	Udayam perur	Mulanth uruthy	Chottani kkara	Edakkattu vayal	Amballur	Maneed	Total
19	Paddy land converted to Coconut + Cashew	21.25	0.00	0.00	0.00	0.00		<b>21.25</b>
20	Paddy land converted to Arecanut	0.00	1.50	0.00	10.25	0.00		<b>11.75</b>
21	Paddy land converted to Mixed Crops	5.26	58.75	0.00	36.50	0.75	41.70	<b>142.96</b>
22	Paddy land converted to Banana	0.00	0.50	0.00	10.50	0.50		<b>11.50</b>
23	Paddy land converted to Rubber	0.00	0.00	0.00	1.50	0.00	4.40	<b>5.90</b>
24	Paddy land converted to Waste land	3.25	0.00	0.00	0.00	0.00		<b>3.25</b>
25	Paddy land converted to Pineapple	0.00	0.00	0.00	0.00	0.50		<b>0.50</b>
26	Paddy land converted to Cultivable Waste Land	0.00	0.00	0.00	0.00	24.75		<b>24.75</b>
27	Paddy land converted to Tuber Crops	0.00	2.75	0.00	0.00	0.00	2.40	<b>5.15</b>
<b>28</b>	<b>Paddy land converted</b>	<b>65.40</b>	<b>73.50</b>	<b>0.00</b>	<b>72.50</b>	<b>78.50</b>	<b>60.00</b>	<b>349.90</b>
29	Coconut	12.01	11.00	0.00	32.25	61.25	6.60	<b>123.11</b>
30	Areca nut	0.00	6.50	0.00	6.00	5.25	2.20	<b>19.95</b>
31	Pineapple	0.00	4.75	0.00	13.50	1.75	12.60	<b>32.60</b>
32	Banana	0.25	4.00	0.00	12.25	6.75	3.00	<b>26.25</b>
33	Pepper	0.13	0.00	0.00	0.00	0.00		<b>0.13</b>
34	Tuber Crops	0.00	0.75	0.00	1.50	1.75	0.30	<b>4.30</b>
35	Pulses	0.00	0.00	0.00	0.00	0.25		<b>0.25</b>
36	Tapioca	0.38	0.00	0.00	0.00	0.00		<b>0.38</b>
37	Vegetables	0.00	0.00	0.00	1.75	1.50		<b>3.25</b>
38	Mixed Crops	863.26	511.00	0.00	334.00	577.75	435.70	<b>2721.71</b>
<b>39</b>	<b>Homestead</b>	<b>876.03</b>	<b>538.00</b>	<b>0.00</b>	<b>401.25</b>	<b>656.25</b>	<b>460.40</b>	<b>2931.93</b>
40	Rubber	10.25	1006.50	0.00	1751.25	723.50	1530.30	<b>5021.80</b>
41	Accasia	0.00	4.00	0.00	0.00	0.00		<b>4.00</b>
42	Teak	0.00	1.75	0.00	0.00	1.75	4.50	<b>8.00</b>
43	Vanila	0.38	0.00	0.00	0.00	0.50	0.30	<b>1.18</b>

Sl.No.	Land use	Udayam perur	Mulanth uruthy	Chottani kkara	Edakkattu vayal	Amballur	Maneed	Total
44	Mangium						3.00	
45	Cashew	0.50	0.75	0.00	0.00	0.00	1.50	<b>2.75</b>
<b>46</b>	<b>Plantation Crops</b>	<b>11.13</b>	<b>1013.00</b>	<b>0.00</b>	<b>1751.25</b>	<b>725.75</b>	<b>1539.60</b>	<b>5037.73</b>
47	Mixed Trees	5.81	8.50	0.00	39.75	1.50	19.20	<b>74.76</b>
<b>48</b>	<b>Agroforestry</b>	<b>5.81</b>	<b>8.50</b>	<b>0.00</b>	<b>39.75</b>	<b>1.50</b>	<b>19.20</b>	<b>74.76</b>
49	Paddy- Waste Land	207.51	123.00	0.00	6.50	0.00	0.80	<b>337.81</b>
50	Cultivable Waste Land	7.13	23.00	0.00	13.25	6.00		<b>49.38</b>
51	Waste Land	0.00	1.75	0.00	6.25	19.50	34.30	<b>61.80</b>
<b>52</b>	<b>Waste Land</b>	<b>214.64</b>	<b>147.75</b>	<b>0.00</b>	<b>26.00</b>	<b>25.50</b>	<b>35.10</b>	<b>448.99</b>
53	Built up Land	34.23	47.75	0.00	40.25	18.50	14.40	<b>155.13</b>
<b>54</b>	<b>Industrial Habitation</b>	<b>34.23</b>	<b>47.75</b>	<b>0.00</b>	<b>40.25</b>	<b>18.50</b>	<b>14.40</b>	<b>155.13</b>
55	Lake	1044.78	0.00	0.00	0.00	0.00		<b>1044.78</b>
56	River						144.00	
57	Water Sources	47.50	20.00	0.00	0.00	255.50	5.30	328.30
<b>58</b>	<b>Water Bodies</b>	<b>1092.28</b>	<b>20.00</b>	<b>0.00</b>	<b>0.00</b>	<b>255.50</b>	<b>149.30</b>	<b>1373.08</b>
59	Marshy Land	16.25	0.00	0.00	0.00	203.00		<b>219.25</b>
60	Mangroves	5.75	0.00	0.00	0.00	0.00		<b>5.75</b>
61	Quarry	0.00	0.00	0.00	0.00	1.00		<b>1.00</b>
62	Rock						4.20	
63	Rock	0.00	0.00	0.00	0.00	0.75		<b>0.75</b>
64	Jasmine	0.05	0.00	0.00	0.00	0.00		<b>0.05</b>
65	Others	0.05	0.00	0.00	0.00	0.00		<b>0.05</b>
<b>66</b>	<b>Others</b>	<b>22.10</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>204.75</b>		<b>226.85</b>
67	Particulars not available			1268.00				<b>1268.00</b>
	<b>Total</b>	<b>2485.00</b>	<b>2147.00</b>	<b>1268.00</b>	<b>2628.00</b>	<b>2259.00</b>	<b>2614.80</b>	<b>13036.10</b>



Table: 11.9

**PALLURUTHY BLOCK**

(Area in Ha)

Sl.No.	Land use	Chellanam	Kumbal angy	Kumbalam	Total
1	Paddy- Mundakan			0.50	<b>0.50</b>
2	Paddy- Puncha				<b>0.00</b>
3	Prawn culture	439.00		21.25	<b>460.25</b>
4	Pokkali + Prawn culture	342.80		110.50	<b>342.80</b>
<b>5</b>	<b>Paddy</b>	<b>781.80</b>	<b>0.00</b>	<b>132.25</b>	<b>914.05</b>
6	Paddy land converted to built up land	1.00		0.75	<b>1.75</b>
7	Paddy land converted to Coconut			27.50	<b>27.50</b>
8	Paddy land converted to Mixed Crops	3.60		6.75	<b>10.35</b>
9	Paddy land converted to Banana			0.25	<b>0.25</b>
10	Lake converted to Mixed Crops			0.25	<b>0.25</b>
11	Paddy land converted to Waste land			4.50	<b>4.50</b>
<b>12</b>	<b>Paddy land converted</b>	<b>4.60</b>	<b>0.00</b>	<b>40.00</b>	<b>44.60</b>
13	Coconut	437.40		84.26	<b>437.40</b>
14	Areca nut			0.38	<b>0.00</b>
15	Banana			0.63	<b>0.00</b>
16	Mixed Crops	386.00		791.54	<b>386.00</b>
<b>17</b>	<b>Homestead</b>	<b>823.40</b>	<b>0.00</b>	<b>876.81</b>	<b>1700.21</b>
18	Mixed Trees			1.50	<b>0.00</b>
<b>19</b>	<b>Agroforestry</b>	<b>0.00</b>	<b>0.00</b>	<b>1.50</b>	<b>1.50</b>
20	Paddy- Waste Land			116.43	<b>116.43</b>
21	Cultivable Waste Land	0.70		5.25	<b>5.95</b>
<b>22</b>	<b>Waste Land</b>	<b>0.70</b>	<b>0.00</b>	<b>121.68</b>	<b>122.38</b>
23	Built up land	24.30		30.50	<b>54.80</b>
<b>24</b>	<b>Industrial Habitation</b>	<b>24.30</b>	<b>0.00</b>	<b>30.50</b>	<b>54.80</b>
<b>25</b>	<b>Mines</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
26	Lake			824.88	<b>824.88</b>
27	River			0.00	<b>0.00</b>
28	Water Logging	0.80			<b>0.00</b>
29	Water Sources	101.40		1.50	<b>102.90</b>
<b>30</b>	<b>Water Bodies</b>	<b>102.20</b>	<b>0.00</b>	<b>826.38</b>	<b>928.58</b>
31	Aqua Culture			1.00	<b>1.00</b>
<b>32</b>	<b>Aqua Culture</b>	<b>0.00</b>	<b>0.00</b>	<b>1.00</b>	<b>1.00</b>
33	Mangroves			20.88	<b>20.88</b>
34	Asci Culture				<b>0.00</b>
35	Railway				<b>0.00</b>
36	Marshy Land			2.00	
37	Sea eroded Land	200.00			<b>200.00</b>
<b>38</b>	<b>Others</b>	<b>200.00</b>	<b>0.00</b>	<b>22.88</b>	<b>222.88</b>
	<b>Total</b>	<b>1937.00</b>	<b>0.00</b>	<b>2053.00</b>	<b>3990.00</b>

Table: 11.10

**PAMPAKUDA BLOCK**

(Area in Ha)

Sl.No.	Land use	Elanji	Piravam	Thirumarady	Kuthattukulam	Palakuzha	Pampa kuda	Rama mangalam	Total
1	Paddy- Virippu	3.36	34.56	0.00	0.00	3.04	18.08	1.92	<b>60.96</b>
2	Paddy- Mundakan	0.00	128.68	2.24	0.00	2.88	6.24	21.60	<b>161.64</b>
3	Paddy- Puncha	0.00	72.98	15.36	0.00	0.00	0.00	0.00	<b>88.34</b>
4	Paddy- Virippu + Mundakan	152.00	0.00	268.16	237.00	50.52	231.04	157.12	<b>1095.84</b>
5	Paddy- Mundakan + Puncha	0.00	271.62	0.00	0.00	0.00	0.00	57.86	<b>329.48</b>
6	Paddy- Virippu + Mundakan + Puncha	0.00	0.00	0.00	0.00	0.00	4.00	65.12	<b>69.12</b>
7	Virippu + Vegetables	32.32	0.00	0.00	0.00	0.96	0.00	0.00	<b>33.28</b>
8	Virippu+ Mundakan + Vegetables	0.00	0.00	3.20	0.00	0.00	122.00	0.00	<b>125.20</b>
9	Paddy -Pineapple	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
10	Paddy - Banana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
<b>11</b>	<b>Paddy</b>	<b>187.68</b>	<b>507.84</b>	<b>288.96</b>	<b>237.00</b>	<b>57.40</b>	<b>381.36</b>	<b>303.62</b>	<b>1963.86</b>
12	Paddy land converted to built up land	3.20	1.28	0.48	0.64	0.00	1.60	3.62	<b>10.82</b>
13	Paddy land converted to Coconut	9.76	7.60	46.24	3.52	0.00	19.84	1.12	<b>88.08</b>
14	Paddy land converted to Areconut	48.96	0.00	9.76	16.48	0.00	0.80	0.00	<b>76.00</b>
15	Paddy land converted to Mixed Crops	65.28	24.16	54.56	78.56	103.90	15.62	19.62	<b>361.70</b>
16	Paddy land converted to Pineapple	0.00	0.80	0.00	0.32	0.00	0.15	0.00	<b>1.27</b>
17	Paddy land converted to Banana	11.20	0.32	12.32	10.20	0.00	2.40	0.00	<b>36.44</b>
18	Paddy land converted to Rubber	13.76	5.49	59.04	35.04	23.20	25.60	0.00	<b>162.13</b>
19	Paddy land converted to Tapioca				0.00	0.00	2.24	0.00	<b>2.24</b>
20	Paddy land converted to Nutmug	0.00	0.00	0.32	0.80	0.00	0.00	0.00	<b>1.12</b>
21	Paddy land converted to Tuber Crops	2.56	0.16	0.00	0.00	7.52	4.00	19.76	<b>34.00</b>

Sl.No.	Land use	Elanji	Piravam	Thirumarady	Kuthattukulam	Palakuzha	Pampa kuda	Rama mangalam	Total
22	Paddy land converted to Cultivable Waste Land	0.00	0.00	0.00	6.76	0.00	0.00	0.00	<b>6.76</b>
<b>23</b>	<b>Paddy land converted</b>	<b>154.72</b>	<b>39.81</b>	<b>182.72</b>	<b>152.32</b>	<b>134.62</b>	<b>72.25</b>	<b>44.12</b>	<b>780.56</b>
24	Coconut	46.56	2.96	59.52	49.20	1.30	6.40	5.60	<b>171.54</b>
25	Arecanut	5.28	3.84	4.16	2.24	10.40	0.80	6.40	<b>33.12</b>
26	Paddy - Arecanut	0.00	0.16	0.00	0.00	0.00	0.00	0.00	<b>0.16</b>
27	Banana	15.84	5.60	0.96	2.08	0.00	0.00	3.84	<b>28.32</b>
28	Pineapple	0.00	4.16	7.36	6.40	40.64	3.20	7.78	<b>69.54</b>
29	Tuber Crops	0.96	0.00	0.64	5.60	0.00	0.00	0.00	<b>7.20</b>
30	Pulses	0.00	0.00	0.48	0.00	0.00	0.00	0.00	<b>0.48</b>
31	Vegetables	5.12	0.00	0.00	0.00	0.00	0.00	0.00	<b>5.12</b>
32	Tapioca	0.00	2.88	0.00	0.00	0.00	0.00	0.00	<b>2.88</b>
33	Mixed Crops (Coconut)	2.40	0.00	0.00	0.00	0.00	0.00	0.00	<b>2.40</b>
34	Mixed Crops	480.48	828.86	370.40	632.59	195.04	803.36	850.88	<b>4161.61</b>
<b>35</b>	<b>Plantation</b>	<b>556.64</b>	<b>848.46</b>	<b>443.52</b>	<b>698.11</b>	<b>247.38</b>	<b>813.76</b>	<b>874.50</b>	<b>4482.37</b>
36	Rubber	1951.52	1335.48	1851.20	1089.81	1736.88	1708.99	912.80	<b>10586.68</b>
37	Teak	0.00	3.20	1.76	0.48	0.00	0.00	1.28	<b>6.72</b>
38	Coffee	0.00	0.00	0.96	0.00	0.00	0.00	0.00	<b>0.96</b>
39	Pepper		0.78	0.00	0.00	0.00	0.00	0.00	<b>0.78</b>
40	Palm	2.08	0.00	0.00	0.00	0.00	0.00	0.00	<b>2.08</b>
41	Mangium		2.08	0.00	0.00	0.00	0.00	0.00	<b>2.08</b>
42	Cashew nut	0.64	0.00	6.40	3.36	0.00	0.00	0.00	<b>10.40</b>
<b>43</b>	<b>Plantation Crops</b>	<b>1954.24</b>	<b>1341.54</b>	<b>1860.32</b>	<b>1093.65</b>	<b>1736.88</b>	<b>1708.99</b>	<b>914.08</b>	<b>10609.70</b>
44	Mixed Trees	14.40	12.76	54.40	97.36	15.36	17.92	4.64	<b>216.84</b>
<b>45</b>	<b>Mixed Trees</b>	<b>14.40</b>	<b>12.76</b>	<b>54.40</b>	<b>97.36</b>	<b>15.36</b>	<b>17.92</b>	<b>4.64</b>	<b>216.84</b>
46	Nutmug	0.00	4.48	0.96	0.32	0.00	0.00	0.00	<b>5.76</b>
47	Vanila	17.12	0.00	0.00	0.00	0.00	0.00	0.00	<b>17.12</b>

Sl.No.	Land use	Elanji	Piravam	Thirumarady	Kuthattukulam	Palakuzha	Pampa kuda	Rama mangalam	Total
48	Vanila (Inter crop )	0.00	0.00	3.20	0.00	0.00	0.00	0.00	<b>3.20</b>
49	Cocco	9.92	0.00	0.00	1.60	0.00	0.00	0.00	<b>11.52</b>
<b>50</b>	<b>Spices</b>	<b>27.04</b>	<b>4.48</b>	<b>4.16</b>	<b>1.92</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>37.60</b>
51	Paddy- Waste Land	0.00	23.44	0.00	0.00	0.00	0.00	0.00	<b>23.44</b>
52	Cultivable Waste Land	2.24	9.41	5.12	21.96	1.12	1.12	0.00	<b>40.97</b>
53	Waste Land	10.40	0.00	9.12	1.60	0.80	0.00	15.84	<b>37.76</b>
<b>54</b>	<b>Waste Land</b>	<b>12.64</b>	<b>32.85</b>	<b>14.24</b>	<b>23.56</b>	<b>1.92</b>	<b>1.12</b>	<b>15.84</b>	<b>102.17</b>
55	Rock	28.16	0.00	20.48	3.36	0.00	0.00	0.00	<b>52.00</b>
56	Abandoned Quarry	0.00	0.48	0.00	0.00	0.00	0.00	0.00	<b>0.48</b>
57	Clay mines- Abandoned	0.00	9.56	0.00	0.00	0.00	0.00	0.00	<b>9.56</b>
58	Quarry	0.00	0.00	0.00	0.00	22.40	0.80	0.00	<b>23.20</b>
<b>59</b>	<b>Mines</b>	<b>28.16</b>	<b>10.04</b>	<b>20.48</b>	<b>3.36</b>	<b>22.40</b>	<b>0.80</b>	<b>0.00</b>	<b>85.24</b>
60	Built up land	10.08	24.60	11.20	10.72	0.00	12.80	11.52	<b>80.92</b>
<b>61</b>	<b>Industrial Habitation</b>	<b>10.08</b>	<b>24.60</b>	<b>11.20</b>	<b>10.72</b>	<b>0.00</b>	<b>12.80</b>	<b>11.52</b>	<b>80.92</b>
62	River	0.00	108.34		0.00	0.00	0.00	0.00	108.34
63	Water Sources	2.40	5.28	44.00	0.00	11.04	0.00	171.68	234.40
<b>64</b>	<b>Water Sources</b>	<b>2.40</b>	<b>113.62</b>	<b>44.00</b>	<b>0.00</b>	<b>11.04</b>	<b>0.00</b>	<b>171.68</b>	<b>342.74</b>
	<b>Total</b>	<b>2948.00</b>	<b>2428.16</b>	<b>2924.00</b>	<b>2318.00</b>	<b>2227.00</b>	<b>3009.00</b>	<b>2340.00</b>	<b>18194.16</b>

Table: 11.11

**PARAKKADAVU BLOCK**

(Area in Ha)

Sl.No.	Land use	Puthen velikara	Sreemoola nagaram	Chengamanad	Nedumba ssery	Parakka davu	Kunnukara	Total
1	Paddy- Virippu	31.36	0.25	0.25	4.25	26.00	19.04	<b>81.15</b>
2	Paddy- Mundakan	151.68	1.25	11.00	57.50	43.50	14.40	<b>279.33</b>
3	Paddy- Puncha	0.00	26.00	8.63	14.00	24.50	6.88	<b>80.01</b>
4	Paddy- Virippu + Mundakan	54.08	10.25	67.89	181.25	178.00	71.68	<b>563.15</b>
5	Paddy- Mundakan + Puncha	0.00	23.00	0.00	38.25	7.50	69.12	<b>137.87</b>
6	Paddy- Virippu + Mundakan + Puncha	0.00	44.00	108.13	41.75	122.00	181.76	<b>497.64</b>
7	Paddy- Mundakan + Tapioca	0.00		0.00	0.00	0.00	0.00	<b>0.00</b>
8	Paddy- Virippu + Vegetables	0.00		0.00	12.00	0.00	0.00	<b>12.00</b>
9	Paddy- Virippu+ Mundakan + Vegetables	0.00		2.43	0.00	6.75	0.00	<b>9.18</b>
10	Paddy- Tuber Crops		1.00					<b>1.00</b>
11	Prawn culture	7.68		0.00	0.00	0.00	0.00	<b>7.68</b>
12	Prawn culture + Asci Culture	15.20		0.00	0.00	0.00	0.00	<b>15.20</b>
13	Paddy-Brick Klin	0.00	97.75	0.00	2.25	0.00	0.00	<b>100.00</b>
14	<b>Paddy</b>	<b>260.00</b>	<b>203.50</b>	<b>198.33</b>	<b>351.25</b>	<b>408.25</b>	<b>362.88</b>	<b>1784.21</b>
15	Paddy land converted to built up land	0.00	3.75	4.00	431.25	3.50	16.16	<b>458.66</b>
16	Paddy land converted to Mixed Crops	11.52	7.00	57.85	35.75	136.75	198.08	<b>446.95</b>
17	Paddy land converted to Coconut	6.72		7.26	0.75	70.75	4.00	<b>89.48</b>
18	Paddy land converted to Tapioca	0.00		0.00	0.00	2.50	0.00	<b>2.50</b>
19	Paddy land converted to Banana	6.24	9.25	2.50		25.50	1.28	<b>44.77</b>
20	Paddy land converted to Areca nut	0.00		0.00	0.00	0.00	1.12	<b>1.12</b>
21	Paddy land converted to Rubber	0.00		0.00	0.00	1.25	0.00	<b>1.25</b>
22	Paddy land converted to Tuber Crops	0.32		1.38	0.00	0.00	0.00	<b>1.70</b>
23	Paddy land converted to Mangium	0.00		1.38	0.00	0.00	0.00	<b>1.38</b>

Sl.No.	Land use	Puthen velikara	Sreemoola nagaram	Chengamanad	Nedumba ssery	Parakka davu	Kunnukara	Total
24	<b>Paddy land converted</b>	<b>24.80</b>	<b>20.00</b>	<b>74.37</b>	<b>467.75</b>	<b>240.25</b>	<b>220.64</b>	<b>1047.81</b>
25	Coconut	98.40		3.38	0.00	44.00	2.56	<b>148.34</b>
26	Areca nut	0.00		0.00	0.00	2.25	0.00	<b>2.25</b>
27	Banana	0.00	31.25	1.75	0.00	0.50	1.44	<b>34.94</b>
28	Paddy - Banana	0.00		0.50	0.00	0.00	0.00	<b>0.50</b>
29	Vegetables	3.04	1.25	0.25	0.00	0.00	0.00	<b>4.54</b>
30	Paddy - Tapioca	0.00		0.50	0.00	0.00	0.00	<b>0.50</b>
31	Tapioca	0.00		1.00	0.50	0.00	0.00	<b>1.50</b>
32	Pineapple	0.00		0.00	2.50	0.75	0.00	<b>3.25</b>
33	Pulses	0.00		1.13	0.00	0.00	0.00	<b>1.13</b>
34	Tuber Crops	0.00		0.00	0.00	0.25	0.00	<b>0.25</b>
35	Mixed Crops	912.56	785.75	888.87	1243.50	1214.00	1282.28	<b>6326.96</b>
36	<b>Homestead</b>	<b>1014.00</b>	<b>818.25</b>	<b>897.38</b>	<b>1246.50</b>	<b>1261.75</b>	<b>1286.28</b>	<b>6524.16</b>
37	Groundnut + Sesamum	0.00		0.00	0.00	0.00	0.00	0.00
38	Groundnut	0.00		0.00	0.00	0.00	0.00	0.00
39	Pineapple	0.00		0.00	0.00	0.00	0.00	0.00
40	Sugarcane	0.00		0.00	0.00	0.00	0.00	0.00
41	Marze	0.00		0.00	0.00	0.00	0.00	0.00
42	Cotton	0.00		0.00	0.00	0.00	0.00	0.00
43	Rubber	4.64	33.75	1.38	52.75	280.75	2.72	<b>375.99</b>
44	Cashew	1.92	0.50	0.00	0.00	0.00	23.52	<b>25.94</b>
45	<b>Plantation Crops</b>	<b>6.56</b>		<b>1.38</b>	<b>52.75</b>	<b>280.75</b>	<b>26.24</b>	<b>367.68</b>
46	Mangium	0.00	1.00	0.13	0.00	0.00	0.00	<b>1.13</b>
47	Mixed Trees	18.24	29.00	2.13	0.00	36.50	1.28	<b>87.15</b>
48	Teak	0.00	1.75	0.00	2.25	0.00	0.00	<b>4.00</b>
49	Agroforestry	<b>18.24</b>		<b>2.26</b>	<b>2.25</b>	<b>36.50</b>	<b>1.28</b>	<b>60.53</b>
50	Vanila		<b>1.25</b>					

Sl.No.	Land use	Puthen velikara	Sreemoola nagaram	Chengamanad	Nedumba ssery	Parakka davu	Kunnukara	Total
51	Nutmug	0.00	1.00	5.13	0.00	39.75	0.00	45.88
52	<b>Spices Crops</b>	<b>0.00</b>	<b>2.25</b>	<b>5.13</b>	<b>0.00</b>	<b>39.75</b>	<b>0.00</b>	<b>47.13</b>
53	Paddy- Waste Land	57.04	64.00	132.51	45.00	32.00	0.00	330.55
54	Cultivable Waste Paddy Land	0.00		60.01	0.00	0.00	0.00	60.01
55	Cultivable Waste Land	24.24	10.75	17.75	21.75	20.75	23.36	118.60
56	Marshy Land	2.56		0.00	0.00	0.00	10.72	13.28
57	Waste Land	0.00	4.50	0.00	0.75	3.00	9.92	18.17
58	<b>Waste Land</b>	<b>83.84</b>	<b>79.25</b>	<b>210.27</b>	<b>67.50</b>	<b>55.75</b>	<b>44.00</b>	<b>540.61</b>
59	Rock	0.80		0.38	0.00	0.00	0.00	1.18
60	Quarry	0.00		0.00	0.00	10.75	0.00	10.75
61	Clay mines	0.00		0.00	0.00	0.00	62.08	62.08
62	Abandoned Quarry	0.00		0.75	0.00	0.00	0.00	0.75
63	Laterite Mines	2.56		0.00	0.00	0.00	0.00	2.56
64	Quarry	0.00		0.00	0.00	3.75	0.00	3.75
65	<b>Mines</b>	<b>3.36</b>		<b>1.13</b>	<b>0.00</b>	<b>14.50</b>	<b>62.08</b>	<b>81.07</b>
66	Built up land	10.80	80.00	19.37	27.75	26.75	3.20	167.87
67	Railway		2.50					
68	<b>Industrial Habitation</b>	<b>10.80</b>	<b>82.50</b>	<b>19.37</b>	<b>27.75</b>	<b>26.75</b>	<b>3.20</b>	<b>170.37</b>
69	Water Sources	256.44	169.25	148.38	21.00	58.50	118.40	0.00
70	Water Logged Area	0.00		0.00	77.25	43.75	0.00	121.00
71	River converted	4.96		0.00	0.00	0.00	0.00	4.96
72	Dam	0.00		0.00	0.00	0.00	0.00	0.00
73	<b>Water Bodies</b>	<b>261.40</b>	<b>169.25</b>	<b>148.38</b>	<b>98.25</b>	<b>102.25</b>	<b>118.40</b>	<b>897.93</b>
74	Govt. Farm	0.00		0.00	0.00	0.00	0.00	0.00
75	Sea eroded Land	0.00		0.00	0.00	0.00	0.00	0.00
76	<b>Others</b>	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
	<b>Total</b>	<b>1683.00</b>	<b>1375.00</b>	<b>1558.00</b>	<b>2314.00</b>	<b>2466.50</b>	<b>2125.00</b>	<b>11521.50</b>

Table: 11.12

**PARAVOOR BLOCK**

Sl.No.	Land use	Chenda mangalam	Koottuvaly	Ezhikkara	Vadakkekara	Chittattukara	Total
1	Paddy- Virippu	0.32	0.32	0.00	0.00	0.32	0.96
2	Paddy- Pokkali	0.00	24.32	0.00	0.00	1.12	25.44
3	Pokkali + Prawn culture	0.00	271.04	680.00	0.00	32.80	983.84
4	Prawn culture	0.00	18.56	61.25	0.00	0.00	79.81
<b>5</b>	<b>Paddy</b>	<b>0.32</b>	<b>314.24</b>	<b>741.25</b>	<b>0.00</b>	<b>34.24</b>	<b>1090.05</b>
6	Paddy land converted	0.00	1.12	0.00	0.00	0.00	1.12
7	Paddy land converted to Coconut	0.00	25.92	0.00	0.00	0.80	26.72
8	Paddy land converted to Mixed Crops	0.00	1.28	0.00	0.00	2.56	3.84
9	Paddy land converted to Banana	0.00	0.00	0.00	0.00	0.32	0.32
<b>10</b>	<b>Paddy land converted</b>	<b>0.00</b>	<b>28.32</b>	<b>0.00</b>	<b>0.00</b>	<b>3.68</b>	<b>32.00</b>
11	Coconut	19.28	45.76	0.00	135.84	85.32	286.20
12	Areca nut	0.00	0.32	0.00	0.00	0.00	0.32
13	Banana	0.00	0.32	0.00	0.00	0.32	0.64
14	Vegetables	0.00	0.00	0.00	0.00	1.28	1.28
15	Mixed Crops	927.88	1388.96	604.00	757.24	678.12	4356.20
<b>16</b>	<b>Homestead</b>	<b>947.16</b>	<b>1435.36</b>	<b>604.00</b>	<b>893.08</b>	<b>765.04</b>	<b>4644.64</b>
17	Teak	0.32					0.32
18	Mixed Trees	2.40	1.60	100.00	0.00	12.96	116.96
<b>19</b>	<b>Agroforestry</b>	<b>2.72</b>	<b>1.60</b>	<b>100.00</b>	<b>0.00</b>	<b>12.96</b>	<b>116.96</b>
20	Nutmug	0.00	0.00	0.00	0.32	0.00	0.32
<b>21</b>	<b>Spices Crops</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.32</b>	<b>0.00</b>	<b>0.32</b>
22	Mangroves	0.00	0.00	3.00	0.00	0.00	3.00
23	Paddy- Waste Land	1.92	6.72	0.00	0.00	0.00	8.64



SI.No.	Land use	Chenda mangalam	Koottuvally	Ezhikkara	Vadakkekara	Chittattukara	Total
24	Cultivable Waste Land	1.76	15.04	2.25	0.16	18.08	37.29
25	Waste Land	0.00	4.32	5.00	0.00	0.00	9.32
<b>26</b>	<b>Waste Land</b>	<b>3.68</b>	<b>26.08</b>	<b>10.25</b>	<b>0.16</b>	<b>18.08</b>	<b>58.25</b>
27	Quarry	0.00	4.16	0.00	0.00	0.00	4.16
<b>28</b>	<b>Mines</b>	<b>0.00</b>	<b>4.16</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>4.16</b>
29	Built up land	1.92	5.28	2.50	0.80	0.48	10.98
<b>30</b>	<b>Industrial Habitation</b>	<b>1.92</b>	<b>5.28</b>	<b>2.50</b>	<b>0.80</b>	<b>0.48</b>	<b>10.98</b>
31	Lake	0.00	0.00	69.00	0.00	0.00	69.00
32	River converted	0.00	0.00	0.00	8.00	0.00	8.00
33	Water Sources	113.00	259.28	0.00	210.64	84.96	667.88
<b>34</b>	<b>Water Bodies</b>	<b>113.00</b>	<b>259.28</b>	<b>69.00</b>	<b>218.64</b>	<b>84.96</b>	<b>744.88</b>
35	Prawn culture	0.00	0.00	0.00	0.00	10.40	10.40
36	Asci Culture	0.00	0.00	0.00	0.00	14.08	14.08
37	Crab Culture	0.00	3.20	0.00	0.00	0.00	3.20
38	Aqua Culture	0.00	0.00	0.00	2.08	0.00	2.08
<b>39</b>	<b>Aqua Culture</b>	<b>0.00</b>	<b>3.20</b>	<b>0.00</b>	<b>2.08</b>	<b>24.48</b>	<b>29.76</b>
40	NH Acquired	0.00	1.92	0.00	0.00	0.00	1.92
41	Marshy Land	3.20	2.56	0.00	9.92	2.08	17.76
<b>42</b>	<b>Others</b>	<b>3.20</b>	<b>4.48</b>	<b>0.00</b>	<b>9.92</b>	<b>2.08</b>	<b>19.68</b>
	<b>Total</b>	<b>1072.00</b>	<b>2082.00</b>	<b>1527.00</b>	<b>1125.00</b>	<b>946.00</b>	<b>6752.00</b>

Table: 11.13

**VADAVUCODE - PUTHENKURISU BLOCK**

(Area in Ha)

Sl.No.	Land use	Poothrikka	Thiruvaniyoor	Vadavucode- Puthenkurisu	Mazhuva nnoor	Aikaranad	Kunnath unadu	Total
1	Paddy- Virippu	10.00	56.75	0.00	0.00	44.25	0.00	<b>111.00</b>
2	Paddy- Mundakan	2.00	0.00	0.00	0.00	0.00	22.00	<b>24.00</b>
3	Paddy- Puncha	0.00	0.00	0.00	11.75	0.00	28.00	<b>39.75</b>
4	Paddy- Virippu + Mundakan	215.25	219.76	17.50	245.25	82.50	0.00	<b>780.26</b>
5	Paddy- Mundakan + Puncha	83.25	0.00	0.00	6.50	0.00	53.75	<b>143.50</b>
6	Paddy- Virippu + Mundakan + Puncha	14.75	0.00	114.00	467.25	153.00	272.00	<b>1021.00</b>
7	Virippu+ Mudakan + Tuber Crops	0.00	24.75	0.00	0.00	0.00	0.00	<b>24.75</b>
8	Virippu + Vegetables	0.00	0.00	0.00	0.00	0.00	51.75	<b>51.75</b>
9	Virippu + Mudakan + Vegetables	0.00	82.44	0.00	0.00	0.00	0.00	<b>82.44</b>
10	Paddy land converted to Pineapple	0.00	13.44	0.00	17.50	18.00	39.00	<b>87.94</b>
11	Paddy- Pulses	0.00	0.00	0.00	0.00	0.50	0.00	<b>0.50</b>
12	Paddy - Tuber Crops	0.00	0.00	0.00	0.00	1.25	0.00	<b>1.25</b>
13	Paddy - Tapioca	0.00	1.50	0.00	0.00	0.00	0.00	<b>1.50</b>
<b>14</b>	<b>Paddy</b>	<b>325.25</b>	<b>398.64</b>	<b>131.50</b>	<b>748.25</b>	<b>299.50</b>	<b>466.50</b>	<b>2369.64</b>
15	Paddy land converted to built up land	1.75	2.75	0.00	3.25	0.00	0.00	<b>7.75</b>
16	Paddy land converted to Coconut	11.00	9.00	0.00	0.00	0.50	0.00	<b>20.50</b>
17	Paddy land converted to Areconut	18.00	6.69	3.00	0.00	14.25	0.00	<b>41.94</b>
18	Paddy land converted to Mixed Crops	51.00	30.89	23.25	33.00	5.25	31.25	<b>174.64</b>
19	Paddy land converted to Pineapple	4.50	0.00	0.75	0.00	0.00	0.00	<b>5.25</b>
20	Paddy land converted to Banana	10.25	1.25	0.00	6.25	2.50	0.00	<b>20.25</b>
21	Paddy land converted to Rubber	1.00	1.50	3.75	2.50	12.75	1.00	<b>22.50</b>
22	Paddy land converted to Tuber Crops	2.00	4.00	0.00	19.75	0.75	0.00	<b>26.50</b>

Sl.No.	Land use	Poothrikka	Thiruvaniyoor	Vadavucode-Puthenkurisu	Mazhuvannoor	Aikaranad	Kunnathunadu	Total
23	Paddy land converted to Cultivable Waste Land	1.00	0.00	0.00	0.00	0.00	0.00	1.00
<b>24</b>	<b>Paddy land converted</b>	<b>100.50</b>	<b>56.08</b>	<b>30.75</b>	<b>64.75</b>	<b>36.00</b>	<b>32.25</b>	<b>320.33</b>
25	Coconut	104.00	0.94	0.00	2.75	9.25	0.00	116.94
26	Arecanut	7.75	2.94	0.00	0.00	7.75	0.00	18.44
27	Pineapple	3.50	15.63	31.00	48.00	20.25	21.75	140.13
28	Banana	7.00	0.38	0.00	0.00	7.25	10.25	24.88
29	Tapioca	5.00	5.00	0.00	0.00	0.00	0.00	10.00
30	Tuber Crops	1.25	0.00	0.00	0.00	4.25	0.00	5.50
31	Pulses	0.00	0.00	0.00	0.00	2.75	0.00	2.75
32	Mixed Crops (Coconut)	0.00	0.00	0.00	0.00	1.50	0.00	1.50
33	Vegetables	5.25	0.00	0.00	0.00	1.25	0.75	7.25
34	Mixed Crops	718.25	475.79	1279.25	1973.75	884.00	1023.50	6354.54
<b>35</b>	<b>Plantation</b>	<b>852.00</b>	<b>500.68</b>	<b>1310.25</b>	<b>2024.50</b>	<b>938.25</b>	<b>1056.25</b>	<b>6681.93</b>
36	Rubber	1158.75	1084.75	654.00	1866.25	1188.75	940.25	6892.75
37	Teak	2.50	1.63	0.00	23.00	3.25	1.00	31.38
38	Cashew nut	0.00	0.00	2.25	0.00	3.50	0.00	5.75
<b>39</b>	<b>Plantation Crops</b>	<b>1161.25</b>	<b>1086.38</b>	<b>656.25</b>	<b>1889.25</b>	<b>1195.50</b>	<b>941.25</b>	<b>6929.88</b>
40	Mahagony	0.00	0.00	0.00	0.00	0.00	0.50	0.50
41	Brick Klin	0.00	0.00	0.00	0.00	0.00	0.75	0.75
42	Mixed Trees	3.75	1.88	95.75	44.75	16.00	6.50	168.63
43	Mixed Trees	<b>3.75</b>	<b>1.88</b>	<b>95.75</b>	<b>44.75</b>	<b>16.00</b>	<b>6.50</b>	<b>168.63</b>
44	Nutmug	1.75	0.00	0.00	0.00	1.75	0.00	3.50
45	Vanila	0.00	1.00	0.00	1.00	0.00	0.00	2.00
<b>46</b>	<b>Spices</b>	<b>1.75</b>	<b>1.00</b>	<b>0.00</b>	<b>1.00</b>	<b>1.75</b>	<b>0.00</b>	<b>5.50</b>
47	Paddy- Waste Land	0.00	23.00	220.50	0.00	10.25	0.00	253.75
48	Cultivable Waste Land	14.25	27.94	40.00	26.00	18.50	33.50	160.19

Sl.No.	Land use	Poothrikka	Thiruvaniyoor	Vadavucode-Puthenkurusu	Mazhuvannoor	Aikaranad	Kunnathunadu	Total
49	Waste Land	4.00	0.00	0.00	0.00	0.00	6.00	10.00
<b>50</b>	<b>Waste Land</b>	<b>18.25</b>	<b>50.94</b>	<b>260.50</b>	<b>26.00</b>	<b>28.75</b>	<b>39.50</b>	<b>423.94</b>
51	Rock	11.25	0.00	3.25	10.50	9.50	0.25	34.75
52	Granite Quarry	0.00	23.50	0.00	0.00	0.00	0.25	23.75
53	Laterite Quarry	12.75	3.07	0.00	0.00	0.00	1.50	17.32
54	Laterite Quarry	0.00	0.00	0.00	0.00	4.50	0.00	4.50
55	Abandoned Quarry	0.00	0.00	0.00	0.00	0.50	0.00	0.50
56	Clay Mines	0.00	0.63	0.00	0.00	0.00	2.50	3.13
<b>57</b>	<b>Mines</b>	<b>24.00</b>	<b>27.20</b>	<b>3.25</b>	<b>10.50</b>	<b>14.50</b>	<b>4.50</b>	<b>83.95</b>
58	Built up land	30.00	38.63	1130.25	102.00	49.50	48.25	1398.63
<b>59</b>	<b>Industrial Habitation</b>	<b>30.00</b>	<b>38.63</b>	<b>1130.25</b>	<b>102.00</b>	<b>49.50</b>	<b>48.25</b>	<b>1398.63</b>
60	River/ Channel	0.00	0.00	0.00	0.00	15.25	0.00	15.25
61	Water Sources	36.25	0.38	59.25	0.00	0.00	62.75	158.63
62	River converted	<b>36.25</b>	<b>0.38</b>	<b>59.25</b>	<b>0.00</b>	<b>15.25</b>	<b>62.75</b>	<b>173.88</b>
63	Fodder	0.00	26.44	0.00	0.00	0.00	9.50	35.94
64	Marshy Land	0.00	2.75	11.25	0.00	0.00	18.75	32.75
<b>65</b>	<b>Others</b>	<b>0.00</b>	<b>29.19</b>	<b>11.25</b>	<b>0.00</b>	<b>0.00</b>	<b>28.25</b>	<b>68.69</b>
	<b>Total</b>	<b>2553.00</b>	<b>2191.00</b>	<b>3689.00</b>	<b>4911.00</b>	<b>2595.00</b>	<b>2686.00</b>	<b>18625.00</b>

Table: 11.14

**VAZHAKKULAM BLOCK**

(Area in Ha)

SI.No.	Land use	Vengola	Vazhakkulam	Kizhakka mbalam	Chooranni kkara	Edathala	Keezhmad	Total
1	Paddy- Virippu	0.00	0.00	0.00	0.00	0.75	7.00	<b>7.75</b>
2	Paddy- Mundakan	0.00	0.00	0.00	45.75	0.00	2.50	<b>48.25</b>
3	Paddy- Puncha	12.50	0.00	0.00	0.00	0.00	2.50	<b>15.00</b>
4	Paddy - Virippu + Mundakan	79.65	387.00	47.25	20.75	65.60	90.50	<b>690.75</b>
5	Paddy - Mundakan + Puncha	9.00	0.00	26.00	26.00	28.15	0.75	<b>89.90</b>
6	Paddy - Puncha + Virippu	0.00	0.00	0.00	0.00	0.00	1.00	<b>1.00</b>
7	Paddy - Virippu + Mundakan + Puncha	393.25	47.00	599.75	1.75	70.75	84.00	<b>1196.50</b>
8	Paddy - Virippu + Mundakan + Vegetables	1.25	0.00	6.75	0.00	0.00	0.00	<b>8.00</b>
9	Paddy - Banana	0.00	0.00	0.00	0.00	2.00	0.00	<b>2.00</b>
10	Paddy- Tapioca	0.00	0.00	0.00	0.00	1.00	0.00	<b>1.00</b>
11	Kole Lands	0.00	0.00	0.00	0.00	0.00	23.50	<b>23.50</b>
12	<b>Paddy</b>	<b>495.65</b>	<b>434.00</b>	<b>679.75</b>	<b>94.25</b>	<b>168.25</b>	<b>211.75</b>	<b>2083.65</b>
13	Paddy land converted to built up land	7.50	0.00	33.25	22.50	15.90	34.50	<b>113.65</b>
14	Paddy land converted to Coconut	3.75	0.00	5.75	5.25	6.35	0.00	<b>21.10</b>
15	Paddy land converted to Areca nut	0.00	0.00	0.00	31.75	0.25	0.00	<b>32.00</b>

Sl.No.	Land use	Vengola	Vazhakkulam	Kizhakka mbalam	Choornni kkara	Edathala	Keezhmad	Total
16	Paddy land converted to Mixed Crops	29.75	0.00	13.25		19.35	56.00	<b>118.35</b>
17	Paddy land converted to Pineapple	1.00	0.00	4.00	0.00	2.75	0.00	<b>7.75</b>
18	Paddy land converted to Banana	6.50	0.00	6.00	2.50	2.00	17.25	<b>34.25</b>
19	Paddy land converted to Areca nut + Banana + Pineapple	0.00	0.00	2.75	0.00	0.00	0.00	<b>2.75</b>
20	Paddy land converted to Vegetables			1.25				<b>1.25</b>
21	Paddy land converted to Rubber	0.00	0.00	0.00	1.50	0.00	1.50	<b>3.00</b>
22	Paddy land converted to Tuber Crops	3.25	0.00	0.50	0.00	1.50	4.50	<b>9.75</b>
23	Paddy land converted to Waste Land	0.00	0.00	0.00	0.00	4.25	0.00	<b>4.25</b>
<b>24</b>	<b>Paddy land converted</b>	<b>51.75</b>	<b>0.00</b>	<b>66.75</b>	<b>63.50</b>	<b>52.35</b>	<b>113.75</b>	<b>348.10</b>
25	Coconut	1.50	1.00	8.75	0.75	12.75	49.50	<b>74.25</b>
26	Areca nut	0.00	0.00	0.00	0.00	1.25	0.00	<b>1.25</b>
27	Coconut + Areca nut	0.00	0.00	3.75	0.00	0.00	0.00	<b>3.75</b>
28	Areca nut + Vanilla	0.00	0.00	0.00	0.00	4.00	0.00	<b>4.00</b>
29	Rubber + Pineapple	0.00	0.00	18.75	0.00	0.00	0.00	<b>18.75</b>
30	Pineapple	55.00	0.00	15.25	0.00	0.50	2.75	<b>73.50</b>
31	Banana	0.50	2.00	2.50	0.75	1.25	11.50	<b>18.50</b>
32	Tapioca	1.25	0.00	0.00	0.00	1.50	0.00	<b>2.75</b>
33	Vegetables + Sugar Cane				9.50			<b>9.50</b>
34	Vegetables	0.00	0.00	0.00	0.50	0.00	0.00	<b>0.50</b>
35	Mixed Crops	1796.60	904.25	1050.00	389.25	698.65	603.00	<b>5441.75</b>
<b>36</b>	<b>Homestead</b>	<b>1854.85</b>	<b>907.25</b>	<b>1099.00</b>	<b>400.75</b>	<b>719.90</b>	<b>666.75</b>	<b>5648.50</b>
37	Rubber	1071.75	420.50	1024.00	3.50	183.85	398.50	<b>3102.10</b>

Sl.No.	Land use	Vengola	Vazhakkulam	Kizhakka mbalam	Choornni kkara	Edathala	Keezhmad	Total
38	Mangium	3.75	0.00	2.50	2.50	2.75	0.00	<b>11.50</b>
39	Teak	0.00	24.25	0.50	4.00	0.25	0.00	<b>29.00</b>
40	Cashew	0.00	0.00	0.00	0.50	4.50	11.25	<b>16.25</b>
<b>41</b>	<b>Plantation Crops</b>	<b>1075.50</b>	<b>444.75</b>	<b>1027.00</b>	<b>10.50</b>	<b>191.35</b>	<b>409.75</b>	<b>3158.85</b>
42	Mixed Trees	0.00	71.25	10.75	2.00	25.00	24.75	<b>133.75</b>
43	Agroforestry	<b>0.00</b>	<b>71.25</b>	<b>10.75</b>	<b>2.00</b>	<b>25.00</b>	<b>24.75</b>	<b>133.75</b>
44	Paddy- Waste Land	2.50	0.00	1.50	139.25	106.75	49.25	<b>299.25</b>
45	Cultivable Waste Land	13.00	14.00	41.00	5.50	77.75	140.50	<b>291.75</b>
46	Waste Land	26.75	13.75	7.25	0.00	0.00	0.25	<b>48.00</b>
<b>47</b>	<b>Waste Land</b>	<b>42.25</b>	<b>27.75</b>	<b>49.75</b>	<b>144.75</b>	<b>184.50</b>	<b>190.00</b>	<b>639.00</b>
48	Rock	9.75	0.00	18.75	0.00	0.00	0.75	<b>29.25</b>
49	Laterite Quarry	0.00	0.00	0.00	0.00	2.25	7.00	<b>9.25</b>
<b>50</b>	<b>Mines</b>	<b>9.75</b>	<b>0.00</b>	<b>18.75</b>	<b>0.00</b>	<b>2.25</b>	<b>7.75</b>	<b>38.50</b>
51	Built up land	35.25	8.25	23.75	38.00	110.90	147.25	<b>363.40</b>
<b>52</b>	<b>Industrial Habitation</b>	<b>35.25</b>	<b>8.25</b>	<b>23.75</b>	<b>38.00</b>	<b>110.90</b>	<b>147.25</b>	<b>363.40</b>
53	River	0.00	70.75	0.00	0.00			<b>70.75</b>
54	Field - Water Logging				17.25			<b>17.25</b>
55	Water Sources	0.00	0.00	10.00	14.00	0.00	102.25	126.25
<b>56</b>	<b>Water Bodies</b>	<b>0.00</b>	<b>70.75</b>	<b>10.00</b>	<b>31.25</b>	<b>0.00</b>	<b>102.25</b>	<b>214.25</b>
57	Paddy - Marshy Land	0.00	0.00	171.50	0.00	0.00	0.00	<b>171.50</b>
58	Defence Area	0.00	0.00	0.00	0.00	143.50	0.00	<b>143.50</b>
<b>59</b>	<b>Others</b>	<b>0.00</b>	<b>0.00</b>	<b>171.50</b>	<b>0.00</b>	<b>143.50</b>	<b>0.00</b>	<b>315.00</b>
	<b>Total</b>	<b>3565.00</b>	<b>1964.00</b>	<b>3157.00</b>	<b>785.00</b>	<b>1598.00</b>	<b>1874.00</b>	<b>12943.00</b>

Table: 11.15

**VYPIN BLOCK**

(Area in Ha)

Sl.No.	Land use	Edavanakadu	Kuzhuppilli	Njarakkal	Nayaram balam	Pallippuram	Total
1	Paddy- Virippu	0.00	0.00	0.00	0.00	5.50	<b>5.50</b>
2	Paddy- Mundakan	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
3	Pokkali + Prawn culture	173.25	202.08	185.54	313.39	0.00	<b>874.26</b>
4	Pokkali + Asci Culture	0.00	0.00	0.00	10.75	0.00	<b>10.75</b>
5	Prawn culture + Asci Culture	0.00	20.16	0.00	0.00	0.00	<b>20.16</b>
6	Pokkali + Prawn culture+ Asci Culture	0.00	7.04	0.00	0.00	0.00	<b>7.04</b>
7	Prawn culture + Asci Culture	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
8	Asci Culture	0.00	1.12	0.00	0.00	0.00	<b>1.12</b>
9	Prawn culture	149.75	26.00	0.00	124.03	26.50	<b>326.28</b>
10	Asci Culture/ Prawn culture	0.00	0.00	63.93	0.00	0.00	<b>63.93</b>
11	Coconut + Prawn culture	0.00	0.00	14.72	0.00	0.00	<b>14.72</b>
12	Pokkali + Prawn culture+ Asci Culture	0.00	0.00	0.00	59.70	0.00	<b>59.70</b>
13	<b>Paddy</b>	<b>323.00</b>	<b>256.40</b>	<b>264.19</b>	<b>507.87</b>	<b>32.00</b>	<b>1383.46</b>
14	Paddy land converted to built up land	0.00	0.00	0.00	1.00	0.00	<b>1.00</b>
15	Paddy land converted to Coconut	22.25	0.00	0.00	0.25	0.00	<b>22.50</b>
16	Paddy land converted to Arecanut	1.75	0.00	0.00	0.00	0.00	<b>1.75</b>
17	Paddy land converted to Mixed Crops	2.00	18.64	0.00	8.40	0.00	<b>29.04</b>
18	<b>Paddy land converted</b>	<b>26.00</b>	<b>18.64</b>	<b>0.00</b>	<b>9.65</b>	<b>0.00</b>	<b>54.29</b>
19	Coconut	113.00	32.64	38.49	114.21	575.50	<b>873.84</b>
20	Arecanut	0.00	0.00	0.96	0.00	0.00	<b>0.96</b>
21	Banana	0.00	0.00	1.52	0.00	0.00	<b>1.52</b>
22	Vegetables	0.00	0.00	0.00	0.25	0.00	<b>0.25</b>



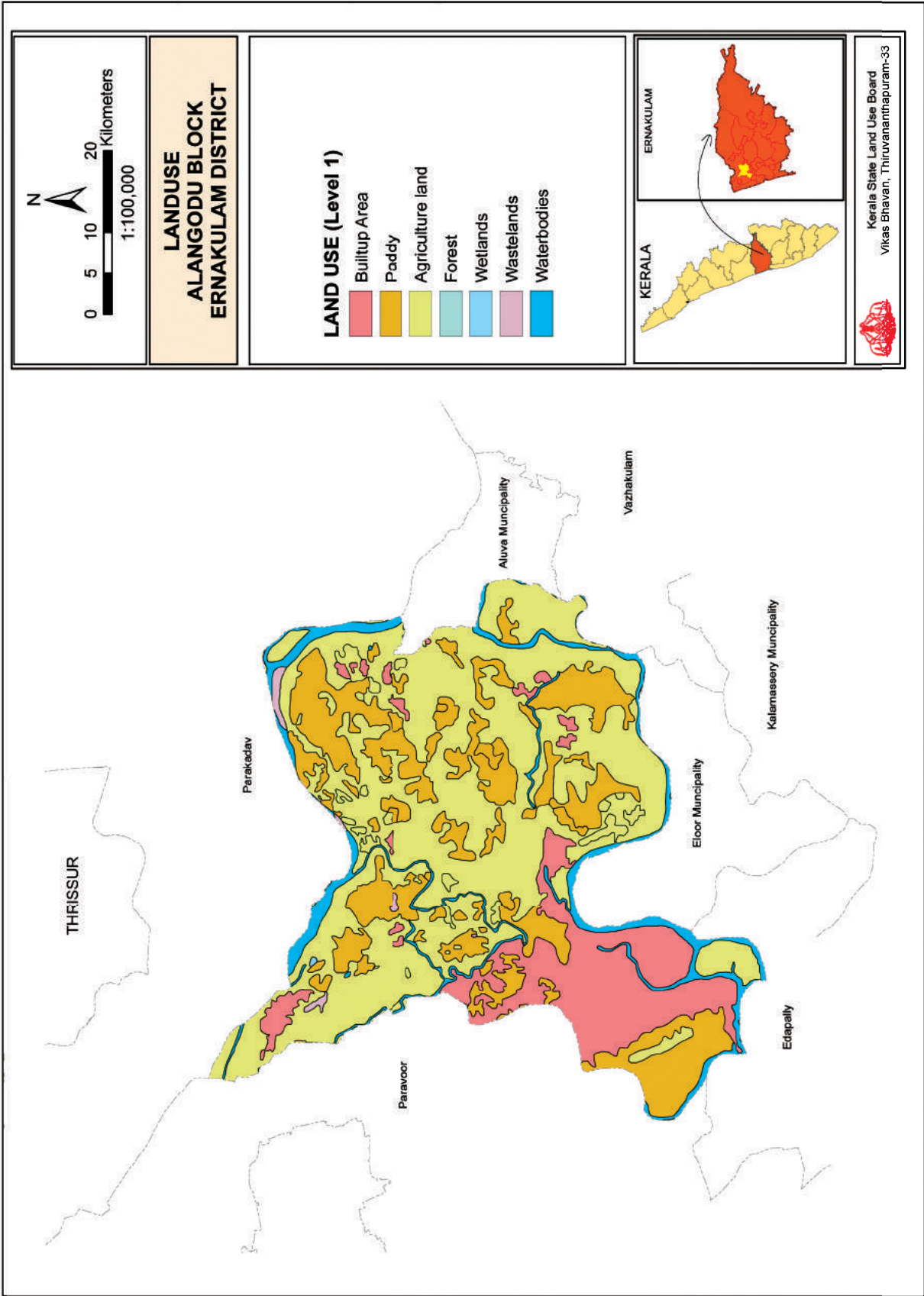
Sl.No.	Land use	Edavanakadu	Kuzhupilli	Njarakkal	Nayaram balam	Pallippuram	Total
23	Mixed Crops	385.25	242.36	345.63	373.16	502.75	1849.15
<b>24</b>	<b>Plantation</b>	<b>498.25</b>	<b>275.00</b>	<b>386.60</b>	<b>487.62</b>	<b>1078.25</b>	<b>2725.72</b>
25	Teak	0.25	0.00	0.00	0.00	0.00	0.25
26	Cashew nut	1.50	0.00	0.00	0.00	0.00	1.50
<b>27</b>	<b>Plantation Crops</b>	<b>1.75</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.75</b>
28	Mixed Trees	0.00	0.00	0.00	0.00	39.25	39.25
29	Mixed Trees	0.00	0.00	0.00	0.00	39.25	39.25
30	Mangroves	0.00	0.00	3.30	3.00	0.00	6.30
31	Cultivable Waste Land	2.00	4.04	1.60	0.00	4.80	12.44
<b>32</b>	<b>Waste Land</b>	<b>2.00</b>	<b>4.04</b>	<b>4.90</b>	<b>3.00</b>	<b>4.80</b>	<b>18.74</b>
33	Built up land	9.00	17.72	28.28	17.78	0.00	72.78
<b>34</b>	<b>Industrial Habitation</b>	<b>9.00</b>	<b>17.72</b>	<b>28.28</b>	<b>17.78</b>	<b>0.00</b>	<b>72.78</b>
35	Water Sources	18.50	0.00	158.28	12.63	276.50	465.91
36	Lake	222.00	85.56	0.00	255.13	224.20	786.89
<b>37</b>	<b>Water Sources</b>	<b>240.50</b>	<b>85.56</b>	<b>158.28</b>	<b>267.76</b>	<b>500.70</b>	<b>1252.80</b>
38	Asci Culture	23.50	0.00	0.00	0.75	0.00	24.25
<b>39</b>	<b>Aqua Culture</b>	<b>23.50</b>	<b>0.00</b>	<b>0.00</b>	<b>0.75</b>	<b>0.00</b>	<b>24.25</b>
40	Govt. Farm	0.00	0.00	0.00	0.00	0.00	0.00
41	Sea eroded Land	0.00	115.64	17.75	0.00	0.00	133.39
42	Jasmine	0.00	0.00	0.00	0.25	0.00	0.25
43	Marshy Land	0.00	0.00	0.00	6.32	0.00	6.32
<b>44</b>	<b>Others</b>	<b>0.00</b>	<b>115.64</b>	<b>17.75</b>	<b>6.57</b>	<b>0.00</b>	<b>139.96</b>
	<b>Total</b>	<b>1124.00</b>	<b>773.00</b>	<b>860.00</b>	<b>1301.00</b>	<b>1655.00</b>	<b>5713.00</b>

Table: 11.16

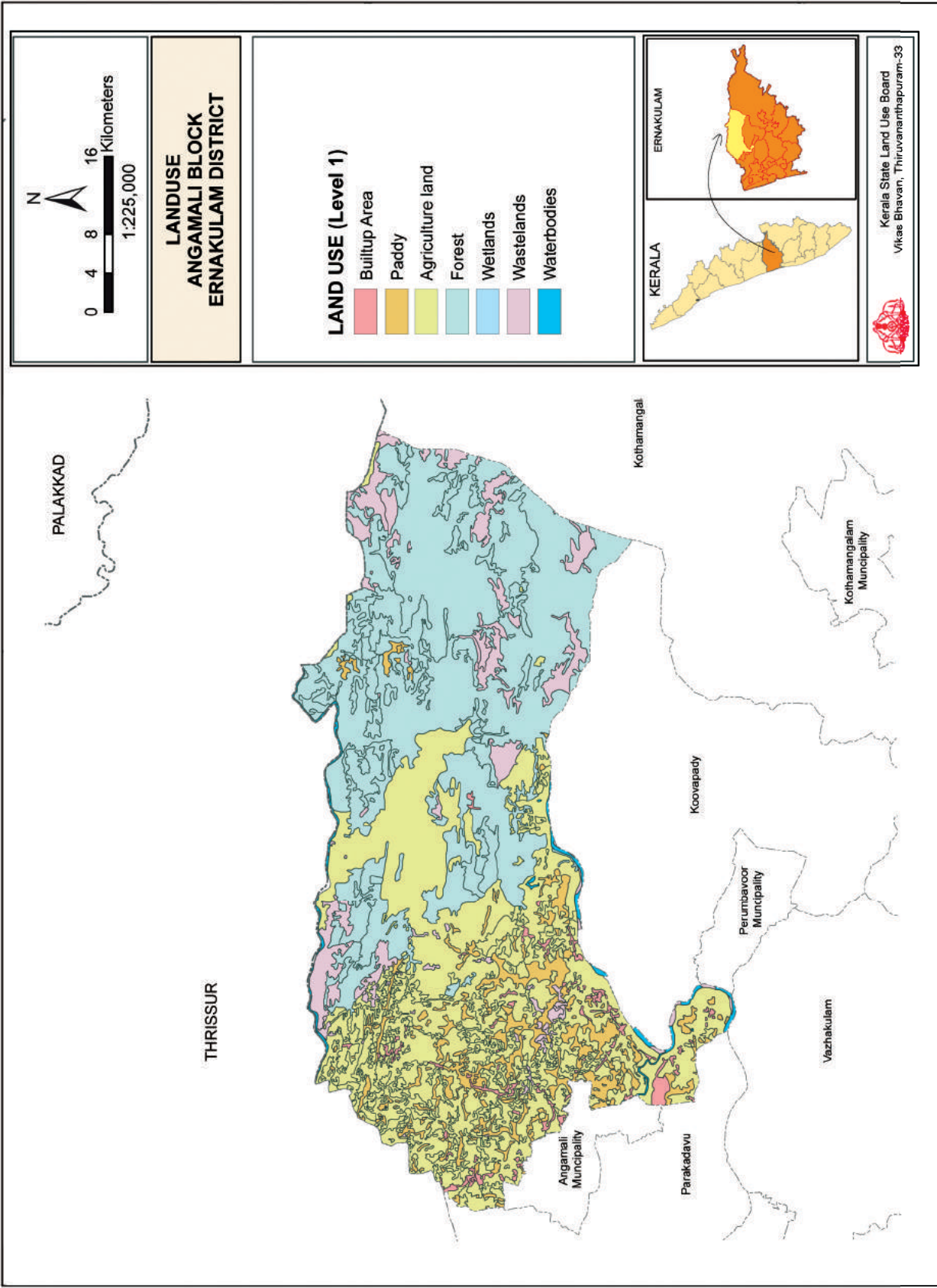
**VYTTILA BLOCK**

(Area in Ha)

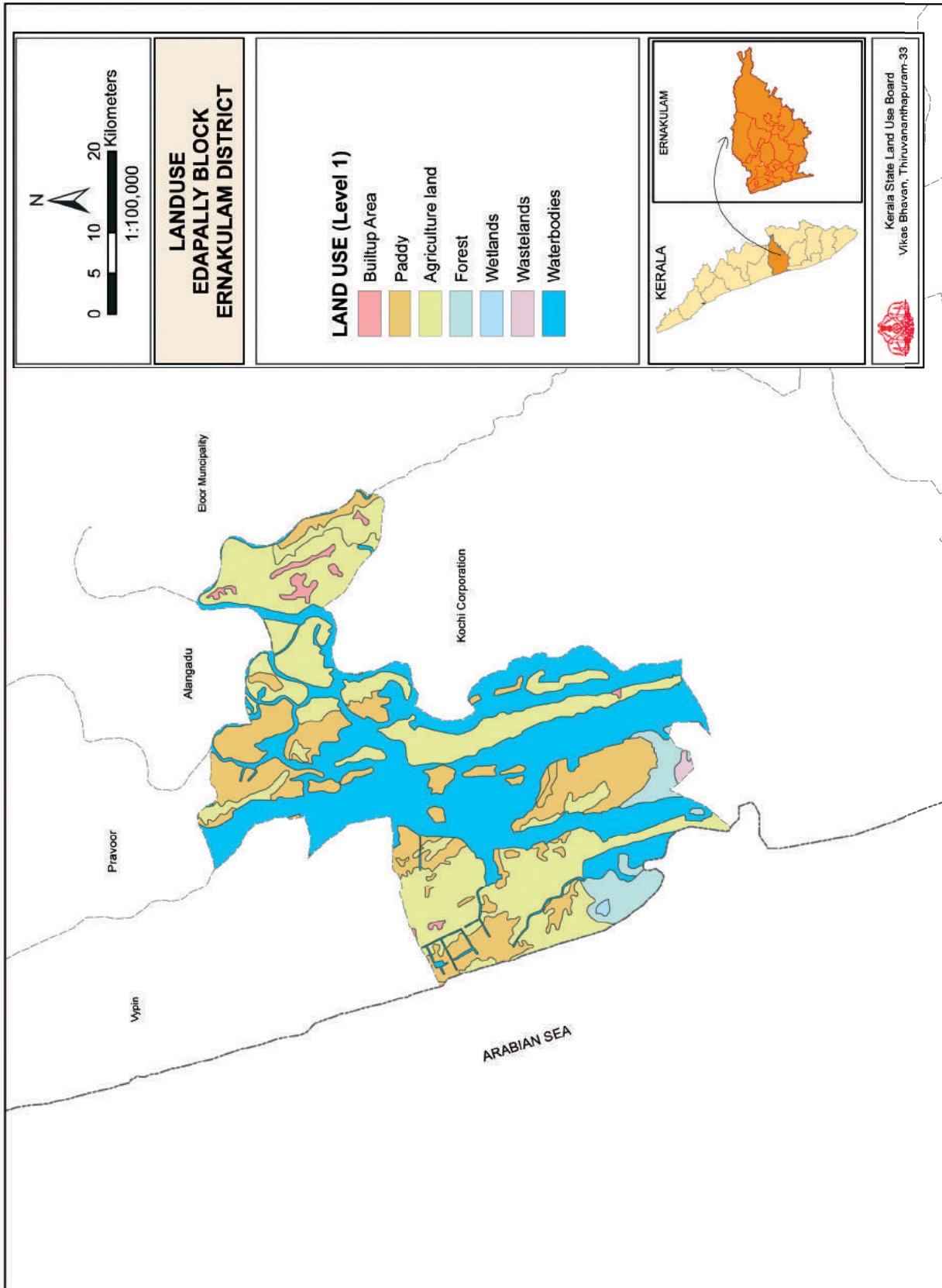
Sl.No.	Land use	Kumbalam	Maradu	Total
1	Paddy- Mundakan	0.50	0.00	<b>0.50</b>
2	Paddy- Puncha	0.00	0.25	<b>0.25</b>
3	Prawn culture	21.25	0.00	<b>21.25</b>
4	Pokkali + Prawn culture	110.50	2.75	<b>113.25</b>
<b>5</b>	<b>Paddy</b>	<b>132.25</b>	<b>3.00</b>	<b>135.25</b>
6	Paddy land converted to built up land	0.75	15.88	<b>16.63</b>
7	Paddy land converted to Coconut	27.50	4.75	<b>32.25</b>
8	Paddy land converted to Mixed Crops	6.75	22.75	<b>29.50</b>
9	Paddy land converted to Banana	0.25	0.00	<b>0.25</b>
10	Paddy land converted to Mixed Crops	0.25	0.00	<b>0.25</b>
11	Paddy land converted to Waste land	4.50	0.00	<b>4.50</b>
<b>12</b>	<b>Paddy land converted</b>	<b>40.00</b>	<b>43.38</b>	<b>83.38</b>
13	Coconut	84.26	0.00	<b>84.26</b>
14	Arecanut	0.38	0.00	<b>0.38</b>
15	Banana	0.63	0.00	<b>0.63</b>
16	Mixed Crops	791.54	950.85	<b>1742.39</b>
<b>17</b>	<b>Plantation</b>	<b>876.81</b>	<b>950.85</b>	<b>1827.66</b>
18	Mixed Trees	1.50	1.50	<b>3.00</b>
19	Mixed Trees	<b>1.50</b>	<b>1.50</b>	<b>3.00</b>
20	Paddy- Waste Land	116.43	27.38	<b>143.81</b>
21	Cultivable Waste Land	5.25	18.50	<b>23.75</b>
<b>22</b>	<b>Waste Land</b>	<b>121.68</b>	<b>45.88</b>	<b>167.56</b>
23	Built up land	30.50	42.31	<b>72.81</b>
<b>24</b>	<b>Industrial Habitation</b>	<b>30.50</b>	<b>42.31</b>	<b>72.81</b>
<b>25</b>	<b>Mines</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
26	Lake	824.88	0.00	<b>824.88</b>
27	River	0.00	0.00	<b>72.81</b>
28	Paddy- Water Logging	0.00	0.38	<b>0.38</b>
29	Water Sources	1.50	125.45	<b>72.81</b>
<b>30</b>	<b>Water Sources</b>	<b>826.38</b>	<b>125.83</b>	<b>952.21</b>
31	Aqua Culture	1.00	0.00	<b>1.00</b>
<b>32</b>	<b>Aqua Culture</b>	<b>1.00</b>	<b>0.00</b>	<b>1.00</b>
33	Mangroves	20.88	11.25	<b>32.13</b>
34	Asci Culture	0.00	3.50	<b>3.50</b>
35	Railway	0.00	7.50	<b>7.50</b>
36	Marshy Land	2.00	0.00	<b>2.00</b>
<b>37</b>	<b>Others</b>	<b>22.88</b>	<b>22.25</b>	<b>45.13</b>
	<b>Total</b>	<b>2053.00</b>	<b>1235.00</b>	<b>3288.00</b>





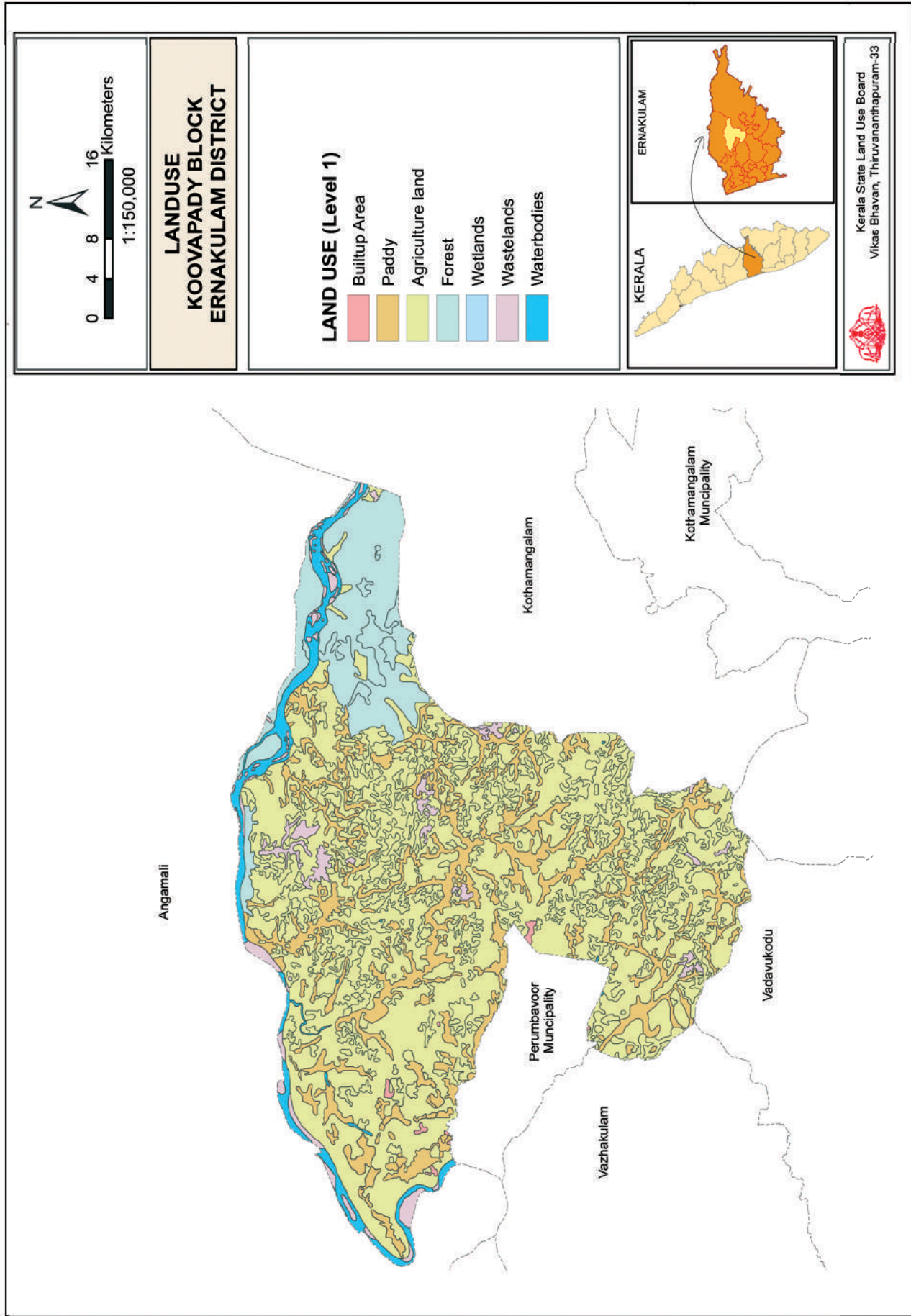




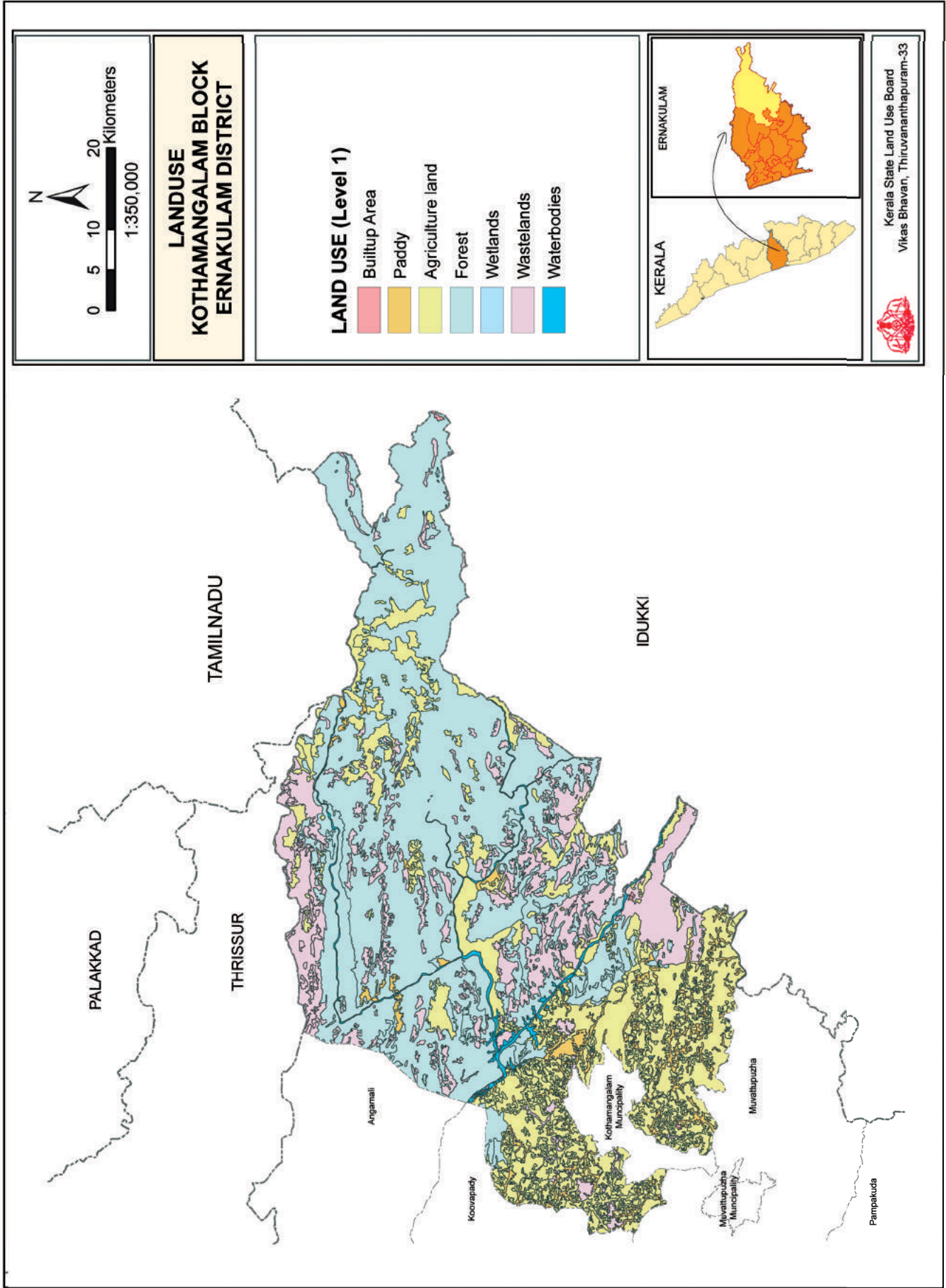




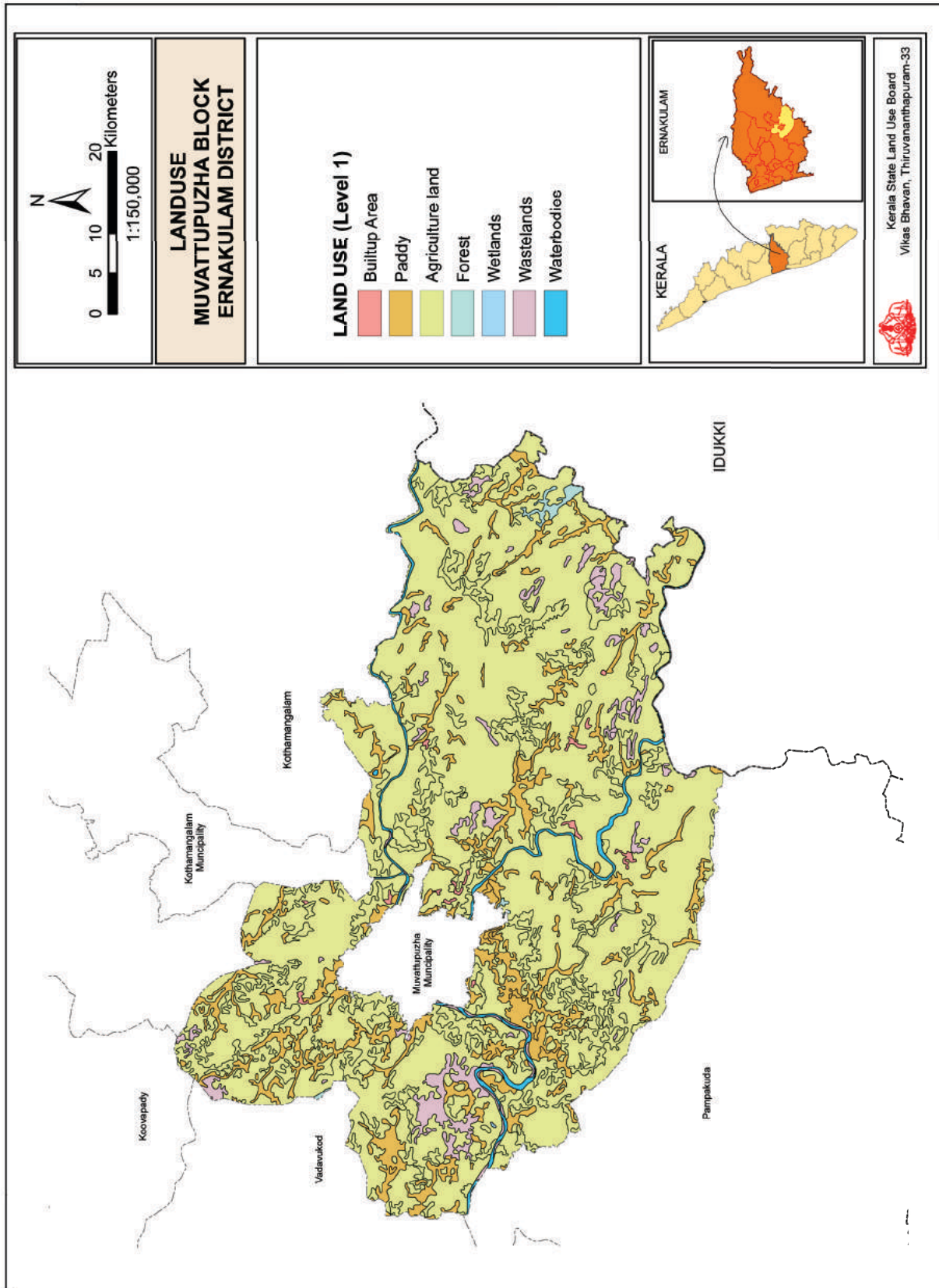






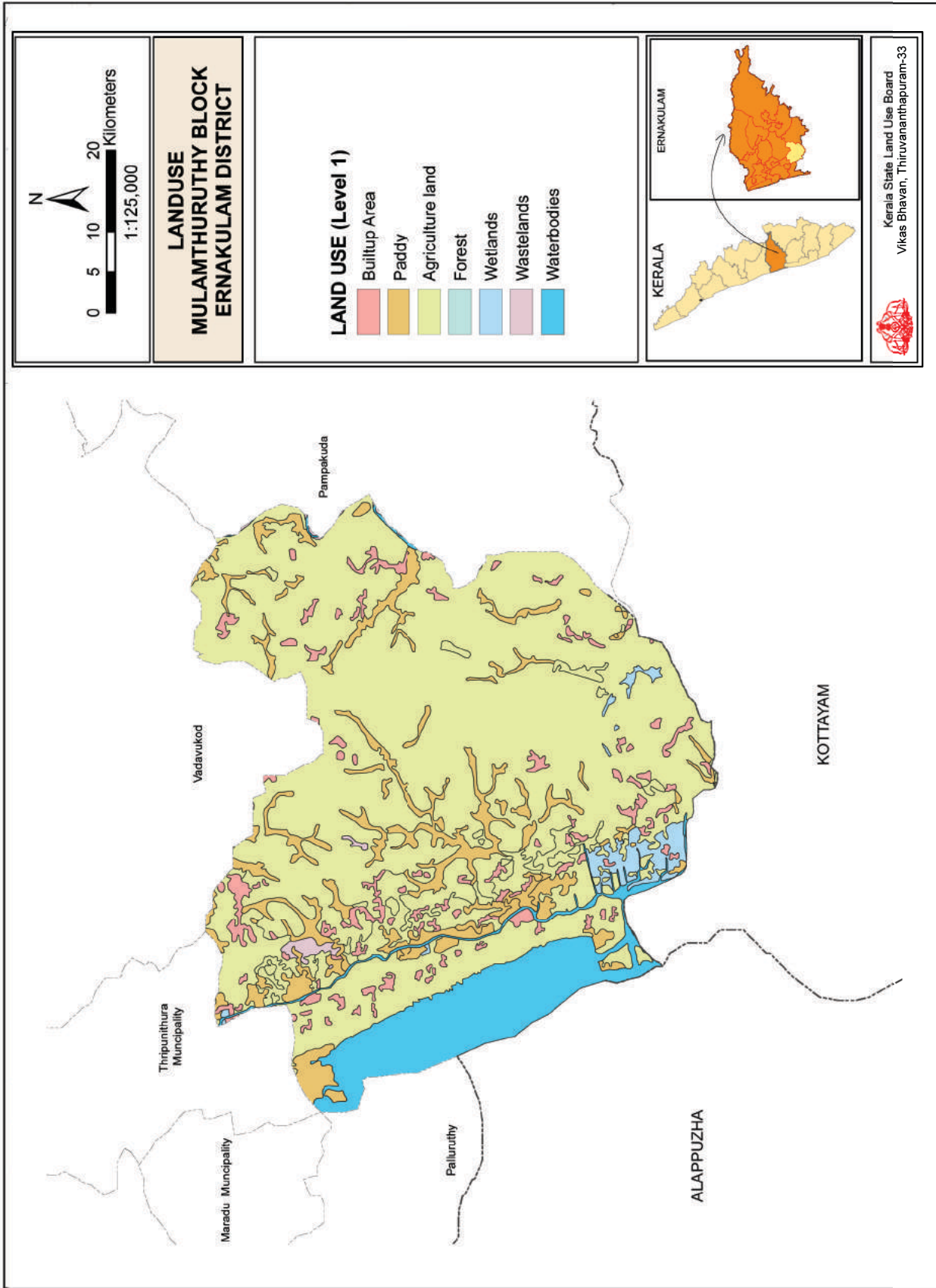






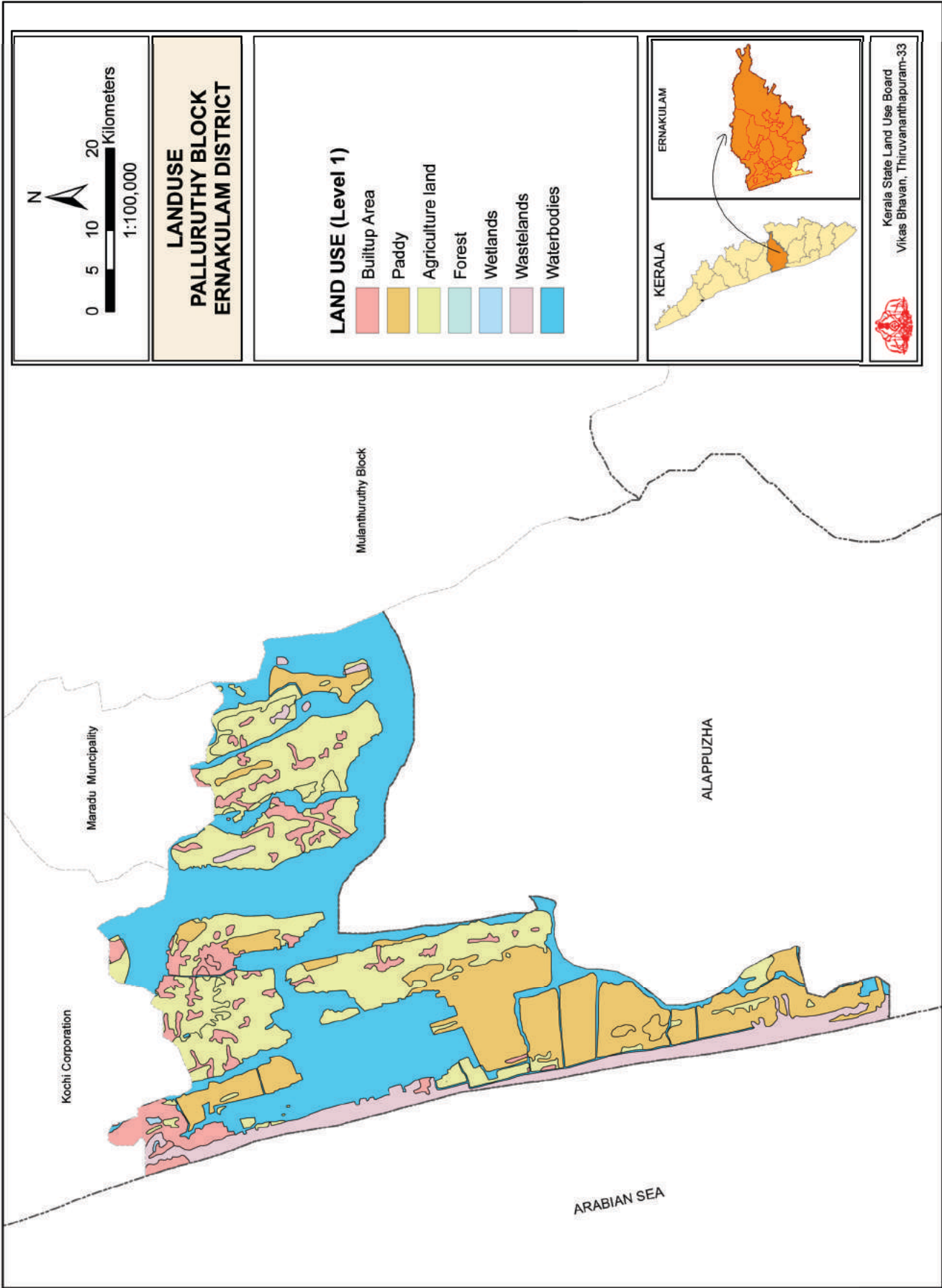




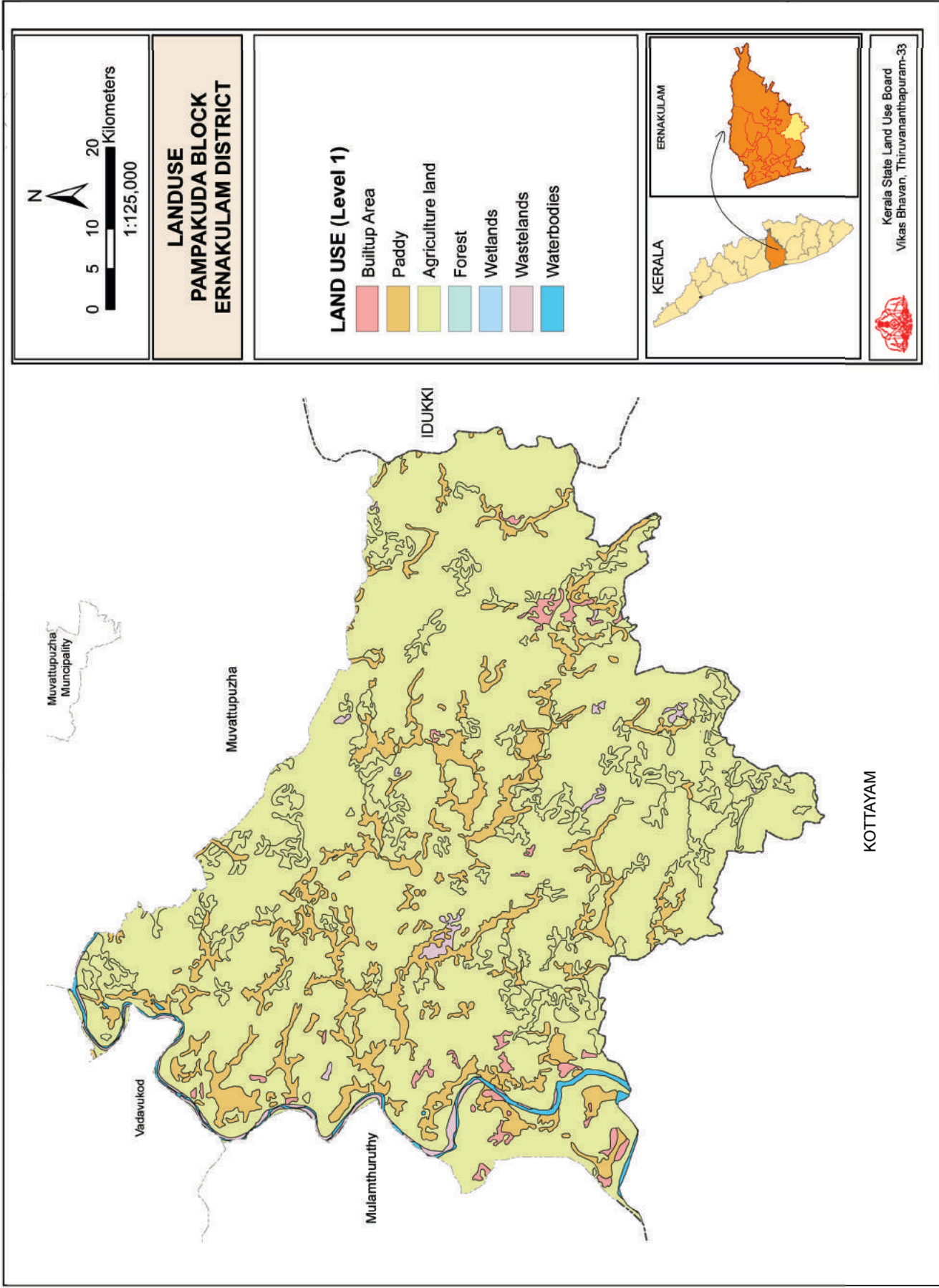




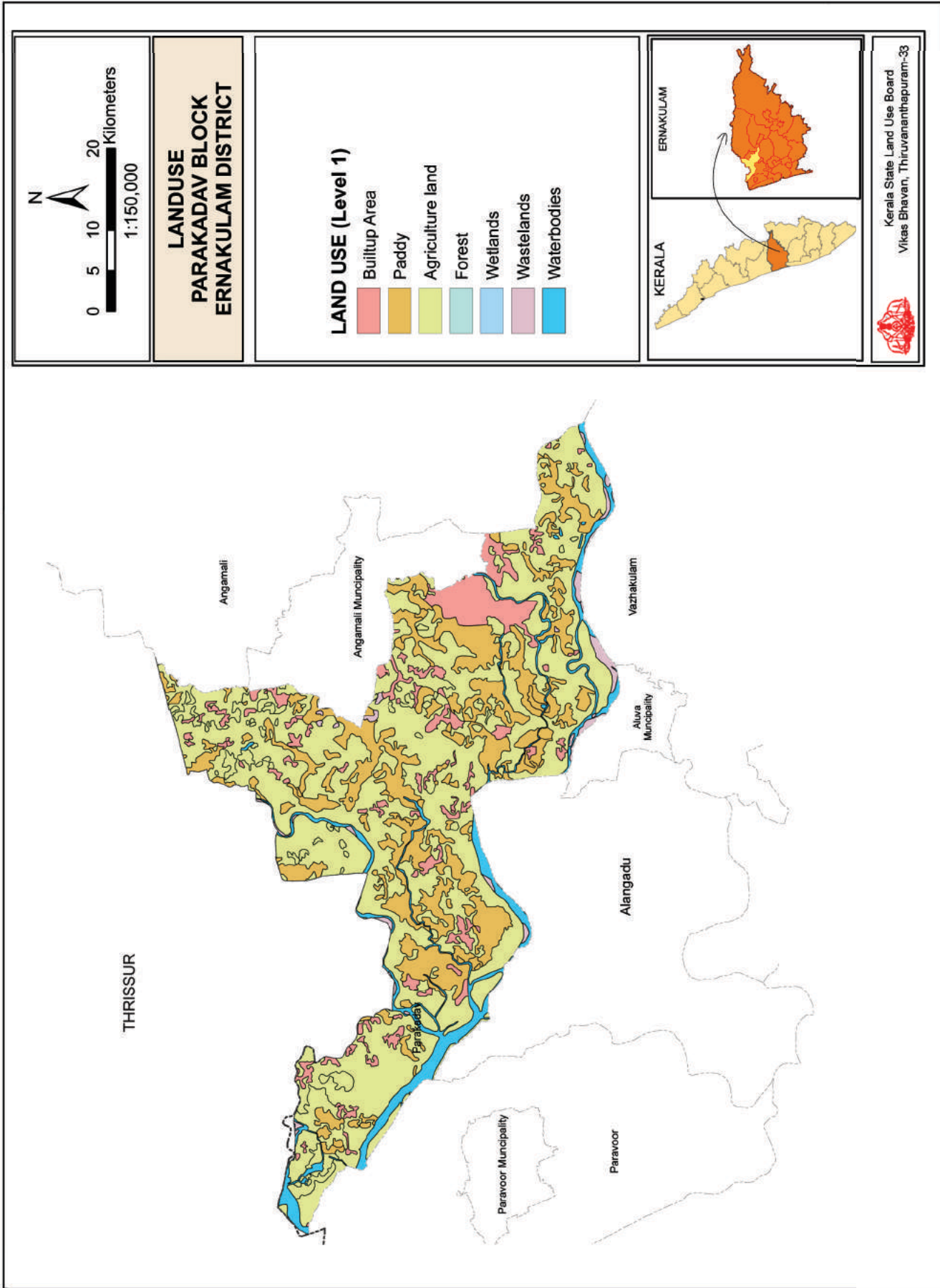






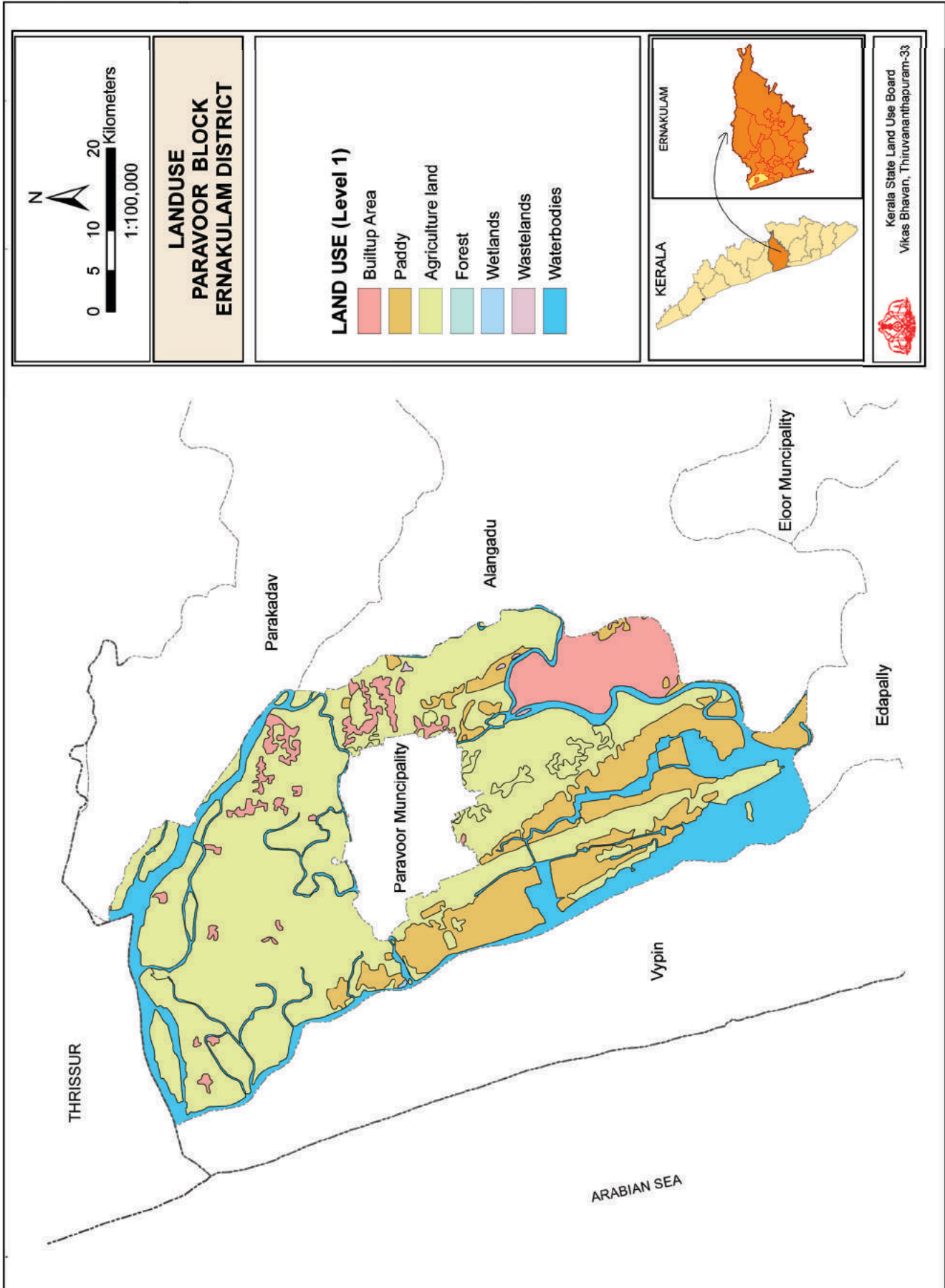






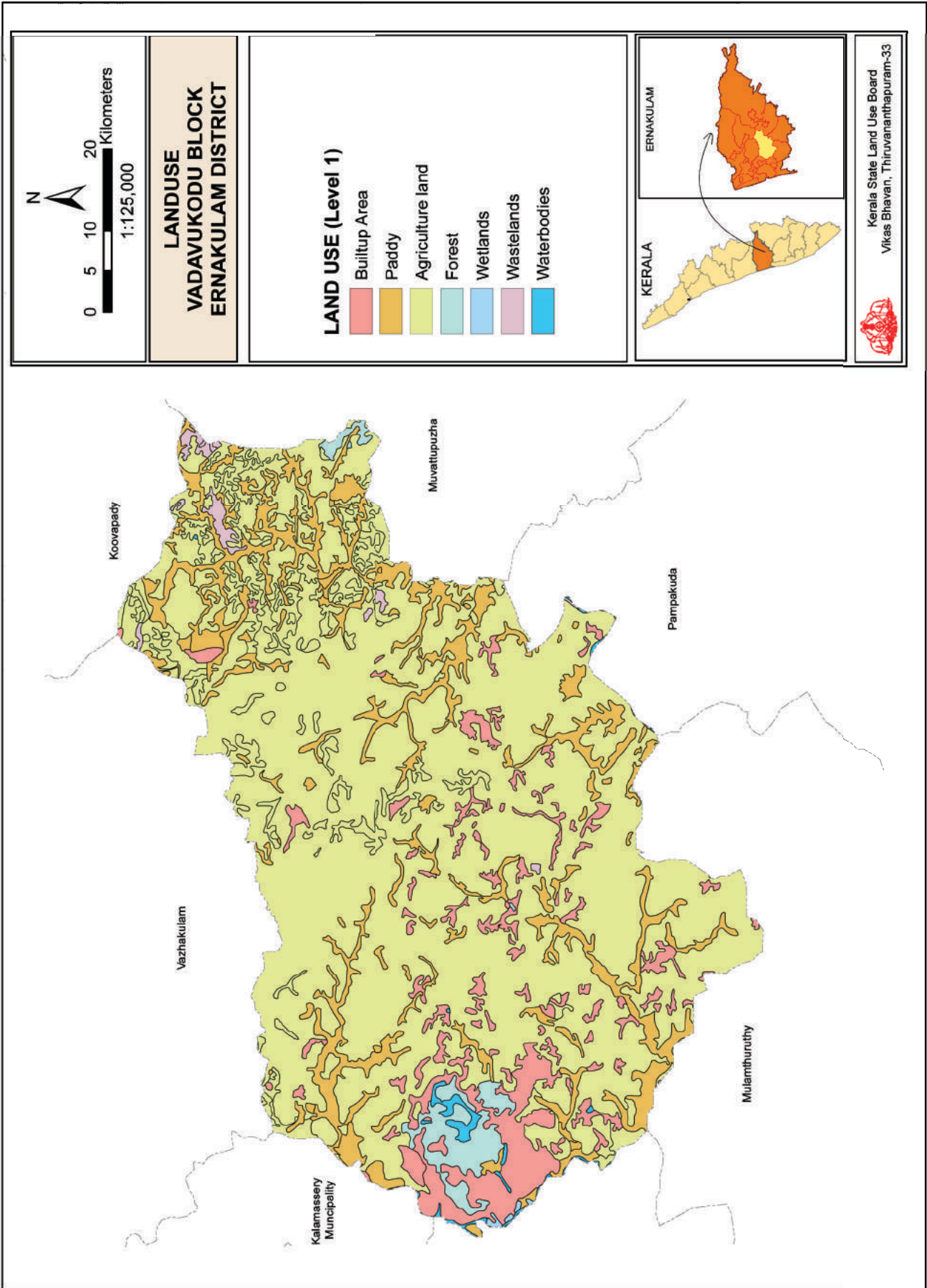




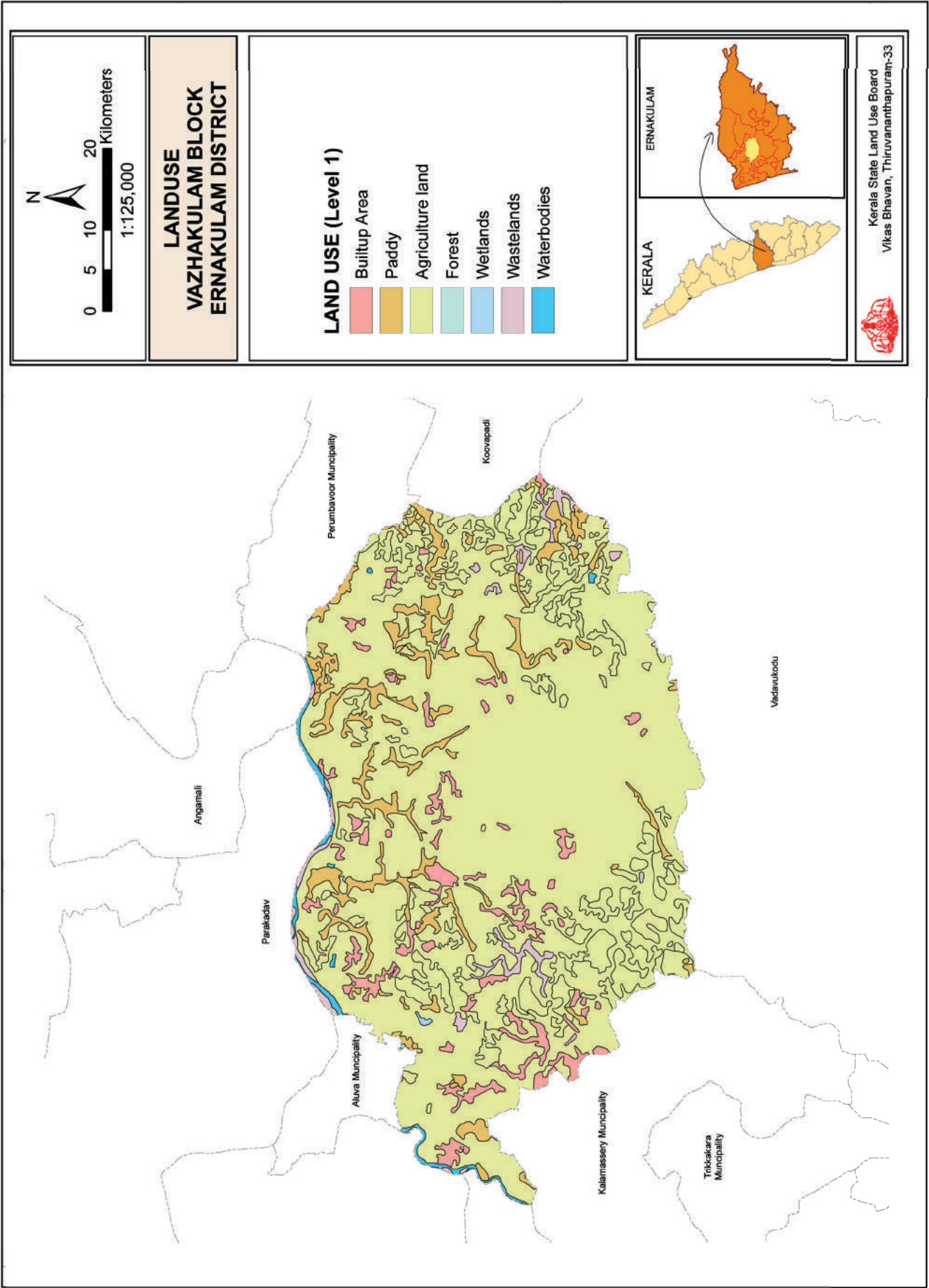




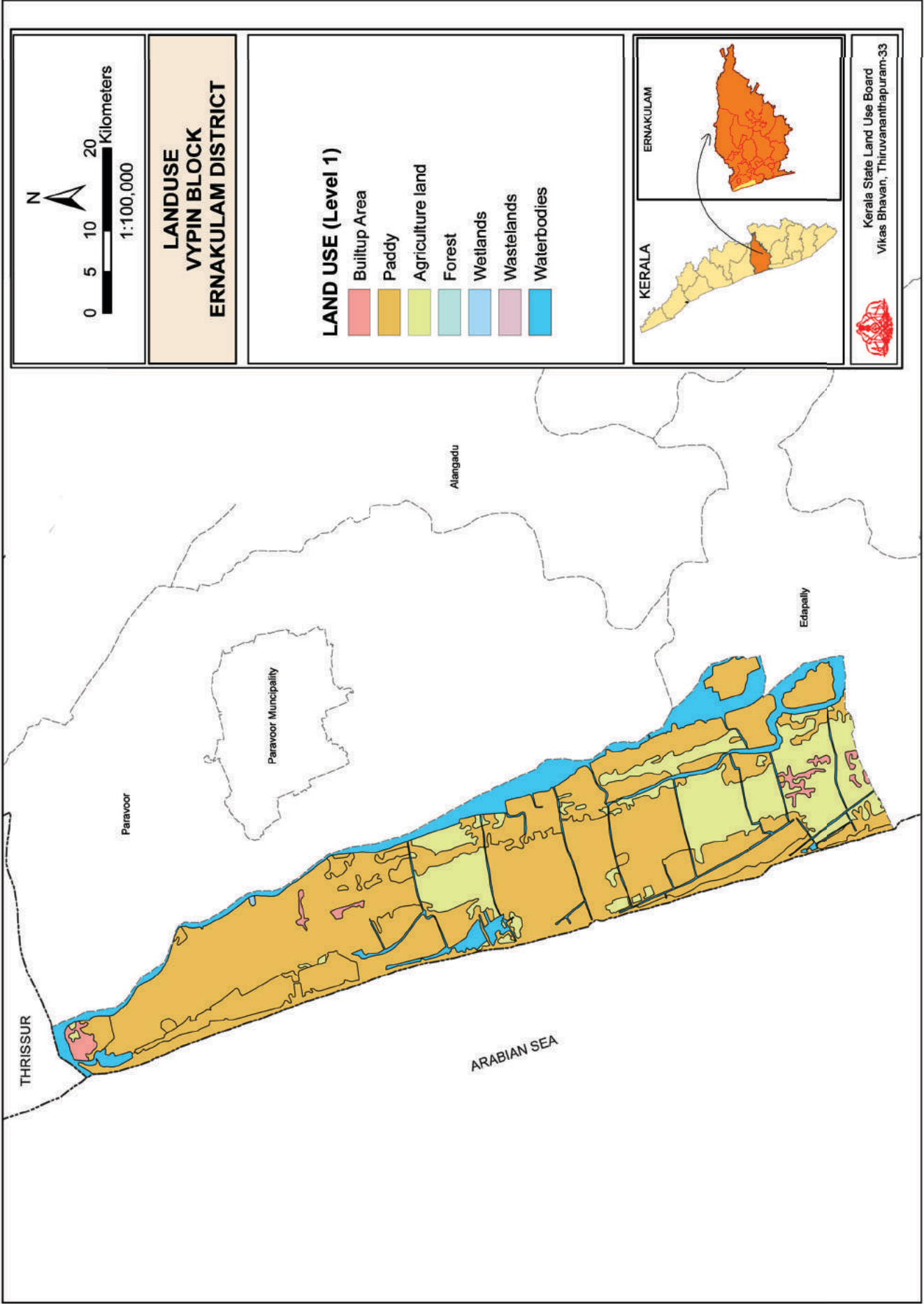




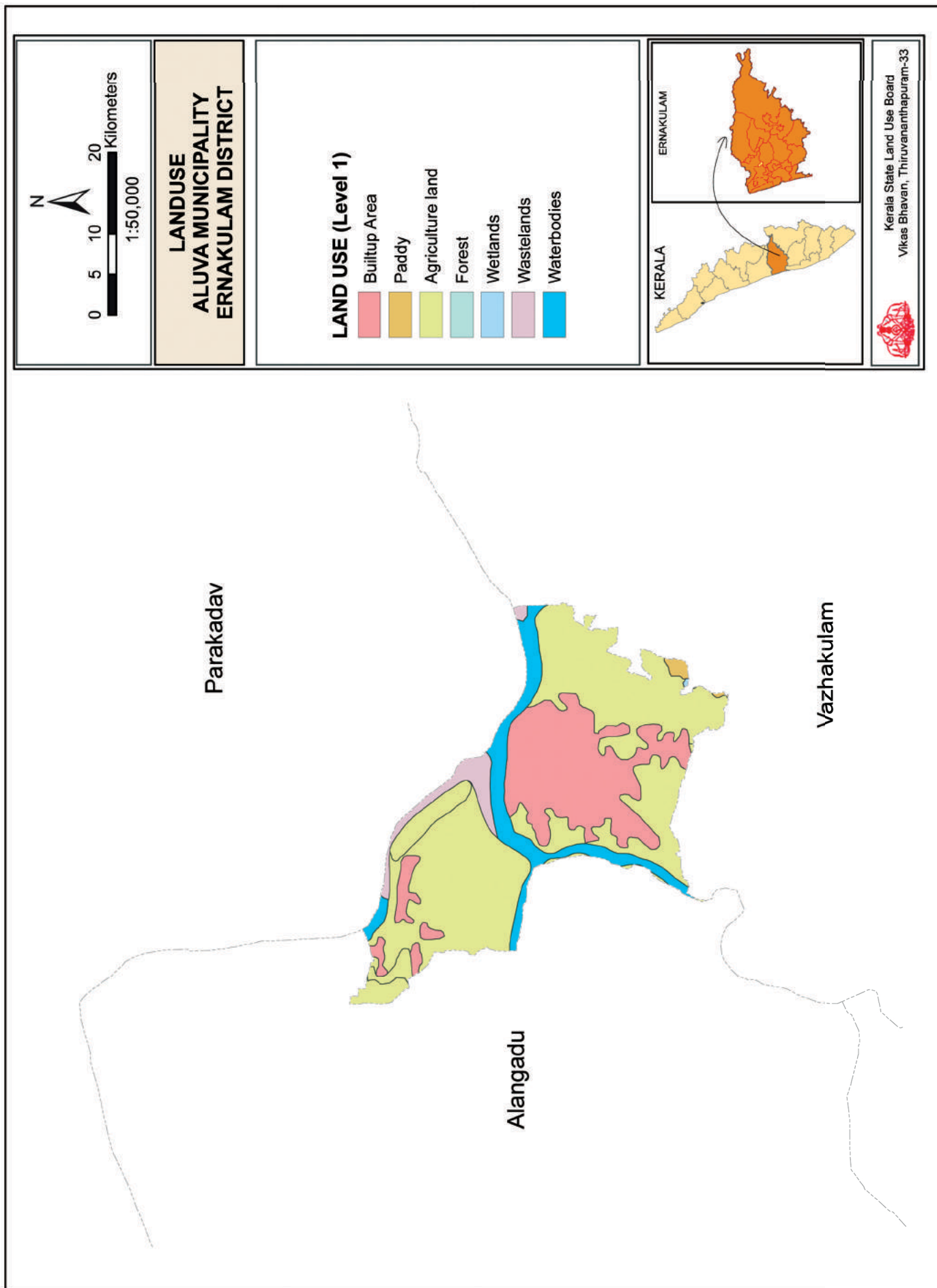






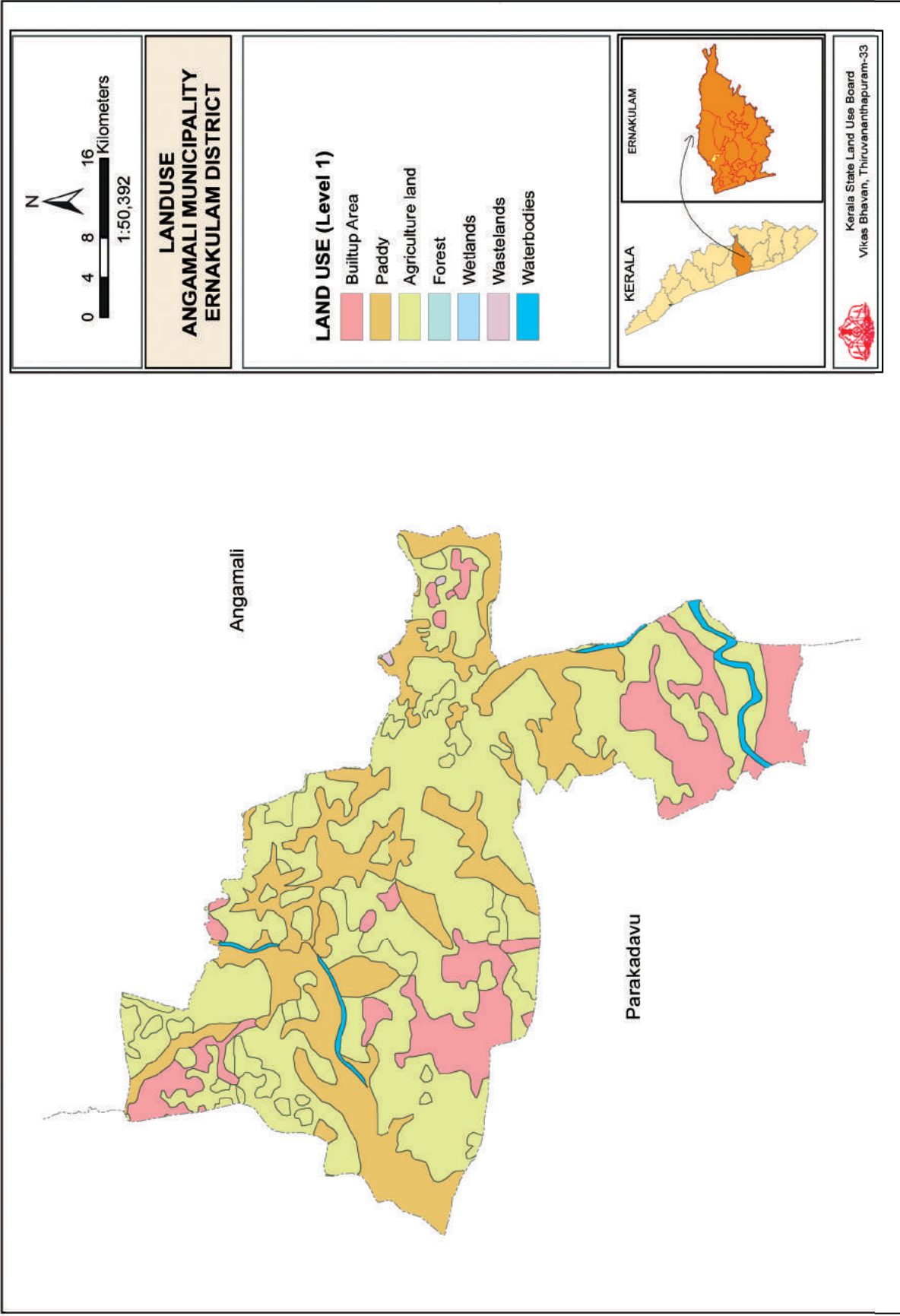




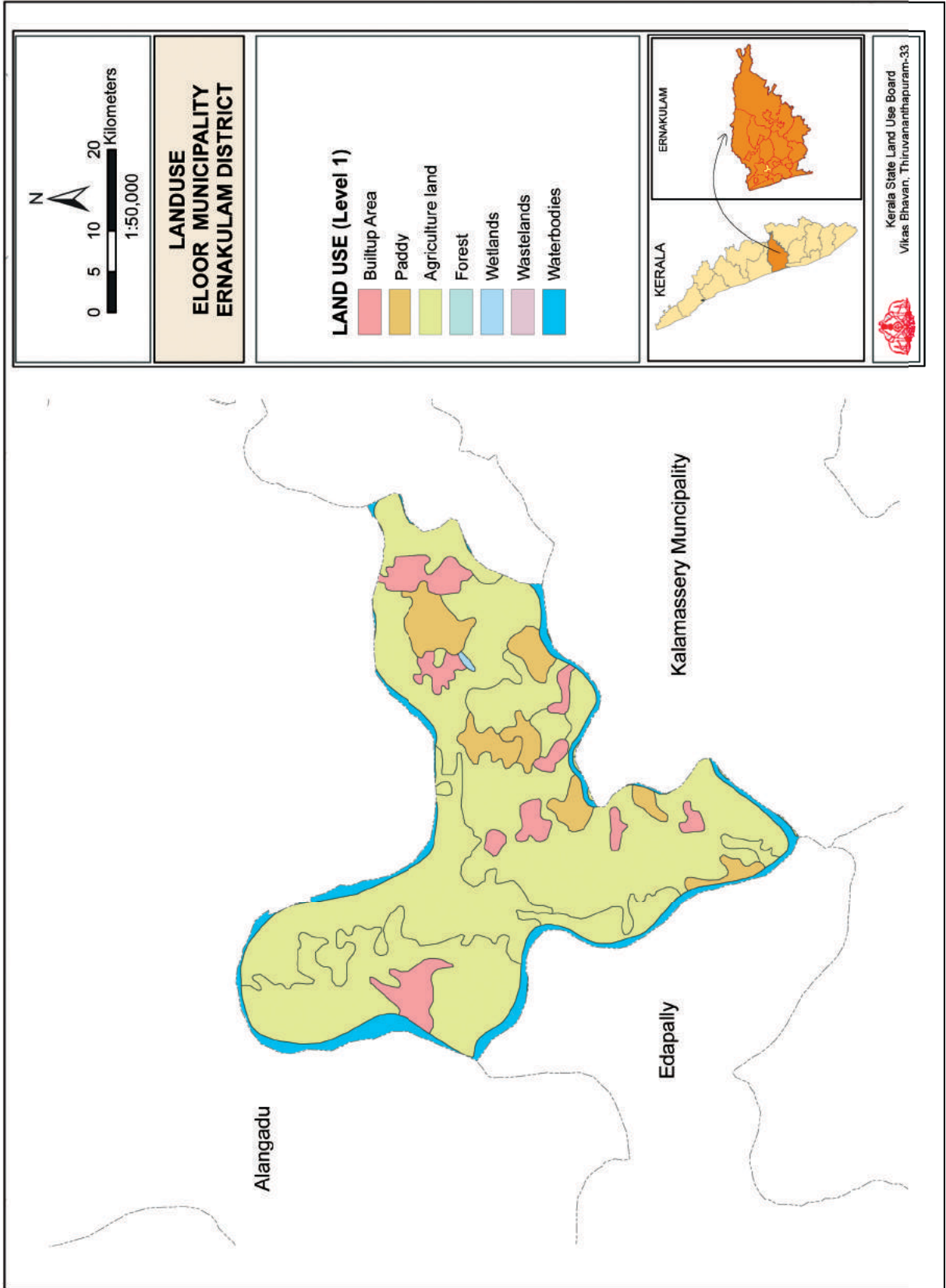




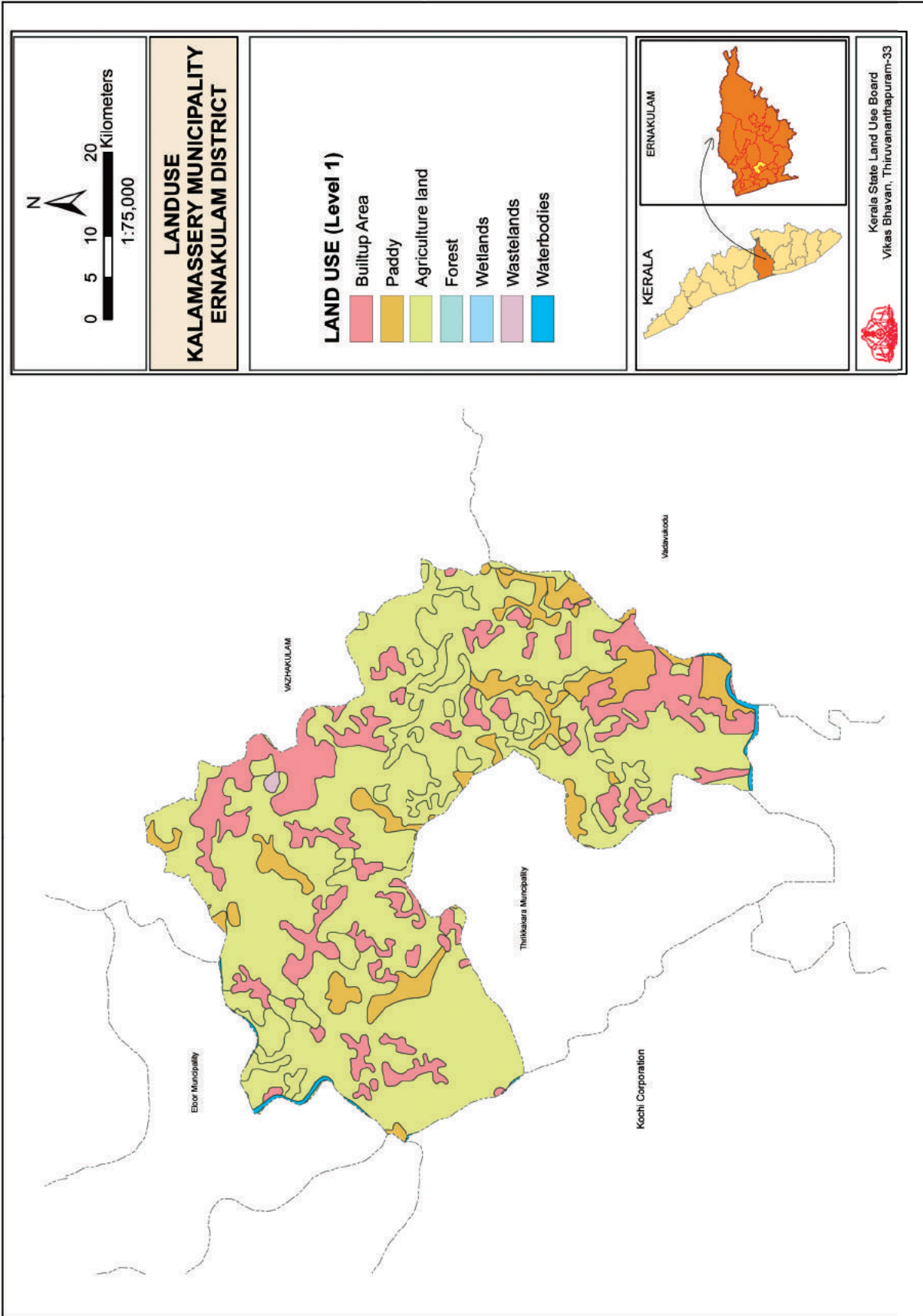




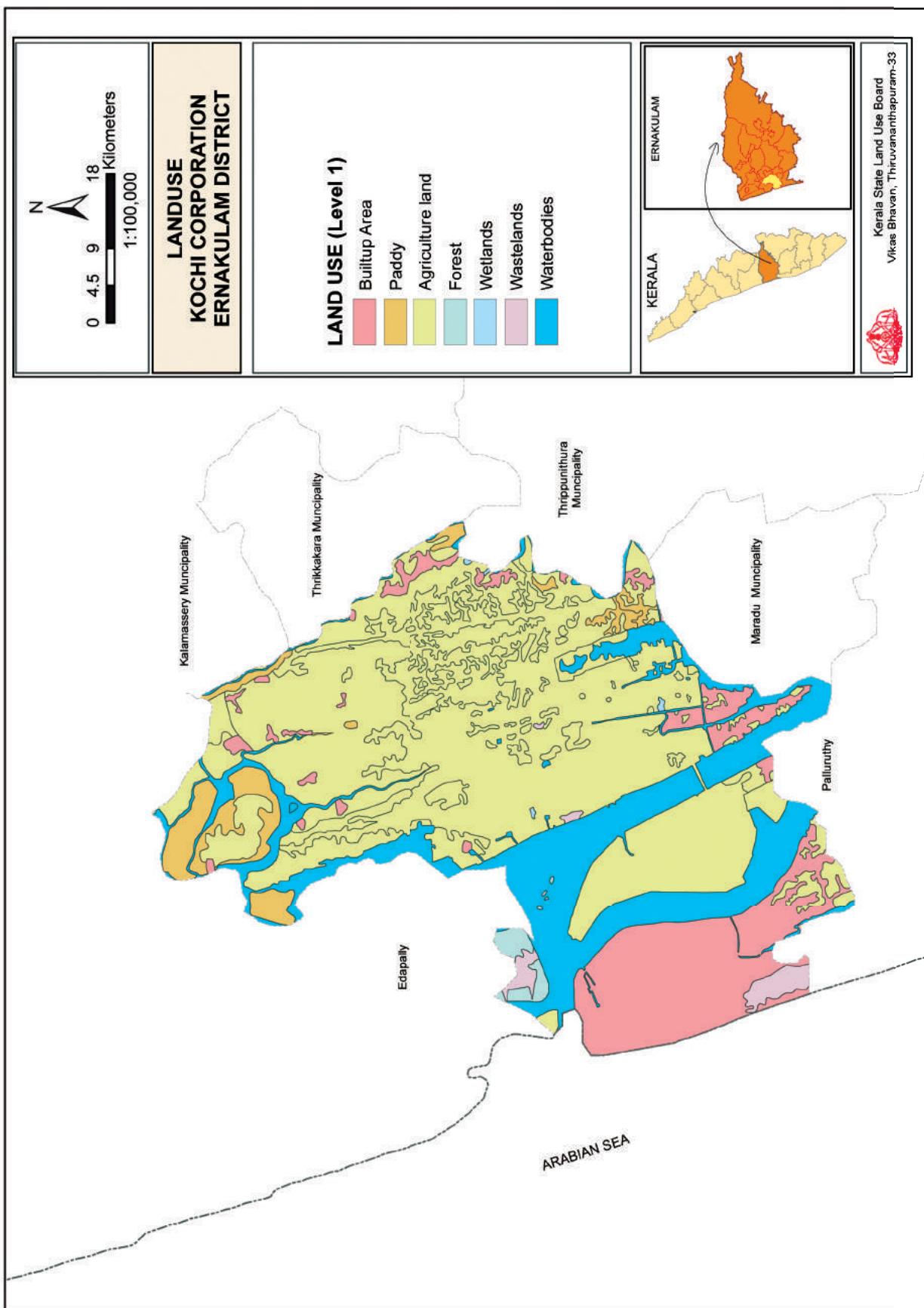






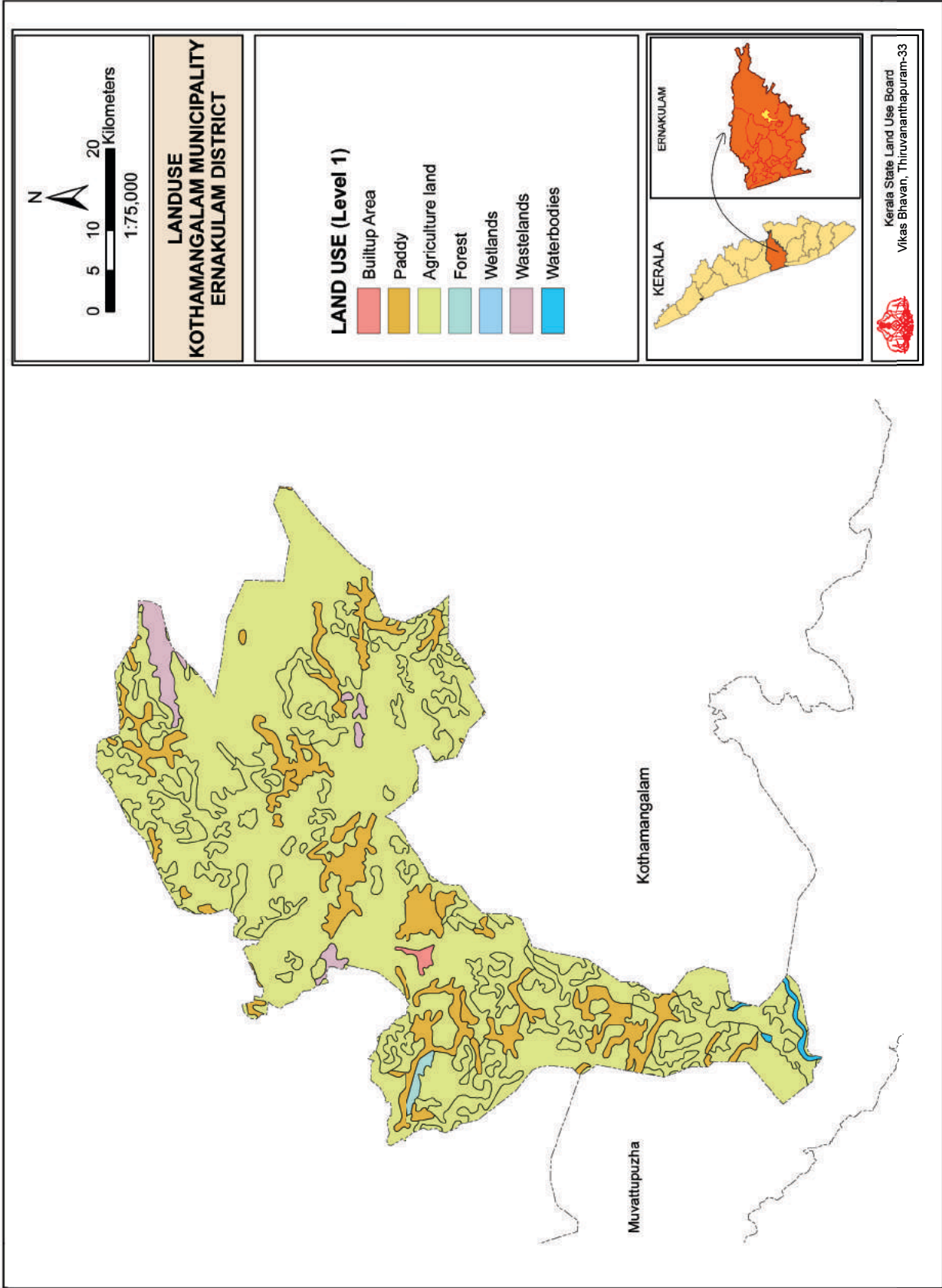




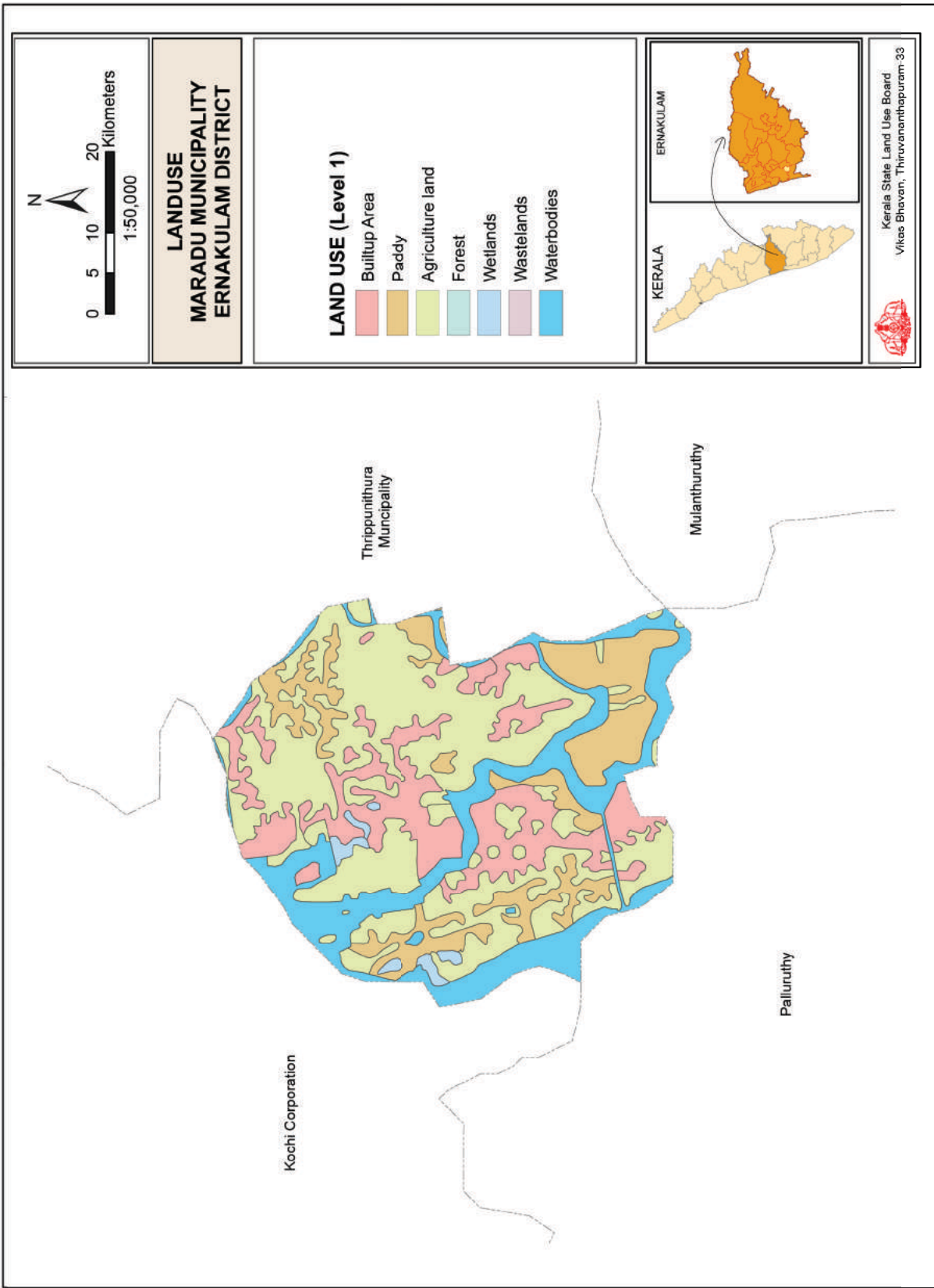




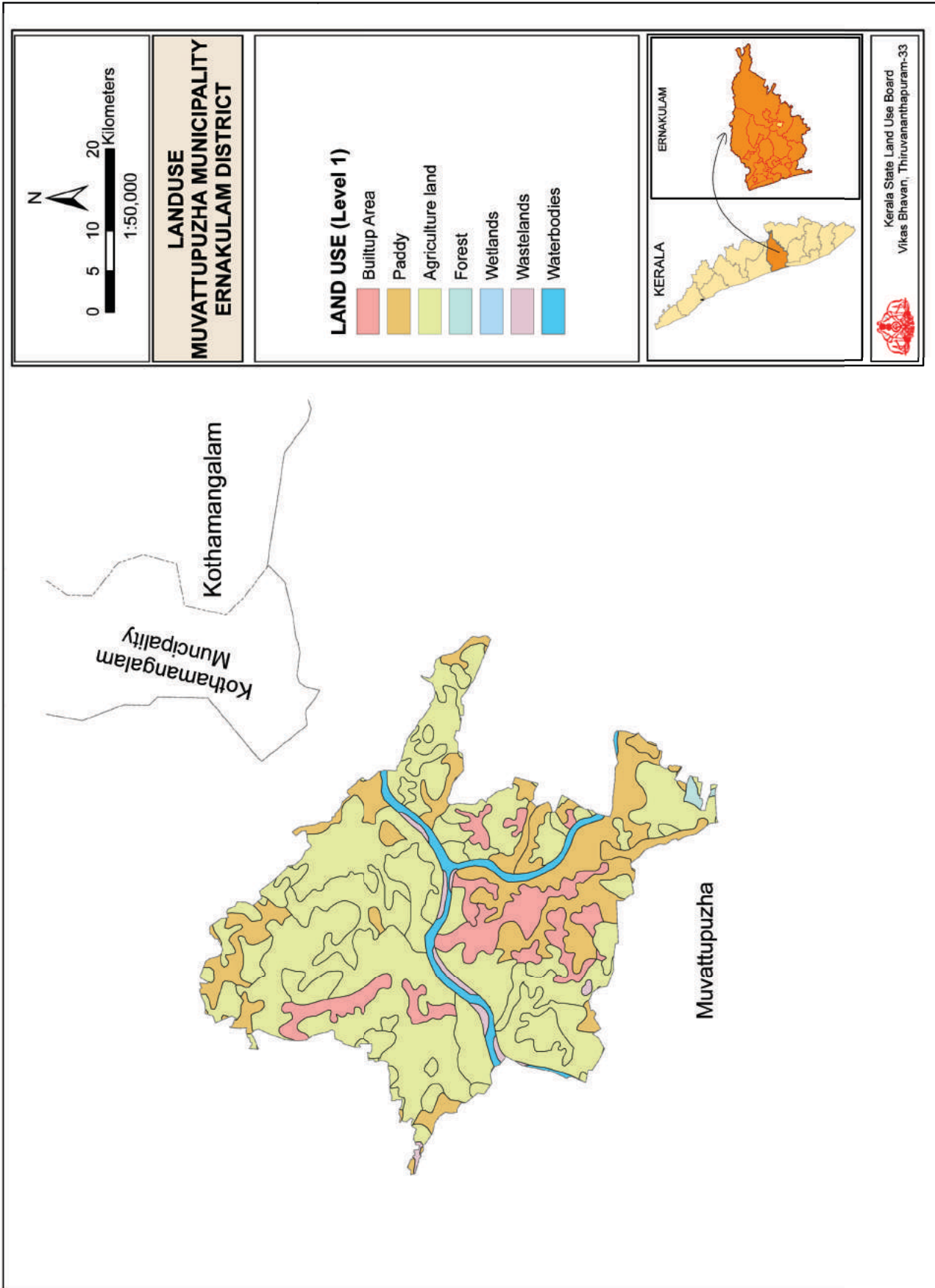




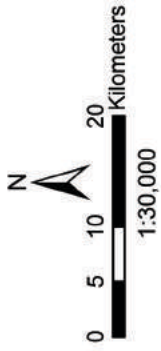






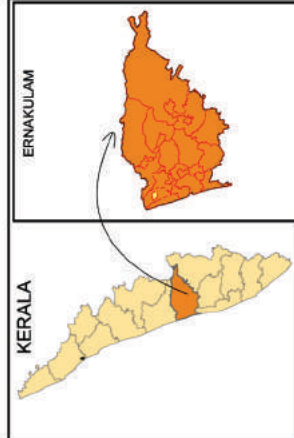




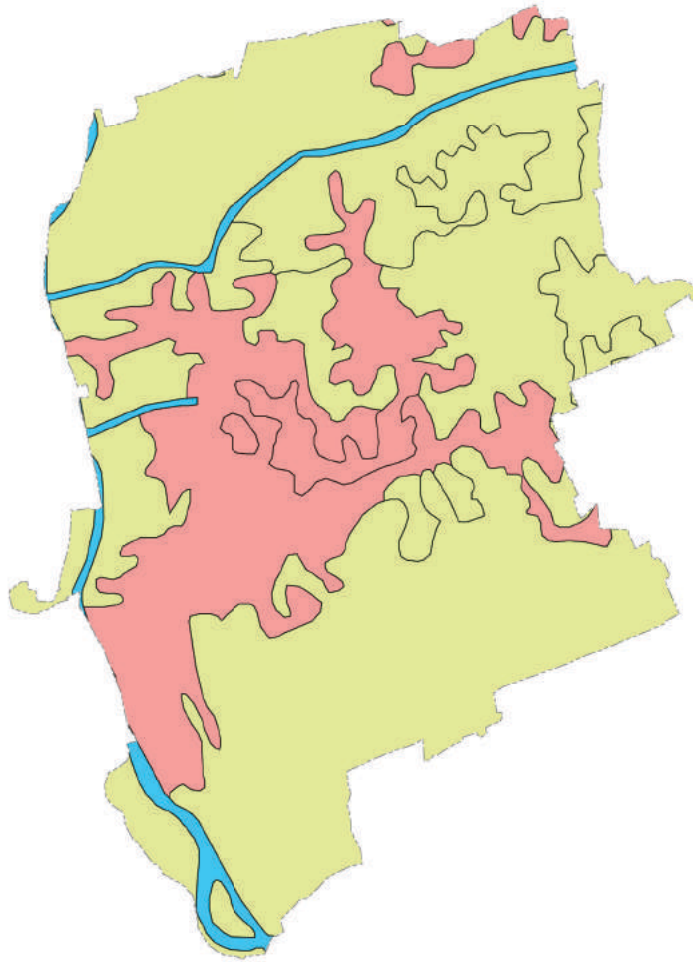


**LANDUSE  
PARAVOOR MUNICIPALITY  
ERNAKULAM DISTRICT**

**LAND USE (Level 1)**



Kerala State Land Use Board  
Vikas Bhavan, Thiruvananthapuram-33

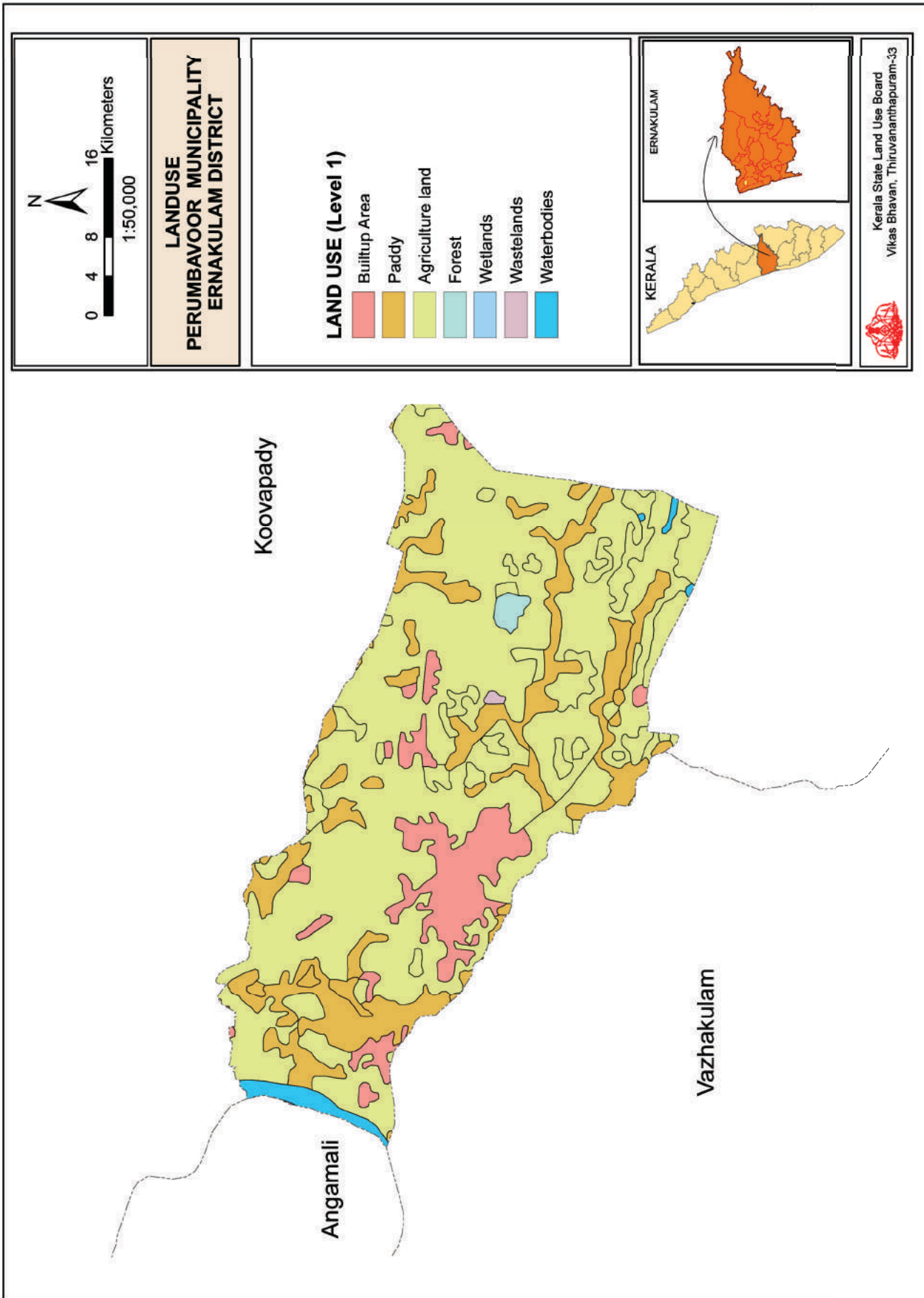


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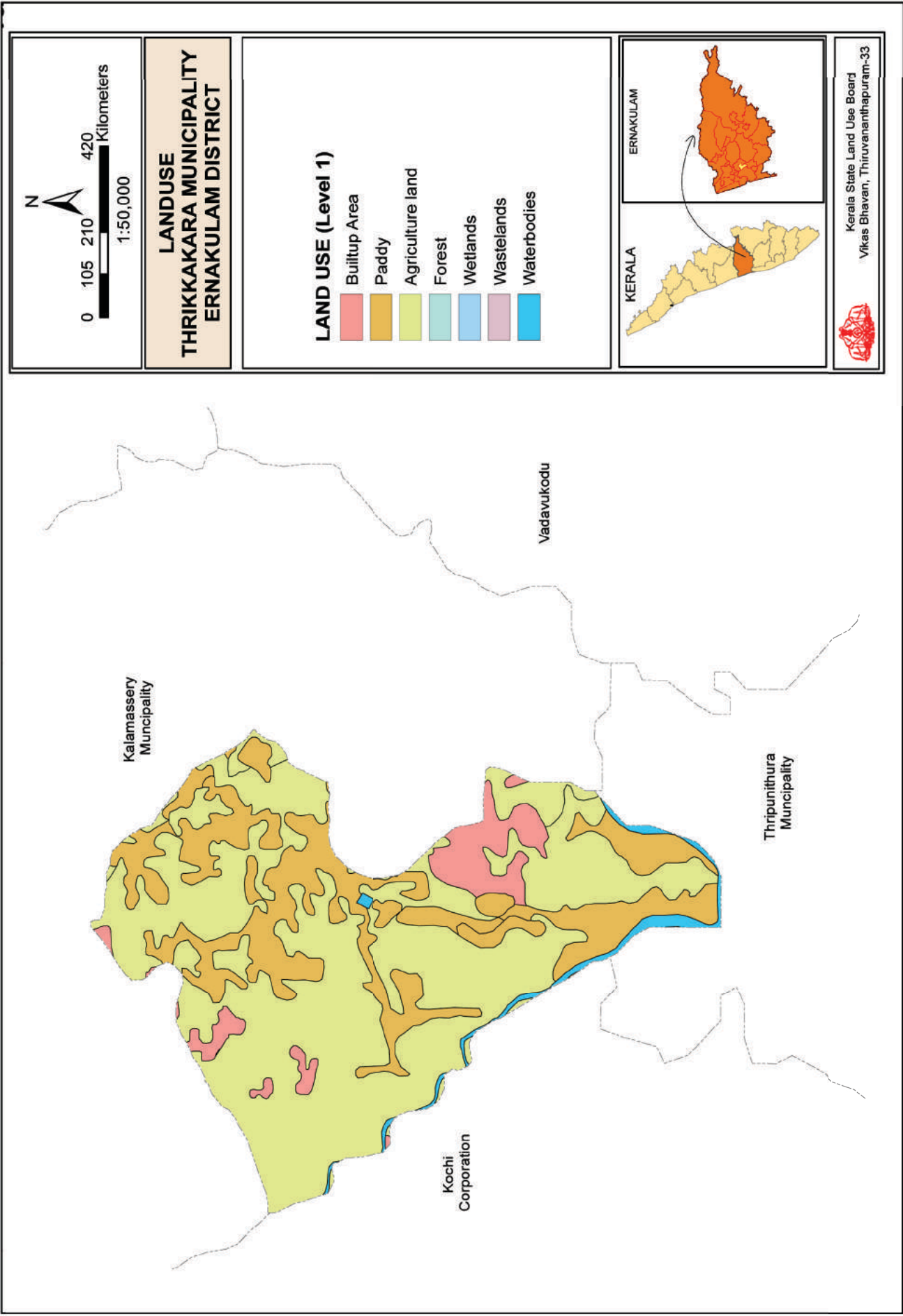
Vypin



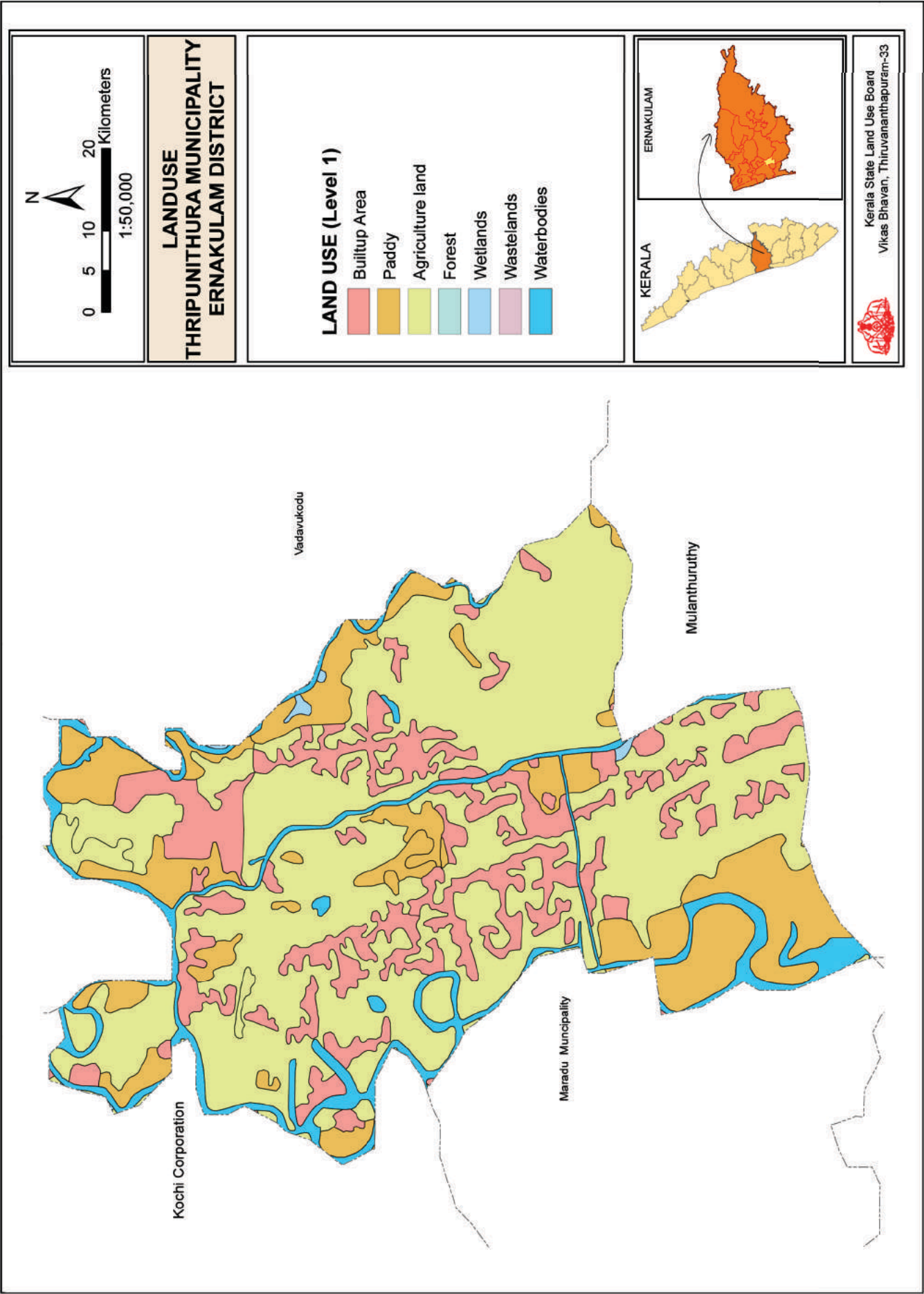














## BIO-DIVERSITY

The 2010 Inter National year of Bio-diversity (IYB), is a special year declared by the United Nations to help raise awareness of the importance of Bio-diversity all over the world. It is an opportunity to stress the importance of biodiversity for our well-being, reflects on our achievements to safeguard biodiversity and encourage a redoubling of our efforts to reduce the rate of biodiversity loss. The 2010 IYB is promoting some important messages. First, Humans are part of nature's rich diversity and have the power to protect or destroy. Second, biodiversity is essential for sustaining the living networks and systems that provide us all with health, wealth, food, fuel and vital services our lives depend on. Third, human activity is causing the diversity of life on earth to be lost at a greatly accelerated rate, but we can prevent this loss. Fourth, we have made some achievements to safeguard biodiversity but we need to do much more and we must act urgently. Throughout 2010 UNEP's IYB website will also feature interesting segments such as biodiversity theme of the week, examples of successful community action in biodiversity conservation and other intriguing biodiversity related components. In connection with the International year of biodiversity 2010, Kerala State Biodiversity Board has taken up several programmes.

Much of Kerala's notable biodiversity is concentrated and protected in Western Ghats. Almost a fourth of India's 10,000 plant species are found in the state. Among the almost 4,000 flowering plant species (1,272 of which are endemic to Kerala and 159 threatened) are 900 species of medicinal plants. Its 9,400 km<sup>2</sup> of forests include tropical wet evergreen and semi-evergreen forests (lower and middle elevations-3,470 km<sup>2</sup>), tropical moist and dry deciduous forests (mid-elevations-4,100 km<sup>2</sup> and 100 km<sup>2</sup>, respectively), and montane subtropical and temperate (*shola*) forests (highest elevations-100 km<sup>2</sup>). Altogether, 24% of Kerala is forested. Two of the world's Ramsar convention listed wetland lake- Sasthamcotta and the Vembanad-Kol wetlands-are in Kerala, as well as 1455.4 km<sup>2</sup> of the vast Nilgiri Biosphere Reserve. The following table depicted the biodiversity statistics in kerala

Table: 12.1

**PLANT DIVERSITY**

Flowering Plants	4000
Grass species	350
Bamboo species	15
Reeds species	9
Orchid species	214
Gymnosperms	4
Ferns and Fern allies	200
Liverworts	200
Algae	231
Fungi	1044
Lichens	800

Table: 12.2

**ANIMAL DIVERSITY**

Large and medium sized mammals	48
General Birds species	475
Water Birds	101
Reptiles General	60
Lizard (endemic) species	30
Snake (endemic) species	57
Amphibian (endemic) species	87
Fresh water fish (endemic) species	84
Butterflies	313



## FORESTS

Kerala has a total recorded forest cover of 11309.42 sq. km which is 29.09% of the total land area of the State. This is greater than the national coverage of 19.50%. The 11309.42 sq.km of forest cover includes 9157.10 sq. km reserve forests; 214.31 sq. km proposed reserve and 1754.18 sq.km vested forest. Of the recorded forest area, the effective (actual) forest area in Kerala is only 9400 sq.km. Forests of Kerala are broadly classified into 5 major categories. They are:

Sl. No.	Forest Type	Area (lakh ha.)
1	Tropical Wet Evergreen Forest	3.480
2	Tropical Moist Deciduous Forests	4.100
3	Tropical Dry Deciduous Forests	0.094
4	Mountain Sub Tropical Forests	0.188
5	Plantations	1.538
<b>Total</b>		<b>9.400</b>

Much of the forest cover of Kerala is spread over the Western Ghats. The Western Ghats represents one of the world's 18 hot spots of bio-diversity and is considered to be a repository of endemic, rare and endangered flora and fauna. There are 28 vegetation types in the state, but the existence of most is doubtful. 51% of the total forest cover is in the southern districts and the remaining 49 percent is in the central and northern regions. Idukki and Pathanamthitta districts have the largest area under forest cover. Alappuzha is the only district without any area under forest cover.

Over the past years the state government had taken a number of steps towards the conservation of forest and wildlife. The state government banned clear felling of natural forest in 1983. With the aid of various organizations, including the World Bank, the government has implemented various programmes for the afforestation of degraded forests. These include Community afforestation, compensatory afforestation and general forestry programmes.

In Ernakulam District, the forest areas fall in Kothamangalam, Munnar, Malayattoor and Idukki wild Life Forest Divisions. Kothamangalam, Munnar and Idukki wild life Divisions are partly lying in the District. Under Malayattoor forest Division there were 617.2411 sq.km of reserve forest in the district. .5248sq.km area is also proposed for the reserve forest. Hence 617.7659 sq.km of forest area falls under Malayattoor Forest Division. Kothamangalam Forest division has 36.421 sq.km area in the district.11,000 sq.km of forest area falls under Munnar forest Division. A portion of Kuttampuzha village of Kothamangalam Taluk is covered by Idukki Wild Life Division. As per village directory data the area covered by forest in the district is 664.51 sq. km.

The Integrated Afforestation and Eco-development Project(IAEDP) supported by National Afforestation and Eco Development Board under the Ministry of Environment and Forest is under implementation in from 1998-99 onwards. Eco-preservation and sustainable management in selected watersheds is the ultimate objective of the scheme. Edamalayar and illithode watersheds in Ernakulam Districts are covered under this scheme.

Table: 13.1

**Districtwise forest Area by legal Status as on 31.03.2009(sq.km)**

District	Division	Reserve / Proposed Forest	Vested Forest	Total
Ernakulam	Malayattoor	615.09		615.1
	Munnar	52.08		52.08
	Vazhachal	95.09		95.1
	Kothamangalam	36.4		36.4
	Idukki (WL)	25.16		25.16
<b>Total</b>		<b>823.82</b>		<b>823.8</b>

Table: 13.2

**Rangewise Area of Forests as on 31.3.2009**

Division/Range	Area (Sq.km)
Thodupuzha	218.38
Kothamangalam	12.15
Kaliyar	49.08
Mullaringad	37.38
<b>Total</b>	<b>316.99</b>

Table: 13.3

**Division/Species wise distribution of plantation area (Ha) as on 31.03.2009**

Divisions	Teak	Teak and Softwood	Accacia Mangjum	Eucalyptus	Cane	Bamboo	Medical Plants	Gravelia Robusta	Albezzia	Elavu	Cashew	Sesbania	Grand Total
<b>CENTRAL CIRCLE</b>													
Malayattoor	5581.47		44										<b>5625.47</b>
Vazhachal	3885.79	1777.99		211.56	34.08	167.28	121.31	76.55	86.05	105.4	10	21.07	<b>6497.03</b>

Source: Forest Statistics 2009, Forest and Wild life Department

Table: 13.4

**Forest cover in Ernakulam**

Geographic Area	Forest Cover				Percent to GA
	Very Dense	Moderate Dense	Open Forest	Total	
2407	12	299	385	696	28.92

Table: 13.5

**Eco-tourism locations under forest department in Ernakulam**

District	Eco-Tourism location
Ernakulam	Panellipor
	Mulamkuzhi
	Kaprikkadu

Table: 13.6

**Tribal Settlements**

	Ernakulam Dist.		Kerala
	Vazhachal	Malayattoor	
No. of divisions			31
No. of Settlements	8	12	723
Area (ha)	52.75	917.48	21531.99
No. of Tribal families possessing land	221	660	20713
No. of landless tribal families	61	56	2193
No. of non- tribal families possessing land in settlement			4486

Source: Forest Statistics 2009, Forest and Wild life Department

Table: 13.7

### Participatory Forest Management (PFM)

The State has adopted Participatory Forest Management (PFM) as a Strategy for conservation of bio-diversity and for the improvement of livelihood of forest dependent people by forming partnership institutions at grass root level since 1998. The institutions in territorial forest divisions are called Vana Samrakshana samithies (VSS) Those in sanctuaries and national parks are called Eco-Development Committees (EDC). During the year 2008-09 there were 388 number of VSS'c and 189 number of EDC'c. List of the names of Vss of Kerala Forest Department in wayanad district under the management of Forest Development Agencies (FDA) are depicted in the following table...

Sl. No.	Name of VSS	Type (Fringe/Tribal)	No. of family			Total	Mgnt.Area (ha)	Range
			SC	ST	Others			
1	2	3	4	5	6	7	8	9
<b>CENTRAL CIRCLE</b>								
	<b>Vazhachal FDA</b>				<b>Vazhachal Division</b>			
1	Athirappilly	Fringe	135	4	110	249	300.00	Charpa
2	Vazhachal	Tribal	-	48	-	48	5097.00	Charpa
3	Olivekichira	Fringe	20	-	130	150	300.00	Athirappilly
4	Erumathadam	Fringe	23	-	175	198	300.00	Athirappilly
5	Ezhattumugham	Fringe	5	3	123	131	100.00	Athirappilly
6	Pokalappara	Tribal	-	49	-	49	9064.00	Vazhachal
7	Puliyilapara	Fringe	36	-	57	93	300.00	Vazhachal
8	Malakkapara	Tribal	-	48	-	48	4000.00	Sholayar
9	Thavalakuzhipara	Tribal	-	42	-	42	2000.00	Sholayar
10	Sholayar	Tribal	-	35	-	35	1200.00	Sholayar
11	Vachumaram	Tribal	-	57	-	57	2500.00	Kollathirumedu

Sl. No.	Name of VSS	Type (Fringe/Tribal)	No. of family			Total	Mgnt.Area (ha)	Range
			SC	ST	Others			
	<b>Malayattoor FDA</b>				<b>Malayattoor Divisoin</b>			
1	Chakkimedu-Vadattupara	Fringe	31	1	134	166	84.00	Thundathil
2	Ponganchuvad	Tribal	-	87	-	87	2000.00	Thundathil
3	Thalumkandam	Tribal	-	29	-	29	2000.00	Thundathil
4	Kannimangalam-Pandupara	Fringe	7	-	105	112	285.00	Kalady
5	Mulamkuzhy	Fringe	36	-	129	165	300.00	Kalady
6	Kaprikkad	Fringe	92	-	286	378	35.00	Kodanad
7	Paneliporu	Fringe	7	-	105	112	72.00	Kodanad
8	Venbooram	Fringe	Newly formed				28.00	Kodanad
9	Thalavachapara	Tribal	-	50	-	50	2000.00	Kuttampuzha
10	Kuchipara	Tribal	-	70	-	70	2000.00	Kuttampuzha
11	Uriyampetti	Tribal	-	52	-	52	3000.00	Kuttampuzha
12	Medanapara	Tribal	-	72	-	72	2500.00	Kuttampuzha
13	Kappayam	Tribal	-	35	-	35	2000.00	Idamalayar
14	Adichilthotti	Tribal	-	61	-	61	5000.00	Idamalayar
15	Thera	Tribal	-	35	-	35	1000.00	Idamalayar
16	Variyam	Tribal	-	122	-	122	4000.00	Idamalayar

Source:Forest Statistics 2009,Forest and Wild life Department







## AGRICULTURE

Agriculture plays a crucial role in the Kerala economy. When compared to other States, the per-capita availability of cultivable land is low in Kerala. Stabilization and augmentation of productivity assume critical importance, given the limited scope for increasing area under cultivation of various crops. 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. The trends in agricultural income in Kerala during the last six years is shown in Table 1. The provisional estimate for 2009-10 indicated an increase of 0.25 per cent in growth over 2008-09.

<b>Trends in Agricultural Income in Kerala</b>					
<b>(Base 2004-05)</b>					
<b>Sl. No.</b>	<b>Year</b>	<b>Agricultural Income (` in crores)</b>	<b>Rate of change over previous year</b>	<b>Agriculture and Allied Sectors (` in crores)</b>	<b>Share of Agriculture and Allied Sectors in GSDP</b>
1	2004-05	16980.51		20843.21	17.48
2	2005-06	18041.97	6.25	21882.16	16.67
3	2006-07	16567.85	-8.17	20507.67	14.48
4	2007-08	16196.60	-2.24	20255.14	13.15
5	2008-09**	16641.70	2.75	20779.74	12.58
6	2009-10*	16683.91	0.25	20927.91	11.54

\* Provisional \*\* Quick  
Source: Directorate of Economics and Statistics

In Ernakulam Agriculture constitutes the most important component of the District economy and it is the biggest source of employment. About 70% of the geographical area is under cultivation. Rice, coconut, lemongrass, pepper, ginger, mango, cashew nut etc; are the most important agricultural products of the District. Usually three crops of paddy and raised annually- Virippu, Mundaken and Puncha and there is another system called Pokkali, which is peculiar to the district. Under this system only one crop can be taken in a year.

Table: 14.1

**CLASSIFICATION OF AREA ON THE BASIS OF LAND UTILISATION**

District	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	Cultivable waste	Fallow other than current fallow
1	2	3	4	5	6	7	8	9	10
	2009-2010	305826	70617	37050	1193	7	133	9938	7150
	2008-2009	305826	70617	38664	1306	4	143	8843	6472
<b>ERNAKULAM</b>	2007-2008	305826	70617	42354	405	1	131	8182	5308

District	YEAR	Current fallow	Marshy Land	Still Water	Water logged Area	Social Forestry	Net Area Sown	Area sown more than once	Total Cropped Area
1	2	11	12	13	14	15	16	17	18
	2009-2010	10876	28	9664	290	117	158763	16789	175552
	2008-2009	10835	86	9192	323	140	159201	19993	179194
<b>ERNAKULAM</b>	2007-2008	9749	108	7912	326	1034	159699	25074	184773

Source:- Agricultural Statistics, DES

Table: 14.2

**DISTRICT WISE AREA UNDER CROPS**

Area in Ha

YEAR	Paddy				Pulses including Tur								Total food grains
	Autumn	Winter	Summer	Total	Jower	Ragi	Other Cereals	Total cereals/ millets	Autumn	Winter	Summer	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
2009-2010	4090	5121	1576	10787	0	0		10787	0	2	160	162	10949
2008-2009	5097	5907	1962	12966				12966			262	262	13228
2007-2008	4382	5725	2236	12343				12343			296	296	12639

YEAR	Sugar crops			Spices and Condiments												Grand Total
	Sugar Cane	Palmyrah	Total	Pepper	Ginger	Turmeric	Cardamom	Areca nut	Tamarind	Vanilla	Cloves	Nutmeg	Cinnamon	Garlic	Total	
1	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2009-2010	5	235	240	5273	199	279		4674	677	54	15	6060	43	0	17303	17543
2008-2009	2	226	228	5317	260	326		4783	666	132	16	6005	37		17542	17770
2007-2008	8	194	202	6106	337	368		5207	676	322	24	5842	16		18898	19100

Table - 14.2 (contd..)

**DISTRICT WISE AREA UNDER CROPS**

(Area in Ha)

YEAR	Fresh Fruits						Dry Fruits		Total Fruits	
	Jack	Mango	Banana	Plantain	Pineapple	Pappaya	Other fresh fruits	Total		Cashew
1	31	32	33	34	35	36	37	38	39	40
2009-2010	3771	3723	6500	3788	6020	1309	780	25891	581	26472
2008-2009	3598	3595	6385	3783	6108	1468	802	25739	596	26335
2007-2008	5594	3550	6115	4119	6978	1237	661	28254	783	29037

YEAR	Tapioca			Total	Tubers					Total
	Autumn	Winter	Summer		Elephant Foot Yam	Colo casia	Yam (Kachil)	Sweet Potato	Other Tubers	
1	41	42	43	44	45	46	47	48	49	50
2009-2010	1310	1383	2572	5265	271	346	36	7	79	739
2008-2009	1216	1451	3013	5680	346	319	34	4	87	790
2007-2008	1060	1353	2735	5148	381	333	33	4	85	836

YEAR	Vegetables										Total Food Crops			
	Drum stick	Amaran- thus	Bitter Gourd	Snake Gourd	Ladies Finger	Brinjal	Green Chillies	Little Gourd (koval)	Ash Gourd (Kumbalam)	Pumpkin		Cucumber	Other Vegetables	Total
1	51	52	53	54	55	56	57	58	59	60	61	62	63	64
2009-2010	619	97	118	117	48	44	29	80	71	68	211	1277	2779	63747
2008-2009	598	108	142	103	52	38	46	66	61	60	161	1304	2739	66542
2007-2008	598	105	151	92	51	36	63	50	69	58	191	1248	2712	69472

Table - 14.2 (contd..)

**DISTRICT WISE AREA UNDER CROPS**

(Area in Ha)

YEAR	Non Food Crops											Grand Total				
	Oil Seeds				Fibre Drugs and Narcotics				Plantation Crops							
	Ground nut	Sesamum	Cocconut	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
2009-2010	0	15	44475	82	44572	0	10	0	3	13	3		58729	1365	60097	104682
2008-2009		26	46240	51	46317		15		2	17	2		58295	1294	59591	105925
2007-2008		48	49412	71	49531		15		2	17	2		57930	1407	59339	108887

YEAR	Non Food Crops						Total	Total non food crops	Total Cropped Area
	Fodder Grass	Green Manure Crops	Other Crops and trees	Medicinal Plants	Total				
1	81	82	83	84	85	86	87		
2009-2010	232	585	6215	91	7123	111805		175552	
2008-2009	232	602	5785	108	6727	112652		179194	
2007-2008	266	661	5340	147	6414	115301		184773	

Source: Agricultural Statistics, DES

Table: 14.3

**BLOCK WISE AREA UNDER CROPS 2009-2010**

(Area in Ha)

Sl. No.	Block	Paddy			Sugar cane	Pepper	Ginger	Turmeric	Arecanut	Nutmeg	Jack	Banana
		Autumn	Winter	Summer								
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Alangad	169.36	190.35	127.99		262.65	0.34	0.73	163.43	159.16	143.95	632.61
2	Angamali	403.13	414.12	46.86		558.16	14.27	21.91	743.2	1504.13	553.03	1599.85
3	Edappalli	71.6	1.2			10.42	0.05	0.33	28.43	2.57	20.67	0.88
4	Koovappadi	754.63	770.33	524.06		384.52	54.47	15.38	351.46	795.04	397.08	794.45
5	Kothamangalam	542.72	793.37	239.17		509.38	55.68	83.09	559.41	357.93	370.81	817.99
6	Mulanthuruthy	129.89	181.89	232.24		477.62	0.97	1.57	215.9	109.36	229.93	41.39
7	Moovattupuzha	249.19	361.83	17.43		752.33	30.86	73.36	465.74	537.14	297.64	489.98
8	Palluruthi	34.39				50.36		0.04	64.79	3.75	33.98	0.3
9	Pampakkuda	232.52	587.06		4.07	540.15	12.08	26.01	301.34	286.86	313.35	368.56
10	Parakadavu	180.81	299.76	45.97		275.48	6.45	5.08	169.86	692.22	207.31	821.24
11	Parur	195.06	1.34			174.93	0.12	0.53	239.66	87.96	146.75	58.71
12	Vazhakkulam	283.77	409.33	188.49		374.53	12.45	26.91	274.31	586.43	287.07	327.88
13	Vadavukode	667.14	996.42	121.69		460.37	4.45	8.31	318.16	502.56	210.05	261.29
14	Vypin	93.85			0.06	174.77	0.04	0.45	413.33	101.4	162.44	0.2
15	Vyttila	0.84				24.24	0.06	0.11	39.37	2.94	23.72	2.42
	Corporation & Municipalities	80.8	113.9	31.68	1.07	242.85	6.56	15.67	325.13	330.46	373.55	282.14
	<b>District Total</b>	<b>4089.70</b>	<b>5120.90</b>	<b>1575.58</b>	<b>5.2</b>	<b>5272.76</b>	<b>198.85</b>	<b>279.48</b>	<b>4673.52</b>	<b>6059.91</b>	<b>3771.33</b>	<b>6499.89</b>

Table - 14.3 (Contd..)

Sl. No.	Block	Plantain	Pineapple	Pappaya	Cashew	Tapioca	Drumstick	Sesamum	Coconut	Betel Leaves	Cocoa
1	2	14	15	16	17	18	19	20	21	22	23
1	Alangad	501.48	0.28	49.57	20.46	162.63	18.88	0	1688.93	0	3.4
2	Angamali	438.22	26.02	140.65	131.52	656.43	47.77	0	5130.82	0	47.91
3	Edappalli	15.28	0.27	3.63	2.4	1.17	3.57	0	612.7	0	0.29
4	Koovappadi	299.35	238.03	107.82	38.24	509.45	59.12	0.69	3333.61	2.88	234.33
5	Kothamangalam	335.19	1421.67	103.48	36.4	965.58	46.72	1	4127.31	1.09	528.6
6	Mulanthuruthy	239.76	66.36	93.83	29.03	85.81	41.48	0	3143.4	0.69	4.55
7	Moovattupuzha	275.32	1537.53	109.1	23.24	709.51	66.61	1.2	3286	0	125.06
8	Palluruthi	42.67	0.57	25.85	4.22	1.08	5.38	0	1089.51	0	1.47
9	Pampakkuda	349.41	1466.65	100.85	36.66	640.24	59.96	10.6	2644.76	0.43	255.21
10	Parakadavu	248.46	13.16	70.61	83.39	273.72	43.35	0	2692.02	0.11	13.79
11	Parur	99.4	1.84	49.75	53.6	45.27	21.72	0	2841.16	0	2.35
12	Vazhakkulam	318.58	451.16	145.69	31.94	455.64	52.25	0	2545.16	3.19	36.71
13	Vadavukode	230.57	526.33	68	27.71	316.16	33.44	1.47	2150.68	1.37	38.05
14	Vypin	131.48	0.9	100.74	17.99	1.88	20.93	0	3670.25	0	3.38
15	Vyttila	33.22	0.71	10.38	12.65	1.01	9.2	0	1044.85	0.03	0.52
	Corporation & Municipalities	229.48	268.9	128.77	31.2	439.88	88.48	0	4473.98	0	69.64
	<b>District Total</b>	<b>3787.87</b>	<b>6020.38</b>	<b>1308.72</b>	<b>580.65</b>	<b>5265.46</b>	<b>618.86</b>	<b>14.96</b>	<b>44475.14</b>	<b>9.79</b>	<b>1365.26</b>

Source: Agricultural Statistics, DES

Table: 14.4

**BLOCK WISE AREA UNDER CROPS 2008-2009**

Area in(Ha)

Sl. No.	Block	Paddy			Sugar cane	Pepper	Ginger	Turmeric	Arecanut	Nutmeg	Jack
		Autumn	Winter	Summer							
1	2	3	4	5	6	7	8	9	10	11	12
1	Alangad	203.63	36.96	8.35		180.87	0.36	0.60	120.98	117.33	137.75
2	Angamali	580.61	489.73	72.3		527.62	16.38	22.62	748.58	1447.15	462.34
3	Edappalli	120.94	2.26			8.57			10.91	0.47	17.21
4	Koovappadi	1050.84	1241.66	791.46		368.37	64.4	16.13	359.34	739.95	385.79
5	Kothamangalam	576.5	912.89	251.06		527.87	86.15	120.79	597	331.87	346.83
6	Mulanthuruthy	223.33	331.6	194.91		560.12	0.79	1.46	220.85	94.33	202.61
7	Moovattupuzha	198.25	22.92	9.47		771.49	25.31	64.5	524.75	516.08	319.85
8	Palluruthi	38.97	242.9			50.45		0.02	64.3	2.81	25.08
9	Pampakkuda	266.86	893.78	3.61	1.69	639.17	18.93	35.55	287.5	470.51	382.11
10	Parakadavu	170.8	323.37	82.24		263.4	11.73	6.2	186.61	628.92	178.46
11	Parur	437.93	0.12			173.9	0.78	1.81	263.5	101.16	138.07
12	Vazhakkulam	392.98	585.08	300.48		392.59	19.49	25.79	302.28	561.81	266.61
13	Vadavukode	530.9	712.64	201.93		410.47	5.79	13.16	347.37	519.71	199.04
14	Vypin	138.43				183.16	0.15	0.22	379.57	101.35	137.78
15	Vyttila	7.21				22.87	0.06	0.13	52.06	3.37	27.54
	Corporation & Municipalities	158.58	111.38	46.42		235.94	10.08	16.56	317.03	368.06	371.32
	<b>District Total</b>	<b>5096.76</b>	<b>5907.29</b>	<b>1962.23</b>	<b>1.69</b>	<b>5316.86</b>	<b>260.40</b>	<b>325.54</b>	<b>4782.63</b>	<b>6004.88</b>	<b>3598.39</b>



Table - 14.4 (Contd..)

Sl. No.	Block	Banana	Plantain	Pineapple	Pappaya	Cashew	Tapioca	Drumstick	Sesamum	Coconut	Betel Leaves	Cocoa
1	2	13	14	15	16	17	18	19	20	21	22	23
1	Alangad	552.98	453.78	0.3	59.34	19.35	120.50	18.71	2.17	1911.01		3.78
2	Angamali	1837.06	399.74	23.09	158.73	99.79	544.91	49.37		5196.89		32.16
3	Edappalli		11.1		2.78	1.77	0.97	0.89		386.19		0.05
4	Koovappadi	736.33	338.04	220.17	96.29	34.82	593.58	41.86	4.98	3343.74	3.33	207.83
5	Kothamangalam	647.82	289.39	1295.1	102.09	35.88	984.6	44.33	4.46	4169.37	0.91	464.03
6	Mulanthuruthy	22.23	192.25	76.83	110.83	38.77	78.92	38.56		3116.72	0.66	4.28
7	Moovattupuzha	576.09	273.09	1943.89	107.95	38.26	795.18	69.93		3078.62		112.45
8	Palluruthi	0.21	28.45	0.66	28.85	4.93	1.67	4.25		974.76		0.89
9	Pampakkuda	457.47	442.7	1057.48	106.89	38.69	872.04	55.77	11.17	3294.18	0.42	270.89
10	Parakadavu	607.75	202.08	6.27	53.28	97.17	287.07	50.32		3524.07		15.67
11	Parur	29.79	129.49	3	58.81	57.73	31.38	13.48		3169.63	0.03	1.75
12	Vazhakkulam	332.39	337.17	458.94	104.51	30.89	474.62	35.46		2511.56	5.35	63.57
13	Vadavukode	315.9	262.78	752.94	72.2	33.5	411.89	39		2162.4	4.25	39.7
14	Vypin	0.9	127.49	2.69	123.69	21.37	4.52	16.58		3561.46	0.19	4.19
15	Vyttila	0.29	22.99	0.71	18.09	12.53	3.96	8.79		1091.56	0.03	0.44
	Corporation & Municipalities	267.71	272	265.47	264.11	30.58	473.82	110.31	3.62	4748.1	0.14	72.07
	<b>District Total</b>	<b>6384.92</b>	<b>3782.54</b>	<b>6107.54</b>	<b>1468.44</b>	<b>596.03</b>	<b>5679.63</b>	<b>597.61</b>	<b>26.40</b>	<b>46240.26</b>	<b>15.31</b>	<b>1293.75</b>

Source: Agricultural Statistics, DES

Table: 14.5

**PRODUCTION OF IMPORTANT CROPS**

Production in Tonnes

YEAR	Rice				Jowar	Ragi	Other Cereals	Sugar cane	Black Pepper	Green Chillies	Pulses including	Cured Ginger	Cured Turmeric
	Autumn	Winter	Summer	Total									
1	2	3	4	5	6	7	8	9	10	11	12	13	14
2009-2010	7803	10622	2599	21024				0	798	80	115	588	900
2008-2009	10172	12334	3401	25907					928	42	186	736	
2007-2008	8196	12088	4123	24407				23	995	58	210	930	

YEAR	Ground nut	Areca nut	Tamarind	Mango	Jack (Nos in million nuts)	Banana	Other Plantain	Pineapple	Tapioca	Sweet Potato	Pappaya	Drum stick	Sesamum
1	15	16	17	18	19	20	21	22	23	24	25	26	27
2009-2010		5130	730	18233	17	58787	25074	57464	228343	81	7427	664	2
2008-2009		5564	711	17364	18	60775	25199	59864	209906	46	5709	670	20
2007-2008	869	6395	721	17146	20	49537	33840	56520	178642	46	5987	622	10

YEAR	Coconut (million nuts)	Cotton (No.of bales of 170kg each)	Nutmeg	Tobacco	Tea	Coffee	Rubber	Cocoa	Processed Cardamom	Raw cashew nuts	Betel leaves	Clove(dry)	Garlic
1	28	29	30	31	32	33	34	35	36	37	38	39	40
2009-2010	235		4873				90770	732		218	365	1	
2008-2009	249		5209				94270	718		241	626	2	
2007-2008	292		6173				87595	700		350	778	2	

Source:Agricultural Statistics,DES

Table: 14.6

## BLOCK WISE PRODUCTION OF IMPORTANT CROPS 2008-2009

Production in Tonnes

Sl. No.	Block	Rice			Canegur	Black pepper	Cured Ginger	Cured Turmeric	Arecanut	Jack (Million Nos.)	Banana
		Autumn	Winter	Summer							
1	2	3	4	5	6	7	8	9	11	12	13
1	Alangad	431.28	72.77	14.65		24.62	0.89	1.35	117.89	0.80	7293.76
2	Angamali	1157.36	1094.38	134.24		79.32	28.47	34.61	732.99	2.05	14865.85
3	Edappalli	234.16	4.79			1.44			10.19	0.08	3.89
4	Koovappadi	1905.50	2245.00	1260.97		45.38	157.14	34.44	383.91	3.41	6910.54
5	Kothamangalam	1377.17	2175.96	440.07		100.78	313.21	381.94	1036.18	1.37	7677.55
6	Mulanthuruthy	448.40	735.36	528.10		51.70	1.94	2.67	165.94	0.46	231.28
7	Moovattupuzha	444.41	50.67	14.76		243.00	76.21	210.31	671.59	1.51	4566.91
8	Palluruthi	40.56	347.53			5.32			38.95	0.04	2.15
9	Pampakkuda	626.26	2354.34	5.23		162.54	58.27	94.35	442.58	2.15	4017.85
10	Parakadavu	378.95	633.32	186.84		54.52	23.18	8.46	215.69	0.70	6997.73
11	Parur	870.75	0.10			13.94	2.20	3.56	264.51	0.47	322.93
12	Vazhakkulam	700.85	1093.99	432.09		56.24	38.79	39.12	399.14	2.03	3013.66
13	Vadavukode	1000.71	1317.52	314.29		42.07	13.52	22.27	572.73	1.45	2389.30
14	Vypin	205.57				18.50	0.17	0.24	215.79	0.21	1.51
15	Vyttila	13.55				1.61	0.07	0.08	32.40	0.05	2.27
	Corporation & Municipalities	336.14	208.07	70.15		26.86	22.44	35.19	263.56	1.28	2477.70
	<b>District Total</b>	<b>10171.62</b>	<b>12333.80</b>	<b>3401.39</b>		<b>927.83</b>	<b>736.47</b>	<b>868.58</b>	<b>5564.04</b>	<b>18.06</b>	<b>60774.89</b>

Table - 14.6 (Contd..)

Sl. No.	Block	Other Plantain	Pineapple	Tapioca	Pappaya	Drumstick	Sesamum	Coconut (Million nuts)	Cocoa	Raw cashew	Betel Leaves
1	2	14	15	16	17	18	19	20	21	22	23
1	Alangad	2480.82	2.20	2358.79	324.71	23.29	1.13	14.59	1.96	9.63	3.53
2	Angamali	3002.85	157.45	15325.59	335.40	62.70		28.45	7.06	36.77	
3	Edappalli	69.20	0.12	28.32	23.64	0.66		1.41		0.66	2.29
4	Koovappadi	2635.36	2449.17	25657.50	393.73	33.40		15.43	82.49	9.45	171.27
5	Kothamangalam	1602.06	12511.96	47236.19	396.52	65.08	5.20	26.63	236.31	9.72	39.13
6	Mulanthuruthy	467.74	470.05	3273.21	738.02	28.00		10.39	0.57	9.36	14.06
7	Moovattupuzha	1598.12	19061.79	23915.04	305.71	59.58		16.76	102.84	13.86	
8	Palluruthi	159.26	3.16	28.72	142.66	12.43	14.02	6.80	0.47	8.46	
9	Pampakkuda	3429.60	11109.89	35186.81	295.98	30.84		12.39	214.58	10.22	14.71
10	Parakadavu	1915.92	42.12	8956.58	207.74	70.15		19.27	2.02	77.84	
11	Parur	939.79	8.81	908.45	195.43	28.03		26.66	1.55	21.47	1.26
12	Vazhakkulam	3047.88	5339.77	15069.23	610.68	46.74		14.21	26.46	13.21	232.71
13	Vadavukode	1274.75	7455.61	13149.59	431.61	42.86		8.72	13.74	8.43	146.57
14	Vypin	566.44	11.08	77.74	527.91	47.05		19.07	1.86	3.08	
15	Vyttila	192.24	2.62	76.23	42.55	6.32		5.69	0.12	3.32	0.38
	Corporation & Municipalities	1816.91	1238.40	18657.53	736.98	113.34		22.90	26.38	5.45	
	<b>District Total</b>	<b>25198.94</b>	<b>59864.19</b>	<b>209905.52</b>	<b>5709.26</b>	<b>670.47</b>	<b>20.35</b>	<b>249.37</b>	<b>718.39</b>	<b>240.94</b>	<b>625.93</b>

Source: Agricultural Statistics, DES

Table: 14.7

**BLOCK WISE PRODUCTION OF IMPORTANT CROPS 2009-2010**

Production in Tonnes

Sl. No.	Block	Rice			Total	Canegur	Black pepper	Cured Ginger	Cured Turmeric	Arecanut	Jack (Million Nos.)	Banana
		Autumn	Winter	Summer								
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Alangad	323.06	403.57	229.48	956.11		29.84	1.13	1.71	176.85	0.54	7996.68
2	Angamali	819.20	882.35	79.55	1781.10		98.57	26.73	33.72	475.46	2.39	12541.65
3	Edappalli	175.46	2.43	0.00	177.90		1.61	0.00	0.65	50.69	0.08	4.62
4	Koovappadi	1288.56	1444.94	729.93	3463.43		36.50	101.91	33.87	390.86	2.32	6674.78
5	Kothamangalam	1212.33	1741.48	376.97	3330.77		105.83	216.87	290.98	840.12	1.59	7414.72
6	Mulanthuruthy	270.35	307.31	625.43	1203.10		62.03	1.47	2.07	170.35	0.52	469.20
7	Moovattupuzha	591.01	857.90	22.62	1471.53		162.79	120.02	327.99	467.25	2.34	3723.84
8	Palluruthi	29.17	0.00	0.00	29.17		6.75	0.00	0.06	48.85	0.03	1.95
9	Pampakkuda	553.47	1435.85	0.00	1989.32		109.52	52.60	102.43	535.25	1.89	3827.52
10	Parakadavu	367.42	643.02	67.08	1077.52		33.50	13.98	8.76	264.98	0.90	9616.20
11	Parur	213.89	2.27	0.00	216.16		9.28	0.37	1.39	225.02	0.31	560.96
12	Vazhakkulam	491.98	771.83	252.69	1516.50		43.58	27.48	47.93	345.05	1.27	2200.44
13	Vadavukode	1174.24	1895.86	166.70	3236.79		43.74	8.94	15.85	447.46	1.02	1627.68
14	Vypin	117.50	0.00	0.00	117.50		14.43	0.06	0.59	266.71	0.32	0.60
15	Vyttila	1.99	0.00	0.00	1.99		0.70	0.06	0.14	36.14	0.04	16.77
Corporation & Municipalities		173.63	233.48	48.85	455.96		38.93	16.71	31.37	388.97	1.18	2109.74
<b>District Total</b>		<b>7803.25</b>	<b>10622.28</b>	<b>2599.30</b>	<b>21024.84</b>		<b>797.60</b>	<b>588.32</b>	<b>899.50</b>	<b>5130.00</b>	<b>16.72</b>	<b>58787.35</b>

Table - 14.7 (Contd..)

Sl. No.	Block	Other Plantain	Pineapple	Tapioca	Pappaya	Drumstick	Sesamum	Coconut (Million nuts)	Nutmeg	Cocoa	Raw cashew	Betel Leaves
1	2	14	15	16	17	18	19	20	21	22	23	24
1	Alangad	4347.83	2.28	4116.65	685.26	41.03		12.18	168.87	1.06	7.29	0.00
2	Angamali	3832.67	161.51	20972.94	556.27	40.37		26.94	947.60	15.22	51.57	0.00
3	Edappalli	122.03	2.56	32.03	11.85	1.08		2.44	0.63	0.00		0.00
4	Koovappadi	2112.81	1564.33	25090.41	602.39	38.43		12.11	744.16	98.57	8.64	118.08
5	Kothamangalam	1872.71	13006.86	44658.08	633.51	59.29		22.39	350.77	278.01	18.68	19.62
6	Mulanthuruthy	880.64	583.57	2542.12	742.38	15.68		10.19	23.40	0.78	3.72	2.76
7	Moovattupuzha	2063.80	13581.00	31041.06	377.81	59.02		16.61	615.03	63.10	8.21	0.00
8	Palluruthi	170.13	3.43	17.55	217.84	14.21		7.08	1.52	0.61	4.85	0.00
9	Pampakkuda	2000.02	18289.13	28611.05	451.61	47.49	2.30	15.18	227.77	203.13	13.85	25.80
10	Parakadavu	1629.90	89.17	7698.38	455.29	77.08		18.62	601.54	6.80	47.64	4.29
11	Parur	409.63	8.62	1075.16	355.02	66.44		21.91	56.12	1.57	15.30	0.00
12	Vazhakkulam	1813.04	3727.94	16266.35	809.16	62.33		14.14	470.32	13.85	10.98	140.36
13	Vadavukode	1387.11	4462.23	13673.92	576.84	22.47		11.05	424.16	11.97	12.26	53.43
14	Vypin	1012.13	2.83	45.36	365.28	38.64		16.12	39.95	1.34	4.10	0.00
15	Vyttila	304.00	2.45	17.64	40.48	7.52		5.87	0.46	0.10	2.58	0.30
	Corporation & Municipalities	1115.61	1975.62	32484.51	545.74	73.35		21.84	200.69	35.86	8.80	0.00
	<b>District Total</b>	<b>25074.05</b>	<b>57463.52</b>	<b>228343.20</b>	<b>7426.73</b>	<b>664.41</b>	<b>2.30</b>	<b>234.67</b>	<b>4872.97</b>	<b>731.95</b>	<b>218.46</b>	<b>364.64</b>

Source:Agricultural Statistics,DES

Table: 14.8

ESTIMATED AREA AND PRODUCTION OF RICE (WINTER)

Area in hectares and Production in Tonnes

YEAR	High Yielding						Local Varieties						Total	
	Irrigated		Unirrigated		Total		Irrigated		Unirrigated		Total		Area	Production
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production		
2009-2010	5087.4	10565	0.67	1.83	5088.07	10566.48	32.83	55.80			32.83	55.81	5120.90	10622.28
2008-2009	5536	11444	296	743	5832	12187	75	147			75	147	5907	12334
2007-2008	5537	11722	17	18	5554	11740	171	348			171	348	5725	12088

Table: 14.9

ESTIMATED AREA AND PRODUCTION OF RICE (SUMMER)

Area in hectares and Production in Tonnes

YEAR	High Yielding						Local Varieties						Total	
	Irrigated		Unirrigated		Total		Irrigated		Unirrigated		Total		Area	Production
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production		
2009-2010	1572.48	2594			1572.48	2593.98	3.1	5.31			3.1	5.31	1575.58	2599.30
2008-2009	1958	3394			1958	3394	4	7			4	7	1962	3401
2007-2008	2235	4121			2235	4121	1	2			1	2	2236	4123

Table: 14.10

THE FINAL ESTIMATION OF YIELD AND PRODUCTION OF RICE (YEAR WISE)- Season: Winter

YEAR	No of		Estimated yield in Tonnes/Ha (Rice)	Area in 1000 Ha	Average Yield (kg/Ha) Rice	Estimated Production of Rice in 1000 tons	Bund Correction Factor (if any)applied	Sampling error for Av.Yield)	%of sampling Error
	Planned	Analysed							
2009-2010	424	424	2.07	5.12	2074	10.62		30.84	1.48
2008-2009	417	417	2.09	5.90	2088	12.33		36.12	1.73
2007-2008	414	414	2.11	5.72	2112	12.08		37.27	1.76

Source:Agricultural Statistics,DES

Table: 14.11

**AREA,MEAN YIELD AND PRODUCTION OF RICE FOR HIGH YIELDING VARITIES OF PADDY  
Season-Winter**

YEAR	Irrigated					Un Irrigated					Total				
	No of Experi-ments	Mean Yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean Yield(kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes
2009-2010	412	2077	5087.40	31.02	10564.64	1	2733	0.67	0	1.83	413	2077	5088.07	31.02	10566.47
2008-2009	368	2067	5536.86	38.01	11443.69	36	2512	295.79	0.671	742.94	404	2089	5832.65	36.08	12186.63

Table: 14.12

**AREA,MEAN YIELD AND PRODUCTION OF RICE FOR LOCAL VARITIES OF PADDY  
Season-Winter**

YEAR	Irrigated					Un Irrigated					Total				
	No of Experi-ments	Mean Yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean Yield(kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes
2009-2010	11	1700	32.83	144.96	55.80	0			0		11	1700	32.83	144.96	55.80
2008-2009	13	1970	74.74	469.40	147.22	0	0	0	0	0	13	1970	74.74	469.40	147.22

Source:Agricultural Statistics,DES



Table: 14.13

**AREA, MEAN YIELD AND PRODUCTION OF RICE FOR ALL VARITIES OF PADDY**  
Season-Winter

YEAR	Irrigated					Un Irrigated					Total				
	No of Experi-ments	Mean Yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean Yield(kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes
2009-2010	423	2074	5120.23	30.84	10620.45	1	2733	0.67	0	1.83	424	2074	5120.90	30.84	10622.28
2008-2009	381	2066	5611.60	37.52	11590.91	36	2512	295.79	0.67	742.94	417	2088	5907.39	36.12	12333.85

Table: 14.14

**AREA, MEAN YIELD AND PRODUCTION OF RICE FOR LOCAL VARITIES OF PADDY**  
Season-Summer

YEAR	Irrigated					Un Irrigated					Total				
	No of Experi-ments	Mean Yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean Yield(kg/Ha)Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean yield (kg/Ha)Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes
2009-2010	8	1715	3.1	47.14	5.31	0			0		8	1715	3.1	47.14	5.31
2008-2009	7	1703	4.1	61.04	6.98	0			0		7	1703	4.1	61.04	6.98

Source:Agricultural Statistics,DES

Table: 14.15

**AREA,MEAN YIELD AND PRODUCTION OF RICE FOR ALL VARITIES OF PADDY**

**Season-Winter**

YEAR	HIGH YIELDING VARIETY					LOCAL VARIETY					TOTAL				
	No of Experi-ments	Mean Yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean Yield(kg/ Ha)Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes
2009-2010	413	2077	5088.07	31.02	10566.47	11	1700	32.83	144.96	55.8	424	2074	5120.90	30.84	10622.28
2008-2009	404	2089	5832.65	36.08	12186.63	13	1970	74.74	469.40	147.22	417	2088	5907.39	36.12	12333.85

Table: 14.16

**AREA,MEAN YIELD AND PRODUCTION OF RICE FOR HIGH YIELDING VARITIES OF PADDY**

**Season-Summer**

YEAR	Irrigated					Un Irrigated					Total				
	No of Experi-ments	Mean Yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean Yield(kg/ Ha)Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experi-ments	Mean yield (kg/Ha)Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes
2009-2010	269	1650	1572.48	50.33	2593.98	0			0		269	1650	1572.48	50.33	2593.98
2008-2009	287	1733	1958.23	54.46	3394.44	0			0		287	1733	1958.23	54.46	3394.44

Source:Agricultural Statistics,DES

Table: 14.17

**FINAL RESULT OF CROP ESTIMATION SURVEY ON DRIAGE RESULTS**

YEAR	No of Driage Exp		Total of Plot Yield Before Driage (gms)	Total of Plot Yield After Driage (gms)	Driage rate applied for estimating Yield
	Planned	Analysed			
2009-2010	55	55	13750	12069	0.88
2008-2009	75	75	13250	12249	0.92

Table: 14.18

**AREA,MEAN YIELD AND PRODUCTION OF RICE FOR ALL VARITIES OF PADDY**

Season-Summer

YEAR	Irrigated					Un Irrigated					Total				
	No of Experiments	Mean Yield (kg/Ha) Rice	Area(Ha)	Sampling Error	Production of Rice in Tonnes	No of Experiments	Mean Yield(kg/ Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes	No of Experiments	Mean yield (kg/Ha) Rice	Area (Ha)	Sampling Error	Production of Rice in Tonnes
2009-2010	277	1650	1575.58	50.24	2599.30	0		0	0	0	277	1650	1575.58	50.24	2599.30
2008-2009	294	1733	1962.33	54.34	3401.43	0		0	0	0	294	1733	1962.33	54.35	3401.43

Table: 14.19

**CROP ESTIMATION SURVEYS-AUXILIARY INFORMATION  
PERCENTAGE OF AREA UNDER DIFFERENT AGRICULTURAL PRACTICES- A STATEMENT**

Season-Summer

YEAR	Seeds Used(No of Exp)			Chemically Manured (%)	Other Manured (%)	Both Chemically and other Manured (%)	Not Manured (%)	Treated with Pesticides (%)	Pesticides not used (%)
	Total	Improved	Local						
2009-2010	277	269	8	98.92	54.15	53.43	0.36	96.39	3.61
2008-2009	294	287	7	98.98	68.37	67.35	1.02	96.26	3.74

Source:Agricultural Statistics,DES

## 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. Sesame		-	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	-	75-100 kg/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

Coconut	Cake to seeds crushed	60 percent
	Copra to nuts	6,773 nuts gives one tone of copra (average), presently it is 7250-7500 nuts due to mite attack
Pepper	Cake to copra	38 percent
	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. Dessicated 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 to 32.8)
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 in general are either export oriented or import substituting and therefore assume special significance from the national point of view. It is estimated that nearly 14 lakh families are dependent on the plantation sector for livelihood. Each of the four plantation crops of South India its distinct characteristics and economics problems. Consequent to the removal of quantitative restrictions on import, plantation crops in general are facing the threat of low quality imports.

Kerala has a substantial share in the four plantation crops of rubber, tea, coffee and cardamom. These four crops together occupy 6.89 lakh ha, accounting for 31.58 percent of the net cropped area in the state and 43 percent of the area under these crops in the country. Kerala's share in the national production of rubber is 91 percent, cardamom 75 percents, coffee 22 percent during the year 2008-09.

### RUBBER

India is the fourth largest producer of natural rubber with a share of eight percent in the world after Thailand, Indonesia and Malaysia. The production of natural rubber in the country was 8.31 lakh MT in 2009-10, registering a 3.8 percent decline compared to the previous year. India is at the same time the second largest consumer of natural rubber after China. A 34 percent decline in the consumption of USA was recorded in 2009 over 2008 while consumption in China and India increased by 17.70 percent and 2.70 percent respectively.

Kerala accounts for 78 percent of the area under rubber in the country. The coverage under the crops in 2009-10 was 5.25 lakh ha, higher by 7933 ha over the previous year. The production of natural rubber in Kerala during the year was 7.45 lakh tones indicating a 4.85 percent decline over the previous year. The increasing trend in productivity continued during 2008-09. It was 1190 kg. per ha in 1998-99, which rose to 1514 kg during 2008-09. However it declined slightly to 1419 Kg/ha in 2009-10. In terms of tapping area, productivity recorded was 1867 kg. per ha during the year 2008-09 which declined to 1784 Kg/ha in 2009-10. Even though the domestic prices of natural rubber were more or less comparable to international prices during 2007-08, (Appendix 4.17) the industrial sector still resorts to imports in bulk quantities. The total quantity imported was 86394 MT which slightly declined to 77616 MT in 2008-09. The import increased to 176756 MT in 2009-10.

The higher price in the international market is reflected in the domestic market also. The average of RSS 4 in the domestic market at Kottayam was Rs. 144.98 per kg. in 2009-10. The international price of RSS3, equivalent of RSS 4 of India, was Rs. 111.13 in the corresponding period. The price of RSS 4 in Kottayam reached Rs. 137.82 during August 2008 and then declined to Rs. 64.88 in October 2008 and further increased to Rs. 108.98 in October 2009 and Rs. 149.48 in March 2010. The Share of Rubber in Ernakulam is 12.92%.

Source: Economic Review, 2010

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)
<b>PRODUCTION</b>						
<b>Natural Rubber (NR)</b>						
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	
<b>Total</b>	<b>71200</b>	<b>72500</b>	<b>311200</b>	<b>297750</b>	<b>861950</b>	<b>4.5</b>
<b>Synthetic Rubber (SR)</b>						
Styrene Butadiene (SBR)	1515	1524	7848	7062	19994	
Poly Butadiene (BR)	6670	6325	32700	32345	75905	
Others	1206	918	5781	4504	14441	
<b>Total</b>	<b>9391</b>	<b>8767</b>	<b>46329</b>	<b>43911</b>	<b>110340</b>	<b>5.5</b>
<b>Total NR &amp; SR</b>	<b>80591</b>	<b>81267</b>	<b>357529</b>	<b>341661</b>	<b>972290</b>	<b>4.6</b>
<b>CONSUMPTION</b>						
<b>Natural Rubber (NR)</b>						
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	
<b>Total</b>	<b>76190</b>	<b>79500</b>	<b>400615</b>	<b>388550</b>	<b>947715</b>	<b>3.1</b>
Out of which Auto Tyre Manufactures	47246	49358	263348	244230	597623	7.8

<b>Synthetic Rubber (SR)</b>						
Styrene Butadiene (SBR)	14605	14535	76760	69435	174855	
Poly Butadiene (BR)	9830	10330	55205	48585	125305	
Others	9200	9355	47600	49125	111670	
<b>Total</b>	<b>33635</b>	<b>34220</b>	<b>179565</b>	<b>167145</b>	<b>411830</b>	<b>7.4</b>
Out of which Auto Tyre Manufactures	23530	25092	130877	118803	298414	10.2
<b>Total NR &amp; SR</b>	<b>109825</b>	<b>113720</b>	<b>580180</b>	<b>555695</b>	<b>1359545</b>	<b>4.4</b>
Out of which Auto Tyre Manufactures	70776	74450	394225	363033	896037	<b>8.6</b>

Table: 15.2

<b>(Metric Tonnes)</b>					
<b>Production Consumption and stock of RR</b>	<b>August 2011</b>	<b>August 2010</b>	<b>April 2011 to August 2011</b>	<b>April 2010 to August 2010</b>	<b>April 2010 to March 2011</b>
<b>Reclaimed Rubber (RR)</b>					
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 Sector plays an important role in strengthening the economy of the state, especially rural economy. It provides self employment opportunities to unemployed and underemployed rural poor. The majority of the live stock population in the state is concentrated in rural areas. The progress in livestock will directly reflect a more balanced development in rural economy and upliftment of weaker sections of the society. A large manpower is also involved in livestock rearing and related activities. About 57% of world cattle population is in India. Animal husbandry activities play a crucial role in socio-economic transformation of rural areas especially in generating employment and income to the weaker sections of the population. The preservation and development of the cattle wealth and poultry are also significant to production of major livestock product of nutritional standard. Generally rearing of cattle and poultry farming are the allied occupations of agricultural workers. The animal power also constitutes the principle source of manure for agriculture. Animal Husbandry Department is vested with the animal health programme in the District by making available timely veterinary assistance and attends to the welfare of the animals in the District. Veterinary health care programmes are implemented through a network of institutions consisting of Veterinary, Polyclinics, and Veterinary Centres. The District Veterinary Centres are serving as referral centres. Mobile veterinary service is also offered from these centres. These centres and Veterinary Polyclinics at taluk level are fully equipped with diagnostic facilities.

The following Table shows the number of institutions functioning under Animal Husbandry Department in the District.

Animal Husbandry Department in the District as on 31.3.2001

Table: 16.1

Sl. No.	Institution	Nos.
(1)	(2)	(3)
1	Artificial Insemination Centre	1
2	Clinical Laboratory	1
3	Cattle Sterility Office	1
4	District Animal Husbandry Office	1
5	District Veterinary Centre	1
6	Feed Mixing Unit	1
7	ICDP Office	1
8	ICDP Sub-centres	81
9	IPD Block	1
10	IPD Sub-centres	4

11	Livestock Marine Products Inspection Lab	1
12	Live Stock Management Training Centre	1
13	Mobile Farm Aid Unit	1
14	Mobile Veterinary Hospital	1
15	Pig Breeding Unit	1
16	Regional Artificial insemination centre	1
17	Regional Poultry Farm	1
18	Rinder Pest Mobile Unit	1
19	Swine Husbandry Office	1
20	Veterinary Dispensaries	78
21	Veterinary Hospitals	23
22	Veterinary Polyclinics.	5
	<b>Total</b>	<b>208</b>

Animal Husbandry Department has launched a pilot programme to extend artificial insemination facilities to the doorstep farmers. Under the Intensive Cattle Development Programme there are 81 sub-centres, one artificial Insemination Centre and a Piggery Development Unit. There is also a mobile farm aid unit. The Regional Poultry Farm under the Intensive Poultry Development Block, Muvattupuzha is rendering good service to the needy public. A Regional Poultry Farm is functioning at Kuruppampady near Perumbavoor. The animal Husbandry Department in collaboration with United Insurance Company has formulated a Kamadhenu Insurance Scheme to insure the family of the farmers and their crossbred mulch cows.

The total Livestock Population in the District as per the XV Quasiquennial Livestock Census 1996 is as follows:

Table: 16.2

Sl. No.	Category	Nos.
(1)	(2)	(3)
<b>Livestock</b>		
1	Cattle	283459
2	Buffaloe	10173
3	Sheep	153
4	Goats	158399
5	Others	15316
	<b>Total</b>	<b>467500</b>

<b>Poultry</b>		
6	Fowls	1524869
7	Ducks	98011
8	Others	21498
9	Total	1944378

According to 1996 Livestock Census, the District had a total livestock population of 46700 which was 8.38 percent of the total livestock population of the state (5576917) while the poultry population (1944378) accounted for 7.22 percent of the total poultry population of the state (26946091). The District has only fourth position in the State in respect of livestock population according to 1996 Livestock Census. Regarding cattle population the District has the 2<sup>nd</sup> position with 283458 cattle, the first position being held by Palakkad with 363338 cattle. The livestock rearing is facing new challenges as a result of the fast changes that are taking place in the farm front replacing livestock friendly seasonal crops by perennial crops. Paddy based farming system and cattle rearing are inter dependent and as such the sharp decline in area under paddy cultivation has its impact on livestock rearing.

Source: AHD, Kerala

Table: 16.3

**Statement of Outbreaks, Attacks, deaths etc. due to contagious diseases and number of animals protected/vaccinated during the year 2007-2008**

Foot and Mouth				Anthrax				Black Quarter				H.S			
Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated
22	397	9	214636	2	3	3	5999	0	0	0	0	1	7	7	9372
Canine Distemper				Parvo Virus				Ranikhet				Fowl Pox			
Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated
3	7	4	1039	0	0	0	930	1	64	18	563965	0	0	0	5413
Infectious Bursal Disease				Duck Plague				Others				Total			
Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated	Out break	Attack	Death	Protected/ Vaccinated
0	0	0	7295	0	0	0	43767	0	0	0	3827	29	478	41	856243

Source:Animal husbandry Statistics, AHD



Table: 16.4

**Number of Cases treated under important categories of diseases in various Departmental institutions during 2007-2008**

Mastitis	Bovine	7808
	Goat	2827
	Others	17
Abortion	Bovine	732
	Goat	652
	Others	16
Worm Infections	Bovine	71896
	Goat	39067
	Others	14757
Coccidiosis	Bovine	3117
	Goat	1834
	Others	367
Babesiosis	Bovine	960
	Goat	165
	Others	19
Other diseases	Bovine	142658
	Goat	88781
	Others	66455
Total	Bovine	227171
	Goat	133336
	Others	85631
<b>Total Number of Animals Treated</b>		<b>446138</b>

Source:Animal husbandry Statistics

Table: 16.5

**Anti rabies Vaccinations done in the District during  
2007-2008**

Prophylactic in dogs	Post Exposure vaccinations					Number of deaths due to rabies				
	Cattle	Buffalo	Goat	Canine	Other Animals	Cattle	Buffalo	Goat	Canine	Other Animals
25830	216	34	624	433	27	16	0	10	9	2

Source:Animal husbandry Statistics

Table: 16.6

**Dairy Co-operative Societies in the  
district as on 31-3-2008**

Primary Societies	338
Regional Unions	1
Total	339
Anand Mode (APCOS)	317
Traditional	21
Total	338

Table: 16.7

**Broiler production and Distribution in  
private sector for the year 2007-2008 in  
Ernakulam District**

Total No of chicken sold	Total Meat Production (Kg)
484126	1188309

Source:Animal husbandry Statistics

Table: 16.8

**Estimated Number of Animals slaughtered Category wise (authorised sector only)  
2007-2008 (in Nos)**

Cattle			Buffalo			Goat and sheep			Pig		
Adult	Young	Total	Adult	Young	Total	Adult	Young	Total	Desi	Improved	Total
73242	10068	83310	72247	12150	84397	88334	11842	100176	7620	22867	30487

Table: 16.9

**Estimated Meat Production - Category wise (authorised sector only) in MT during  
2007-2008**

Cattle			Buffalo			Goat and sheep			Pig			Total Meat Production
Adult	Young	Total	Adult	Young	Total	Adult	Young	Total	Desi	Improved	Total	
4407	173	4580	4488	197	4685	812	61	873	393	813	1206	11344

Source: Animal husbandry Statistics

Table: 16.10

**Kerala XVIII quinquennial Census 2007**  
**Cattle (Exotic and Crossbred) Male**

District	Under 1 year	1 to 2 and half years	Total	Used for Breeding	Used for Agriculture only	Used for Bullock cart	Others	Total	Total Males
Ernakulam	6646	1774	8420	115	62	44	151	372	8792
Rural	6019	1381	7400	55	61	22	138	276	7676
Urban	627	393	1020	60	1	22	13	96	1116

Table: 16.11

**Cattle (Exotic and crossbred) Female**

District	Under 1 year	1 to 2 ½ years	Total	Females over 2 ½ years					Total Females	Total Exotic and Crossbred Cattles
				In milk	Dry	Not Yet Calved	Above 10 years	Total		
Ernakulam	23746	39762	63508	56052	14227	5297	2531	78107	141615	150407
Rural	21718	33785	55503	51910	12805	4493	2124	71332	126835	134511
Urban	2028	5977	8005	4142	1422	804	407	6775	14780	15896

Source: Report on Eighteenth quinquennial report, AHD

Table: 16.12

**XVIII Quinquennial Census 2007**

Ernakulam	Total Livestock				Other livestock
	Buffaloes	Sheep	Goats	Pigs	
	5111	0	166672	5565	5
Rural	4689	0	157051	5208	3
Urban	422	0	9621	357	2

Table: 16.13

**Statement showing the distribution of livestock in Ernakulam district (1996 to 2007)**

Livestock Number			Percentage Distribution		
1996	2003	2007	1996	2000	2003
467500	306323	332337	8.38	8.4	8.8

Table: 16.14

**Live Stock and poultry-Cattle indigenous-Male**

District	Under 1 year	1 to 3 years	Total	Male over 3 years					Total Males
				Used for Breeding	Used for Agriculture only	Used for Bullock cart	Others	Total	
Ernakulam	511	256	<b>767</b>	2	5	5	11	23	<b>790</b>
Rural	504	256	<b>760</b>	2	5	5	11	23	<b>783</b>
Urban	7	0	<b>7</b>	0	0	0	0	0	<b>7</b>

Source:- Report on 18th Quinquennial , Dept of Animal Husbandry

Table: 16.15

**VETERINARY PERSONNEL IN THE DEPARTMENT AS ON 31/3/2008**

District	Officers in the cadre of additional Director and above	Officers in the Cadre of Joint Director	Officers in the Cadre of Deputy Director	Officers in the Cadre of Assistant Director	Veterinary Surgeon	Livestock Inspectors
Ernakulam	0	1	6	36	93	210

Source:Animal husbandry Statistics

Table: 16.16

**Live Stock and poultry-Cattle indigenous-Female**

District	Under 1 year	1 to 3 years	Total	Females over 3 years					Total Females	Total Indigenous Cattle	Total Cattle
				In Milk	Dry	Not Yet Calved	Above 10 years	Total			
Ernakulam	777	780	1557	1656	439	52	83	2230	3787	4577	154984
Rural	773	778	1551	1635	427	52	83	2197	3748	4531	139042
Urban	4	2	6	21	12	0	0	33	39	46	15942

Table: 16.17

**Live Stock and poultry-Buffaloes-Male**

District	Under 1 year	1 to 3 years	Total	Male over 3 years					Total Males
				Used for Breeding	Used for Agriculture only	Used for Bullock cart	Others	Total	
Ernakulam	1044	1290	2334	22	37	0	160	219	2553
Rural	979	1207	2186	22	37	0	160	219	2405
Urban	65	83	148	0	0	0	0	0	148

Source:- Report on 18th Quinquennial , Dept of Animal Husbandry

Table: 16.18

**Live Stock and poultry-Cattle indigenous-Female**

District	Under 1 year	1 to 3 years	Total	Females over 3 years					Total Females	Total Buffaloes
				In Milk	Dry	Not Yet Calved	Above 10 years	Total		
Ernakulam	661	1005	1666	616	207	59	10	892	2558	5111
Rural	592	917	1509	541	179	47	8	775	2284	4689
Urban	69	88	157	75	28	12	2	117	274	422

Table: 16.19

**Live stock and poultry-Goats**

District	Male			Female					Total Goats
	Under 1 year	1 year and above	Total	Under 1 year	1 year and above			Total	
					In milk	Dry	Not calved		
Ernakulam	27252	13737	40989	47222	52896	20814	4751	125683	166672
Rural	25541	12717	38258	44949	49642	19824	4378	118793	157051
Urban	1711	1020	2731	2273	3254	990	373	6890	9621

Table: 16.20

**Live stock-Horses**

District	Males				Females			Total Horses
	Below 3 years	3 years and above			Below 3 years	3 years and above	Total	
		Used for Cart	Used for sport	Total				
Ernakulam	2	1	0	3	1	1	2	5
Rural	1	0	0	1	1	1	2	2
Urban	1	1	0	2	0	0	0	2

Source: Report on 18th Quinquennial, Dept of Animal Husbandry

Table: 16.21

**Live stock and poultry  
Pigs-Exotic Crossbred**

District	Male			Female			Total Exotic pigs
	Below 6 months	6 months and above	Total	6 months and above	Below 6 months	Total	
Ernakulam	1098	894	1992	927	1497	2424	4416
Rural	3854	826	1869	845	1367	2212	4081
Urban	49	68	123	82	130	212	335

Table: 16.22

**Live Stock and poultry-Pigs-Indigenous**

District	Male			Female			Total Indigenous Pigs	Total Pigs
	Below 6 months	6 months and above	Total	Below 6 months	6 months and above	Total		
Ernakulam	230	237	467	246	436	682	1149	5565
Rural	225	237	462	240	425	665	1127	5208
Urban	5	0	5	6	11	17	22	357

Table: 16.23

**Live stock and poultry-Fowls**

District	Cocks			Hens			Total
	Improved	Desi	Total	Improved	Desi	Total	
Ernakulam	39779	103676	143455	109777	530650	640427	783882
Rural	35729	97559	133288	102599	456308	558907	692195
Urban	4050	6117	10167	7178	74342	81520	91687

Table: 16.24

**FWLS  
Chicken below 5 months**

District	For Eggs			For Meat			Total Fowls
	Improved	Desi	Total	Improved	Desi	Total	
Ernakulam	51928	157433	209361	35630	11665	47295	1040538
Rural	48516	147086	195602	33924	9527	43451	931248
Urban	3412	10347	13759	1706	2138	3844	109290

Source: Report on 18th Quinquennial, Dept of Animal Husbandry



Table: 16.25

**Livestock-Elephant**

District	Male	Female	Total
Ernakulam	9	16	25
Rural	8	15	23
Urban	1	1	2

Table: 16.26

**Livestock-Rabbits**

District	Male	Female	Total
Ernakulam	6178	11560	17738
Rural	5836	11091	16927
Urban	342	469	811

Table: 16.27

**Livestock-Dogs**

District	Male	Female	Total
Ernakulam	62124	27522	89646
Rural	50619	21557	72176
Urban	11505	5965	17470

Table: 16.28

**Livestock and poultry  
Fowls**

District	Desi	Improved	Total
Ernakulam	302902	66523	369425
Rural	294660	62260	356920
Urban	8242	4263	12505

Source: Report on 18th Quinquennial, Dept of Animal Husbandry

Table: 16.29

**Livestock and poultry  
Ducks**

District	Drakes			Ducks		
	Improved	Desi	Total	Improved	Desi	Total
Ernakulam	3751	11049	14800	10030	37979	48009
Rural	3313	9671	12984	8583	36010	44593
Urban	438	1378	1816	1447	1969	3416

Table: 16.30

**Livestock and poultry  
Ducks**

District	Duckling below 6 months						Total Ducks
	For Eggs			For Meat			
	Improved	Desi	Total	Improved	Desi	Total	
Ernakulam	2893	4725	7618	323	320	643	71070
Rural	2858	7392	7250	298	252	550	65377
Urban	35	333	368	25	68	93	5693

Source: Report on 18th Quinquennial, Dept of Animal Husbandry

Table: 16.31

**Number and Percentage Distribution of Indigenous and Crossbred Cattle in 2007 and the previous year**

District	2000			2003			2007		
	Indigenous	Crossbred	% distributio n of CB	Indigenous	Crossbred	% distributio n of CB	Indigenous	Crossbred	% distributio n of CB
Ernakulam	32709	172464	84.06	18114	155183	89.55	4577	150407	97

Table: 16.32

**Variation of Indigenous and Crossbred cattle over 2003 census**

District	2003			2007			% variation over 2003 census		
	Indigenous	Crossbred	Total	Indigenous	Crossbred	Total	Indigenous	Crossbred	Total
Ernakulam	18114	155183	173297	4577	150407	154984	-74.73	-3.08	10.57
State	387183	1735274	2122457	118872	1621245	1740117	-69.3	-6.75	18.01

Table: 16.33

**Concentration of Cattle Population in the Rural and Urban area of the State according to 2007 Census**

District	Number			% rural-urban distribution		% districtwise distribution		
	Rural	Urban	Total	Rural	Urban	Rural	Urban	Total
Ernakulam	139042	15942	154984	89.71	10.29	8.47	16.08	8.91
State	1640961	99156	1740117	94.3	5.7	100	100	100

Source:Report on 18th Quinquennial,Dept of Animal Husbandry

Table: 16.34

**Density of livestock and poultry population during 2007**

Ernakulam	Area in sq.km	Cattle		Buffaloes		Goats		Total livestock		Total Poultry	
		Population	Density per sq.km	Population	Density per sq.km	Population	Density per sq.km	Population	Density per sq.km	Population	Density per sq.km
		2407	154984	64.39	5111	2.12	166672	69.24	332337	138.07	1172780

Table: 16.35

**Sexwise distribution of cattle in the Ernakulam district as per 2007 Census**

Ernakulam	Number			Percentage of sex distribution of cattle				
	Male	Female	Total	District wise			Sex wise	
	9582	145402	154984	5.86	9.22	8.91	6.18	93.82

Table: 16.36

**Concentration of buffaloes in rural and urban areas in Ernakulam district**

Ernakulam	Number		% of rural urban			% of district wise distribution		
	Rural	Urban	Total	Rural	Urban	Rural	Urban	Total
	4689	422	5111	91.74	8.26	8.65	10.71	8.79

Source: Report on 18th Quinquennial, Dept of Animal Husbandry

Table: 16.37

**Comparative Statement of distribution and variation of goats in different districts**

District	2003		2007		% Variation over the previous year
	Number	%	Number	%	
Ernakulam	116276	9.58	166672	9.64	62.78

Table: 16.38

**Comparative Statement of distribution and variation of Pigs in different districts**

District	2003		2007		% Variation over the previous year
	Number	%	Number	%	
Ernakulam	9815	12.84	5565	9.43	-43.3

Table: 16.39

**Number and percentage distribution of Poultry, Fowls and Ducks in the Ernakulam district according to 2007 census**

District	Fowls		Ducks		Others		Total Poultry	
	Number	%	Number	%	Number	%	Number	%
Ernakulam	1040538	8.8	71070	8.21	61172	15	1172780	8.96

Table: 16.40

**Density of Poultry, Fowls and Ducks as per 2007 Census**

District	Area in sq.km	Fowls		Ducks		Total Poultry	
		Number	Density in Sq.km	Number	Density in Sq.km	Number	Density in Sq.km
Ernakulam	2131	369425	173.36	9005	4.23	383723	180.07

Source: Report on 18th Quinquennial, Dept of Animal Husbandry



## FISHERIES

Fisheries form one of the most important sectors of Kerala's economy. Kerala is a coastal state and is bordered on the west by the marine flora and fauna rich Arabian Sea. The coastline of the state runs to a length of about 590km. The territorial limits of the state is about 22 kms from the sea shore and the total area covered by the sea that falls within this territory comes up to around 13,000 square kilometres. This is the area in which the marine fishermen of the state are allowed to venture. The shallow seabed surrounding the state of Kerala comes to around 3919 square kilometres. This is the most fertile region of the Arabian Sea as far as fisheries are concerned. The potential of the state in terms of marine fisheries is believed to be about 5.17 lakh tones. 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 fisheries of the state are famous all over the world and are exported to Europe and America among other parts of the globe. At present the state of Kerala produces about 6 lakh tones of marine fishes every year.

Geographically, inland fisheries have great scope in the state. An inimitable feature of the state is the occurrence of 49 interconnected backwaters which have an area of 46129 ha. Besides there are estuaries, backwaters, brackish water area pookali and prawn filtration fields and private shrimp farms. All these bodies of water provide rich sources of inland fish production.

Ernakulam District is one of the nine coastal districts of Kerala. It has coastal line of 46 Kms forming 7.8 percent of the total length of coast line in the state.

The sea along the entire coast of the District and the backwaters abound in fish of various kinds, offering enormous natural facilities for both marine and inland fisheries. Kochi is an ideal place to provide support to fisheries in its various aspects like education, research and development. Various important institutions are located here to serve this purpose like the Central Marine Fisheries Research institute. Natural and Engineering Training, Cochin, Base of the Exploratory Fisheries Project, Export Inspection Council of India, Integrated Fisheries Project, the Marine product and Export Development Authority, Naval Physical and Oceanographic Laboratory, Central Institute of Fisheries, Regional Centre of the National Institute of Oceanography (ICAR), Office of the Fisheries Advisor, Office of the Joint Director of

Fisheries, Kerala Fisheries Corporation, Regional Shrimp Hatchery, Department of Industrial Fisheries, Department of Marine Sciences Unit (University of Kochi), Fisheries Research Unit (Kerala Agricultural University) and the Sea Food Exporters Association of India.

The number of fishermen population in the District during 1999-2000 was 139,387, which comprised of 73,981 in marine and 64,406 in inland sectors. The District has only fourth position in respect of fishermen population in the State. The enormous increase in the number of crafts does not appear to have helped in boosting the marine fish production proportionately. On the other hand, the high presences of mechanized and motorized crafts have deprived the opportunities for thousands of traditional fishermen who solely depend on this sector for subsistence. In the District there were 4523 crafts in operation during 1999-2000. Of these 1327 were mechanized, 1129 were motorized and 2067 were non-motorised. The State has enacted the Kerala Marine Fishing Regulation Act with a view to enforcing a strict regulatory mechanism.

The species-wise composition of fish landing in Ernakulam District in the marine sector shows that the major landing during 1998 were the common varieties of fish such as Oil Sardine, Macherel, Prawns, Percehes etc. The landing of Oild Sardine was 5016 tonnes in the District, which was 6.45 percent of the State landing (77795 tonnes). The landing of Mackerel (2300 tonnes) was 3.74 percent of the State landing (58575 tonnes). The fish landing contribution of the District was 60028 tonnes in 1998 i.e., 11.06 percent of the State landing (542696 tonnes). The landing of marine fish has shown a decrease of -34.77 percent during the period 1996-1998.



Table: 17.1

**Fresh Water Resources in Ernakulam 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)
2009	719	233.17	201	26.94	54	245.94	72	13.98
2008	719	233.17	201	26.94	54	245.94	72	13.98

Table: 17.2

**Check Dams in Ernakulam District**

Year	Sl. No.	Name of the Check Dam	Area in Hect.	Location		Type of construction	Ownership
				Block	Panchayath		
2009	1	Muriyathodu para	3.20	Angamali	Manjapara	Planks	Panchayath
	2	Kottai	2.80				
	<b>Total</b>		<b>6.00</b>				
Year	Sl. No.	Name of the Check Dam	Area in Hect.	Location		Type of construction	Ownership
				Block	Panchayath		
2008	1	Muriyathodu para	3.20	Angamali	Manjapara	Planks	Panchayath
	2	Kottai	2.80				
	<b>Total</b>		<b>6.00</b>				

Table: 17.3

**Distribution of Fishermen Population in Ernakulam**

2005-2006				2006-2007			
Male	Female	Children	Total	Male	Female	Children	Total
25608	25045	18088	68741	25784	25217	18212	69213
2007-2008				2008-2009 (Estimated)			
Male	Female	Children	Total	Male	Female	Children	Total
26027	25455	18384	69866	26298	25719	18575	70592

Source: Inland Fisheries Statistics, Dept of Fisheries

Table: 17.4

**Percentage of Active Fishermen to the Fishermen Population (Inland)**

2005-2006			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
1	2	3	4	5	6
68741	9396	13.67	69213	9396	13.58

2007-2008			2008-2009		
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
1	2	3	4	5	6
69866	7363	10.54	70592	11021	15.61

Source: Inland Fisheries Statistics, Dept of Fisheries

Table: 17.5

**List of Fishing Villages (Inland) and Inland Fishermen Population**

Sl. No.	Name of village	Fishermen Population			
		2005-2006	2006-2007	2007-2008	2008-2009
1	Kadamakudi	1127	1135	1146	1158
2	Ezhikkara	10894	10969	11072	11187
3	Mulavukadu	4278	4307	4348	4393
4	Cheranelloor	1700	1713	1729	1747
5	Maradu	1679	1691	1707	1725
6	Kumpalam	5287	5323	5373	5429
7	Udayamperoor	10078	10147	10243	10349
8	Ernakulam (West)	1274	1283	1295	1309
9	Poonithura	3978	4005	4043	4085
10	Nedamagramam	2831	2850	2877	2907
11	Ernakulam (East)	2680	2698	2723	2751
12	Kumpalangi	2533	2550	2574	2601
13	Palluruthy	5980	6021	6078	6141
14	Vadakkekkara	8183	8239	8317	8403
15	Puthenvelikkara	6239	6282	6341	6407
	<b>Total</b>	<b>68741</b>	<b>69213</b>	<b>69866</b>	<b>70592</b>

Table: 17.6

**District wise Species wise Inland Fish Landings in Ernakulam**

Sl. No.	2007-2008		Sl.No.	2006-2007	
	Name of Fish	Number		Name of Fish	Number
1	Prawn	11290	1	Prawn	11056
2	Etroplus	1442	2	Etroplus	1420
3	Murrels	1201	3	Murrels	1181
4	Mulletts	1315	4	Mulletts	1294
5	Cat Fish	1365	5	Cat Fish	1343
6	Jew fish	1052	6	Jew fish	1035
7	Tilapia	2899	7	Tilapia	2854
8	Labeo fimbriatus	0	8	Labeo fimbriatus	0
9	Barbus	73	9	Barbus	72
10	Mrigal	220	10	Mrigal	216
11	Crabs	13	11	Crabs	13
12	Common Carps	522	12	Common Carps	513
13	Catla	1106	13	Catla	1088
14	Gourami	0	14	Gourami	0
15	Chamos	187	15	Chamos	183
16	Eels	30	16	Eels	29
17	Labeo Rohitha	185	17	Labeo Rohitha	182
18	Mussel	84	18	Mussel	0
19	Edible Oyster	157	19	Edible Oyster	0
20	Miscellaneous	1714	20	Miscellaneous	1685
	<b>TOTAL</b>	<b>24855</b>		<b>TOTAL</b>	<b>24164</b>

Source: Inland Fisheries Statistics, Dept of Fisheries

Table: 17.7

**District wise Species wise values of Inland Fishes in Ernakulam (Value Rs in 000's)**

Sl. No.	2006-2007		Sl. No.	2007-2008	
	Name of Fish	Number		Name of Fish	Number
1	Prawn	2399152	1	Prawn	2483800
2	Etroplus	102240	2	Etroplus	108150
3	Murrels	55507	3	Murrels	60050
4	Mulletts	122930	4	Mulletts	124925
5	Cat Fish	61778	5	Cat Fish	64155
6	Jew fish	37260	6	Jew fish	37872
7	Tilapia	97036	7	Tilapia	101465
8	Labeo fimbriatus	0	8	Labeo fimbriatus	0
9	Barbus	1944	9	Barbus	2044
10	Mrigal	8856	10	Mrigal	9240
11	Crabs	3965	11	Crabs	3965
12	Common Carps	23085	12	Common Carps	23490
13	Catla	47872	13	Catla	49770
14	Gourami	0	14	Gourami	0
15	Chamos	10614	15	Chamos	11220
16	Eels	1044	16	Eels	1080
17	Labeo Rohitha	8008	17	Labeo Rohitha	8325
18	Mussel		18	Mussel	1512
19	Edible Oyster		19	Edible Oyster	2198
20	Miscellaneous	79195	20	Miscellaneous	82272
	<b>TOTAL</b>	<b>3060486</b>		<b>TOTAL</b>	<b>3175533</b>

Table: 17.8

**Details of Fish/Shrimp/Prawn seed farms and Hatcheries in Ernakulam**

Number of Seed farms/Hatcheries			Total	Seed Production capacity (in lakhs)			Total
Fish	Shrimp	Scampi		Fish	Shrimp	Scampi	
2	4	1	7	0	100	0	100

Source: Inland Fisheries Statistics, Dept of Fisheries

Table: 17.9

### Working of FFDA in Ernakulam

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
2008-2009	296	221.50	163.50	147	406900	21.40	38.60	179
2007-2008	171	98.45	60.76	148	132000	26.60	47.90	125
2006-2007	205	83.46	55.97	187	699300	19.08	14.50	195

Source: Inland Fisheries Statistics, Dept of Fisheries

Table: 17.10

**Contribution of Fishing to NDP Estimates at current prices**

2005-2006(base year 2004-05)	Ernakulam	2005-2006(base year 1999-2000)	Ernakulam
Net Domestic Product * (Rs.in lakhs)	1682300	Net Domestic Product * (Rs.in lakhs)	1508385
Fishing* (Rs. In lakhs)	26483	Fishing* (Rs. In lakhs)	26981
Percentage of fishing to Net Domestic Product	1.57	Percentage of fishing to Net Domestic Product	1.79
Population (In' 0000)*	3240	Population (In' 0000)*	3240
Per Capita income(In Rs.)*	51923	Per Capita income(In Rs.)*	46555
Contribution of Fishing to per capita income	815.19	Contribution of Fishing to percapita income	833.33

**Contribution of Fishing to NDP Estimates at Current Prices**

2006-2007(base year 2004-05)	Ernakulam	2006-2007(base year 1999-2000)	Ernakulam
Net Domestic Product * (Rs.in lakhs)	1921199	Net Domestic Product * (Rs.in lakhs)	1804801
Fishing* (Rs. In lakhs)	28039	Fishing* (Rs. In lakhs)	26526
Percentage of fishing to Net Domestic Product	1.46	Percentage of fishing to Net Domestic Product	1.47
Population (In' 0000)*	3269	Population (In' 0000)*	3269
Per Capita income(In Rs.)*	58770	Per Capita income(In Rs.)*	55210
Contribution of Fishing to percapita income	858.04	Contribution of Fishing to percapita income	811.59

Source: Inland Fisheries Statistics, Dept of Fisheries.

## **WETLANDS**

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. (Cowardin et al, 1979).

However the area under wetlands is fast declining across the world. Kerala, lying along the south west coast of India is blessed with a number of wetland ecosystems owing to its unique climatic regime and physiography. One of the wettest regions on earth with an average annual rainfall of 300 cm, the state of Kerala has around 6.5 lakh hectares under wetlands (Ministry of Environment and Forests, Government of India.). There has been large-scale degradation of wetlands with increasing human intervention and associated land use changes. There is an urgent need, therefore, to devise plans to prevent the degradation of wetlands, which is ever increasing with time. The significance of wetlands are manifold some of which are discussed below.

Wetlands serve as natural reservoirs of water and help enhance the ground water in the neighbouring areas. The wetlands support paddy, which is the source of rice, the staple food of Kerala. The wetlands spread over the coastal belts serve as a buffer preventing excessive intrusion of salt water. Hence there is an urgent need to devise plans to prevent the degradation of wetlands.

### **NATURAL WETLANDS OF ERNAKULAM – A PROFILE**

#### **The Vembanad Wetlands**

The physical spread of the Vembanad region extends to the low lying areas surrounding the Vembanad Lake, which form the deltaic plains of Pullot, Periyar, Muvattupuzha, Achencoil, Pamba, Manimala and Meenachil Rivers originating from the Western Ghats. The region lies between 915' – 90 35' N latitude and 76<sup>0</sup>23' – 76<sup>0</sup>35' E longitude. It covers an area of 870 km<sup>2</sup> comprising of about 490km<sup>2</sup> of paddy fields, 300 km<sup>2</sup> of garden lands. The remaining areas consist of water bodies like lagoons, canals, and rivers. Nearly 60% of the area excluding the lake lie 0.5m to 2m below sea level and this area spread across Kuttanad. The entire region is half submerged in water during the monsoon season from June to January every year.

Bunds have been constructed to protect the low-lying areas from floods and tides. During high tide in dry season salt water incursion is a dominant phenomena noticed in the Vembanad ecosystem while fresh water inundation occurs during monsoon rains. This condition exists from centuries.

### Other Wetlands

Kodungallur kayal and Varapuzha kayal are two other backwaters adjoining the Vembanad Lake. The Kodungallur kayal is found north of Parur taluk, and extends to the Thrissur district. The Varappuzha kayal lies south of the Parur taluk and the Periyar river drains into it.

### PADDY - RESENT SCENARIO

Paddy covers nearly ten percent of the total area of the district, while water bodies cover five percent of the total area. Other land use classes occupy 79 percent of the total geographical area of the district. Nearly 6 percent of land under paddy was converted to other land uses since the 1970s. This is a distressing reality, which needs careful evaluation. Wetlands serve a number of purposes including recharging the ground water of the neighbouring areas. With the conversion of wetlands to other land uses, water scarcity is expected to increase over the years. It should also be borne in the mind of any decision maker that if the present trend is not arrested, the wetland ecosystems will be degraded and the changes can never be reverted. Around 29977 hectares of land is under paddy cultivation within the district at present whereas during the 1970's paddy covered around 47328 hectares of land. The rate of conversion of paddy to other land use is around 37 percent over a period of 30 years. If this trend continues with 36 percent of paddy converted every 30 years, paddy cultivation will be non-existent before the turn of a century. The data pertaining to paddy at present and during the 1970's is provided in the table below (Table 4.1).

**Ernakulam – Area Under Paddy and Other Land Use**

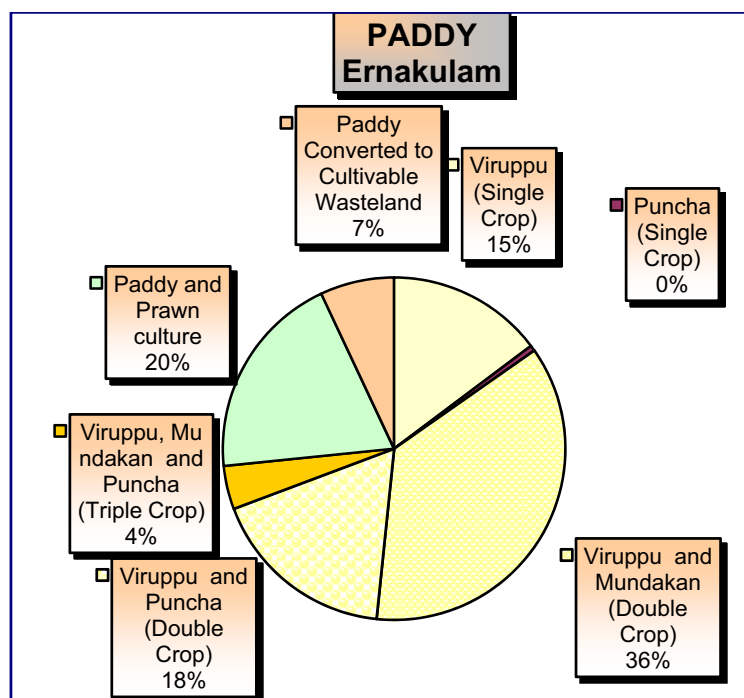
Type	Area (in hectares)	Percentage
Total Area under Paddy	29977.28	10
Converted Paddy	17350.53	6
Total area under paddy during 1970's	47327.81	16
Other Land Use	243300.5	79
Water body	15250.36	5
Total District Area	305878.7	100



The conversion of paddy cannot be treated in isolation for the conversion will have detrimental effect on the environment and in turn on the human populations they support.

### PADDY CULTIVATION - ERNAKULAM

Paddy is cultivated as a single crop, double crop and triple crop within the district. However the area under double crop is more extensive amounting to 53 percent of the paddy cultivated areas whereas only a single crop is raised in 16 percent of the total paddy cultivated area. Of the total paddy fields, nearly seven percent of the land is left uncultivated. The pokkali system of rice cultivation (paddy and prawn culture) is carried out in 20 percent of the area. However the pokkali system of rice cultivation is being replaced by prawn cultivation alone in most parts because of the dwindling returns from paddy cultivation. The figure gives an idea about the percentage of area under various classes. Triple crop is raised only in 4 percent of the total paddy cultivated area. The puncha crop is raised in areas where the irrigation facilities are quite well developed



Among the double crops raised Viruppu and Mundakan crops are raised in 10872 hectares, which is nearly double the area where the double crop Viruppu and

Puncha is raised (which is 5273 hectares). The table furnished below gives details on the area under single, double and triple crops. Single crop virippu is raised on 4410 hectares of land whereas triple crop is raised in 1228 hectares.

#### Area Under Paddy - Ernakulam

Type	Area (in hectares)	Percentage Area
Virippu (Single Crop)	4410.98	14.71
Puncha (Single Crop)	155.98	0.52
Viruppu and Mundakan (Double Crop)	10872.17	36.27
Viruppu and Puncha (Double Crop)	5273.13	17.59
Viruppu, Mundakan and Puncha (Triple Crop)	1228.47	4.10
Paddy and Prawn culture	5867.65	19.57
Paddy Converted to Cultivable Wasteland	2089.73	6.97
Mud flats	79.16	0.26
<b>Total Area under Paddy</b>	<b>29977.28</b>	<b>100</b>

#### CONVERSION OF PADDY

Around 17350 hectares, which were previously under paddy cultivation, has been converted to other land use over a period of thirty years. Majority of the paddy fields were converted for the cultivation of mixed crops (8163.50 hectares) and coconut plantations (3439 ha). The increasing population pressure has led to the conversion of paddy fields into built up land. Around 2505 hectares of land under paddy were converted into built up areas within the district.

### Paddy Converted to Other Land Use

Type	Area (in hectares)	Percentage
Paddy Converted to Areca nut	2.68	0.02
Paddy Converted to Banana	1056.54	6.09
Paddy Converted to Built-up land	2504.59	14.44
Paddy Converted to Coconut	3439.01	19.82
Paddy Converted to Eucalyptus	20.20	0.12
Paddy Converted to Mixed Crop	8163.50	47.05
Paddy Converted to Mixed Trees	259.35	1.49
Paddy Converted to Nutmeg	26.07	0.15
Paddy Converted to Rubber	1775.58	10.23
Paddy Converted to Tapioca	91.76	0.53
Paddy Converted to Teak	11.26	0.06
<b>Paddy Area Converted</b>	<b>17350.53</b>	<b>100</b>

Rubber is also grown on land, which were previously under paddy cultivation. The next major conversion of paddy was done for the cultivation of banana plantations, which occupy 1056.54 hectares. Details regarding the land use to which the paddy lands were converted are provided in the table above. 48 per cent of the paddy fields are being converted to mixed crops followed by coconut (20%), built up land (14 %), rubber (10%), and banana (6%).

Table: 18.1

**WETLAND DETAILS**

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
<b>ALANGODU</b>	Alangad	Other landuses	1182.34
		Paddy Converted Lands	232.61
		Viruppu and Mundakan	353.02
		Viruppu and Puncha (Double Crop)	3.54
		Viruppu (Single Crop)	56.44
		Water body	62.72
		<b>1890.67</b>	
	Kadungallur	Other landuses	957.82
		Paddy Converted Lands	379.66
		Viruppu and Mundakan (Double Crop)	194.17
		Viruppu and Puncha (Double Crop)	95.54
		Viruppu (Single Crop)	21.27
		Water body	76.76
	<b>1725.21</b>		
	Karumalloor	Other landuses	1108.20
		Paddy Converted Lands	321.45
		Viruppu and Mundakan (Double Crop)	162.09
		Viruppu and Puncha (Double Crop)	224.44
		Viruppu (Single Crop)	48.12
		Water body	173.63
	<b>2037.92</b>		
	Varapuzha	Other landuses	582.99
		Paddy and Prawn culture	259.54
		Viruppu (Single Crop)	0.01
Water body		98.85	
<b>941.38</b>			
<b>6595.19</b>			
<b>Aluva Municipality</b>			0.00
		Other landuses	542.91
		Paddy Converted Lands	59.83
		Viruppu (Single Crop)	3.53
		Water body	88.55
<b>694.81</b>			
<b>694.81</b>			
<b>ANGAMALI</b>	Ayyampuzha	Other landuses	23906.77
		Paddy Converted Lands	336.82
		Puncha (Single Crop)	19.76
		Viruppu and Puncha (Double Crop)	7.05
		Viruppu (Single Crop)	103.38
		Water body	16.29
		<b>24390.07</b>	

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
	Kalady	Other landuses	993.34
		Paddy Converted Lands	350.08
		Viruppu and Mundakan (Double Crop)	46.13
		Viruppu and Puncha (Double Crop)	255.45
		Viruppu, Mundakan and Puncha (Triple Crop)	19.26
		Water body	37.35
			<b>1701.61</b>
	Kanjoor	Other landuses	791.84
		Paddy Converted Lands	276.44
		Viruppu and Mundakan (Double Crop)	18.97
		Viruppu and Puncha (Double Crop)	63.79
		Viruppu (Single Crop)	4.61
		Viruppu, Mundakan and Puncha (Triple Crop)	65.44
		Water body	152.27
		<b>1373.35</b>	
	Karukutty	Other land uses	1993.72
		Paddy Converted Lands	370.91
		Puncha (Single Crop)	1.45
		Viruppu and Mundakan (Double Crop)	41.26
		Viruppu and Puncha (Double Crop)	119.34
		Viruppu (Single Crop)	138.79
		Viruppu, Mundakan and Puncha (Triple Crop)	24.22
	Water body	14.56	
		<b>2704.25</b>	
	Neeleswaram	Other landuses	2598.86
		Paddy Converted Lands	309.67
		Viruppu and Mundakan (Double Crop)	61.91
		Viruppu and Puncha (Double Crop)	40.26
		Viruppu (Single Crop)	2.23
		Viruppu, Mundakan and Puncha (Triple Crop)	94.24
		Water body	112.37
		<b>3219.54</b>	
	Manjapra	Other landuses	641.85
		Paddy Converted Lands	225.68
		Viruppu and Puncha (Double Crop)	112.06
		Viruppu (Single Crop)	48.46
		Viruppu, Mundakan and Puncha (Triple Crop)	37.59
		Water body	6.70
		<b>1072.35</b>	
	Mookkannur	Other landuses	1912.10
		Paddy Converted Lands	216.81
		Puncha (Single Crop)	37.06
		Viruppu and Mundakan (Double Crop)	49.65
		Viruppu and Puncha (Double Crop)	212.97
		Viruppu (Single Crop)	7.71

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
Angamali Municipality	Thuravoor	Viruppu, Mundakan and Puncha (Triple Crop)	0.97
		Water body	7.01
			<b>2444.29</b>
		Other landuses	1147.45
		Paddy Converted Lands	209.84
		Viruppu and Mundakan (Double Crop)	44.87
		Viruppu and Puncha (Double Crop)	278.86
		Viruppu (Single Crop)	1.23
		Viruppu, Mundakan and Puncha (Triple Crop)	19.46
		Water body	9.80
		<b>1711.50</b>	
		<b>38616.95</b>	
		0.00	
		Other landuses	1399.02
		Paddy Converted Lands	201.18
		Viruppu and Mundakan (Double Crop)	71.04
		Viruppu and Puncha (Double Crop)	251.56
	Viruppu (Single Crop)	108.91	
	Viruppu, Mundakan and Puncha (Triple Crop)	2.13	
	Water body	31.31	
		<b>2065.14</b>	
		<b>2065.14</b>	
EDAPALLY	Cheranallur		0.00
		Other landuses	444.28
		Paddy Converted Lands	53.06
		Water body	35.99
			<b>533.33</b>
	Elamkunnappuzha	Other landuses	868.36
		Paddy Converted Lands	92.82
		Paddy and Prawn culture	187.58
		Viruppu (Single Crop)	0.67
		Water body	247.66
			<b>1397.08</b>
	Kadamakkudy	Other landuses	301.45
		Paddy Converted Lands	27.92
		Paddy and Prawn culture	506.36
		Water body	503.43
			<b>1339.16</b>
	Mulavukade	Other landuses	422.64
Paddy Converted Lands		8.66	
Paddy and Prawn culture		246.37	
Water body		1112.05	
		<b>1789.72</b>	
		<b>5059.29</b>	

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
<b>Eloor Municipality</b>	Eloor	Other landuses	0.00
		Paddy Converted Lands	969.92
		Viruppu and Mundakan (Double Crop)	212.16
		Viruppu (Single Crop)	18.03
		Water body	28.55
			98.91
			<b>1327.56</b>
<b>Kalamassery Municipality</b>			<b>1327.56</b>
			0.00
		Other landuses	2643.51
		Paddy Converted Lands	521.02
		Viruppu and Mundakan (Double Crop)	204.27
		Viruppu and Puncha (Double Crop)	9.10
		Viruppu (Single Crop)	390.97
Water body	48.29		
	<b>3817.17</b>		
	<b>3817.17</b>		
<b>Kochi Corporation</b>			0.00
		Other landuses	6288.23
		Paddy Converted Lands	406.46
		Mud flats	62.95
		Paddy and Prawn culture	82.82
		Viruppu and Mundakan (Double Crop)	7.94
		Viruppu (Single Crop)	40.15
		Water body	1745.71
	<b>8634.26</b>		
	<b>8634.26</b>		
<b>KOOVAPADY</b>	Asamannoor		0.00
		Other landuses	1719.78
		Paddy Converted Lands	75.84
		Viruppu and Puncha (Double Crop)	196.15
		Viruppu (Single Crop)	26.12
	Viruppu, Mundakan and Puncha (Triple Crop)	165.85	
		<b>2183.74</b>	
	Koovappady	Other landuses	2341.99
		Paddy Converted Lands	279.57
		Puncha (Single Crop)	71.70
		Viruppu and Mundakan (Double Crop)	58.49
		Viruppu and Puncha (Double Crop)	216.95
		Viruppu (Single Crop)	99.83
		Viruppu, Mundakan and Puncha (Triple Crop)	104.22
	Water body	207.68	
	<b>3380.43</b>		
Mudakuzha	Other landuses	1598.60	
	Paddy Converted Lands	141.80	
	Puncha (Single Crop)	3.41	
	Viruppu and Puncha (Double Crop)	195.64	

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)	
KOTHAMANGALAM	Ockal	Viruppu (Single Crop)	24.29	
		Viruppu, Mundakan and Puncha (Triple Crop)	216.94	
		Water body	12.64	
			<b>2193.32</b>	
		Other landuses	752.22	
		Paddy Converted Lands	173.69	
		Viruppu and Mundakan (Double Crop)	15.44	
		Viruppu and Puncha (Double Crop)	92.85	
		Viruppu (Single Crop)	83.27	
		Water body	226.16	
	Rayamanglam		<b>1343.62</b>	
		Other landuses	2329.55	
		Paddy Converted Lands	172.91	
		Viruppu and Puncha (Double Crop)	166.08	
		Viruppu (Single Crop)	217.72	
		Viruppu, Mundakan and Puncha (Triple Crop)	78.43	
		Water body	1.19	
	Vengoor		<b>2965.89</b>	
		Other landuses	4751.87	
		Paddy Converted Lands	198.91	
		Puncha (Single Crop)	18.16	
		Viruppu and Puncha (Double Crop)	36.31	
		Viruppu (Single Crop)	192.18	
		Viruppu, Mundakan and Puncha (Triple Crop)	134.20	
		Water body	492.55	
			<b>5824.19</b>	
			<b>17891.18</b>	
	Kavalangad		0.00	
		Other landuses	6976.56	
		Paddy Converted Lands	486.05	
		Viruppu and Mundakan (Double Crop)	97.52	
		Viruppu (Single Crop)	94.04	
		Water body	148.80	
			<b>7802.96</b>	
		Keerampara	Other landuses	2554.99
			Paddy Converted Lands	229.46
			Viruppu and Mundakan (Double Crop)	97.40
	Viruppu and Puncha (Double Crop)		37.24	
	Viruppu (Single Crop)		41.48	
	Water body		130.04	
	Kottappadi		<b>3090.61</b>	
		Other landuses	2735.18	
		Paddy Converted Lands	110.73	
		Puncha (Single Crop)	2.01	
		Viruppu and Puncha (Double Crop)	157.95	
		Viruppu (Single Crop)	57.48	
		Viruppu, Mundakan and Puncha (Triple Crop)	32.15	
	<b>3095.50</b>			



BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
	Kuttampuzha	Other landuses	63590.65
		Paddy Converted Lands	151.80
		Viruppu and Mundakan (Double Crop)	10.05
		Viruppu and Puncha (Double Crop)	5.02
		Viruppu (Single Crop)	134.17
		Water body	858.69
		<b>64750.38</b>	
	Nellikuzhi	Other landuses	2065.17
		Paddy Converted Lands	359.24
		Viruppu and Mundakan (Double Crop)	26.65
		Viruppu and Puncha (Double Crop)	98.38
		Viruppu (Single Crop)	68.52
		Viruppu, Mundakan and Puncha (Triple Crop)	35.95
		Water body	12.19
	<b>2666.11</b>		
	Paingottur	Other landuses	2716.92
		Paddy Converted Lands	241.52
		Viruppu and Mundakan (Double Crop)	22.43
		Viruppu (Single Crop)	39.33
		Water body	9.88
	<b>3030.08</b>		
	Pallairmangalam	Other landuses	1039.97
		Paddy Converted Lands	92.12
		Viruppu and Mundakan (Double Crop)	108.45
		Viruppu (Single Crop)	11.41
		Water body	24.65
	<b>1276.58</b>		
	Pindimana	Other landuses	2040.55
		Paddy Converted Lands	259.66
		Viruppu and Mundakan (Double Crop)	4.79
		Viruppu and Puncha (Double Crop)	84.32
		Viruppu (Single Crop)	33.67
		Viruppu, Mundakan and Puncha (Triple Crop)	20.44
	Water body	83.87	
	<b>2527.31</b>		
	Pothanikkade	Other landuses	1507.15
		Paddy Converted Lands	264.91
		Viruppu and Mundakan (Double Crop)	25.29
		Viruppu (Single Crop)	8.76
		Water body	3.23
	<b>1809.35</b>		
	Varappetty	Other landuses	1666.41
		Paddy Converted Lands	209.70
		Viruppu and Mundakan (Double Crop)	282.04
		Viruppu (Single Crop)	8.56
		Water body	40.77
	<b>2207.46</b>		
			<b>92256.35</b>

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
Kothamangalam Municipality			0.00
		Other landuses	3092.09
		Paddy Converted Lands	530.02
		Viruppu and Mundakan (Double Crop)	103.62
		Viruppu and Puncha (Double Crop)	64.11
		Viruppu (Single Crop)	34.03
		Water body	47.94
			<b>3871.80</b>
			<b>3871.80</b>
	Maradu Municipality	Maradu	
Other landuses			870.59
Paddy Converted Lands			79.10
Mud flats			16.23
Paddy and Prawn culture			150.95
Viruppu (Single Crop)			42.62
Water body			271.29
			<b>1430.77</b>
MOOVATTUPUZHA	Arakuzha		0.00
		Other landuses	2299.32
		Paddy Converted Lands	355.07
		Viruppu and Mundakan (Double Crop)	128.49
		Viruppu (Single Crop)	78.03
		Water body	53.30
			<b>2914.21</b>
		Avoly	Other landuses
	Paddy Converted Lands		189.11
	Viruppu and Mundakan (Double Crop)		102.31
	Viruppu (Single Crop)		93.11
	Water body		52.14
		<b>1943.32</b>	
	Ayavana	Other landuses	2404.20
		Paddy Converted Lands	300.00
		Viruppu and Mundakan (Double Crop)	159.47
		Viruppu (Single Crop)	41.37
		Water body	84.15
		<b>2989.18</b>	
	Kalloorkkade	Other landuses	2311.04
Paddy Converted Lands		163.86	
Viruppu and Mundakan (Double Crop)		104.54	
Viruppu (Single Crop)		10.86	
Water body		8.89	
	<b>2599.19</b>		

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
<b>MULANTHURUTHY BLOCK</b>	Manjalloor	Other landuses	2012.07
		Paddy Converted Lands	253.65
		Viruppu and Mundakan (Double Crop)	60.91
		Viruppu (Single Crop)	11.13
		Water body	2.85
			<b>2340.60</b>
	Marady	Other landuses	1682.36
		Paddy Converted Lands	264.41
		Viruppu and Mundakan (Double Crop)	1.07
		Viruppu and Puncha (Double Crop)	13.97
		Viruppu (Single Crop)	253.24
		Water body	70.39
		<b>2285.44</b>	
	Paipra	Other landuses	2551.96
		Paddy Converted Lands	367.29
		Viruppu and Mundakan (Double Crop)	282.52
		Viruppu and Puncha (Double Crop)	38.67
		Viruppu (Single Crop)	19.49
		Water body	25.21
		<b>3285.14</b>	
	Valakam	Other landuses	1594.81
		Paddy Converted Lands	436.70
		Viruppu and Mundakan (Double Crop)	130.35
		Viruppu and Puncha (Double Crop)	51.31
		Viruppu (Single Crop)	46.44
		Water body	64.31
		<b>2323.92</b>	
		<b>20680.99</b>	
			0.00
	Amballur	Other landuses	1434.69
		Paddy Converted Lands	137.19
		Paddy and Prawn culture	484.13
		Viruppu and Mundakan (Double Crop)	22.62
Viruppu and Puncha (Double Crop)		37.18	
Viruppu (Single Crop)		96.85	
Water body	76.09		
	<b>2288.75</b>		
Chottanikkara	Other landuses	907.76	
	Paddy Converted Lands	79.72	
	Viruppu and Mundakan (Double Crop)	150.49	
	Viruppu and Puncha (Double Crop)	43.97	
	Viruppu (Single Crop)	3.73	
	Water body	9.54	
	<b>1195.20</b>		
Edakkattuvayal	Other landuses	2096.67	
	Paddy Converted Lands	277.98	
	Viruppu and Mundakan (Double Crop)	72.64	
	Viruppu and Puncha (Double Crop)	25.25	

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
Muvattupuzha Municipality	Maneed	Viruppu (Single Crop)	70.50
			<b>2543.05</b>
		Other landuses	<b>2149.60</b>
		Paddy Converted Lands	69.11
		Viruppu and Mundakan (Double Crop)	384.90
		Viruppu (Single Crop)	9.22
	Mulanthuruthy	Water body	16.81
			<b>2629.64</b>
		Other landuses	1798.36
		Paddy Converted Lands	216.77
		Viruppu and Mundakan (Double Crop)	188.62
		Viruppu and Puncha (Double Crop)	77.06
	Udayamperur	Water body	16.69
			<b>2297.51</b>
		Other landuses	971.50
		Paddy Converted Lands	198.35
		Paddy and Prawn culture	141.28
		Viruppu and Mundakan (Double Crop)	61.39
	PALLURUTHY	Viruppu and Puncha (Double Crop)	33.86
		Water body	1329.68
			<b>2736.05</b>
		Other landuses	0.00
		Paddy Converted Lands	902.21
		Viruppu and Mundakan (Double Crop)	129.91
	Chellanam	Viruppu (Single Crop)	47.87
		Water body	48.86
			53.82
		<b>1182.67</b>	
Other landuses		<b>1182.67</b>	
Paddy Converted Lands		0.00	
Kumbalam	Water body	1322.88	
		6.94	
	Paddy and Prawn culture	889.02	
	Water body	905.52	
		<b>3124.36</b>	
	Other landuses	773.22	
Kumbalangy	Paddy Converted Lands	36.15	
	Paddy and Prawn culture	149.35	
	Viruppu (Single Crop)	46.63	
	Water body	909.98	
		<b>1915.32</b>	
	Other landuses	452.68	
PAMPAKUDA	Paddy and Prawn culture	348.13	
	Viruppu (Single Crop)	8.70	
	Water body	756.31	
		<b>1565.82</b>	
Elanji		<b>6605.51</b>	
	Other landuses	0.00	
	Paddy Converted Lands	2675.49	
	9.72		

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)	
PARAKADAV	Koothattukulam	Viruppu and Mundakan (Double Crop)	342.52	
		Viruppu (Single Crop)	12.06	
		<b>3039.79</b>		
		Other landuses	1814.07	
		Paddy Converted Lands	151.73	
		Viruppu and Mundakan (Double Crop)	271.90	
		Viruppu (Single Crop)	30.20	
		<b>2267.90</b>		
		Palakuzha	Other landuses	2027.85
			Paddy Converted Lands	208.22
	Viruppu and Mundakan (Double Crop)		43.17	
	Viruppu (Single Crop)		8.05	
	<b>2287.29</b>			
	Pampakuda	Other landuses	2174.12	
		Paddy Converted Lands	309.25	
		Viruppu and Mundakan (Double Crop)	324.03	
		Viruppu and Puncha (Double Crop)	2.93	
		Viruppu (Single Crop)	26.01	
		Water body	0.50	
		<b>2836.83</b>		
	Piravam	Other landuses	2172.75	
		Paddy Converted Lands	453.41	
		Viruppu and Mundakan (Double Crop)	247.38	
		Viruppu (Single Crop)	2.15	
		Water body	122.91	
	<b>2998.60</b>			
	Ramamanagalam	Other landuses	1680.59	
		Paddy Converted Lands	159.87	
		Viruppu and Mundakan (Double Crop)	395.56	
		Viruppu (Single Crop)	9.32	
		Water body	145.72	
	<b>2391.06</b>			
	Thirumarady	Other landuses	2303.97	
		Paddy Converted Lands	219.79	
		Viruppu and Mundakan (Double Crop)	573.00	
		Viruppu (Single Crop)	0.46	
	<b>3097.22</b>			
	<b>18918.69</b>		0.00	
	Chengamanad	Other landuses	799.42	
		Paddy Converted Lands	146.46	
		Viruppu and Mundakan (Double Crop)	321.61	
		Viruppu and Puncha (Double Crop)	140.56	
Viruppu (Single Crop)		49.21		
Water body		140.22		
<b>1597.48</b>				
Kunnukara	Other landuses	781.19		
	Paddy Converted Lands	626.38		

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
PARAVOOR	Nedumbassery	Viruppu and Mundakan (Double Crop)	383.17
		Viruppu (Single Crop)	25.12
		Water body	176.81
			<b>1992.67</b>
		Other landuses	1206.30
		Paddy Converted Lands	318.37
		Viruppu and Mundakan (Double Crop)	247.54
		Viruppu and Puncha (Double Crop)	476.60
		Viruppu (Single Crop)	0.11
		Viruppu, Mundakan and Puncha (Triple Crop)	100.34
	Water body	18.99	
		<b>2368.24</b>	
	Parakkadavu	Other landuses	1658.07
		Paddy Converted Lands	484.84
		Viruppu and Mundakan (Double Crop)	165.47
		Viruppu and Puncha (Double Crop)	66.98
		Viruppu (Single Crop)	23.91
		Viruppu, Mundakan and Puncha (Triple Crop)	53.55
		Water body	68.12
		<b>2520.94</b>	
	Puthenvelikara	Other landuses	1246.23
		Paddy Converted Lands	72.12
		Viruppu and Mundakan (Double Crop)	310.22
		Viruppu and Puncha (Double Crop)	20.32
		Viruppu (Single Crop)	29.87
		Water body	276.37
		<b>1955.13</b>	
	Sreemoolanagaram	Other landuses	768.08
		Paddy Converted Lands	168.41
		Viruppu and Mundakan (Double Crop)	207.07
		Viruppu and Puncha (Double Crop)	75.68
		Viruppu (Single Crop)	3.08
Viruppu, Mundakan and Puncha (Triple Crop)		24.04	
Water body		148.80	
	<b>1395.17</b>		
	<b>11829.63</b>		
	0.00		
Chengamangalam	Other landuses	929.14	
	Viruppu and Mundakan (Double Crop)	2.34	
	Water body	181.58	
	<b>1113.06</b>		
Chittattukara	Other landuses	878.02	
	Paddy Converted Lands	29.31	
	Viruppu (Single Crop)	49.66	
	Water body	47.31	
	<b>1004.31</b>		

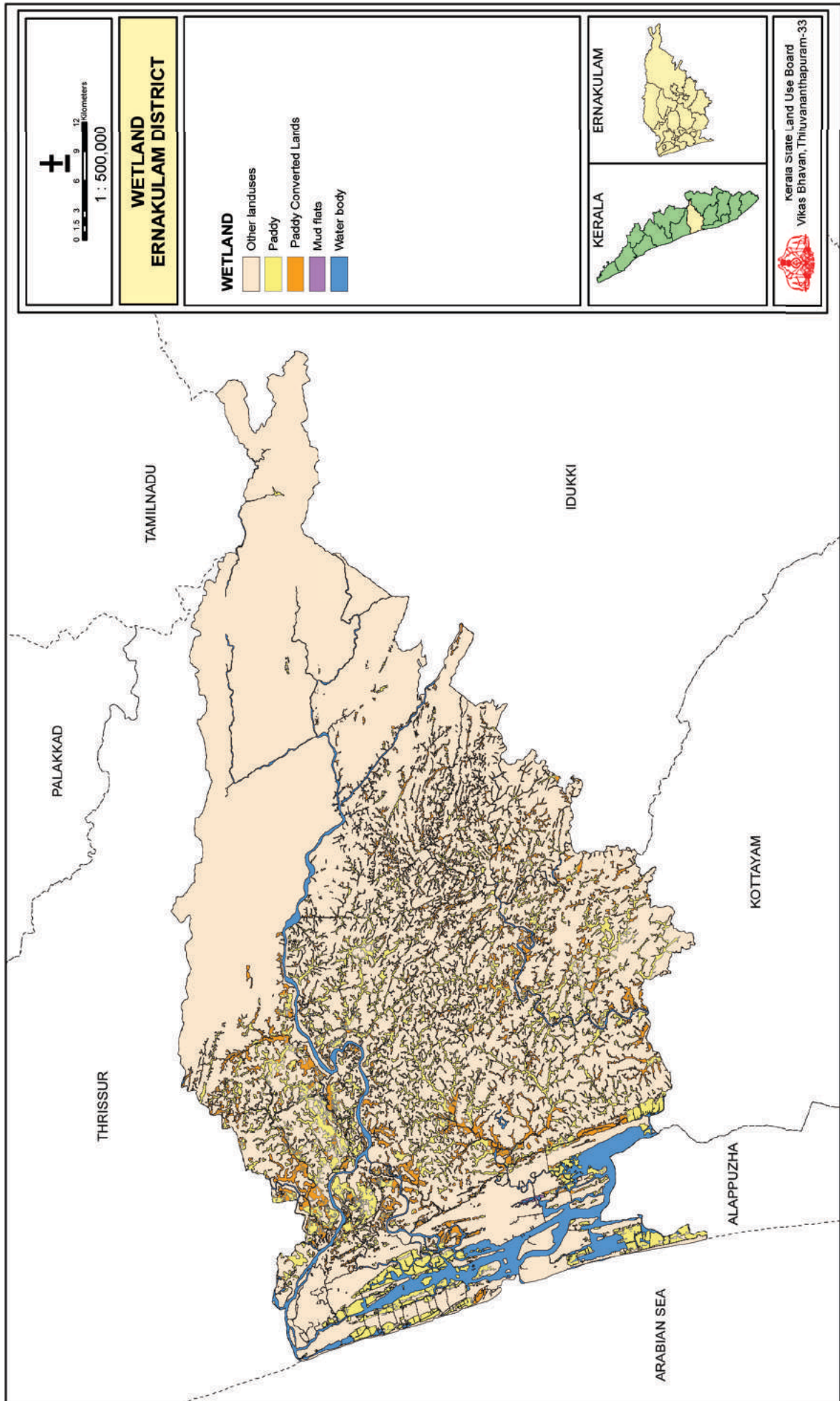
BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
Paravoor Municipality	Ezhikkara	Other landuses	557.42
		Paddy and Prawn culture	556.33
		Viruppu (Single Crop)	0.78
		Water body	508.79
			<b>1623.32</b>
	Kottuvally	Other landuses	1422.17
		Paddy Converted Lands	103.54
		Paddy and Prawn culture	376.22
		Viruppu (Single Crop)	21.96
		Water body	281.44
			<b>2205.33</b>
	Vadakkekara	Other landuses	878.28
		Viruppu (Single Crop)	1.78
		Water body	160.94
			<b>1041.00</b>
		<b>6987.02</b>	
Perumbavoor Municipality			0.00
	Other landuses	775.67	
	Viruppu (Single Crop)	2.31	
	Water body	24.99	
		<b>802.97</b>	
		<b>802.97</b>	
Thrikkakara Municipality			0.00
	Other landuses	1388.06	
	Paddy Converted Lands	98.90	
	Viruppu and Mundakan (Double Crop)	9.13	
	Viruppu and Puncha (Double Crop)	137.78	
	Viruppu (Single Crop)	172.83	
	Water body	21.13	
			<b>1827.83</b>
		<b>1827.83</b>	
Thrippunithura Municipality			0.00
	Other landuses	1197.76	
	Paddy Converted Lands	204.64	
	Viruppu and Mundakan (Double Crop)	82.35	
	Viruppu (Single Crop)	38.71	
	Water body	22.47	
			<b>1545.94</b>
		<b>1545.94</b>	
Thrippunithura Municipality			0.00
	Other landuses	1951.41	
	Paddy Converted Lands	381.66	
	Paddy and Prawn culture	164.33	
	Viruppu and Mundakan (Double Crop)	130.86	
	Viruppu (Single Crop)	82.89	
Water body	257.08		
		<b>2968.22</b>	

BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)
VADAVUKODU	Aikaranad		<b>2968.22</b>
		Other landuses	0.00
		Paddy Converted Lands	2000.28
		Viruppu and Mundakan (Double Crop)	183.73
		Viruppu (Single Crop)	187.18
		Water body	53.07
	Kunnathunadu	Other landuses	0.70
		Paddy Converted Lands	<b>2424.96</b>
		Viruppu and Mundakan (Double Crop)	2155.13
		Viruppu (Single Crop)	294.04
		Water body	126.49
			340.24
	Mazhuvannoor	Other landuses	14.91
		Paddy Converted Lands	<b>2930.81</b>
		Viruppu and Mundakan (Double Crop)	3827.04
		Viruppu and Puncha (Double Crop)	344.05
		Viruppu (Single Crop)	327.64
			413.09
	Poothrikka	Other landuses	30.45
		Paddy Converted Lands	<b>4942.28</b>
		Viruppu and Mundakan (Double Crop)	2046.26
		Viruppu (Single Crop)	177.13
		Water body	410.89
			5.49
	Thiruvaniyoor	Other landuses	13.71
		Paddy Converted Lands	<b>2653.48</b>
Viruppu and Mundakan (Double Crop)		2036.79	
Viruppu (Single Crop)		209.23	
Water body		357.96	
		20.02	
Vadavucode-Puthenkurisu	Other landuses	0.25	
	Paddy Converted Lands	<b>2624.26</b>	
	Viruppu and Mundakan (Double Crop)	2527.67	
	Viruppu (Single Crop)	444.61	
	Water body	22.50	
		50.20	
VAZHAKULAM	Choornikkara	Water body	91.68
			<b>3136.66</b>
		Other landuses	<b>18712.45</b>
		Paddy Converted Lands	0.00
		Viruppu and Puncha (Double Crop)	460.39
		Water body	234.69
	Edathala	Other landuses	76.24
		Paddy Converted Lands	37.14
		Viruppu and Mundakan (Double Crop)	<b>808.47</b>
		Viruppu and Puncha (Double Crop)	1497.06
		Viruppu (Single Crop)	80.63
		Water body	161.43
	Keezhmad	Other landuses	204.39
		Paddy Converted Lands	46.98
		Viruppu and Mundakan (Double Crop)	1.35
			<b>1991.86</b>
		Other landuses	1157.08
		Paddy Converted Lands	374.37
		Viruppu and Mundakan (Double Crop)	63.72



BLOCK	PANCHAYAT	NEW-LANDUS	AREA (Ha)	
VYPIN	Kizhakkambalam	Viruppu and Puncha (Double Crop)	1.99	
		Viruppu (Single Crop)	7.61	
		Water body	86.60	
			<b>1691.36</b>	
		Other landuses	2084.23	
		Paddy Converted Lands	202.08	
		Viruppu and Mundakan (Double Crop)	679.76	
		Viruppu (Single Crop)	45.41	
		Water body	22.25	
			<b>3033.73</b>	
		Vazhakkulam	Other landuses	1567.28
			Paddy Converted Lands	201.24
		Viruppu and Mundakan (Double Crop)	193.44	
		Viruppu and Puncha (Double Crop)	71.22	
		Viruppu (Single Crop)	27.28	
		Water body	39.00	
			<b>2099.45</b>	
	Vengola	Other landuses	2708.57	
		Paddy Converted Lands	204.65	
		Puncha (Single Crop)	2.49	
		Viruppu and Mundakan (Double Crop)	267.35	
		Viruppu and Puncha (Double Crop)	240.96	
		Viruppu (Single Crop)	117.96	
			<b>3541.97</b>	
			<b>13166.84</b>	
			0.00	
	Edavanakkade	Other landuses	557.06	
		Paddy and Prawn culture	330.27	
		Water body	171.07	
			<b>1058.40</b>	
	Kuzhappully	Other landuses	299.79	
		Paddy and Prawn culture	267.02	
		Water body	92.94	
			<b>659.75</b>	
	Nayarambalam	Other landuses	508.72	
		Paddy and Prawn culture	440.56	
		Water body	135.61	
			<b>1084.89</b>	
	Njarakkal	Other landuses	490.13	
		Paddy and Prawn culture	212.42	
		Water body	131.01	
			<b>833.55</b>	
Pallippuram	Other landuses	984.94		
	Paddy and Prawn culture	54.05		
	Viruppu (Single Crop)	13.51		
	Water body	304.18		
		<b>1356.68</b>		
		<b>4993.27</b>		
		<b>District Total</b>	<b>306800.00</b>	







## **WASTELANDS**

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 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 proejt is as follows:

- 01 Land with dense scrub
- 02 Land with open scrub
- 03 Waterlogged - permanent
- 04 Waterlogged - seasonal
- 05 Scrub dominated forest
- 06 Degraded pastures/grazing land
- 07 Sands - riverine
- 08 Coastal sands
- 09 Mining wastelands
- 10 Barren rocky area

### **Data base**

Under wasteland mapping, four types of data are used. They are Satellite data, Topographic maps, Legacy data and Ground data.

### **Satellite data**

The IRS P6 LISS III geometrically corrected data with in the framework of NNRMS specified standards form the primary input for updating of wastelands. Multi – temporal data sets are used for the updation of wastelans in a pursuit to archieve improved classification accuracies. The geo-coded scene covers an area of 27 x 27 km covering approximately 729 sq. km.

### **Topographic maps**

Survey of India topographical maps on 1:50000scale in digital form will be used as a base layer for mapping and planning groundtruth collection. The digital topomap layer contains administrative boundaries (international, state, district, tehsil, village and forest management boundary), major roads, railway, drainage, settlements etc.

### **Legacy data**

The wasteland layer generated earlier using the 2003 remotesensing data will form the primary legacy layer. The other layers such as landuse/landcover and biodiversity data generated on different scales will be used as a reference while updating wasteland catogories.

### **Ground data**

Ground truth or ground investigation forms are important and integral part of the interpretation methodology of remotely sensed data. Ground data is attributed to collection, verification and measurement of information about the different surface features on earth, which are responsible for the occurrence of specific spectral reflectance behavioral patterns. Ground truth is dependent upon the extent of doubtful areas, the sampling procedure adopted during field traverses, the terrain conditions, classification accuracy requirements etc. However, good quality satellite data (more contrast and cloud free), interpretation skill/experience and knowledge of the study area can minimize ground truth collection.

### **Methodology**

The methodology is essentially digital interpretation of Multi – season IRS-P6 (LISS - III) geo-coded image (FCC) for identification of different categories of wasteland 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 wastelands. 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.

## **Procedure**

Preparing the data is a primary requirement before undertaking image interpretation and subsequent analysis. Preparation of datasets involves the following steps.

### **Step 1 - Geo - rectification**

Satellite data which is available in a raster form need to be geo-referenced to a map coordinate system so as to generate spatial information to be used subsequently in a GIS environment. The process of geo-rectification involve assigning a coordinate system and transforming the raster image to input coordinate system which enables viewing, querying, and analyzing the geographic data. Images of different points of time are often acquired from sensors / platforms with varying geometry. Hence such images need to be referenced to a common projection system. The ETM + data which is available in UTM projection with wgs84 datum as a reference image is used for rectification of IRS LISS III 2005 - 2006 data using image to image registration algorithm.

### **Step 2 - Tile preparation for image interpretation**

In conformity with the National Spatial Framework defined for NNRMS standards the entire state is divided to tile scheme (consisting of 15 minutes x 15 minutes) for interpretation, edge matching, quality assurance and final map preparation. For the ease of interpretation these tiles will be further divided in to grids of 5'x5'.

### **Step 3 - Image preparation**

Consistency in the image handling requires a thorough pre-processing of satellite data for inter and intra image alignments in terms of geometry and radiometry. Image data in Geo Tiff format may be imported using suitable format converters (National spatial framework projection parameter from NNRMS standards) and care to be taken to maintain the geo referencing scheme.

### **Step 4 - Image enhancements**

In order to improve the classification accuracy image enhancement methods are used. It is essential for improving the image contrast and allows the best possible delineation of wastelands by fine tuning the contrast.

### **Image interpretation**

Image interpretation is defined as "the art of examining the images for the purpose of identifying objects or surface features and judging their significance". Interpretation key was prepared on the basis of image characteristics like tone, texture, shape, size, pattern, location and association that generally play a very important role for identification of various objects. Wasteland vector data of year 2003 is used as a template for updating the wasteland vector polygons by overlying it on to 2005-2006 satellite data.

## Analyzing wasteland dynamics

For analyzing wasteland dynamics, overlay operation is done in between Interpreted vector for current year (2005-2006) and the wasteland vectors for the year 2003.

### Ground data collection and verification

Ground truth / field verification is an important component in wasteland mapping and its validation exercise. It is very helpful in improving the classification accuracy of various wasteland categories.

### Computation of statistics

The district wise area statistics of different wasteland categories is generated. Out of the different categories of wasteland classified by National Remote Sensing Agency, the following seven categories have been identified in the district. The different categories identified and mapped in the State are as follows.

**Scrubland:** - This is a land which is generally prone to deterioration due to erosion. Such land occupies relatively high topographic locations. Scrublands are associated with moderate slopes in plains and foot hills and are generally surrounded by agricultural lands.

On the basis of presence of vegetation cover scrublands are classified into two sub-classes.

**1. Land with dense scrub:** - These areas possess shallow and skeletal soils, at times chemically degraded, extremes of slopes, severely eroded and land subjected to excessive aridity with scrub dominating the landscape. These are having a tendency for intermixing with cropped areas.

**2. Land with open scrub:** - This is a land which is generally prone to deterioration due to erosion and having no scrub cover. Such lands possess sparse vegetation or devoid of scrub and have a thin soil cover.

**3. Waterlogged / marshy land:** - Waterlogged land is that land where the water is at/or near the surface for the most part of the year. Marsh is a land, which gets permanently or periodically inundated by water and is characterized by hydrophytic vegetation, which includes water hyacinth and reeds.

Depending on the duration of water logging seasonality, two sub classes are delineated.

**a. Waterlogged – permanent :-** these are waterlogged areas where the waterlogging conditions prevail during most part of the year. These areas are mostly located in low-lying areas.

**b. Waterlogged – seasonal :-** seasonally waterlogged areas are those where the waterlogging condition prevail usually during the monsoon period. These lands are mostly located in plain areas associated with the drainage congestion.

**4. Scrub dominated forest:** - Land, as notified under the Forest Act and those lands with various types of forest cover, in which vegetative cover is less than 20 per



cent are classified as degraded land. These areas are generally confined to the fringe areas of notified forests.

**5. Sand (coastal / desert / riverine):** - It refers to land with accumulation of sand, in coastal, riverine or inland areas. Mostly these lands are found in deserts, riverbeds and along the shores.

a. **Sands – Riverine:** - Riverine sands are those that are accumulated in the flood plains as sheets, or sand bars. These include inland sand which was accumulated along the abandoned river courses or by reworking of sand deposits by wind action leading to long stretches of sand dunes or sand cover areas.

b. **Coastal sands:** - These are the accumulation of sand that are seen as a strip along the seacoast due to action of seawater.

**6. Mining wastelands:** - Lands where mining operations bring about the deterioration of land are the mining wastelands. The industrial wastelands are lands which have deteriorated on account of large scale industrial effluent discharge.

**7. Barren rocky area:** - The rock exposures of varying lithology often barren and devoid of soil cover and vegetation. They occur amidst hill-forests as openings or as isolated exposures on plateau and plains. Barren rocky areas occur on steep isolated hillocks / hill slopes, crests, plateau and eroded plains associated with barren and exposed rocky / stony wastes, lateritic outcrops, mining and quarrying sites.

#### **Brief description on spatial distribution and physical condition of wastelands**

Area and percentage to total of each category of wasteland is given below.

Table: 19.1

Sl. No.	Wasteland Categories	Area in sq.km	% to total geographical area	% to total wastelands
1	Land with Dense Scrub	21.15	0.69	18.25
2	Land with Open Scrub	10.81	0.35	9.33
3	Waterlogged - Seasonal	3.42	0.11	2.95
4	Scrub dominated forest	52.03	1.70	44.90
5	Coastal Sands	1.42	0.05	1.22
6	Mining wastelands	11.93	0.39	10.30
7	Barren rocky area	15.13	0.49	13.06
	<b>Total</b>	<b>115.88</b>	<b>3.78</b>	<b>100.00</b>

**1. Scrub dominated forest:-** :-This is the major category of the wasteland identified in the district. It covers a total area of 52.03 sq. km. representing 1.70 percent of the total geographical area and 45 percent of the total wasteland in the district. The forest 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. But the under-utilized or degraded forests identified in all the above forest lands are marked with appropriate symbol and accounted accordingly. This degraded forest area may or may not be within the notified

forest boundary as seen in Survey of India toposheets. Major area of this category of wastelands occur in Kuttampuzha Panchayath (2933.20 ha), Kavalangad Panchayath (39.37 ha), Mookkannur Panchayath (23.05 ha).

2. **Land with dense scrub :-** This is the next major category of wasteland mapped in the district. It represents 0.69 percent of the total geographical area and 18.25 percent of the total wastelands. This category of wastelands is distributed mainly in Ayyampuzha Panchayath (559.58 ha), Manjalloor Panchayath (190.78 ha), Kavalangad Panchayath (177.34 ha), Kalloorkkade Panchayath (103.80 ha).

### **Suggestions for reclamation of wastelands**

The major groups of wasteland mapped in the district are the Scrub dominated forest land and land with dense scrub. Both covers an area of about 73.18 sq. km. which represent more than 60 percent of the total wastelands in the district.

All the degraded forestlands are to be developed to hold perennial vegetative cover in order to check further deterioration and to make better use of the potentialities. Afforestation or greening of the degraded forestlands are to be taken with public participation. Catchments of reservoirs that are seen devoid of vegetation have to be compulsorily afforested with utmost importance for preventing soil loss from the slopes and to check silting up of the reservoirs. Suitable steps have to be initiated for afforestation of the degraded lands. Most of these wastelands are located at high altitudes. So suitable species for permanent vegetative cover are to be tried and introduced.

The measure to alleviate the waterlogging may be grouped into preventive and curative categories. The preventive measures aim at judicious utilization of water resources in such a way as to prevent building high ground water table. This can be achieved by lining of canals, adjustment of cropping pattern, irrigating the field with water which is sufficient enough for crop growth only thereby preventing loss of water which may contribute to ground water table and conjunctive use of surface and ground water resources. The main curative step is the establishment of surface drainage which transports the rain water as well as surplus irrigation water to the main stream. Another approach is to establish sub-surface drainage which lower the water table and simultaneously improves the physical condition of subsurface soils.

The wasteland coming under barren rocky/stony waste/sheet rock area hardly sustain plant growth due to lack of soil. Stony and gravelly lands lying extensively as wasteland to be closed to grazing for a few years to establish good vegetative cover before controlled grazing is permitted. The rocky, stony and hilly areas with skeletal soil not considered suitable for agriculture can be developed for recreation purposes.

Table: 19.2

**WASTELAND**

BLOCK	PANCHAYAT	DESCRIPTION	AREA (Ha)
<b>ALANGODU</b>	Alangad	Miscellaneous polygon	1890.67
			1890.67
	Kadungallur	Miscellaneous polygon	1725.21
			1725.21
	Karumalloor	Miscellaneous polygon	2037.92
			2037.92
	Varapuzha	Miscellaneous polygon	941.38
			<b>941.38</b>
			<b>6595.19</b>
	<b>Aluva Municipality</b>		
		Miscellaneous polygon	694.81
			<b>694.81</b>
<b>ANGAMALI</b>	Ayyampuzha		0.00
		Barren Rocky Area	192.20
		Land with Dense Scrub	559.58
		Miscellaneous polygon	21438.18
		Scrub Dominated Forest	2168.51
		Waterlogged - Seasonal	31.60
			<b>24390.07</b>
	Kalady	Miscellaneous polygon	1701.61
			<b>1701.61</b>
	Kanjoor	Land with Dense Scrub	4.50
		Land with Open Scrub	9.63
		Miscellaneous polygon	1359.21
			<b>1373.35</b>
	Karukutty	Land with Dense Scrub	13.51
		Miscellaneous polygon	2690.75
			<b>2704.25</b>
	Malayattoor-Neeleswaram	Barren Rocky Area	26.97
		Land with Dense Scrub	76.56
		Miscellaneous polygon	3116.01
			<b>3219.54</b>
	Manjapra	Miscellaneous polygon	1072.35
			<b>1072.35</b>
	Mookkannur	Land with Dense Scrub	39.53
		Miscellaneous polygon	2381.71
		Scrub Dominated Forest	23.05
			<b>2444.29</b>
	Thuravoor	Miscellaneous polygon	1711.50
		<b>1711.50</b>	
		<b>38616.95</b>	
<b>Angamali Municipality</b>			2065.14
		Miscellaneous polygon	2065.14
			<b>2065.14</b>

BLOCK	PANCHAYAT	DESCRIPTION	AREA (Ha)
<b>EDAPALLY</b>	Cheranallur	Miscellaneous polygon	533.33
			<b>533.33</b>
	Elamkunnappuzha	Miscellaneous polygon	1397.08
			<b>1397.08</b>
	Kadamakkudy	Miscellaneous polygon	1339.16
			<b>1339.16</b>
	Mulavukade	Miscellaneous polygon	1780.80
		Waterlogged - Seasonal	8.93
			<b>1789.72</b>
			<b>5059.29</b>
<b>Eloor Municipality</b>	Eloor	Miscellaneous polygon	1327.56
			<b>1327.56</b>
		<b>1327.56</b>	
<b>Kalamassery Municipality</b>		Land with Dense Scrub	93.57
		Land with Open Scrub	24.15
		Miscellaneous polygon	3699.45
			<b>3817.17</b>
		<b>3817.17</b>	
<b>Kochi Corporation</b>		Coastal Sands	16.35
		Miscellaneous polygon	8603.80
		Waterlogged - Seasonal	14.11
			<b>8634.26</b>
		<b>8634.26</b>	
<b>KOOVAPADY</b>	Asamannoor	Land with Dense Scrub	1.40
		Miscellaneous polygon	2182.34
			<b>2183.74</b>
	Koovappady	Land with Dense Scrub	9.25
		Miscellaneous polygon	3371.18
			<b>3380.43</b>
	Mudakuzha	Land with Dense Scrub	20.87
		Miscellaneous polygon	2172.45
			<b>2193.32</b>
	Ockal	Miscellaneous polygon	1343.62
			<b>1343.62</b>
	Rayamanglam	Land with Dense Scrub	5.64
		Miscellaneous polygon	2960.25
		<b>2965.89</b>	
Vengoor	Land with Dense Scrub	5.93	
	Land with Open Scrub	105.98	
	Miscellaneous polygon	5704.96	
	Scrub Dominated Forest	7.32	
		<b>5824.19</b>	
		<b>17891.18</b>	

BLOCK	PANCHAYAT	DESCRIPTION	AREA (Ha)
<b>KOTHAMANGALAM</b>	Kavalangad	Barren Rocky Area	146.67
		Land with Dense Scrub	177.34
		Land with Open Scrub	43.04
		Miscellaneous polygon	7396.54
		Scrub Dominated Forest	39.37
			<b>7802.96</b>
	Keerampara	Barren Rocky Area	9.38
		Land with Dense Scrub	33.13
		Land with Open Scrub	399.71
		Miscellaneous polygon	2648.40
			<b>3090.61</b>
	Kottappadi	Barren Rocky Area	7.42
		Land with Open Scrub	132.43
		Miscellaneous polygon	2955.65
			<b>3095.50</b>
	Kuttampuzha	Barren Rocky Area	896.42
		Land with Dense Scrub	20.33
		Land with Open Scrub	2.76
		Miscellaneous polygon	60610.23
		Scrub Dominated Forest	2933.20
		Waterlogged - Seasonal	287.45
			<b>64750.39</b>
	Nellikuzhi	Land with Dense Scrub	0.09
		Miscellaneous polygon	2666.02
			<b>2666.11</b>
	Paingottur	Barren Rocky Area	141.74
		Land with Dense Scrub	39.86
		Land with Open Scrub	4.09
		Miscellaneous polygon	2844.39
			<b>3030.08</b>
	Pallarimangalam	Land with Dense Scrub	12.20
		Land with Open Scrub	2.35
		Miscellaneous polygon	1262.04
			<b>1276.58</b>
	Pindimana	Barren Rocky Area	6.65
		Land with Dense Scrub	4.18
		Land with Open Scrub	14.78
		Miscellaneous polygon	2501.69
			<b>2527.31</b>
	Pothanikkade	Land with Dense Scrub	3.83
		Miscellaneous polygon	1805.52
			<b>1809.35</b>
	Varappetty	Barren Rocky Area	17.38
		Land with Dense Scrub	12.20
		Miscellaneous polygon	2177.89
			<b>2207.46</b>
			<b>92256.35</b>

BLOCK	PANCHAYAT	DESCRIPTION	AREA (Ha)	
<b>Kothamangalam Municipality</b>		Land with Dense Scrub	16.60	
		Land with Open Scrub	36.31	
		Miscellaneous polygon	3818.88	
			<b>3871.80</b>	
			<b>3871.80</b>	
<b>Maradu Municipality</b>	Maradu	Miscellaneous polygon	1430.77	
			<b>1430.77</b>	
			<b>1430.77</b>	
<b>MOVATTUPUZHA</b>	Arakuzha	Barren Rocky Area	8.75	
		Land with Dense Scrub	63.88	
		Miscellaneous polygon	2841.57	
				<b>2914.21</b>
	Avoly	Barren Rocky Area	9.45	
		Land with Dense Scrub	3.30	
		Miscellaneous polygon	1930.57	
				<b>1943.32</b>
	Ayavana	Barren Rocky Area	7.52	
		Land with Dense Scrub	19.88	
		Miscellaneous polygon	2961.78	
				<b>2989.18</b>
	Kalloorkkade	Land with Dense Scrub	103.80	
		Miscellaneous polygon	2495.39	
				<b>2599.19</b>
	Manjalloor	Barren Rocky Area	2.72	
		Land with Dense Scrub	190.78	
		Miscellaneous polygon	2147.09	
				<b>2340.60</b>
	Marady	Land with Dense Scrub	28.23	
		Miscellaneous polygon	2257.21	
			<b>2285.44</b>	
Paipra	Land with Dense Scrub	24.89		
	Land with Open Scrub	4.27		
	Miscellaneous polygon	3255.99		
			<b>3285.14</b>	
Valakam	Land with Dense Scrub	3.02		
	Land with Open Scrub	3.56		
	Miscellaneous polygon	2317.33		
			<b>2323.92</b>	
			<b>20680.99</b>	
<b>MULANTHURUTHY</b>	Amballur	Miscellaneous polygon	2288.75	
				<b>2288.75</b>
	Chottanikkara	Land with Dense Scrub	12.95	
		Land with Open Scrub	9.51	
Miscellaneous polygon		1172.74		
			<b>1195.20</b>	

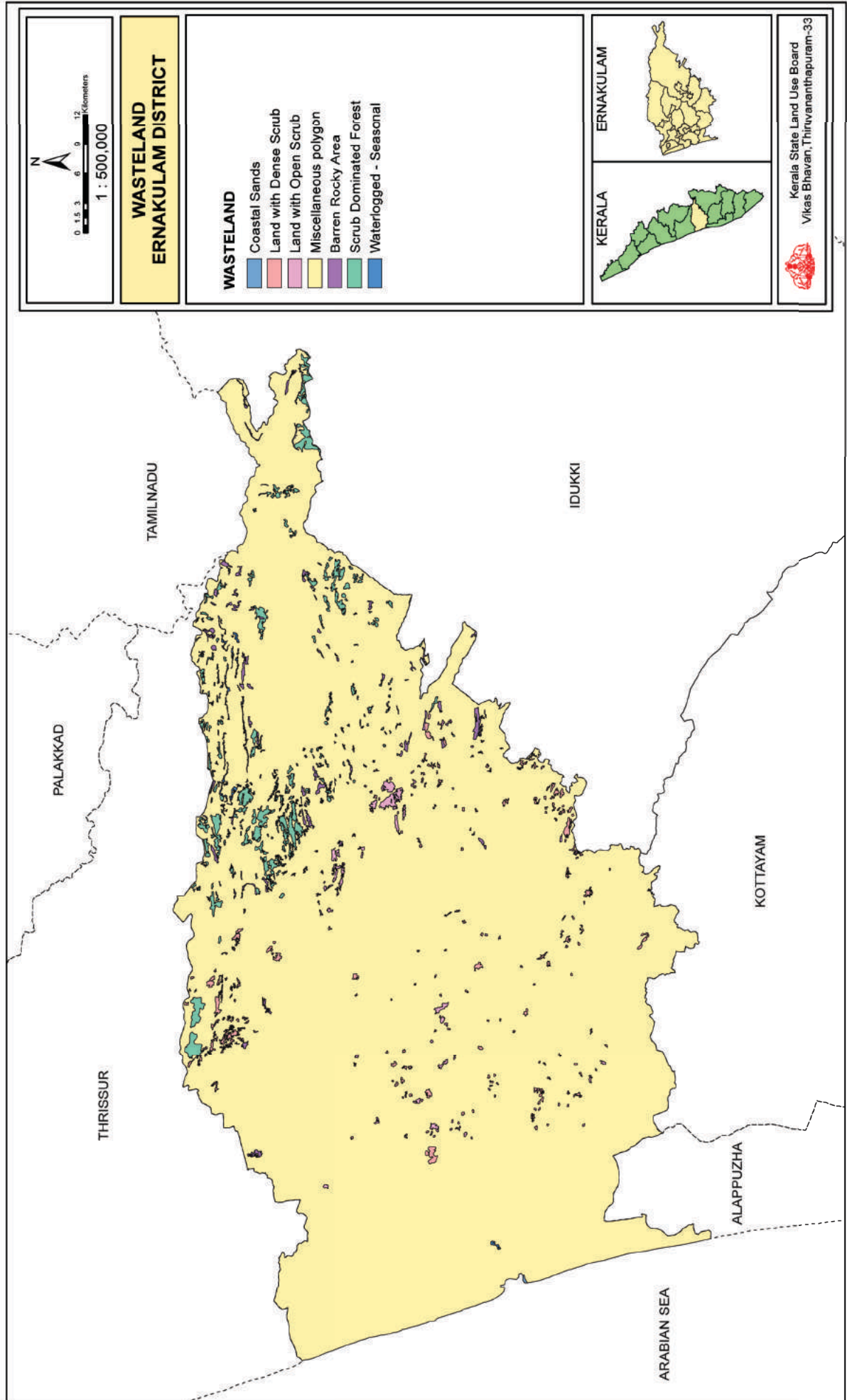
BLOCK	PANCHAYAT	DESCRIPTION	AREA (Ha)
Muvattupuzha Municipality	Edakkattuvayal	Land with Dense Scrub	3.42
		Miscellaneous polygon	2539.62
			<b>2543.05</b>
	Maneed	Land with Dense Scrub	15.76
		Land with Open Scrub	6.42
		Miscellaneous polygon	2607.47
			<b>2629.64</b>
	Mulanthuruthy	Land with Dense Scrub	4.31
		Land with Open Scrub	17.79
		Miscellaneous polygon	2275.40
			<b>2297.51</b>
	Udayamperur	Land with Open Scrub	4.99
		Miscellaneous polygon	2731.06
			<b>2736.05</b>
			<b>13690.19</b>
		Miscellaneous polygon	1182.67
			<b>1182.67</b>
PALLURUTHY			
	Chellanam	Miscellaneous polygon	3124.36
			<b>3124.36</b>
	Kumbalam	Miscellaneous polygon	1915.32
			<b>1915.32</b>
	Kumbalangy	Miscellaneous polygon	1565.82
			<b>1565.82</b>
			<b>6605.50</b>
PAMPAKUDA			
	Elanji	Land with Dense Scrub	42.12
		Miscellaneous polygon	2997.67
			<b>3039.79</b>
	Koothattukulam	Land with Dense Scrub	3.99
		Miscellaneous polygon	2263.91
			<b>2267.90</b>
	Palakuzha	Land with Dense Scrub	37.79
		Miscellaneous polygon	2249.50
			<b>2287.29</b>
	Pampakuda	Land with Dense Scrub	3.15
		Land with Open Scrub	2.64
		Miscellaneous polygon	2831.04
			<b>2836.83</b>
	Piravam	Miscellaneous polygon	2998.60
			<b>2998.60</b>
	Ramamanagalam	Land with Dense Scrub	12.14
		Land with Open Scrub	2.54
		Miscellaneous polygon	2376.39
			<b>2391.06</b>
	Thirumarady	Land with Dense Scrub	34.67
		Land with Open Scrub	1.10
		Miscellaneous polygon	3061.45
			<b>3097.22</b>
			<b>18918.69</b>

BLOCK	PANCHAYAT	DESCRIPTION	AREA (Ha)	
<b>PARAKADAV</b>	Chengamanad	Land with Dense Scrub	5.04	
		Miscellaneous polygon	1592.44	
				<b>1597.48</b>
	Kunnukara	Land with Open Scrub	13.84	
		Miscellaneous polygon	1978.82	
				<b>1992.67</b>
	Nedumbassery	Miscellaneous polygon	2368.24	
				<b>2368.24</b>
	Parakkadavu	Barren Rocky Area	49.90	
		Miscellaneous polygon	2471.04	
			<b>2520.94</b>	
Puthenvelikara	Miscellaneous polygon	1955.13		
			<b>1955.13</b>	
Sreemoolanagaram	Miscellaneous polygon		1395.17	
			<b>1395.17</b>	
			<b>11829.63</b>	
<b>PARAVOOR</b>	Chengamangalam	Miscellaneous polygon	1113.07	
			<b>1113.07</b>	
	Chittattukara	Miscellaneous polygon	1004.31	
			<b>1004.31</b>	
	Ezhikkara	Miscellaneous polygon	1623.32	
			<b>1623.32</b>	
Kottuvally	Miscellaneous polygon		2205.33	
			<b>2205.33</b>	
Vadakkekara	Miscellaneous polygon		1041.00	
			<b>1041.00</b>	
			<b>6987.02</b>	
<b>Paravoor Municipality</b>		Miscellaneous polygon	802.97	
			<b>802.97</b>	
<b>Perumbavoor Municipality</b>		Miscellaneous polygon	1827.83	
			<b>1827.83</b>	
<b>Thrikkakara Municipality</b>		Miscellaneous polygon	1545.94	
			<b>1545.94</b>	
<b>Thrippunithura Municipality</b>		Miscellaneous polygon	2968.22	
			<b>2968.22</b>	
<b>VADAVUKODU</b>	Aikaranad	Land with Dense Scrub	14.89	
		Miscellaneous polygon	2410.07	
				<b>2424.96</b>
	Kunnathunadu	Land with Dense Scrub	18.70	
		Land with Open Scrub	3.65	
	Miscellaneous polygon	2908.47		
			<b>2930.81</b>	



BLOCK	PANCHAYAT	DESCRIPTION	AREA (Ha)	
VAZHAKULAM	Mazhuvannoor	Land with Dense Scrub	46.57	
		Land with Open Scrub	65.58	
		Miscellaneous polygon	4830.13	
				<b>4942.28</b>
	Poothrikka	Land with Dense Scrub	23.61	
		Miscellaneous polygon	2629.88	
				<b>2653.48</b>
	Thiruvaniyoor	Land with Dense Scrub	85.43	
		Land with Open Scrub	8.11	
		Miscellaneous polygon	2530.72	
				<b>2624.26</b>
	Vadavucode-Puthenkurisu	Land with Dense Scrub	16.33	
		Land with Open Scrub	5.13	
		Miscellaneous polygon	3115.19	
				<b>3136.66</b>
				<b>18712.45</b>
	VAZHAKULAM	Choornekkara	Miscellaneous polygon	808.47
				<b>808.47</b>
		Edathala	Land with Dense Scrub	30.02
			Land with Open Scrub	46.59
Miscellaneous polygon			1915.24	
				<b>1991.86</b>
Keezhmad		Land with Open Scrub	14.77	
		Miscellaneous polygon	1676.59	
				<b>1691.36</b>
Kizhakkambalam		Land with Dense Scrub	37.65	
	Land with Open Scrub	67.01		
	Miscellaneous polygon	2929.07		
			<b>3033.73</b>	
Vazhakkulam	Land with Dense Scrub	47.47		
	Miscellaneous polygon	2051.98		
			<b>2099.45</b>	
Vengola	Land with Dense Scrub	31.51		
	Land with Open Scrub	28.00		
	Miscellaneous polygon	3482.45		
			<b>3541.97</b>	
			<b>13166.84</b>	
VYPIN	Edavanakkade	Miscellaneous polygon	1058.40	
			<b>1058.40</b>	
	Kuzhappully	Miscellaneous polygon	659.75	
			<b>659.75</b>	
	Nayarambalam	Miscellaneous polygon	1084.89	
			<b>1084.89</b>	
			<b>833.55</b>	
Pallippuram	Miscellaneous polygon	1356.68		
			<b>1356.68</b>	
			<b>4993.27</b>	
		<b>District Total</b>	<b>306800.00</b>	







## WATERSHED

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

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

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

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

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

Table: 20.1

**WATER SHEDS**

Sl. No.	WSCODE	Area(Ha)	Sl. No.	WSCODE	Area(Ha)
1	13M100a	1826.01	46	13M59a	2017.50
2	13M101a	530.13	47	13M59b	1021.61
3	13M102a	1190.23	48	13M59c	887.47
4	13M103a	2675.61	49	13M59d	1639.67
5	13M10a	747.44	50	13M59e	845.23
6	13M11a	1099.09	51	13M59f	1172.86
7	13M12a	2594.30	52	13M59g	206.36
8	13M13a	996.88	53	13M59i	1193.70
9	13M14a	150.53	54	13M59j	1010.71
10	13M15a	994.82	55	13M5a	144.46
11	13M16a	1038.79	56	13M60a	1484.09
12	13M17a	1855.67	57	13M60b	887.41
13	13M17b	2914.40	58	13M60c	384.12
14	13M17c	527.63	59	13M60d	1258.33
15	13M17d	1848.82	60	13M60e	369.70
16	13M17e	587.81	61	13M60f	180.46
17	13M17f	1723.29	62	13M61a	3.47
18	13M17g	1728.95	63	13M64c	156.63
19	13M17h	853.30	64	13M6a	648.43
20	13M18a	2047.86	65	13M7a	372.31
21	13M19a	769.38	66	13M87a	27.35
22	13M19b	2510.28	67	13M89a	44.60
23	13M19c	1509.42	68	13M8a	681.66
24	13M19d	1121.91	69	13M90a	0.57
25	13M1a	703.54	70	13M95a	8.73
26	13M20a	2356.59	71	13M96a	3.63
27	13M21a	322.83	72	13M97a	31.58
28	13M21b	1385.10	73	13M98a	90.95
29	13M21c	686.85	74	13M99a	666.08
30	13M22a	740.92	75	13M9a	75.56
31	13M23a	737.89	76	14P133a	761.36
32	13M24a	1690.52	77	14P134a	837.16
33	13M29a	8.26	78	14P135a	430.69
34	13M2a	1070.90	79	14P136a	620.77
35	13M30a	404.27	80	14P137a	856.82
36	13M30b	679.67	81	14P138a	1422.62
37	13M30c	792.20	82	14P139a	1380.28
38	13M31a	1607.80	83	14P140a	588.04
39	13M32a	1416.66	84	14P140b	1109.16
40	13M33a	1199.00	85	14P140c	2731.69
41	13M34a	1420.71	86	14P140d	912.92
42	13M35a	2748.90	87	14P141a	1543.79
43	13M35b	1783.66	88	14P142a	1627.87
44	13M35c	2188.48	89	14P143a	1455.27
45	13M35d	2395.07	90	14P143b	1307.76

Sl. No.	WSCORE	Area(Ha)
91	14P183a	1309.83
92	14P18a	177.68
93	14P19a	1069.65
94	14P20a	366.31
95	14P21a	1227.34
96	14P21b	1401.31
97	14P21c	1512.63
98	14P21d	1791.83
99	14P21e	1931.26
100	14P22a	1474.14
101	14P23a	3492.40
102	14P24a	1905.82
103	14P24b	1094.04
104	14P25a	1311.69
105	14P25b	997.06
106	14P25c	1360.67
107	14P25d	1259.59
108	14P25e	1080.77
109	14P25f	2443.68
110	14P26a	2066.14
111	14P27a	1689.85
112	14P27b	543.53
113	14P27c	1099.98
114	14P27d	356.37
115	14P27e	2245.20
116	14P27f	547.72
117	14P27g	1336.00
118	14P28a	1587.82
119	14P29a	1286.37
120	14P29b	1356.17
121	14P29c	779.15
122	14P29d	964.77
123	14P29e	2116.34
124	14P30a	1467.66
125	14P30aa	1545.96
126	14P30ab	769.70
127	14P30ac	721.91
128	14P30ad	752.19
129	14P30ae	569.60
130	14P30af	823.37
131	14P30ag	941.44
132	14P30ah	2495.12
133	14P30ai	721.39
134	14P30aj	1115.60
135	14P30ak	618.00
136	13M36a	942.16
137	13M37a	2457.71

Sl. No.	WSCORE	Area(Ha)
138	13M38a	1112.78
139	13M38al	19.84
140	13M38am	1.53
141	13M38ao	76.78
142	13M38ap	147.34
143	13M38aq	2677.55
144	13M38ar	2052.40
145	13M38as	681.40
146	13M38b	2120.32
147	13M38c	695.97
148	13M38d	1898.94
149	13M38e	1608.28
150	13M38f	1442.45
151	13M38g	1734.87
152	13M38h	935.06
153	13M38i	1900.27
154	13M38j	689.13
155	13M38k	3011.64
156	13M38l	846.74
157	13M38m	28.00
158	13M38o	309.81
159	13M38p	973.94
160	13M38q	1354.59
161	13M38r	2413.11
162	13M38s	1189.88
163	13M38t	1224.76
164	13M38u	1326.84
165	13M39a	1626.58
166	13M3a	149.55
167	13M40a	2098.66
168	13M4a	80.50
169	13M52c	0.01
170	13M53a	6.62
171	13M54a	1.51
172	13M54b	29.42
173	13M54c	266.64
174	13M54d	493.54
175	13M55a	2135.95
176	13M56a	2917.99
177	13M57a	2019.14
178	13M58a	935.95
179	14P143c	1398.02
180	14P144a	3774.40
181	14P144b	1047.19
182	14P144c	2391.02
183	14P144d	404.88
184	14P145a	2216.08

Sl. No.	WSCORE	Area(Ha)
185	14P146a	2247.95
186	14P147a	2125.44
187	14P148a	253.52
188	14P149a	2283.34
189	14P150a	1193.09
190	14P151a	520.61
191	14P152a	2231.48
192	14P153a	2593.96
193	14P154a	253.41
194	14P155a	1730.31
195	14P156a	2312.39
196	14P157a	945.40
197	14P158a	708.46
198	14P159a	785.48
199	14P160a	187.04
200	14P161a	1398.76
201	14P162a	454.15
202	14P163a	1236.84
203	14P164a	754.56
204	14P165a	356.14
205	14P166a	91.92
206	14P167a	177.48
207	14P168a	110.89
208	14P169a	93.56
209	14P16a	728.51
210	14P170a	146.33
211	14P171a	388.98
212	14P172a	155.21
213	14P173a	228.08
214	14P174a	387.84
215	14P175a	1007.88
216	14P176a	277.70
217	14P177a	1794.33
218	14P178a	75.49
219	14P179a	818.86
220	14P17a	499.12
221	14P17b	429.90
222	14P180a	82.33
223	14P181a	531.92
224	14P182a	1176.69
225	14P30al	2064.88
226	14P30am	1773.81
227	14P30an	3731.39
228	14P30ao	1026.12
229	14P30ap	838.61
230	14P30aq	515.91
231	14P30ar	1501.58

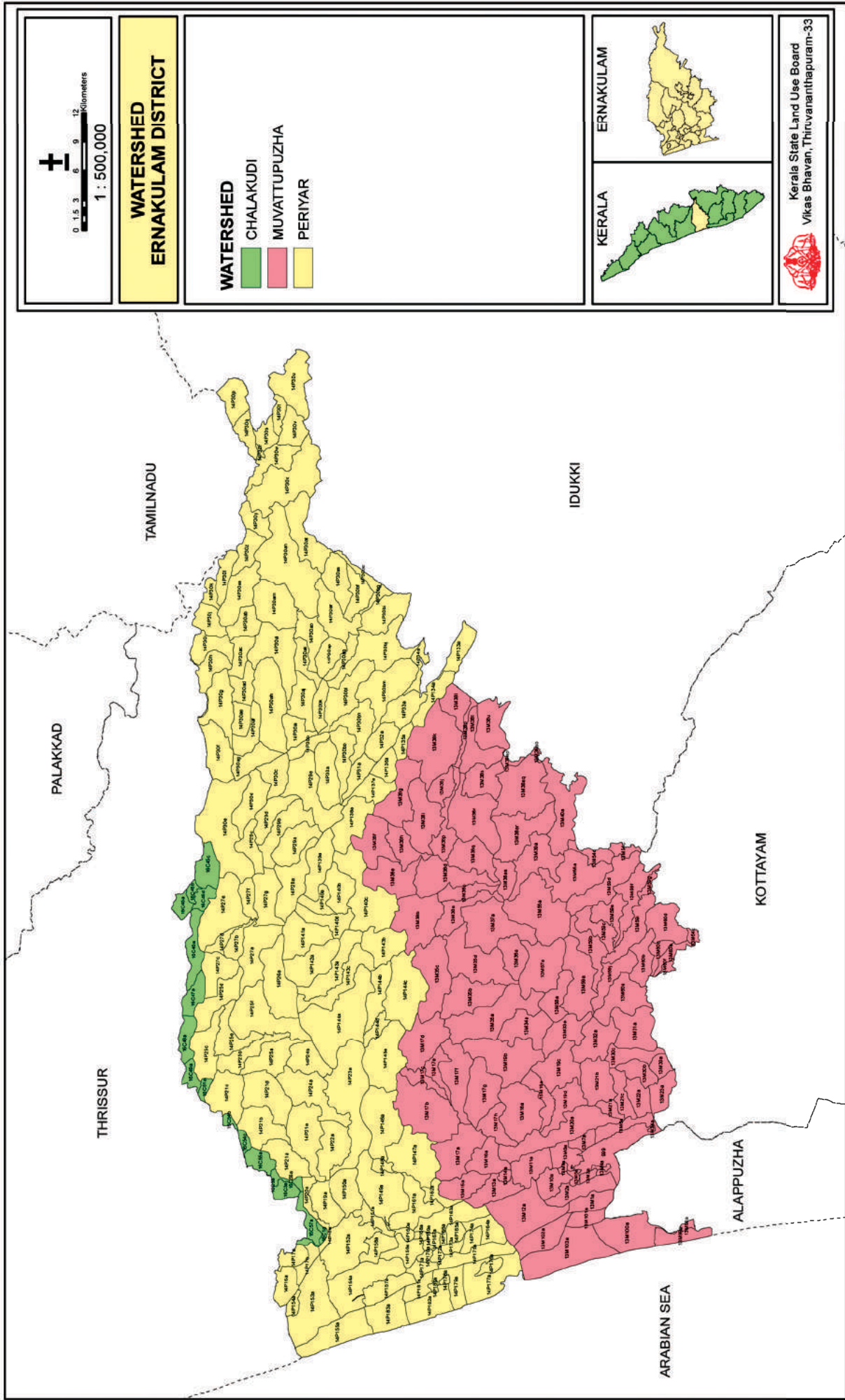
Sl. No.	WSCORE	Area(Ha)
232	14P30as	1157.49
233	14P30at	1703.80
234	14P30av	5.80
235	14P30aw	3.80
236	14P30b	504.37
237	14P30bd	0.24
238	14P30be	349.03
239	14P30bf	901.42
240	14P30bg	252.83
241	14P30bi	1369.39
242	14P30bj	2162.19
243	14P30bk	612.34
244	14P30bl	1618.15
245	14P30bm	2130.33
246	14P30bn	1282.24
247	14P30bo	1070.07
248	14P30c	927.72
249	14P30d	1286.77
250	14P30e	3516.16
251	14P30f	1368.57
252	14P30g	1506.62
253	14P30h	862.06
254	14P30i	929.22
255	14P30j	773.04
256	14P30k	356.65
257	14P30l	688.15
258	14P30o	2.37
259	14P30p	962.25
260	14P30q	614.73
261	14P30r	76.55
262	14P30s	548.14
263	14P30t	416.63
264	14P30u	1661.18
265	14P30v	855.78
266	14P30w	1049.49
267	14P30x	2952.65
268	14P30y	680.17
269	14P30z	772.40
270	14P31a	684.79
271	14P32a	897.00
272	14P33a	1035.75
273	14P34a	462.67
274	14P35a	18.75
275	14P35e	0.88
276	14P36a	7.15
277	14P3a	2.85
278	14P40k	0.24



Sl. No.	WSCORE	Area(Ha)
279	14P4a	2.41
280	15P12c	0.17
281	15P13a	11.29
282	15P14b	7.76
283	16C17a	0.38
284	16C1a	210.40
285	16C38k	2.36
286	16C3a	404.80
287	16C42c	47.72
288	16C43a	22.82
289	16C44b	15.49
290	16C45a	375.77
291	16C45b	189.03

Sl. No.	WSCORE	Area(Ha)
292	16C45c	872.45
293	16C45d	396.79
294	16C46a	866.61
295	16C47a	622.47
296	16C48a	610.56
297	16C49a	351.93
298	16C51a	197.60
299	16C54b	129.30
300	16C54c	198.27
301	16C55a	568.43
302	16C56a	257.64
303	16C57a	480.48
	<b>District Total</b>	<b>306800.00</b>







## MINOR IRRIGATION

Kerala has a wide network of rivers and rivulets and springs spread over the entire cropped area. Minor Irrigation sector received considerable attention from Seventh Plan onwards and got a considerable boost during the Ninth Plan period consequent to the enhanced flow of funds from the grant in aid of the local bodies as well as special support received from the external agencies like European Economic Community, Dutch Government and assistance under RIDF of NABARD. With introduction of decentralized planning, all minor irrigation works (having cultivable command area up to 2000 ha.) were vested with the Panchayat Raj Institutions (PRIs). But by the enactment of new Act 'Kerala Irrigation and Water Management Act 2003' the definition of minor irrigation has been changed and works benefiting an area less than 15 ha. only come under the category of minor irrigation and are vested with PRIs. All other works having cultivable command area greater than 15ha. have been taken over by the Water Resources Department as medium irrigation. The major works implemented under surface water are minor irrigation Class-I, II and Lift irrigation schemes. Construction of check dam, Vented cross bars, weirs, tanks etc are the various works executed under minor irrigation Class-I & II.

The cumulative physical achievement of Minor irrigation up to Xth Five year plan was 235957 ha. (net). Minor irrigation has been given a considerable thrust during Eleventh Plan. About 24 per cent of the outlay in Irrigation sector is proposed for the development of Minor Irrigation. The details of physical achievement during the first two years of Eleventh Plan are shown in the table.

Table: 21.1

### Physical Achievement of Minor Irrigation (Surface Water)

Sl. No	Name of Schemes	(Net area in Ha.)	
		2007-08	2008-09
1	MI Class I	2217.00	1474.81
2	MI Class II	711.00	1522.93
3	Lift Irrigation works	712.00	173.75
4	Repairs to MI structure	40.00	0.00
5	MI Class I- NABARD	1802.00	2032.90
6	MI Class II- NABARD	1285.00	3015.90
7	Lift Irrigation- NABARD	53.00	88.62
	<b>Total</b>	<b>6820.00</b>	<b>8308.91</b>

The minor irrigation has always been a thrust area for NABARD not only in terms of providing increased refinance but also by introducing various developmental initiatives and financial incentives. The RIDF I, II and III have been closed on December 2002, RIDF IV by March 2005, RIDF V by June 2006 RIDF VI by September 2007, RIDF VII by December 2008. RIDF VIII by September 2008 and its reimbursement claim was closed by 31.12.2008. The RIDF X closed by December 2009 and its reimbursement claim by 31.03.2010.

Table: 21.2

**Details of Completed Projects under different Trenches of RIDF**

<b>Sl. No</b>	<b>RIDF Trenches</b>	<b>No. of Schemes completed</b>
1	RIDF I	59
2	RIDF II	115
3	RIDF III	91
4	RIDF IV	66
5	RIDF V	122
6	RIDF VI	81
7	RIDF VII	39
8	RIDF VIII	43
9	RIDF IX	20
10	RIDF X	12
11	RIDF XI	135
12	RIDF XIII	176
13	RIDF XIV	8
	<b>Total</b>	<b>967</b>

**MINOR IRRIGATION CENSUS – ERNAKULAM (2000-2001)**

Table 21.3

**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
10200	2213	1659	1223	987	648	495	177	17602

Table 21.4

**CULTURABLE COMMAND AREA AND POTENTIAL CREATED THROUGH SURFACE FLOW SCHEMES**

Culturable Command Area	Irrigation Potential created				
	Kharif	Rabi	Perennial	others	Total
4808	3485	3151	1193	2748	10577

Table 21.5

**POTENTIAL UTILISED THROUGH SURFACE FLOW SCHEMES**

Kharif	Rabi	Perennial	Others	Total
3185	2913	1048	2579	9725

Table 21.6

**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
34	533	0	567	31	6	0	1	38

Table 21.7

**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	
113	1602	1607	65	630	3904	1599	1604	57	586	3846

Table 21.8

**DISTRIBUTION OF SURFACE FLOW SCHEMES IN USE ACCORDING TO UTILISATION OF POTENTIAL CREATED**

No Constraints in Utilisation	Constraints in utilisation					Total
	Non filling-up of storage	Siltation of Storage	Break down of channel	Other reason	Total	
383	54	14	1	90	159	542

Table 21.9

**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
854	94	88	64	43	23	28	19	1213

Table 21.10

**DISTRIBUTION OF SURFACE LIFT SCHEMES ACCORDING TO UTILISATION OF POTENTIAL CREATED**

No constraints in utilisation	Constraints in utilisation							Total in Use
	Inadequate power supply	Mechanical break down	Less water discharge	Storage Siltation	Channel break down	Other reason	Total	
649	1	6	100	131	246	44	528	1177

Table 21.11

**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
129	273	402	23801	2563	26364	23150	2555	25705

Table 21.12

**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
36	32	68	3760	685	4445	3457	682	4139



Table 21.13

**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
8	3	11	1726	4	1730	1702	4	1706

Table 21.14

**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
9	687	696	386	2611	2997	362	2432	2794

Table 21.15

**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
723	548	497	786	1193	3024	432	414	741	1207	2794

Table 21.16

**AGRICULTURE LAND AND ITS USE**

Graphical Area	Cultivable Area	Net Area Shown	Net Area Irrigated through			
			Maj/ Med Scheme	Ground Water	Surface Water	Total
293105	184268	169242	10893	10879	16474	38246

Table 21.17

**VILLAGES ACCORDING TO THEIR GROUND WATER LEVEL**

Below 10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	Above 70	Total
Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	Mtr	
93	4	0	0	0	0	0	0	0	0	0	0	0	0	97

Table 21.18

**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	
24	97	17602	359	11	17972	567	1213	1780	19752

Table 21.19

**IRRIGATION POTENTIAL CREATED/UTILISED THROUGH GROUND WATER SCHEMES IN USE**

DUG WELLS			SHALLOW TUBEWELLS			DEEP TUBEWELLS			TOTAL		
No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised	No. in use	Potential Created	Potential utilised
17299	11760	10846	355	441	402	11	8	8	17665	12209	11256

Table 21.20

**CROP WISE AREA IRRIGATED BY GROUND WATER SCHEMES**

DUG WELLS					SHALLOW TUBEWELLS				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
1923	1798	4540	2584	10845	67	48	230	58	403

DEEP TUBEWELLS					TOTAL				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
1	1	2	4	8	1991	1847	4772	2646	11256

Table 21.21

**CROP WISE AREA IRRIGATED BY SURFACE WATER MINOR IRRIGATION SCHEMES**

SURFACE FLOW					SURFACE LIFT				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
3185	2913	1048	2579	9725	8274	6104	4885	15081	34344

TOTAL				
Karif	Rabi	Perennial	Other	Total
11	12	13	14	15
11459	9017	5933	17660	44069

Table 21.22

**CROP WISE AREA IRRIGATED BY SURFACE FLOW SCHEMES**

TANKS					OTHER STORAGES				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
1599	1604	57	586	3846	616	553	497	1133	2799

PERMANENT DIVERSIONS					TEMPORARY DIVERSIONS				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
394	391	235	281	1301	569	357	251	576	1753

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
7	7	8	4	26	3185	2912	1048	2580	9725

Table 21.23

**CROP WISE AREA IRRIGATED BY MINOR IRRIGATION SCHEMES**

GROUND WATER					SURFACE WATER				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
1991	1847	4772	2646	11256	11459	9017	5933	17660	44069

TOTAL				
Karif	Rabi	Perennial	Other	Total
11	12	13	14	15
13450	10864	10705	20306	55325

Table 21.24

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

DUG WELLS					SHALLOW TUBEWELLS				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
39	37	52	54	182	0	0	16	9	25

DEEP TUBEWELLS					TOTAL				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
0	0	0	0	0	39	37	68	63	207

Table 21.25

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

TANKS					OTHER STORAGES				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
2	2	0	0	4	18	4	0	1	23

PERMANENT DIVERSIONS					TEMPORARY DIVERSIONS				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
11	12	13	14	15	16	17	18	19	20
0	0	0	0	0	11	0	0	0	11

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
0	0	0	0	0	31	6	0	1	38

Table 21.26

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

SURFACE FLOW					SURFACE LIFT				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
31	6	0	1	38	0	0	0	0	0

TOTAL				
Karif	Rabi	Perennial	Other	Total
11	12	13	14	15
31	6	0	1	38

Table 21.27

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

ON RIVER					ON STREAM				
Karif	Rabi	Perennial	Other	Total	Karif	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				
Karif	Rabi	Perennial	Other	Total	Karif	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				
Karif	Rabi	Perennial	Other	Total
21	22	23	24	25
0	0	0	0	0

Table 21.28

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

GROUND WATER					SURFACE WATER				
Karif	Rabi	Perennial	Other	Total	Karif	Rabi	Perennial	Other	Total
1	2	3	4	5	6	7	8	9	10
39	37	68	64	208	31	6	0	1	38

TOTAL				
Karif	Rabi	Perennial	Other	Total
11	12	13	14	15
70	43	68	65	246

Table 21.29

**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
17049	354	11	376	66	8	717	18581

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
69	2	0	2	3	0	1	77

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
17118	356	11	378	69	8	718	18658

Source:- Minor Irrigation Census - Irrigation Department

## CHALAKKUDY IRRIGATION PROJECT

Chalakkudy project was taken up in two stages. The first stage consists of a diversion weir across Chalakkudy river at Thumburmuzhy. The second stage is an extension of canal systems executed during the first stage. There is no independent storage for Chalakkudy Irrigation system, but there are hydel reservoirs in the upper reaches. The source of water is the tailrace and surplus water from Peringalkuthu hydro electric scheme and the drainage water from the catchment of Chalakkudy river below the Peringalkuthu scheme. The Power houses of Kerala Sholayar and Peringalkuthu are operated at a pattern to suit the irrigation need of the basin. The weir is situated nearly 16 Km. east of Chalakkudy town.

### BASIC INFORMATION

District	-	Thrissur
<u>Ayacut area in Ha.</u>		
Achieved	-	Net 18530 Gross 37260
Potential	-	Net 19690 Gross 39380
River	-	Chalakkudy
Benefited District	-	Thrissur
Year of Starting	-	1949 First stage
	-	1958 Second stage

### SALIENT FEATURES

#### I<sup>st</sup> Stage

##### (a) Weir

<u>Site</u>	Across the river Chalakkudy 11 miles east of Chalakkudy town. Latitude 10° 10' N Longitude 76° 26' 30" E nearest Railway Station – Chalakkudy (In Cochin Shornur Broad gauge line)
<u>Type</u>	Gravity type in mass concrete with coarse rubble casing.
<u>length</u>	185 m
<u>Maximum height of weir</u>	3.66 m
<u>Level</u>	
Average bed level	106.5 R.L
	Deepest foundation - 101.50
	Top of weir - 113.50

Discharge in river Maximum - 115,000 cusecs.  
 Minimum during crop - 613 cusecs.  
 Dry weather flow - 450 cusecs.

Nature of weir Weir is of gravity type constructed mass concrete with coursed rubble casing.

(b) Head Work Regulators:

Vents 14' X 5' with radial shutters, operated from platform above M.F.L. Water diverted through the regulator - 570 cusecs.

Nature of work Foundation 1½" metal concrete in cement mortar.

Super structure Rubble in cement mortar  
Plat form R.C.C. docking on R.S.J.

(c) Canal Systems:

New conversion from dry land	-	15,600 acres
Single crop land converted to Double crop land	-	7,600 acres
Existing double crop land	-	5,200 acres
Total	=	28,400 acres

Length

Main canals	-	56 Km
Branch Canals	-	162 Km
Discharge at head of main canal	-	285 cusecs

**II<sup>nd</sup> Stage**

The 2nd Stage contemplates only extension of the Channel System.

<u>Length of Canal</u>		
Main Canal	-	27 km
Branch Canal	-	98 Km
<u>Ayacut Served</u>		
New Conversion	-	4050 acres
Single crop converted into Double crop lands	-	9450 acres
Existing double crop	-	6750 acres
Total	-	20250 acres

Crops Paddy, Arecanut, Coconut, Vegetables.

## **MUVATTUPUZHA IRRIGATION PROJECT**

The Muvattupuzha Valley Irrigation Project (MVIP) envisages construction of earth cum masonry dam at Muttom (Malankara dam) across Thodupuzha a tributary of Muvattupuzha. It utilizes the tail race discharge of Idukki hydro electric project and the run off in the Thodupuzha river up to Malankara for irrigation of a total net cultivable command area of 17737 ha. The dam at Malankara across Thodupuzha River shall pick up the discharge and divert into two canal system on either sides of dam. Muvattupuzha river is formed by confluence of three tributaries namely. Todupuzha river, Kaliyar River and Kothamangalam river, all rising in the mountains of the Western Ghat. This project will benefit three districts viz, Ernakulam, Kottayam and Idukki. The dam site is about 27 Km from Muvattupuzha town and 8 Km from Thodupuzha town and is connected by all-weather road. The nearest main railway junction at Ernakulam is about 45 Km from Muvattupuzha. Location - Longitude Bet 76<sup>0</sup> 26' and 76<sup>0</sup> 40' south & Latitude Bet 9<sup>0</sup> 37' and 10<sup>0</sup> 4' North.

### Basic Information

Ayacut Area in ha Net 17737, Gross 34737

#### River basin

Size of population served	:	674805
Quantum of water made available (1000 cum)	:	52570/year
Quantum of water percapital (litre)	:	140/day
Quantum of water for industrialuse (1000 cum)	:	5257/year

#### Hydrology

Catchment	:	153.5 sq.km
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#### Catchment area at head work site

Cross	:	153.5 sq.km
unintercepted	:	153.5 sq.km
Catchment area rainfed	:	153.5 sq.km

#### Climatic data

Period of record	:	1956-1985	
		Max	Min
Air temperature 0C		39	18
Humidity (percent)		85	60
Wind (KM/Hr)		4.4	2.6

Proposed utilisation by the project	:	341 Mm3/year
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Maximum probable flood	:	1444.32 cumecs
Design flood (dam)	:	1444.32 cumecs
River flow (minimum discharge)	:	51 cumecs
<b>Reservoir water level</b>		
Maximum water level	:	+ 43.000
Full reservoir level	:	+ 42.000
Minimum draw down level	:	+ 39.000
Dead storage level	:	+ 39.000
Free Board	:	2.00 m above MWL
Live storage (M cum)	:	10 Mm
<b>Capacity at (M cum)</b>		
Maximum water level	:	42.00 Mm <sup>3</sup>
<b>Flood absorption capacity (M cum)</b>		
Below FRL	:	Nil
Between FRL & MWL	:	5.00
<b>Type of spillway</b>		
Full reservoir level (m)		+ 42.000
Maximum water level (m)		+ 43.000
Overall length (m)		62.100
Crest level (m)		+ 36.900
Maximum discharging capacity at FRL & MWL (cumecs)		1444.32
<b>Tail water level (EL-M)</b>		
Maximum		+33.75
<b>River sluice</b>		
Size (m)		1.50 x 2.00
Sill level (EL-M)		+ 28.000
<b>Discharging capacity at (cumecs)</b>		
i) Full reservoir level		86.2
ii) Minimum drawdown level		75.5
<b>Head regulators</b>		
	Left	Right
a) Total length (m)	22.50	10.5
b) Height above deepest foundation (m)	6.00	5.50

The estimates cost of the project as per 1980 Schedule of Rate was Rs. 4808 lakhs and the revised estimate of which is Rs. 793 crores based on 2008 schedule of rates. The expenditure as on March 2010 is Rs. 756.44 crores. The canal system consists of left bank main canal of 37.10 km length and right main canal of 28.337 Km of length and branches and distributaries of 57.154 and 241.014 Kms of length respectively. The work of dam, left bank main canal and Right Bank main Canals are completed and in respect of branches and distributaries it is completed for a total length of 43.544 Km, 159.19 Km respectively. The project was commissioned partly in November 2004, since when water distribution is being carried out in the completed stretches of canal. Project was initiated in 1974 for implementation with an original estimated cost of Rs. 20.86 crores. The escalation of expenditure till 2005-10

was 3516 percent. The project has to be closed during the eleventh plan itself considering the implementation of the project for more than decades. The cropping pattern in the Ayacut has changed and additional investment is required to irrigate the five crops.

## **PERIYAR VALLEY IRRIGATION PROJECT**

The River Periyar is the longest and largest among the 44 rivers in Kerala. The Periyar River originates from the Sivagiri group of hills in the forest and Sundra Malai at an elevation of +1830 mts. about 100 Km. south of Devikulam. Periyar Valley Irrigation Project is one of the medium Irrigation Projects in Kerala, situated in Ernakulam District and spread over the Ayacut area of Kothamangalam, Muvattupuzha, Kunnathunadu, Aluva and Paravoor Taluk. The Periyar barrage is at Bhoothathankettu in Kothamangalam Taluk at 1.5 Km. downstream of the affluence of the Idamalayar and Periyar. The Project envisages the utilisation of the controlled release from the Earthen dam constructed across Idamalayar one of the hydel schemes in the Muthirapuzha tributary of the Periyar. It is envisaged for various purposes such as irrigation, power generation, and salinity control, industrial and domestic uses. *Location*- Latitude 10<sup>0</sup> 08' 16" North & Longitude 76<sup>0</sup> 40'00" East.

Ayacut Area in Ha.			
Potential	:	Net: 32800,	Gross : 85600
Achieved	:	Net: 30567,	Gross : 79750

### Hydrology:-

Drainage Area above the Barrage site		
a. Total	:	3048 Sq.Km
b. Free	:	938 Sq.Km.
Designed flood discharge of the barrage	:	7079 Cumec.
Idamalayar Catchment above the Ennakkal dam	:	380 Sq.Km.
Average yield from the Idamalayar Catchment		
Above the Ennakkal Dam	:	1369 Mm <sup>3</sup>
Average Annual Rainfall in the Ayacut	:	3178 mm
Length of Barrage	:	210.92 m
Height of Barrage	:	11.79 m
No. of Openings and Size of Gates ( 3 Nos.)	:	9.14 m x 10.36 m
No. of Openings and size of Gates ( 12 Nos.)	:	12.19 x 9.14 m
General Bed level of rive	:	23.10 m
Deepest foundation level	:	18.50 m

### Crest Level of Weir:-

a. Central Span	:	24.59 m
b. Side Spans	:	25.81 m
F.R.L. of barrage	:	34.95 m
M.F.L. of upstream of barrage	:	34.95 m

Road Bridge level	:	36.43 m.
Hoisting Plat Form		
i. Top Level of Piers		
a. Central Spans	:	45.89 m
b. Side Spans	:	44.67 m
ii. Top Level of Decking		
a. Central Spans	:	47.61 m
b. Side Spans	:	45.39 m
Water Spread area at FRL	:	1640 ha. or 16.40 Sq.Km.
Width of Road Bridge	:	6.78 m
Width of Hoisting Platform	:	3.66 m

**Head Regulator:-**

Site	:	At.ch.2100m of Main Canal
Sill Level	:	29.44 m
Full Supply of depth	:	5.51 m
Discharge	:	50.80 Cumecs
Top level of operating Platform	:	36.44 m.
Gross Command Area	:	1,14,352 ha.
Cultivable Command Area	:	36,500 ha.

## **BRIDGE CUM REGULATOR AT KANAKKANKADAVU**

### **PROJECT DETAILS**

This is a medium Irrigation Project at Kanakkankadavu across Chalakkudy river in Puthenvelikkara Panchayat in Ernakulam district. The main objective of the Project is to prevent intrusion of saline water to the upstream of the Chalakkudy river. About 2600 hectares of agricultural land in Poyya, Mala, Kuzhoor, Kunukara and Puthenvelikkara Panchayaths are protected from the threat of intrusion of saline water on construction of this bridge cum regulator. At present the prevention of saline water is made by temporary arrangements in every year constructing earthen bunds. Two temporary bunds are laid in every year, one at Kanakkankadavu and the other just downstream side of the proposed permanent structure in Chalakkudy river. These bunds are of purely temporary nature and will be washed of during flood season. On completion this regulator cum bridge has avoided yearly loss of expenditure for providing the temporary bunds and 2600 hectares of cultivable land can be protected from salinity.

By providing a deck, the structure will serve the purpose of a bridge across Chalakkudy river at about 20 Kms. downstream of Chalakkudy town. The bridge will help much for the development of that locality and act as a link road connecting the National Highway and coastal road. Hence the structure will serve these two purposes. The location of the structure is just at the upstream of the termination point of Chengamanad- Kanakkankadavu PWD road at Kanakkankadavu.

### Basic Information

District	Ernakulam
River	Chalakkudy
Ayacut area protected	2600 ha
Benefitted district	Ernakulam & Thrissur
Year of Starting	1984
Year of Commissioning	2000
Year of Completion	2002
Total Expenditure	Rs: 11.48 Crores
Officer in Charge	Executive Engineer, Irrigation Division, Ernakulam.

### Salient Features

#### Structural Details.

Span between Abutments	83.36 m
No. of piers	9
No. of span including lock	11 each 6.08 m.
Length of impervious apron	
a) Upstream side	12 m
b) Downstream side	12 m
Benefitted area-	2600 ha
Maximum high tide level	+00.700 m
Maximum low tide level	-0.100 m (approx)
Shutter level	+1.000 m
MFL on 10.8.86	2.65 m
MFL during June 1985	3.200 m

#### Other Utilities

The bridge and approach road is the shortest route from Aluva town to Mala in Trichur District by reducing about 10 kms

Source:- Irrigation Department

Table: 21.30

**Net Area Irrigated (Source wise)**

(In Ha)

Sl. No	Source	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	2	3	4	5	6	7	8
1	Government Canals	101397	104669	98664	88318	95956	94813
2	Private Canals	4729	4965	4300	4324	6318	2656
3	Tanks	43983	45062	42064	41580	39752	40851
4	Wells	108445	110000	114477	131002	133312	125892
5	Other Sources	134802	135227	125900	122321	123915	122118
6	Total	393356	399923	385405	387545	399253	386330
7	Area irrigated more than once in a year		918341				
8	Gross irrigated area	455391	464765	475231	455310	458238	454783
9	Net area irrigated to net area Sown (%)	18	19	17.52	18.41	18.86	16.34
10	Gross irrigated area to gross cropped area (%)	15	15	16.29	16.44	16.96	17.04
11	Irrigated area under paddy to total irrigated area	40	38	45	40	37	37

Table: 21.31

**Distribution of district wise number of wells and tube wells**

Sl. No.	District	Number of wells in use				Number of Tubewells		
		With pump set		Total	Without Pump set	Electric	Diesel	Total
		Electric	Diesel					
1	Thiruvananthapuram	45241	1505	46746	88612	2988	46	3034
2	Kollam	92216	888	93104	122916	864	449	1313
3	Pathanamthitta	18437	268	18705	26892	766	24	790
4	Alappuzha	66962	3770	70732	88935	89806	898	90704
5	Kottayam	42524	314	42838	36312	1226	24	1250
6	Idukki	17735	1355	19090	19762	580	207	787
7	Ernakulam	154134	1276	155410	49546	19715	203	19918
8	Thrissur	220863	2758	223621	36248	22310	536	22846
9	Palakkad	59172	2919	62091	42851	9389	522	9911
10	Malappuram	121428	10517	131945	58980	6698	843	7541
11	Kozhikode	53036	1300	54336	29516	2576	220	2796
12	Wayanad	951	652	1603	2563	197	121	318
13	Kannur	92905	3723	96628	79707	1870	176	2046
14	Kasaragod	66583	14587	81170	31389	7216	664	7880
	<b>State</b>	<b>1052187</b>	<b>45832</b>	<b>1098019</b>	<b>714229</b>	<b>166201</b>	<b>4933</b>	<b>171134</b>

Table: 21.32

**Number of Wells and tube wells used for irrigation in different size classes**

Sl.No.	Size class	Number of wells in use				Number of Tubewells		
		With pump set		Total	Without Pump set	Electric	Diesel	Total
		Electric	Diesel					
1	Below 1.00	947022	31395	978417	688987	154895	4081	158976
2	Small (1.00 - 1.99)	70320	8399	78719	18176	6798	602	7400
3	Semi-medium(2.00-3.99)	26732	4324	31056	5622	2899	174	3073
4	Medium (4.00 - 9.99)	7033	1226	8259	1200	1390	57	1447
5	Large (10 & above)	1080	488	1568	244	219	19	238
6	All categories	<b>1052187</b>	<b>45832</b>	<b>1098019</b>	<b>714229</b>	<b>166201</b>	<b>4933</b>	<b>171134</b>

Source: Agri. Census, DES

Table: 21.33

**Distribution of district wise holdings receiving irrigation by different sources 2000-01**

Sl. No.	District	Source of Irrigation																	
		Canal		Tank		Well		Tubewells		Other sources		Total							
		No	%	No	%	No	%	No	%	No	%	No	%						
1	Thiruvananthapuram	9115	4.84	5244	4.05	103026	6.19	3061	1.74	34692	5.65	155138	5.59						
2	Kollam	2278	1.21	5589	4.31	184522	11.08	2282	1.29	33753	5.49	228424	8.24						
3	Pathanamthitta	1143	0.61	2246	1.73	32972	1.98	1229	0.70	11888	1.94	49478	1.78						
4	Alappuzha	10373	5.50	31692	24.46	137345	8.25	87135	49.4	51067	8.31	317612	11.45						
5	Kottayam	3005	1.59	4206	3.25	70878	4.26	721	0.41	39142	6.37	117952	4.25						
6	Idukki	4564	2.42	9573	7.39	41279	2.48	1129	0.64	41296	6.72	97841	3.53						
7	Ernakulam	57443	30.48	13798	10.65	198740	11.94	23426	13.28	65959	10.74	359366	12.96						
8	Thrissur	31838	16.90	20779	16.04	246575	14.81	23606	13.38	62246	10.13	385044	13.88						
9	Palakkad	51087	27.11	9819	7.58	126441	7.60	10102	5.73	150300	24.47	347749	12.54						
10	Malappuram	4523	2.40	12946	9.99	153418	9.22	7101	4.03	29127	4.74	207115	7.47						
11	Kozhikode	5392	2.86	4235	3.27	85389	5.13	3370	1.91	19010	3.09	117396	4.23						
12	Wayanad	2029	1.08	1781	1.37	7645	0.46	700	0.4	22596	3.68	34751	1.25						
13	Kannur	4435	2.35	6460	4.99	172943	10.39	2699	1.53	35726	5.82	222263	8.01						
14	Kasaragod	1214	0.64	1184	0.91	103439	6.21	9813	5.56	17532	2.85	133182	4.8						
	<b>State</b>	<b>188439</b>	<b>100.00</b>	<b>129552</b>	<b>100.00</b>	<b>1664612</b>	<b>100.00</b>	<b>176374</b>	<b>100.00</b>	<b>614334</b>	<b>100.00</b>	<b>2773311</b>	<b>100.00</b>						

Source: Agri. Census, DES

Table: 21.34

**Net Area Irrigated (Source-wise) 2005 - 2008 (Area in hectare)**

Sl. No.	District	Govt. Canal			Private Canal			Govt. Tanks			Private Tanks			Govt. Wells		
		2005-06	2006-07	2007-08	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08
1	Thiruvananthapuram	2471	2842	4242	210	231	83	294	309	354	65	79	61	2	3	2
2	Kollam	413	351	974	80	100	255	9	12	23	175	245	356	3	3	4
3	Pathanamthitta	1620	1912	2019	29	23	1	6	8	1	103	88	55	18	8	
4	Alappuzha	5347	5278	1074	141	71		7	11	12	8436	5062	2619	7	5	1
5	Kottayam	745	559		23	6		1			88	119	187	6	2	
6	Idukki	2508	2483	3103	698	558	322	27	21		5539	5594	6553	22	27	2
<b>7</b>	<b>Ernakulam</b>	<b>20569</b>	<b>19512</b>	<b>11577</b>	<b>41</b>	<b>70</b>	<b>19</b>	<b>253</b>	<b>268</b>	<b>289</b>	<b>2389</b>	<b>2078</b>	<b>1623</b>	<b>512</b>	<b>589</b>	<b>399</b>
8	Thrissur	24849	23819	14758	84	147	207	532	399	210	6895	6206	4632	443	199	15
9	Palakkad	41332	42159	45115	991	595	830	194	184	409	3912	4029	4786	32	21	36
10	Malappuram	824	972	2282	539	550	756	676	473	131	1986	2443	4709	27	36	59
11	Kozhikode	1246	1209	1261	24	28	153	8	10		201	237	448	7	8	15
12	Wayanad	856	702	74	664	511	370	42	45	30	95	119	179	4	6	15
13	Kannur	1244	1169	1066	958	709	644	74	59	42	1714	1885	1870	18	31	69
14	Kasaragod	82	103	773	467	701	684	70	81	564	11215	12000	11437	65	67	13
	<b>State</b>	<b>104106</b>	<b>103070</b>	<b>88318</b>	<b>4949</b>	<b>4300</b>	<b>4324</b>	<b>2193</b>	<b>1880</b>	<b>2065</b>	<b>42813</b>	<b>40184</b>	<b>39515</b>	<b>1166</b>	<b>1005</b>	<b>630</b>



Table 21.34 (Contd...)

**Net Area Irrigated (Source-wise) 2005 - 2008 (Area in hectare)**

Sl. No.	District	Private Wells			Minor Irrigation			Other Sources			Tube Wells			Total		
		2005-06	2006-07	2007-08	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08
1	Thiruvananthapuram	542	813	2763	12	19		475	404	544	1	2	9	4072	4702	8058
2	Kollam	1531	1715	1983	4	7	26	403	564	852	2	3	4	2620	3000	4477
3	Pathanamthitta	1872	1928	2108	58	104	65	2412	1809	1275	1	2	1	6119	5882	5525
4	Alappuzha	3176	2509	1423	69	17		22821	22593	24494	3653	4091	5086	43657	39637	34709
5	Kottayam	856	1087	1958	66	65	65	12861	12732	13874	1	2	3	14647	14572	16087
6	Idukki	2273	1705	1596	45	43	33	5942	5467	4590	40	12	240	17094	15910	16439
<b>7</b>	<b>Ernakulam</b>	<b>10201</b>	<b>9079</b>	<b>6722</b>	<b>3449</b>	<b>3483</b>	<b>3592</b>	<b>5938</b>	<b>5225</b>	<b>3409</b>	<b>285</b>	<b>356</b>	<b>426</b>	<b>43637</b>	<b>40660</b>	<b>28056</b>
8	Thrissur	36752	36384	37170	2592	3110	3280	12392	11029	7596	3223	999	682	87762	82292	68550
9	Palakkad	14822	16008	19267	1152	1155	322	13576	13712	12023	987	1481	5890	76998	79344	88678
10	Malappuram	5481	7125	10535	640	614	766	8313	7482	4819	5238	4619	606	23724	24314	24663
11	Kozhikode	1427	1969	4132	135	81	46	1943	1535	1065	452	240	138	5443	5317	7258
12	Wayanad	67	77	316	293	416	606	8152	9049	10638	162	41	2	10335	10966	12230
13	Kannur	7919	9661	14987	225	101	48	7355	6914	4510	8	11	76	19515	20540	23312
14	Kasaragod	22297	23412	25412	186	219	298	11271	7787	5697	174	305	4625	45827	44675	49503
	<b>State</b>	<b>109216</b>	<b>113472</b>	<b>130372</b>	<b>8926</b>	<b>9434</b>	<b>9147</b>	<b>113854</b>	<b>106302</b>	<b>95386</b>	<b>14227</b>	<b>12164</b>	<b>17788</b>	<b>401450</b>	<b>391811</b>	<b>387545</b>

Source: Agri. Statistics, DES



**POWER****DETAILS OF POWER GENERATION IN KERALA**

Table: 22.1

**1. KSEB HYDRO**

<b>Sl. No.</b>	<b>Name of Station</b>	<b>Power( in Mega Watts)</b>	<b>Energy (in Million Units)</b>
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
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**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

## MISCELLANEOUS

### TRADE AND COMMERCE

Ernakulam District has the place of honor on the commercial map of Kerala. It has won this unique position because of the location of the Cochin Harbour, 'the Queen of the Arabian Sea', in the District. The bulk of the sea borne trade of Kerala is carried on through the port of Cochin.

### COCHIN EXPORT PROCESSING ZONE

The Government of India has set up a separate zone for developing export oriented industries in the region. There are several units presently registered there. The items of export relate to scented oils, readymade garments, latex, gloves, electronic hardware, electronic software, food and agro products, etc.

### RAILWAYS

Railways play a significant role in the transport system of the District. Ernakulam is a major railhead of the Southern Railway. The Shornur- Cochin Harbour Terminus, Ernakulam- Thiruvananthapuram and Ernakulam- Alappuzha- Kayamkulam are the three broad-gauge railway tracks in the District. The length of broad-gauge railway track in the District is 53.94 kms. There are 6 railway stations in between Shornur and Cochin Harbour Terminus line and about 5 railway stations on the Ernakulam Junction- Thiruvananthapuram line within the District. Ernakulam Junction- Kayamkulam railway line has two railway stations within the District.

### PORT

The Cochin port known as 'the Queen of the Arabian Sea' is one of the major ports in India and it plays a very significant role in shaping the economy of the state. The port was planned, designed and constructed by the British Engineer Robert Bristow in 1920. The port is unique as it gives shipment facility even during the rainy season. Seventy five per cent of the total imports and exports of the State are carried out through this port. Super tankers meant for Kochi Refineries also call at this port. The principal commodities of export from this port are coir products, tea, rubber, coffee, cashew, kernels, chemicals, rice and other food grains, pepper, ginger, cardamom, turmeric, coconut oil, cashew shell liquid, lemon grass oil, timber, marine

products, oil cakes, machinery, iron and steel, mineral sand including granite and cement. The commodities which imported are rice, paddy, pulses, coal, machinery, iron and steel, tin plate, motor vehicles and spare parts, chemicals and chemical preparations, oil seeds including copra and ground nuts, drugs and medicines, paper, old newspaper and stationary, cotton (raw and waste), oil-man stores, provision and liquid sculpture, rock phosphate, fertilizers, liquid ammonia, salt, zinc concentrate, calcined bauxide, soda, candles, paraffin wax, cement etc.

The numbers of ships called at Cochin Port during year 2000-01 are 1100 as against 1096 in the year 1999-2000 and 858 during 1990-91. But the net registered tonnage decreased from 87.79 lakh tones during 1999-2000 to 82.17 lakh tones in the year 2000-01, an overall decrease of 6.41 per cent.

## **AIRPORTS**

Cochin is one of the four Airports in Kerala and regular Airport services are operated from Cochin to Delhi, Mumbai and Thiruvananthapuram. The Airport is under the control of the Defence Department of Government of India.

## **COCHIN INTERNATIONAL AIRPORT LTD.**

India's first Private Airport was opened in June 1999 at Nedumbassery. In June, 2000 it was raised to international level. Oman Airways started their operation from August 2001 and Silk Air started their operation from October 2001 are the major achievement of Cochin International Airport. During 1999-2000, 869 international flights were organized by Air India and 60 by Indian Airlines. Indian Airlines had operated 2367 domestic flights and 2101 domestic flights by Jet Airways. During 2000-01 the number of international flights operated by Air- India, Indian Airlines and Jet Airways mutually is 2454. The domestic flights have increased to 7874 during 2000-01 from 4468 during 1999-2000.

Table: 23.1

**NUMBER OF MOTOR VEHICLES HAVING VALID REGISTRATION AS ON 31.03.2010**

District	Goods		Buses		Four Wheelers			Three Wheelers		Tractors/ Trailors		Total		
	Four wheeler and above	Three wheeler	Stage carriage	Contract carriage	Motor Car	Motor Cab	Jeep	Autoricks haw	Motor Cycle	Tractor	Trailor		Other	
Ernakulam	53657	14493	5310	19234	159462	20219	2124	52307	553150	1341	1301	154	7881	890633

Table: 23.2

**KSRTC Operations Statistics during 2009-10**

Unit	No. of Buses held as on 31.03.10	No. of Schedules as on 31.03.10	No. of routes as on 31.03.10	Routes distance (Kms)	Gross Kms (in lakhs)	Effective Kms operated (in lakhs)	Passengers carried (in lakhs)	Average carrying capacity per bus
<b>Ernakulam</b>								
Aluva	69	66	40	3000	74.51	65.22	183.22	60
Ankamali	51	50	43	1290	56.28	45.33	113.53	60
Ernakulam	109	79	52	4732	127.66	110.3	134.75	60
Kothamangalam	45	41	24	2208	47.56	45.73	84.99	60
Moovattupuzha	74	67	68	3400	76.94	70.79	165.61	60
North Paravoor	57	50	95	3705	59.9	51.96	136.43	60
Perumbavoor	45	42	21	2297	48.34	45.92	137.43	60
Piravam	38	37	38	2850	35.46	31.62	79.56	60

Table: 23.3

**NEWLY REGISTERED VEHICLES FOR THE YEAR 2009-10  
(Provisional)**

<b>Transport Vehicles</b>	<b>Ernakulam</b>
Multi Axiled/ Articulated Vehicles	0
Trucks/ Lorries	211
Four Wheelers	0
Three Wheelers	479
<b>Total</b>	<b>690</b>
Stage Carriages	103
Contract Carriages	379
P.S.V.S	5
Other Buses EIV	144
<b>Total Buses</b>	<b>631</b>
Motor Cabs	1313
Maxi Cabs	22
Other Taxis	12
<b>Total Taxi</b>	<b>1347</b>
LMV Passenger 3 Wheelers	3143
4-6 Seaters	0
M Cycle on Hire	0
<b>Total</b>	<b>3143</b>
Other TVs	11
Total TVS	5822
Scooter	8863
Mopeds	964
Motor Cycle	220332
<b>Total</b>	<b>230159</b>
Cars	10825
Jeeps	1800
Omni Buses	144
Tractors	57
Trailors	154
Other Vehicles	16
<b>Total</b>	<b>12996</b>
<b>Total NTVS</b>	<b>44855</b>
<b>Grand Total</b>	<b>50677</b>



Table: 23.4

**GROWTH OF MOTOR VEHICLES IN ERNAKULAM DISTRICT AND THEIR INDEX (BASE 2001=100)**

District	2000-01		2001-02		2002-03		2003-04		2004-05	
	Motor Vehicles (Nos)	Index	Motor Vehicles (Nos)	Index	Motor Vehicles (Nos)	Index	Motor Vehicles (Nos)	Index	Motor Vehicles (Nos)	Index
1	2	3	4	5	6	7	8	9	10	11
Ernakulam	592536	100	734717	124	787086	132.8	838100	141.4	896933	151.4
2005-06		2006-07		2007-08		2008-09		2009-10		
Motor Vehicles (Nos)	Index	Motor Vehicles (Nos)	Index	Motor Vehicles (Nos)	Index	Motor Vehicles (Nos)	Index	Motor Vehicles (Nos)	Index	
12	13	14	15	16	17	18	19	20	21	
953249	160.9	1041205	175.7	748605	126.3	815863	137.7	890633	150.3	

Table: 23.5

**KSRTC Operations Statistics during 2009-10**

Unit	No. of Buses held daily	Average Kms Run per day per bus	Average Route length (Kms)	Earning per Vehicle on road per day (in Rs.)	Earning per Km of buses operated (in ps.)
<b>Ernakulam</b>					
Aluva	69	298	75	6372	2151
Ankamali	48	318	30	6831	2148
Ernakulam	102	141	91	9265	2250
Kothamangalam	44	321	92	6549	2026
Moovattupuzha	72	308	50	6689	2170
North Paravoor	56	309	39	6373	2059
Perumbavoor	47	307	109.38	6865	2225
Piravam	30	333	75	5955	1784

