Integrated Watershed Management Programme

State Perspective and Strategic Plan (SPSP) Kerala State

Submitted to

Department of Land Resources,
Ministry of Rural Development
Government of India

By

Local Self Government Department
Government of Kerala

State Perspective and Strategic Plan for IWMP

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Chapter I

1.0 Introduction

Physical features and physical-cum-political map of the State

Kerala lies within east longitudes 74 degree 52' and 72 degree 22' and north latitudes 8 degree 18' and 12 degree 48' , and constitutes 1.18 % area of the country and its total geographical area is 38, 863 sq km. There are mainly three broad physiographic divisions in the State, viz. High lands, Mid lands and Low lands. The low land is adjacent to the coast and extends up to an altitude of 7.5 m MSL. The High land is on the eastern part consisting of the hills and mountains of the Western Ghats and it extends from 75 m MSL and above. In between the High lands and the Low lands is the Midland having an undulating topography which extends from 7.5 m MSL up to 75 m MSL (Fig.2). The extent and percentage of area under the three divisions are given in Table 1.1

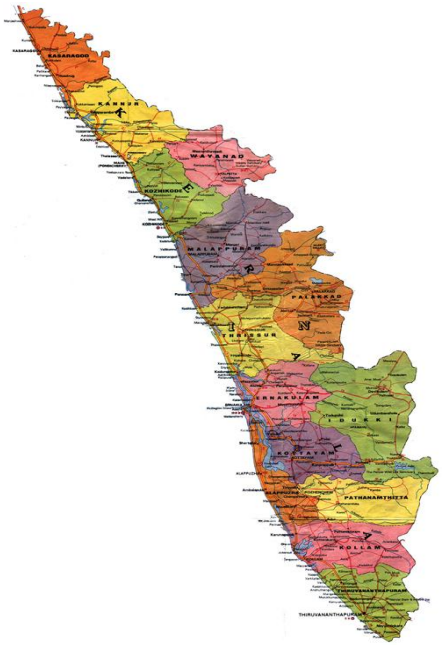


Fig.1. Political Map of Kerala

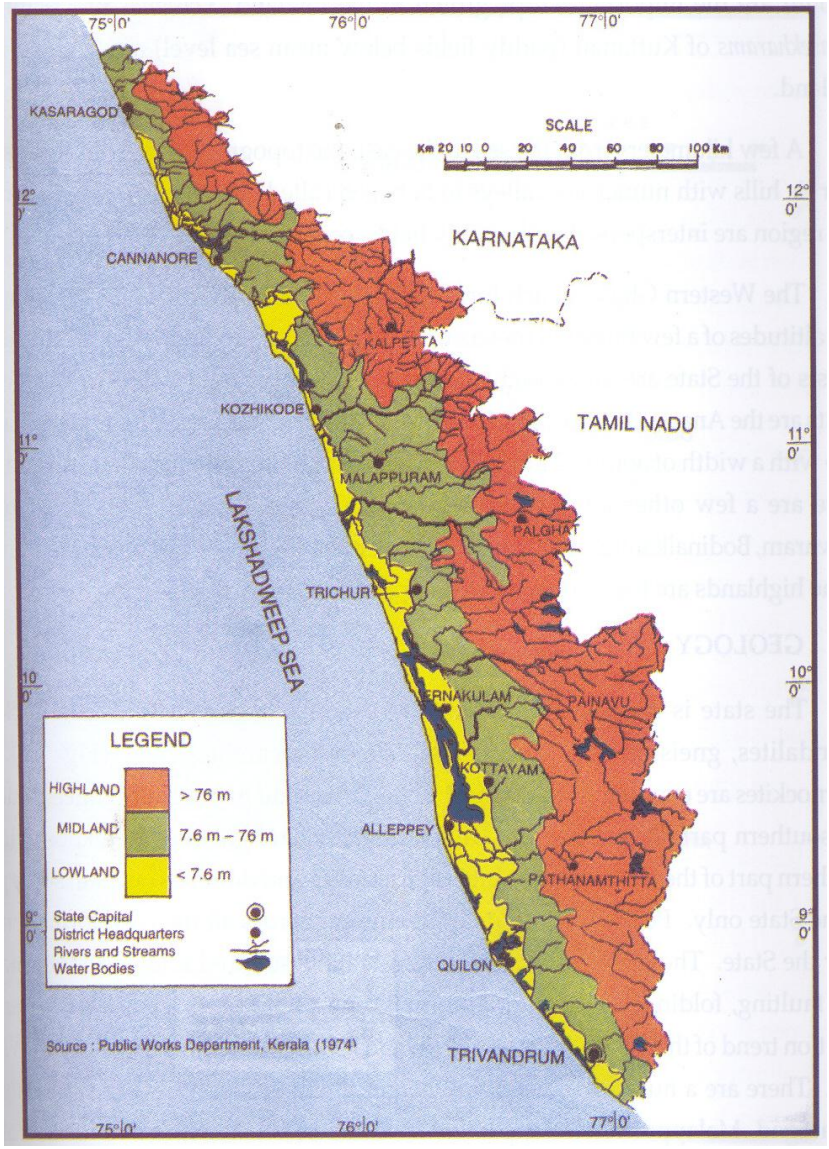


Fig.2 Physiographic map of Kerala (SoE report 2005)

Table.1.1 Physiographic Units, Altitudes and area

Unit	Altitude (m)	Area (Km^2)	Area (%)
Lowland	0 – 7.5	3979.3	10.24
Midland	7.5 - 75	16231.2	41.76
Highland	> 75 m	18653.5	48.00

Source: SoE report 2007

1.1 Drainage systems along with state map indicating major rivers

Kerala falls in the humid tropical climatic region, where the main climatic factor is the rainfall. As mentioned earlier the average annual rainfall of the State is 3000 mm, of which 65-70% is received during southwest monsoon (June-August), 18-22% during northeast monsoon (October-December) and remaining as pre-monsoon showers. Kerala is a narrow strip of land located very close to the Lakshadweep Sea. Kerala has an undulating topography with plain lands, valleys and hills. The width of the State varies between 15 and 120 km. The Western Ghats, which forms the eastern part of the State, rise from a very low altitude of few hundred meters up to 2000 m on an average. Kerala has a steep slope towards the Lakshadweep Sea. Rivers of varying lengths and widths and its tributaries mainly constitute the drainage system of the State. Out of the 44 rivers, 41 originate from the Western Ghats and flow towards the west and drains to the Lakshadweep sea, while three of them originate from Western Ghats within Kerala and join the Bay of Bengal. The longest river is the Bharathapuzha (about 374.40km).

Fig.3. Rivers of Kerala

Source: SoE Report 2007

The drainage pattern of the State exhibits large variations due to the spatial and temporal variation of the rainfall in the State. Heavy runoff is occurs in the river system during the monsoon periods between June and December. About 80-90% of the annual flow is recorded during these periods. During the rest of the period that is between January and May the runoff in the river systems are very minimal

1.2 Brief description of all river basins

The entire land area of Kerala can be subdivided into 41 major and 4 minor west draining basins and three east draining sub-basins forming part of the Cauvery River system. Then there are a few coastal wetland areas not draining into any river but connected to backwaters or estuaries. Extensive areas of Alleppey district in the thaluks of Cherthala and Ambalapuzha, part of the Vaikom thaluk of Kottayam district, parts of Chavakkad thaluk in Thrissur district are examples of such land areas in Kerala.

Of the 41 major and 4 minor distinct west sloping basins 10 are multi-State basins. All the three east-draining basins are parts of larger sub-basins in the adjacent States.

The 45 west draining river basins and the 3 east draining basins can be segregated on the basis of the extent of the basin into four categories. The first category includes the major basins with more than 1000sq km basin area. 13 basins including Kabini fall within this category. (In the case of multi-State basins, the area falling within Kerala alone is taken into consideration) These are

1. Periyar (5284sq km)
2. Bharathapuzha (4400sq km)
3. Chaliyar (2535sq km)
4. Pamba (2235sq km)
5. Kabini (1920sq km)
6. Kallada (1699sq km)
7. Moovattupuzha (1554sq km)
8. Achankoil (1484sq km)
9. Chalakkudy (1404sq km)
10. Valapattanam (1321sq km)
11. Meenachil (1272sq km)
12. Kadalundi (1122sq km)
13. Karuvannur (1054sq km)

The second category of basins has more than 500sq km area but less than 1000sq km. There are 8 such basins including the east flowing Bhavani. They are

1. Manimala (847sq km)
2. Karamana (702 sq km)
3. Vamanapuram (687 sq km)
4. Ithikkara (642 sq km)
5. Korapuzha (624 sq km)
6. Kuttiyadi (583 sq km)
7. Chandragiri (570 sq km) (Another 836sq km is in Karnataka)
8. Bhavani (562 sq km)

Trivandrum and Kozhikode districts have two each of these medium size rivers.

The third category of rivers includes basins extending over less than 500sq km but more than 100sq km. There are 18 such basins including the east flowing Pambar. They are

1. Neyyar (479 sq km)
2. Kuppam (469 sq km) (Another 70sq km falls in Karnataka)
3. Kariangode (429 sq km) (Another 132sq km is in Karnataka)
4. Anjarakkandi (412 sq km)
5. Keecheri (401 sq km)
6. Mahe (394 sq km)
7. Pambar (384 sq km)
8. Peruvamba (300 sq km)
9. Shiriya (290 sq km) (Another 297 sq km are in Karnataka)
10. Puzhakkal (234 sq km)
11. Pallikkal (220 sq km)
12. Neeleswaram (190 sq km)
13. Chittari (145 sq km)
14. Kavvayi (143 sq km)
15. Tellichery (132 sq km)

16. Mogral (132 sq km)
17. Tirur (117 sq km)
18. Mamom (114 sq km)

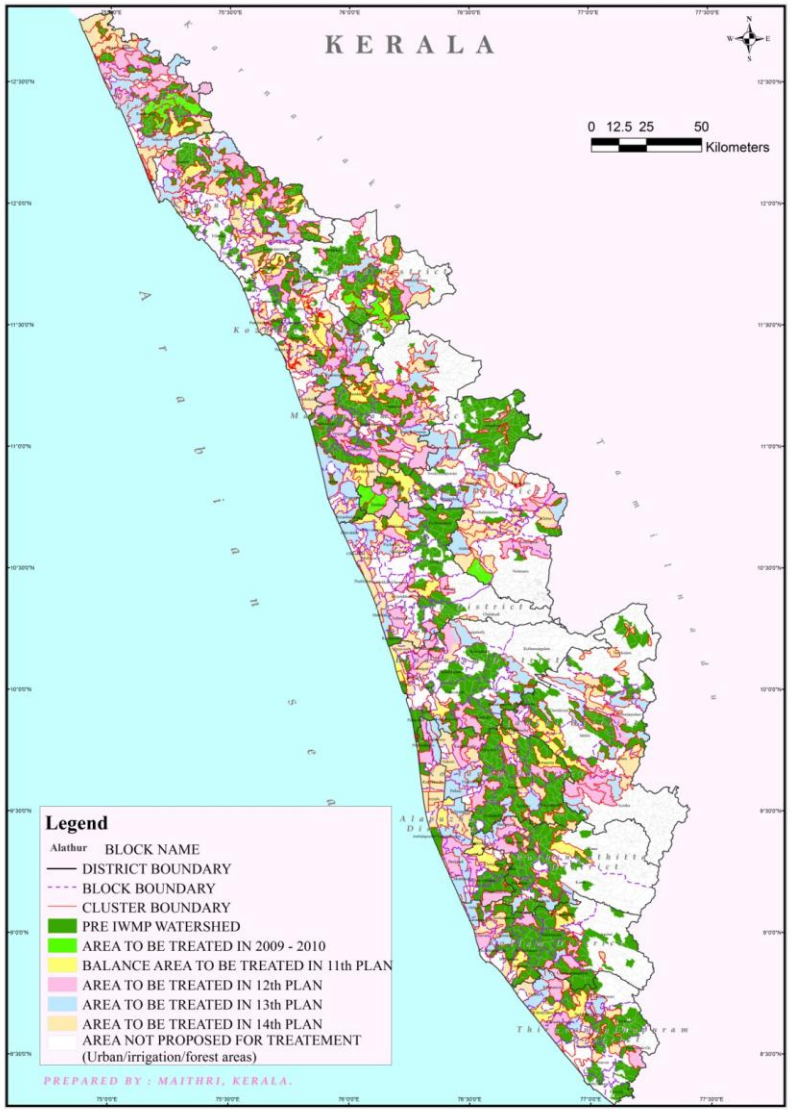
Of these small basins, 6 are in Kannur district and 5 are in Kasargod district.

Then there are the small coastal basins with less than 100sq km area. There are a 9 such basins. They are

1. Kallayi (96 sq km)
2. Manjeshwar (90 sq km)
3. Uppala (76 sq km)
4. Ayroor (66 sq km)
5. Ramapuram (52sq km)
6. Bekal (26 sq km)
7. Kumbala (25 sq km)
8. Pooraparamba (23 sq km)
9. Kalnad (19 sq km)

1.3 Demarcation of micro-watersheds along with code nos. on a map.

Fig.4. Micro watersheds of Kerala



1.4 Overview of the State

The total population as per 2001 census is 31841374 out of which the male population is 15468614 and the female population is 16372760. Kerala has recorded a growth of 9.43% in population during the 10 year period between 1991 and 2001. The total population as per 1991 Census was 29098518. The male population during 1991 was 15468614 and the female population was 14809523. Kerala has a population density of 819 (Census 2001) and ranks eighth among the Indian States. During 1991 the density of population was 749. Kerala's literacy rate of 90.92 (2001) is the highest in India.

Table SPSP 1: State Profile* (Source: Census 2001, DES, GoK)

1	2	3	4	5	6	7									
No	Name of District	No. of Blocks	Total no. of villages	No. of GPs	Geographical area in Ha.	Population (As per the 2001 Census)									% of BPL to total population
						Male			Female			Total			
						SC	ST	Others	SC	ST	Others	SC	ST	Others	
	Thiruvananthapuram	12	115	78	218600	178718	9890	1381979	192139	11003	1461297	370857	20893	2842606	39.13
	Kollam	13	104	71	251838	147518	2408	1038923	156044	2699	1111936	303562	5107	2150859	39.32
	Pathanamthitta	9	68	54	268750	78731	3184	507483	83271	3365	557982	162002	6549	1065465	33.06
	Alappuzha	12	91	73	136058	96900	1565	916064	102331	1566	990734	199231	3131	1906798	45.95
	Kottayam	11	95	75	219550	73885	8972	882069	76397	9368	902955	150282	18340	1785024	18.10
	Idukki	8	64	52	514962	79389	25510	461783	79973	25463	457103	159362	50973	918886	15.29
	Ernakulam	15	117	88	235319	129706	5079	1403612	133812	4967	1428622	263518	10046	2832234	26.56
	Thrissur	17	138	92	299390	171443	2293	1248316	182783	2533	1366864	354226	4826	2615180	33.54
	Palakkad	13	156	91	438980	210624	19990	1036371	221954	19675	1108868	432578	39665	2145239	52.13
	Malappuram	14	135	102	363230	140535	5996	1608045	144907	6271	1719717	285442	12267	3327762	41.18
	Kozhikode	12	117	78	233330	98386	2924	1298048	102597	3016	1374160	200983	5940	2672208	34.84
	Wayanadu	3	49	25	212560	16738	67394	307141	16626	68668	304052	33364	136062	611193	49.87
	Kannur	9	129	81	296797	48275	9793	1094749	50716	10176	1195247	98991	19969	2289996	38.85
	Kasaragod	4	75	39	196133	44904	15132	528047	45314	15206	555475	90218	30338	1083522	44.46
	Total	152	1453	999	3885497	1515752	180130	13712630	1588864	183976	14535012	3104616	364106	28246972	**36.58**

*from column no.2, total no. of districts; from columns 3, total no of blocks, from columns 4, total no of villages, from columns 5, total no of Gram Panchayats, from column no.6 to 7 the totals for the entire State may be given at the end of the table.

1.5. Economic Development

a. Economic growth of the State, Growth of net state domestic product, per capita income

The achievements of the people of Kerala are the result of major social, economic, and political transformations. These changes have roots in Kerala's history, but they were also, in an important sense, achievements of public action in post-1957 Kerala (the present state of Kerala was established in 1956. They were possible because there was mass literacy; because agrarian relations were transformed; because there were important changes in the conditions of freedom of the people of the oppressed castes; because of enlightened social attitudes toward girls' and women's survival and education, and because of the public policy interventions of governments in Kerala. All of these conditions are replicable

Nearly 50% of the State's population depends upon agriculture. A unique feature of the State is the predominance of cash crops. Kerala is a major producer of coconut, rubber, pepper, cardamom, ginger, cocoa, cashew, arecanut, coffee and tea. Tree spices like nutmeg, cinnamon, cloves etc. are also cultivated. Rice and tapioca are important food crops. Coconut production was 5,167 million nuts in 2000 and 2001.

The agriculture sector in the State recorded an average growth rate of 3.6%. A review of the long term performance of the crop sector, over the last decade, shows that the total output from the sector has recorded an average annual growth 2.5%. There was, of course, a large scale shift from high volume low value crops like tapioca and rice to low volume, high value crops like pepper and rubber. The per capita income during 2003-04 at current prices works out to Rs. 24130 (Table 1.5). The share of Primary Sector in the Net Domestic Product is only 16.70%

Table. 1.5. Net State domestic product at factor cost by industry of origin of Kerala for the years from 1998-99 to 2003-2004 (at current prices)

Base: 1993-94 **(Rs.in lakhs)**

No	Industry of Origin /Year	98-99	99-2000	2000-01	2001-02	2002-03 Provisional	2003-04 Quick
1	Agriculture	1114695	1222120	1067820	1026498	1040724	1038268
2	Forestry & Logging	103613	121479	195541	118930	115838	110625
3	Fishing	111189	135343	136319	138132	138587	147128
4	Mining and Quarrying	9634	11249	15752	15299	18523	22646
SUB TOTAL OF PRIMARY		**1339131**	**1490191**	**1415432**	**1298859**	**1313672**	**1318667**
5	Manufacturing	558175	612334	603075	550833	571778	592406
5.1	Registered	301905	344959	342089	308834	330224	350854
5.2	Un-registered	256270	267375	260986	241999	241554	241552
6	Electricity, Gas and Water supply	57794	77090	137799	151264	201144	260205
6.1	Electricity	51536	69490	127404	138551	185381	240068
6.2	Gas	1109	1251	1322	1542	1679	1835
6.3	Water supply	5149	6349	9073	11171	14084	18302
7	Construction	534385	490976	651710	701567	816259	933928
SUB TOTAL OF SECONDARY		**1150354**	**1180400**	**1392584**	**1403664**	**1589181**	**1786539**
8	Transport, Storage& Comm.	324347	376451	448039	508635	596679	699094
8.1	Railways	11155	12818	9170	12364	14102	16100
8.2	Transport by other means	245683	298910	353109	381115	440329	505474
8.3	Communication	66440	63709	84565	113737	140661	175720
8.4	Storage	1069	1014	1195	1419	1587	1800
9	Trade, Hotel & Restaurants	1167492	1295247	1534603	1470945	1657130	1841859
10	Banking & Insurance	270687	300062	337028	391791	435946	499645

11	Real estate ownership, Business, legal	232654	269437	342265	389379	452497	527419
12	Public Administration	222145	307385	317024	313409	361982	414380
13	Other Services	399286	473431	584536	605045	699281	805710
SUB TOTAL OF TERTIARY		**2616611**	**3022013**	**3563495**	**3679204**	**4203515**	**4788107**
NET DOMESTIC PRODUCT		**5106096**	**5692604**	**6371511**	**6381727**	**7106368**	**7893313**
Population ('000)*		31168	31432	31699	31968	32357	32711
Per capita income (in Rupees)		**16383**	**18111**	**20100**	**19963**	**21962**	**24130**

*Population figures are estimated on the basis of 1991 & 2001 Census.

b. ***Role of watershed management in the State – Importance of watershed programme for the State, historical background of watershed development in the State, current status, expected outcomes, etc.***

The Watershed Approach aimed at augmentation and stabilization of production and productivity, minimizing ecological degradation, reduction in regional disparity, opening up of greater opportunities for employment of rural poor in the rain fed areas Management of land resources under the watershed programme includes both cultivated rain fed land as well as uncultivated land under ownership of private land owners, Panchayat, revenue department etc. This is being done with a view to increasing food production as well as diversifying the existing farming system particularly of small and marginal farmers through sustainable enhancement of productivity. The watershed approach would result in improving the productivity of not only agriculture and allied commodities but also the overall production of bio-mass for enhancement of self-employment opportunities and thus the overall income of the rural household. A naturally demarcated unit watershed area has to be taken up for treatment. But often a readymade intervention package (such as so many meters of soil conservation stone pitched bunds) is arbitrarily applied on a randomly selected area.

Even when a watershed unit is correctly identified, the treatment that area receives and a rationale for the choice of that watershed have no bearing on the specific function that area has within the basin. Basins, even the simplest, have heterogeneity of forms and functions within their constituent subunits. So far there has not been any attempt to develop a clear status picture of each of the basins and formulate basin level watershed Eco restoration programs.

Integration of the treatment measures for soil, water, biomass and the atmosphere i.e. factors constituting the local environment is utmost essential. Such integration alone will optimize biomass production. Achieving the highest sustainable biomass production potential is the best indicator for a sustainable, healthy ecosystem. But so far our attempts have been to mechanically retain some water and soil matrix in locations convenient to us.

A self-sustaining ecosystem alone can modulate the local climate buffering the location from wide climatic oscillations. Only an intricately structured natural ecosystem or a man-modified system mimicking the natural system can regulate the solar energy flux that area receives. It is this energy input which influences climate and weather and the wide oscillations of this input result in disruptive climatic change including droughts and floods.

Only a healthy ecosystem can optimize the local biomass production and sustain nutrient export downstream. The generation and export of nutrients from ecosystems through the drainage channels is an often forgotten vital function of a basin.

Under a set of given local physical environmental and climatic conditions, maximum potential moisture retentivity and groundwater retention is possible only with such an ecosystem.

In Kerala, soil loss is mainly due to flowing water. But water loss is partly due to wind dispersal of moisture. Only vegetative measures can be depended upon for reducing the wind energy and increasing the atmospheric humidity. Humid, denser air column moves with less speed. Moisture loss due to evaporation and evapo-transpiration is drastically curtailed by vegetation. This is achieved both by the regulation of energy flux and also by building up soils rich in organic content. Moist dense vegetation cover insulates land surface and reduces heat energy absorption by the substratum. Absorbing incoming heat energy and by using it up through evapo-transpiration and evaporation, plant cover lowers atmospheric temperature. This in turn reduces evaporation and evapo-transpiration water loss from the land surface. Generating soils, which are rich in organic content, which in turn retains a high proportion of moisture, the cooler soil strata in turn, insulates against drastic energy oscillations. Soils rich in organic content store more water due to their porosity and also due to the organic content storing bonded water. The litter-mulch insulation on one hand generates and maintains the soil and on the other prevents evaporation loss of soil moisture as well as permits longer duration of time for incoming waters to be absorbed by the soil strata.

Historical Background

Government took an important policy decision during the IX Plan period that the development plans of the Local Self Government (LSGD) institutions should be on watershed basis. As part of this decision, various committees were constituted at different levels, and the initial works on the preparation of watershed based master plans were also undertaken. Micro watersheds of approximately 500 ha size were delineated and resource inventories had also been prepared at the Block level.

On the basis of the decision of the Government to continue the watershed based approach during the X Plan period also, directions were issued to take up further activities for the preparation of the watershed master plans and in the case of agriculture and allied sectors it was made compulsory that the development plans should be watershed based.

The Integrated Watershed Development Project (IWDP), Hariyali, Western Ghats Development Programme (WGDP), National Watershed Development Programme for Rain fed Areas (NWDPRA), currently being implemented in the State are Centrally sponsored watershed development programmes. The National Rural Employment Guarantee (NREG) scheme gives top priority for watershed development. Government has decided that the XI Plan proposals of the LSGD institutions should be on watershed approach.

Chapter 2

2.0 Agro-climatic zones

Based on altitude, rainfall, soil and topography, the state has been delineated into thirteen agro-climatic zones. Block Panchayat has been taken as the unit for purposes of delineation. All the Blocks, Municipalities and Corporations have been grouped into appropriate agro-ecological zones. Whenever a Block or Municipality was found to fall in more than one agro-climatic zone, it was assigned to that zone which has the largest area. Though 13 agro-climatic zones have been identified, no Block was assigned to one zone viz. the Riverbank alluvium as it is found scattered in several blocks. This zone is found generally all along the banks of the major rivers. It is found relatively extensively in the lower basins of the Periyar and Pampa river systems. Further, such alluvium deposits are generally found in the paddy fields that form the valley portions of the undulating landscape, which is interspersed with mildly sloping hills. The principal characteristics of each zone are summarized in Table 28. Each of the zones identified is assigned a popular name. Many of them are currently in vogue and are associated with areas having singular agro-climatic features and cropping patterns.

The State is subdivided into four agro-climate zones as per State Land Use Board records (Table SPSP 2). The Kerala Agricultural University has adopted a much more detailed zonation and the State is divided into 13 agro ecological zones (Table SPSP 2(1))

Table SPSP 2: Details of Agro-climatic zones in the State (Source: SLUB 1997, KAU, Meteorological Department)

1	2	3	4	5		6	7	
No	Name of the Agro-climatic zone	Area in Ha.	Names of the districts	Major soil types		Average rainfall in mm (preceding 5 years average)	Major crops	
				a)Type	b) Area in Ha.		a)Name	b) Area in Ha.
	South Zone	665455	Thiruvananthapuram, Kollam, Pathanamthitta, Kottayam	laterite Sandy loam Alluvial soil		TVM:1955 KLM:2729 PTA:3087 KTM:3047	Table. SPSP 2(1)	Table. SPSP 2(1)
	Central Zone	759675	Ernakulam, Thrissur, Palakkad (Pokkali, Kole, and Attappady area excluded)	Laterite Soil Sandy loam Alluvial soil Black soil		EKM: 3250 TCR: 3097 PKD: 2363	do	do
	North Zone	1057350	Malappuram, Kozhikode, Kannur, Kasaragod	Laterite soil Sandy soil		MLP: 2560 KNR: 3375 KKD; 3185 KSD:3480	**do**	**do**
	Special Zone on Problem areas	478350	Parts of Alappuzha, Kottayam, Ernakulam, Thrissur, Malappuram	Alluvial soil		ALP: 3025	**do**	**do**
	High Altitude Zone	917050	Wayanadu, Idukki, Attappady Hill ranges of Palakkad, thannithode, Seethathode Panchayats of Pathanamthitta, Ariyan kavu, Kulathupuzha and Thenmala Panchayats of Kollam, Peringamala, Vithura, Aryanad, Kallikkad and Amboori Panchayats of Thiruvananthapuram.	Laterite soil Loamy Soil		WYD: 3622 IDK: 3946	**do**	**do**
	Total	**3877880**						

*From column no.3, Zone-wise total area, from column no.4, No. of districts, from column no. 6, district-wise average rainfall, from column no.5&7, category-wise area, for the entire State may be indicated at the end of the Table.

Table SPSP 2 (1): Agro-ecological zones of Kerala: Main features and distribution (Source: Kerala Agricultural University)

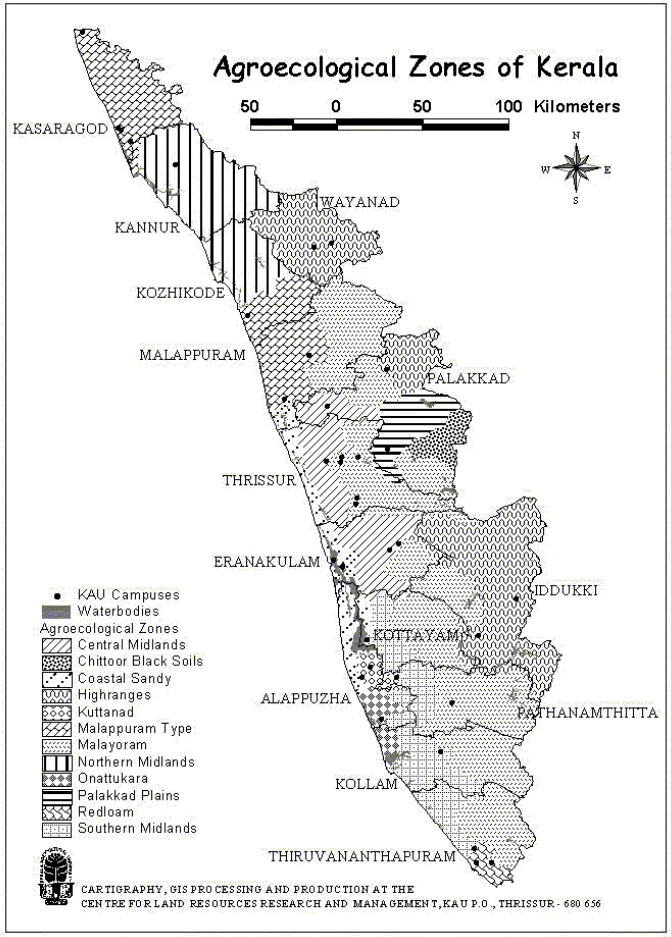
No.	*Zones*	*Altitude type*	*Rainfall pattern*	*Topography model*	*Soil type*
I	**Onattukara**	**I**	**I**	**I**	**Sandy loam**
Quilon ©, Chavara, Karunagappally, Ochira, Kayamkulam (M), Mavelikkara, Mavelikkara (M), Muthukulam[1], Haripad[2]					
II	**Coastal Sandy**	**I**	**I**	**I**	**Sandy loam**
Ambalapuzha[2], Alleppey (M)[2], Aryad[3], Kanjikuzhy[3], Cherthalai (M), Pattanakad[3], Thykkattussery[3], Vaikom (M), Vaikom[3], Vyttila[4], Edappally[4], Palluruthy[4], Kochi ©[4], Vypeen[4], Parur[4], Parur (M), Kodungallur, Thalikkulam, Mathilakom, Chavakkad, Andathode[5], Ponnani[5]					
III	**Southern midlands**	**I**	**I**	**III**	**Laterite without B-horizon**
Trivandrum ©, Trivandrum Rural, Kazhakkuttam, Chirayinkeezh, Attingal (M), Varkala, Kilimannoor, Ethikkara, Mukhathala, Anchalummude, Chadayamangalam, Kottarakara, Vettikkavala, Chittumala, Sasthamkotta, Elanthur, Pandalam, Kulanada, Bharanikkavu, Chengannur[7], Koippuram[7], Thiruvalla (M)[7], Mallappilly[7], Changanacherry (M), Madappally[2], Pallom, Kottayam (M), Ettumannur[2], Kaduthurithy					
IV	**Central midlands**	**I**	**I & II**	**IIa**	**Laterite**
Pampakuda, Vadavucode, Koovappady, Perumbavoor (M), Vazhakkulam, Aluva (M), Alangad[7], Parakadavu[7], Angamaly, Mulanthuruthy, Mala, Vellangallur[5], Irinjalakkuda (M), Irinjalakkuda[5], Cherpu[5], Anthikkad[5], Thrissur ©, Puzhakkal[5], Mullassery, Kunnamkulam (M), Chowannur, Trithala, Pattambi, Ottappalam					
V	**Northern midlands**	**I**	**II**	**IIb**	**Laterite**
Pandalayani[8], Balusseri, Perambra, Meladi, Vadakara (M), Thodannur, Kunnummel, Tuneri, Badagara, Thalassery[6], Thalassery(M), Kuthuparamba, Edakkad, Cannanore (M), Irikkur, Cannanore[6], Taliparamba, Payyannur					
VI	**Malappuram type**	**I**	**II**	**IIc**	**Laterite**
Tirur, Kuttipuram, Tanur, Tirurangadi, Vengara, Malappuram, Manjeri, Kondotty, Kozhikode[8], Kozhikode ©, Chevayur, Kunnamangalam, Koduvally, Nileshwar[8], Kanhangad[9], Kasargod[9], Manjeshwar[9]					

VII	**Malayoram**	**I**	**I**	**III**	**Laterite without B**
Perumkadavila, Vellanad, Nedumangad, Vamanapuram, Anchal, Pathanapuram, Parakode, Konni, Ranni, Vazhoor, Kanjirappally, Pampady, Erattupetta, Lalam, Pala (M), Uzhavoor, Thodupuzha, Elamdesam, Muvattupuzha, Muvattupuzha(M), Kothamangalam, Chalakudy[7], Kodakara[7], Ollukkara, Pazhayannur, Mannarkkad, Sreekrishnapuram, Perinthalmanna, Mankada, Vandur					
VIII	**Palakkad plains**	**I**	**II**	**II**	**Red loam**
Alathur, Palakkad, Palakkad (M), Kuzhalmannam, Nemmara[10]					
IX	**Red loam**	**I**	**I**	**III**	**Red loam**
Nemom, Neyyattinkara (M), Athiyannur, Parassala					
X	**Chittoor black soil**	**I**	**II**	**IIa**	**Black soil**
Chittur, Kollengode					
XI	**Kuttanad**	**I**	**I**	**I**	**Peat (kari)**
Chambakulam, Veliyanad, Pulikeezhu[7]					
XII	**Riverbank alluvium**	**I**	**I**	**I**	**Alluvium**
Distributed as narrow stretches in the river banks all over Kerala					
XIII	**High ranges**	**II**	**I & II**	**III**	**Red loam**
Arudai, Devikulam, Attapadi, Kalpetta, Sultan Battery, Mananthavady					

Table SPSP 2 (1) contd. Agro-ecological zones Source: Kerala Agricultural University

Parameter	Level	Description		
I. Altitude	Type I	Up to 500 m above MSL (Low altitude zone- hot humid tropics, spread over the entire state)		
	Type II	More than 500 m above MSL		
II. Rainfall	Pattern I	Both the southwest and northeast monsoons are active and moderately distributed. Southwest monsoon with June maximum (South of 11ºN latitude).		
	Pattern II	Poorly distributed rainfall; southwest monsoon with July maximum and concentrated in 3-4 months. Northeast monsoon relatively weak (North of 11^0 N Latitude).		
III. Soil types	1	Alluvial soil (Spread over river banks)		
	2	Sandy soil (Coastal areas)		
	3	Sandy loam soil (Coastal areas)		
	4	Laterite soil with well defined B horizon (Natural midlands)		
	5	Laterite soil without B-horizon (Natural highlands).		
	6	Red soil (Southern-most Kerala)		
	7	Black soil (Chittur thaluk of Palakkad district)		
	8	Peat (kari) soil (Kuttanad)		
	9	Acid-saline soil (Pokkali and Kaipad areas)		
IV. Topography		*Valleys*	*Hill tops*	*Slopes*
	Model-I	Extensive valleys with level but raised garden lands		
	Model-IIa	Valleys less extensive	Hills with moderate gradients	Slopes having mild gradients

Fig. 5. Agro ecological Zones of Kerala



Source: Kerala Agricultural University

Soil Types and their Distribution

Kerala is endowed with a variety of soils thanks to the climate, topography, and vegetation characteristics. Laterite and loams form the major soil types of Kerala. The other soil types developed as a result of agro climatic variations include riverine and coastal alluvium, black soils, and problem soils like acid saline, hydromorphic, and greyish Onattukara.

1. Red soil: The red colour is due to the presence of Fe2O3.Localised in southern parts of Thiruvananthapuram. The soil is almost homogeneous. Acidity ranges from 4.8 to 5.9. The gravel content is comparatively less. Low in essential nutrients and organic matter.

2. Laterite soil: Majority of area comprises this type of soil. Heavy rainfall and high temperature are conducive for laterisation. Laterites are poor in available N and P. Low in Water Holding Capacity and CEC is low.

3. Coastal alluvial soil: Seen in the coastal tracts along the west. They have been developed from recent marine deposits. Permeability is more. Low organic matter content. Low CEC. Water Holding Capacity is less.

4. Riverine alluvial soil: Seen along the banks of rivers. Shows wide variation in physio-chemical properties depending on the nature of alluvium and the characteristic of the catchment area through which the river flows. Organic Matter, N and K are moderate.

5. Greyish Onattukara soil: Sandy soil confined to the Onattukara region. They occur as marine deposits and extend to the interior up to the laterite soil. Extremely deficient in plant nutrients. CEC is also poor.

6. Brown hydromorphic soil: Localized in river valleys. Mostly confined to the valley bottoms of undulating topography in the mid lands and low lying areas of coastal strips. Exhibits wide variation in physico-chemical and morphological properties. Drainage is the major problem. Moderately supplied with organic matter, N and K. Deficient in lime.

7. Hydromorphic saline soil: Found in the coastal tracts of Ernakulam, Thrissur and Kannur districts. During rainy season the fields are flooded leaving the area almost free of salt. Maximum accumulation of salts occurs during summer.

8. Acidic saline soil: Seen in Kuttanad region covering about 875 sq.km. Soil face with serious problems of hydrology, flood, acidity and salinity. Typical water logged soils

a) Kayal soil: It comprises reclaimed areas of Kottayam and Alappuzha districts. Slightly acidic. Medium in organic matter content. Poor in available nutrients but rich in Ca.

b) Karappadam: Distributed over a large area of upper Kuttanad. River borne alluvial soil 1-2 m. below the sea level. Generally clay loam in texture, high acidity, fair amount of organic matter, poor in available nutrients particularly P. Deficient in lime.

c) Kari soil: Acidity is due to the presence of different forms of S. Kari soil resemble Peat soil.

9. Black soil: Seen in Chittur area of Palakkad district. Low in Organic matter, calcareous, moderately alkaline, and high in clay content. CEC is high. Medium in P and K content and low in N.

10. Forest soil: A product of weathering of crystalline rocks under forest cover. Rich in organic carbon. PH acidic. Rich in N and poor in P.

Major problems of Kerala soils are acidity, salinity, water logging and poor physical properties. 88% of soils are acidic. 60% of the area is medium in available N, 65% of the area is low in available P and 75% is low in available K.

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Table. SPSP-2(2).Area and Production of important crops and % variation from 1961-62 to 2005-06

Sl No	Crop	Area (ha)			Production (Tonnes)		
		1961-62	2005-06	% variation	1961-62	2005-06	% variation
1	Rice	753009	275742	-63	988150	629987	-36
2	Tapioca	236776	90539	-62	1618713	2568284	59
3	Coconut	505035	897833	78	3247mn	6326mn	95
4	Pepper	99887	237998	138	26550	87605	230
5	Cashew	55051	78285	42	84449	68262	-19
6	Rubber	133133	494400	271	24589	739225	2906
7	Groundnut	15993	3299	-79	13533	2441	-82
8	Seasamum	11953	600	-95	2539	210	-92
9	Cotton	9587	2655	-72	23751bales	3452bales	-85
10	Pulses	43546	10562	-76	16889	7940	-53
11	Ginger	12050	12226	1	11185	56288	403
12	Turmeric	4847	3384	-30	4267	8237	93
13	Banana	42693	61400	44	55443	491823	787
14	Tobacco	704	43	-94	915	69	-92
15	Total cereals	766381	278617	-64	999566	631591	-37
16	Arecanut	56764	108590	91	8091mn	24478mn	203
17	Coffee	18807	84644	350	8145	60175	639
18	Tea	37426	35043	-6	37428	56384	51

(Source : Dept. of Economics and Statistics, 2007)

2.1 Rainfall

a) ***Rainfall in the State, months during which rainfall is received in the State, distribution of rainfall over the year with average rainfall per month, type of monsoon etc.***

The total annual rainfall in the State varies from 360 cm. over the extreme northern parts to about 180 cm. in the southern parts. The southwest monsoon (June October) is the principal rainy season when the State receives about 70% of its annual rainfall. Monsoon rainfall as percentage of annual rainfall decreases from north to south and varies from 83 % in north most district of Kasaragod to *50%* south most district of Thiruvananthapuram. Northeast monsoon rainfall as percentage of annual rainfall increases from north to south and varies from 9% in the northern most district of Kasaragod to 27% in the southern most district of Thiruvananthapuram. The rainfall amount in the State decreases towards the south with decrease of height of Western Ghats. The southernmost district of Thiruvananthapuram where Western Ghats are nearest to the sea coast and its average height is also least in the State receives minimum amount of rainfall. The thunderstorm rains in the pre-monsoon months of April and May and that of monsoon months are locally known as 'EDAVAPATHI'. Rainfall during northeast monsoon season is known as 'THULAVARSHAM' in local language. The southwest monsoon sets -over the southern parts of the State by about 1 st June and extends over the entire State by 5 th June. June and July are the rainiest months, each accounting individually to about 23% of annual rainfall

b) A brief description of droughts and floods in the State

(i). Flood

Although Kerala state is characterized by undulating topography, almost 25% of the total geographical area is prone to floods (SOE Report 2007). The flood prone areas include Kuttanad regions around Vembanad Lake, Kole lands of Thrissur and Ernakulam districts and other low lying areas, flood plains and flat bottomed villages all through the state. The flood prone areas accommodate about 18% of Kerala's population. The change in land use pattern is a primary factor for the flood problem. Other major factors are extreme rain fall and management of water resources and forests.

Table SPSP 3: Details of average rainfall recorded at the District headquarters

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	Eranakulam	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: SoE report 2007

(ii). Drought

Kerala has been experiencing increasing incidents of drought in recent past due to weather anomalies and developmental pressures resulting from the changes in land use, traditional practices and life style of the people. The increase in population and subsequent expansion in irrigated agriculture and industrial growth necessitated exploitation of more water resources. The special and temporal variations in rain fall highly undulating topography, low water retention capacity of the soils, high population density are some of the factors that accelerated the problem. The water scarcity in summer is reflected in dry rivers and lowering water table.

Table SPSP 4: Details of drought and flood affected districts, blocks and villages in the State during last 10 years * (MIS Table-M (SP) 6)

1	2	3	4	5	6		7
No	Name of the District	Particulars	Names of the Block	Villages	Periodicity		Not affected
					Annual	Any other (pl. specify)	
	District wise Details furnished in Table SPSP4(1) and (2)	Flood	Details in SPSP4(2)	No.of villages			
				Name (s) of villages			
		Drought	Details in Table SPSP4(1)	No.of villages			
				Name(s) of villages			
	State Total	Flood		No.of villages	1017		435
				Name (s) of villages			
		Drought		No.of villages	693		759
				Name(s) of villages			

Source: GoK figures compiled from various Govt. Orders

Table SPSP 4(1): Details of drought and flood affected districts, blocks and villages in the State during last 10 years.

Drought affected areas

District	Thaluk	No. of Villages
Thiruvananthapuram	Thiruvananthapuram	11
	Neyattinkara	11
	Nedumangad	6
	ChirayinKeezhu	8
Total		**36**
Kollam	Karunagappally	6
	Pathanapuram	8
	Kollam	14
	Kottarakara	11
	Kunnatur	4
Total		**43**
Pathanamthitta	Ranni	11
	Mallappally	9
	Thiruvilla	4
	Adoor	10
Total		**34**
Alappuzha	Kuttanad	14
	Karthikappally	10
	Mavelikkara	6
	Ambalappuzha	9
	Chengannur	5
	Cherthala	20
Total		**64**
Idukki	Udumbanchola	21
	Devikulam	17
Total		**38**

Kottayam	Kottayam	18
	Changanassery	4
	Vaikom	9
	Kanjirappaly	12
	Meenachal	26
	Changanacherry	15
	Meenachil	12
Total		**96**
Thrissur	Kodungalloor	12
	Thrissur	9
	Chavakkadu	15
	Mukandapuram	14
	Thalappilly	26
Total		**76**
Ernakulam	Entire Thaluk	63
Palakkad	Entire Thaluk	83
Malappuram	Entire Thaluk	39
Kozhikode	Entire Thaluk	9
Wayanadu	Entire Thaluk	48
Kannur	Entire Thaluk	25
Kasaragod	Entire Thaluk	39
Grand Total		**693**

Table SPSP 4 (2): Details of drought and flood affected districts, blocks and villages in the State during last 10 years

Flood affected areas

District	Thaluk	No of Villages
Thiruvananthapuram	Thiruvananthapuram	30
	Neyattinkara	29
	Nedumangad	27
	ChirayinKeezhu	28
Total		**114**
Kollam	Karunagappally	6
	Pathanapuram	7
	Kollam	9
	Kottarakara	7
	Kunnatur	1
Total		**30**
Pathanamthitta	Kozhenchery	20
	Thiruvalla	12
	Mallappally	9
	Adoor	12
	Ranni	11
Total		**64**
Alappuzha	Kuttanad	14
	Karthikappally	18
	Mavelikkara	15
	Ambalappuzha	13
	Chengannur	11
	Cherthala	20
Total	Total	**91**

Idukki	Thodupuzha	18
	Udumbanchola	21
	Devikulam	17
Total		**56**
Kottayam	Kottayam	18
	Changanassery	4
	Vaikom	9
	Meenachil	12
Total		**43**
Ernakulam	Kochi	10
	Paravoor	9
	Muvattupuzha	17
	Kanayannoor	7
	Kothamangalam	2
	Kunnathunadu	1
Total		**46**
Thrissur	Thrissur	51
	Chavakkad	26
	Thalappilly	31
	Mukundapuram	32
	Kodungalloor	18
Total		**158**
Palakkad	Chittoor	16
	Chittoor	25
	Alathur	23
	Mannarkadu	16
	Ottappalam	36

Total		**116**
Malappuram	Perinthalmanna	21
	Eranad	26
	Ponnani	7
	Tirurangadi	14
	Nilambur	15
	Tirur	21
Total		**104**
Kozhikode	Kozhikode	50
	Quilandy	35
	Vadakara	29
Total		**114**
Wayanadu	Sulthanbathery	15
	Vythiri	18
	Mananthavady	16
Total		**49**
Kannur	Thalassery	17
	Kannur	17
	Thaliparamba	18
Total		**52**
Kasaragod	Kasaragod	38
	Hosdurg	33
Total		**71**
Grand Total		**1017**

Chapter 3

3.0 Demography and land distribution – an overview

Census 2001 put Kerala's population at 31,841,374 persons which included 15,468,614 males and 16,372,760 females. Although Kerala accounts for only 1 per cent of the total area of India, it has about 3 per cent of the country's population. The population density of the state is about 819 people per square kilometers, three times the national average. Kerala is one of the densest States in the country and it recorded a decadal population growth of + 9.42% (2,740,101 persons). Kerala, with a sex-ratio (females per 1000 males) of 1058, is the only state in India with a positive figure. In the human development and related indices it occupies prime position among the Indian States.

3.1 Land reform measures

The distribution of number of holdings and area operated according to tenancy status is summarized in Table 3.1

Regarding the tenancy status of operational holding out of the total (6656632) operational holding 6601147 (99.17%) are wholly owned and self-operated holding. The percentage of area is 98.17%. Wholly leased in, wholly otherwise operated and partly owned and partly leased in and partly otherwise operated area is only 55485 hectare. The percentage of area is 0.83. The size class wise composition of the number of operational holding wholly owned and self-operated is in marginal 95.00%, small 3.36%, semi medium 1.12%, Medium 0.23% larger and above 0.04%. 56.54% of wholly owned operated area is in the size class below 1 hectare, 19.02% area is in the size class of 1.00 to 2.00 hectare, 12.01% is semi-medium (2.00-3.99), 5.30% comes under Medium size class and 7.30% is in larger and above size class. The leased in operational holding is only 2018 numbers which is only 0.03% of the total operational holding of the state. However, there is a small increase in the percentage, as it was 0.01% in the previous census.

Table 3.1 Distribution of Number of holdings and area operated according to tenancy status

Sl. No	Category of holdings and size group (Ha)	Number of holdings				Area operated (in hectors)			
		Wholly owned and self operated	Wholly leased in	Wholly otherwise operated	Partly owned, partly leased in and partly otherwise operated	Wholly owned and self operated	Wholly leased in	Wholly otherwise operated	Partly owned, partly leased in and partly otherwise operated
1	2	3	4	5	6	7	8	9	10
1	Marginal 0.02-0.99	6287518	1679	23643	22588	871199	428	2579	8294
2	Small 1.00-1.99	221853	223	721	4013	293108	273	982	5406
3	Semi-medium 2.00-3.99	73682	84	206	1679	185610	183	496	4239
4	Medium 4.00-9.99	15464	17	26	501	81713	111	143	2790
5	Large 10 & above	2630	15	3	87	109091	231	48	2562
6	**All categories**	**6601147**	**2018**	**24599**	**28868**	**1540721**	**1226**	**4248**	**23291**

Source: Report on 7th Agricultural Census, DES, GoK

3.2 Operational land holdings in the State under different categories and income

a) Land holdings:

According to the Agricultural Census 2000-01. The total number of operational holdings in Kerala has been estimated as 66.57 lakhs out of which individual holdings accounted for 65.68 lakhs. This accounted for 98.61%. The remaining 1.39% is institutional and joint holdings. There are 7589 joint holdings reported during 2000-01 census.

Table 3. 2 Operational Holdings

Type of Operational Holdings	No. of Operational Holdings	Area operated (Ha)
Individual	6568383	1456543
Joint	7589	4110
Institutional	80660	108835
Total	**6656632**	**1569488**

Source: Report on 7th Agricultural Census, DES, GoK

The 66.57 lakhs operational holdings accounted for an operated area of 15.69 lakh hectares out of which 14.57 lakh hectares were the operational area of individual holdings. Institutional holdings, account for 1.21% of the total number of holdings, have accounted for an area of 6.93% of the total operated area in the state, showing a comparatively very high average size of the holding for them. With regard to joint holdings, 0.18% of the total number of holdings, have accounted for an area of 0.26% of the total operated area in Kerala.

Land Reform Measures

Under Section 82 (1) of the Kerala Land Reforms Act, 1963, a ceiling of land area was fixed for individuals and joint families. Individuals were prevented from owning, holding or possessing land in excess of the ceiling area with effect from first January 1970. The leasing of land to any other individual or company in violation of these ceiling provisions was similarly prohibited.

The result of this Act was to redistribute land to all agricultural labourers and dwellers. The effect has been to reduce the average size of land holdings to less than 0.4 ha. with ninety percent holdings less than half a hectare in size. It also means that there are no large blocks of land in private ownership that can be used by the private sector for plantation forestry. This limits future access of the private sector into forestry to use of government land.

Table-SPSP 5: Details of District-wise land holding pattern in the State * (MIS Table-M (SP) 9)

(Source: Agricultural Census 2000-01)

1	2	3	4	5	6		
S. No.	Names of Districts	Type of Farmer	No. of households	No. of BPL households	Land holding (ha)		
					Irrigated	Rain fed	Total
	Furnished in Table SPSP 5(1)	i) Large		Table SPSP 5(2)			
		ii) Small					
		iii) Marginal					
		iv) Landless					
		Sub-total					
	Total for the Districts	Alappuzha			0	140638	140638
		Ernakulam			63769	145864	209634
		Idukki			0	180997	180997
		Kasargode			0	191516	191516
		Kannur			83419	185098	268518
		Kollam			0	157999	157999

		Kozhikode			60846	142153	202999
		Malappuram			1010	267001	268011
		Palakkad			120932	176440	297372
		Kottayam			0	212182	212182
		Pathanamthitta			0	125097	125097
		Thrissur			41977	168493	210470
		Thiruvananthapuram			34306	131042	165349
		Wayanadu			32168	77738	109906
		Total for the State			**438428**	**2302260**	**2740688**
	Total for the State	i) Large	2735				111901
		II) Medium	91659				275296
		ii) Small	226810	1297			299774
		iii) Marginal	6335428	32579 + 23159 (1-12 cents)			882516
		iv) Landless	128680	7747			
		Total					

*Data for the entire State regarding each item may be given in the same format at the end of the table

Table-SPSP 5 (1) District wise average size of holdings

Sl No	District	Below 1.00			1.00 – 1.99			2.00 – 3.99			4.00 – 9.99			10.0 & above			All sizes		
		90-91	95-96	00-01	90-91	95-96	00-01	90-91	95-96	00-01	90-91	95-96	00-01	90-91	95-96	00-01	90-91	95-96	00-01
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
1	Thiruvananthapuram	0.15	0.10	0.09	1.30	1.27	1.27	2.46	2.46	2.43	5.27	5.33	5.19	53.55	18.16	27.11	0.21	0.12	0.11
2	Kollam	0.18	0.13	0.12	1.32	1.28	1.28	2.56	2.48	2.43	5.31	5.24	5.40	81.85	18.08	98.25	0.23	0.17	0.15
3	Pathanamthitta	0.24	0.18	0.17	1.33	1.31	1.29	2.56	2.52	2.42	5.42	5.52	5.57	46.46	192.04	46.57	0.39	0.31	0.24
4	Alappuzha	0.16	0.13	0.11	1.33	1.34	1.32	2.57	2.62	2.57	5.41	5.40	5.61	18.22	14.23	14.80	0.23	0.19	0.15
5	Kottayam	0.22	0.17	0.16	1.41	1.34	1.32	2.62	2.56	2.54	5.62	5.26	5.49	20.48	16.38	27.76	0.47	0.36	0.30
6	Idukki	0.33	0.22	0.23	1.29	1.31	1.29	2.47	2.42	2.43	5.49	5.40	5.40	116.90	27.79	70.41	1.00	0.48	0.56
7	Ernakulam	0.16	0.12	0.11	1.37	1.32	1.33	2.58	2.54	2.48	5.29	5.06	5.43	47.19	61.87	33.56	0.29	0.22	0.18
8	Thrissur	0.18	0.15	0.13	1.35	1.32	1.32	2.56	2.82	2.53	5.02	5.33	5.20	25.05	33.06	31.73	0.27	0.23	0.18
9	Palakkad	0.20	0.16	0.15	1.41	1.37	1.35	2.66	2.61	2.58	5.28	5.24	5.13	42.37	30.63	18.63	0.48	0.40	0.31
10	Malappuram	0.19	0.16	0.14	1.36	1.33	1.32	2.63	2.53	2.53	5.27	5.32	5.53	22.38	32.88	43.50	0.33	0.26	0.22
11	Kozhikode	0.18	0.15	0.13	1.35	1.32	1.32	2.60	2.49	2.48	5.26	5.25	5.12	49.34	29.38	56.40	0.29	0.21	0.19
12	Wayanadu	0.33	0.25	0.21	1.49	1.34	1.35	2.83	2.54	2.55	5.34	5.45	5.33	55.92	44.55	43.25	0.86	0.61	0.58
13	Kannur	0.24	0.21	0.19	1.46	1.35	1.33	2.60	2.54	2.52	5.14	5.09	5.17	22.53	42.48	22.70	0.46	0.38	0.32
14	Kasaragod	0.20	0.25	0.22	1.34	1.35	1.34	2.59	2.48	2.53	5.26	5.11	5.08	108.32	54.90	20.35	0.61	0.49	0.42
State		**0.20**	**0.15**	**0.14**	**1.37**	**1.33**	**1.32**	**2.61**	**2.55**	**2.52**	**5.32**	**5.26**	**5.29**	**55.91**	**35.29**	**40.93**	**0.37**	**0.27**	**0.24**

Source: Report on 7th agricultural Census, DES, GoK 2007

Table SPSP 5 (3) Land Ownership Classification of BPL Families - 1999

District	No. of Households as per 1991 Census	No. of Families below poverty line	% of families under BPL	Land Ownership Groups			
				Landless	Nominal (1 to below 12cents)	Marginal (12cents to 2.5acres)	Small (2.5acres to below 5acres)
1	**2**	**3**		4	5	6	7
Thiruvananthapuram	481223	188310	39.13	18834	121413	46277	1367
Kollam	446630	175617	39.32	14637	98231	61249	725
Pathanamthitta	226435	74856	33.06	3538	39440	31581	158
Alappuzha	339857	156151	45.95	6327	106948	42056	691
Kottayam	326926	59182	18.10	4332	38431	15572	698
Idukki	225177	34435	15.29	3847	10458	19152	855
Ernakulam	374728	99521	26.56	6651	64910	27047	752
Thrissur	473916	158961	33.54	11942	108441	37336	988
Palakkad	392461	204605	52.13	17368	119226	65010	2651
Malappuram	438016	180375	41.18	11369	103901	62873	1771
Kozhikode	378224	131781	34.84	5544	74771	50189	1141
Wayanadu	129927	64794	49.87	7747	23159	32579	1297
Kannur	314171	122067	38.85	7785	42052	69810	2337
Kasargode	163981	72901	44.46	8759	17418	40649	5914
STATE	**4711672**	**1723556**	**36.58**	**128680**	**968799**	**601380**	**21345**

Source: Report on 7th agricultural Census, DES, GoK 2007

Table SPSP 5 (4) Average Size of Holders (2000-01)

Size class hectare	No.of operational holders (in lakhs)	Area of operation (hectares)	Average size of the holder (hectares)
Below 1 hectare	63.35	882502	0.14
1 to 2 hectares	2.27	299767	1.32
2 to 4 hectares	0.76	190527	2.51
4 to 10 hectares	0.16	84759	5.30
10 hectares and above	0.03	111933	37.31
All	**66.57**	**1569488**	**0.24**

Source: Report on 7th Agricultural Census, DES, GoK 2007

Table SPSP 6: Share of Agriculture Sector to State Income/National Income at Current Prices and Total Work Force in the State and India

1	2		3	
Year	Percentage share of Agriculture in NSDP@ figure		Percentage share of Agriculture in Total Workforce	
	State	All India	State	All India
1980-81				
1990-91				
2000-01	Furnished in Table SPSP6 (1)			

Source of data:

@NSDP: Net State Domestic Product

Table SPSP 6 (1): Percentage share of Agriculture in NSDP figure

	98-99	99-2000	2000-01	2001-02	2002-03 Provisional	2003-04 Quick
NSDP	3064366	3271615	3356516	3450935	3703699	3973699
Agriculture	689962	701705	544822	531156	538045	516465
% to NSDP	**22.52**	**21.45**	**16.23**	**15.39**	**14.53**	**13.00**

Source: DES, GoK

Table SPSP 7: Sectoral Composition of Net State Domestic Product (NSDP) in State. (Rs. In Lakhs), (at constant Price)

Sector	**Years**			
	1970-71	**1980-81**	**1990-91**	**2000-01**
Agriculture and allied Sectors(Primary)				**684795**
Industrial Sector (Secondary)				**682963**
Service Sector(Tertiary)				**2083177**

Source: DES, GoK

Table SPSP 7(1): Sectorial Composition of Net State Domestic Product (NSDP) in State. (Rs. In Lakhs), (at constant Price)

No	Sector /Year	98-99	99-2000	2000-01	2001-02	2002-03 Provisional	2003-04 Quick
1	PRIMARY	829494	850968	684423	684795	694743	679101
2	SECONDARY	638631	637391	701997	682963	723416	767474
3	TERTIARY	1596241	1783256	1970096	2083177	2285540	2527124
4	NET DOMESTIC PRODUCT	3064366	3271615	3356516	3450935	3703699	3973699

Source: DES, GoK

Chapter 4

4.0 Land Use Pattern

4.1 Land use planning and agriculture land in the state:

The land utilization of the Agricultural Census 2000-01 reveals that 83.57% of the area used for cultivation during the census period which is about 1% lower than the last census (84.48%). Land not available for cultivation has decreased by 1.55% than the last census. This shows a positive sign in the recent scenario of Agriculture.

Out of the total area of 1569488 hectare, net cultivated area (net area sown + current fallow) is 1338127 hectares, which is 85.25% of the total operated area. Land not available for cultivation is only 9.04%. Compared with the results of last censuses of 1990-91and 1995-96, the net area sown has decreased from 87.08% in 1990-91 to 84.48% in 1995-96 and it is only 83.57% in 2000-01 of the total operated area in these census periods. No substantial increase or decrease is noticed in the land utilization of current fallow land, other uncultivated land excluding fallow land, fallow other than current fallow and cultivable waste. Land not available for cultivation has increased from 8.05% in 1990-91 to 10.59% in 1995-96 of the total operated area in these census periods. But the same has decreased from 10.59% to 9.04% when it reached in 2000-01. No abnormal variation is noticed in net area sown during 1990-91, 1995-96 and 2000-01. It is almost same in all the districts during the previous censuses. Some variation is noticed between districts in the case current fallow in the result of 1990-91, 1995-96 and 2000-01 censuses. Current fallow is highest in Palakkad in all the censuses. It is least in Kozhikode. Thiruvananthapuram district is having highest percentage in other uncultivated land. Fallow land and land not available for cultivation is highest in Palakkad.

The high population pressure on land has led to high rate of fragmentation of land holdings and encroachment to ecologically fragile areas. Even steep areas have been brought under various forms of agriculture. The cover of natural forest also declined considerably during the last century. (SoE report 2007). The rice cultivation which facilitated storage of water in the low land fields contributing to ground water recharge has declined by 60% over the past 20 years from 1982 to 2002.

4.2 Mechanism in the State for regulating land use conversion

Land Use changes in Kerala have been creating a lot of concern from the environmental as well as food security point of view. Agricultural lands especially Paddy lands are converted for other purposes at a very fast rate. Reasons attributed for conversion are mainly that there is scarcity of land for habitation and industrial development. The high population density exerts a very high pressure on lands. Large scale removal of soil from the hills and upland areas for brick making and for reclamation of low lying areas is making hitherto fertile into unproductive and degraded lands.

Having realized the seriousness of the problem the government has enacted legislations preventing unauthorized conversion of paddy lands.

Table-SPSP 8: Land Use status in the State (Source: DES, GoK 2007-08) (Area in Ha.)

1	2	3	4	5		6	7	8	9	10	11	12	13
State	Geographical Area	Forest Area	Land under Non-Agri use	Total rain fed area		Permanent pastures	Land under miscellaneous tree crops and groves	Current fallow	Other fallow	Net sown area	Net area sown more than once	Net irrigated area%	Gross cropped area
				a)cultivated	b)cultivable waste								
Kerala	3886287	1081509	449003	216045	91093	95	4593	83454	45644	2105070	663667	27.28	2768737

*Data for the entire State regarding each item may be given in the same format at the end of the table

SPSP 8(1) District wise distribution of Land Utilization (O.H. Approach) (Area in Hectares) All social groups

No.	District	Net area sown	Current fallow	Other uncultivated land	Fallow land other than current fallow	Cultivable waste	Land not available for cultivation	Total	% 0f net irrigated area
1	2	3	4	5	6	7	8	9	
1	Thiruvananthapuram	72846	894	9600	413	493	3270	87516	10.38
2	Kollam	73125	1306	2622	355	783	9277	87468	11.13
3	Pathanamthitta	59700	1254	3281	933	610	5612	71390	6.02
4	Alappuzha	54415	2701	2052	1903	1761	8679	71511	50.34
5	Kottayam	111389	1912	1199	1080	1490	12041	129111	12.71
6	Idukki	143318	1692	2856	934	1124	10275	160199	19.13
7	Ernakulam	97597	1262	4403	932	1309	11775	117278	32.71
8	Thrissur	93049	1145	6223	1891	2761	9749	114818	62.67
9	Palakkad	127191	6700	4354	2671	4316	12797	158029	52.77
10	Malappuram	110346	2965	3883	1712	2465	13717	135088	26.70
11	Kozhikode	90812	526	481	564	495	13336	106214	12.34
12	Wayanadu	82465	610	590	571	1257	7432	92925	20.79
13	Kannur	123516	2502	1865	1194	2354	15199	146630	17.23
14	Kasaragod	71797	1092	4510	1154	4031	8727	91311	46.09
State		**1311566**	**26561**	**47919**	**16307**	**25249**	**141886**	**1569488**	**27.28**

Source: Report on 7th agricultural Census, DES, GoK 2007

SPSP 8(2) Land utilization pattern (Operational holding Approach) (Area in Hectares)

No.	Land use pattern in Operational Holding	1990-91		1995-96		2000-01	
		Area	Percentage	Area	Percentage	Area	Percentage
1	2	3	4	5	6	7	8
1	Net area sown	1556284	87.08	1446571	84.48	1311566	83.57
2	Area under current fallow	19928	1.11	22308	1.30	26561	1.69
3	Other uncultivated land excluding fallow land	19165	1.07	24195	1.41	47919	3.05
4	Fallow land other than current fallow	20625	1.15	15729	0.93	16307	1.04
5	Cultivable waste land	27500	1.54	22146	1.29	25249	1.61
6	Land not available for cultivation	143788	8.05	181274	10.59	141886	9.04
Total area of holdings		**1787290**	**100**	**1712223**	**100**	**1569488**	**100**

Source: Report on 7th Agricultural Census, DES, GoK 2007

4.3 Irrigated areas

a) Irrigated area in the State – major sources of irrigation

Among the various sources, well and tube well is highest in marginal size class, i.e. 55.02%, 55.10% and 63.42% and 53.26%, 54.54% and 54.79% during 1990-91, 1995-96 and 2000-01 respectively. Canal irrigation is the largest source of irrigation. The census result reveals that tube well irrigation percentage is least in the State in all the periods of census. It is only 1.49% during 1990-91, 5.39% during 1995-96 and 5.27% during 2000-01. The different sources listed are canal tank, well, tube wells and other sources. Out of the 2773311 irrigated holdings canal irrigated holdings are 188439, tank irrigated holdings are 129552 well irrigated holdings are 1664612 tube well irrigated holdings are 176374 and irrigation from other sources comes to 614334.

The percentage of canal irrigated area is largest in Palakkad (52.66%) district and lowest in Pathanamthitta (0.31%) district. Tank irrigated area is largest in Idukki (26.64%). Among the districts used for wells for irrigation purposes, Thrissur stands first 20.31%. In Pathanamthitta district 0.76% of cultivated area is irrigated from wells. Tube wells irrigated area is highest in Alappuzha 26.13%. It is below 1% in Thiruvananthapuram (0.76%), Kollam (0.35%) and Pathanamthitta (0.26%) districts. Irrigation from other sources is prominent in Alappuzha (15.98%) where as it is also below 2% in Thiruvananthapuram (1.95%) and is below 3% in Kollam (2.20%) and Pathanamthitta (2.40%) districts.

Table-SPSP 9: Irrigation Status (Area in 000 Ha.)*

1	2	3	4	5	6	7	
Districts	Gross# cultivated area	Net cultivated area	Gross@ irrigated area	Net irrigated area	Net irrigated %	Rain fed	
						Area	% of net cultivated area
Furnished in Table SPSP 9(2)	Furnished in Table SPSP 9(2)	Furnished in Table SPSP 9(2)		Furnished in Table SPSP 9(1)	Furnished in Table SPSP 9(1)	Furnished in Table 9(1)	

Source of data:

*Data for the entire State regarding each item may be given in the same format at the end of the table

This represents the total area sown once and/or more than once in a particular year, i.e. the area is counted as many times as there are sowings in a year. This total area is known as gross cultivated area.

@It is the total area under crops, irrigated once and/or more than once in a year. It is counted as many times as the number of times the areas are cropped and irrigated in a year.

Table-SPSP 9(1)

Districts	Net irrigated area ('000 Ha)	Rain fed Area ('000 Ha)
Alappuzha	0	141
Ernakulam	64	146
Idukki	0	181
Kasargode	0	192
Kannur	83	185
Kollam	0	158
Kozhikode	61	142
Malappuram	1	267
Palakkad	121	176
Kottayam	0	212
Pathanamthitta	0	125
Thrissur	42	168
Thiruvananthapuram	34	131
Wayanadu	32	78
Total	**438**	**2302**

Source: Report on 7th Agricultural Census, DES, GoK 2007

Table-SPSP 9 (2) District wise Gross cropped area, Net sown area, intensity of cropping 2000-01

(Area in hect.)

No	Districts	Net area sown	Gross cropped area	Intensity of cropping	Net irrigated area %
1	*2*	*3*	*4*	*5*	*6*
1	Thiruvananthapuram	72846	84881	1.17	10.38
2	Kollam	73125	87492	1.20	11.13
3	Pathanamthitta	59700	71866	1.20	6.02
4	Alappuzha	54415	63217	1.16	50.34
5	Kottayam	111389	127456	1.14	12.71
6	Idukki	143318	170175	1.19	19.13
7	Ernakulam	97597	115765	1.19	32.71
8	Thrissur	93049	107243	1.15	62.67
9	Palakkad	127191	166015	1.31	52.77
10	Malappuram	110346	122577	1.11	26.70
11	Kozhikode	90812	116591	1.28	12.34
12	Wayanadu	82465	113106	1.37	20.79
13	Kannur	123516	143237	1.16	17.23
14	Kasaragod	71797	79682	1.11	46.09
	State	**1311566**	**1569303**	**1.20**	**27.28**

Source: Report on 7th agricultural Census, DES, GoK 2007

Table-SPSP 10: Source-wise Area Irrigated (Area in Ha.)

1	2	3		4		5		6		7		8	
Districts	Canal (Area)	Tanks		Open wells		Bore wells		Minor irrigation		Others (Pl. specify) RWH tanks, Sprinkler, drip, pot etc		Total	
		No	Area	No	Area	No	Area	No	Area	No	Area	No	Area
Thiruvananthapuram	3302	465	478	4336	452	144	NA		4	1573	392		4628
Kollam	49	352	548	5735	849	66	NA			1778	204		1650
Pathanamthitta	1013	266	445	1139	665	49	Na		64	1937	2985		5172
Alappuzha	4128	2179	8456	4129	3914	4928	1524		108	12912	21539		39669
Kottayam	990	986	440	3543	591	163	1		103	8278	11916		14041
Idukki	4662	11627	8614	8005	1156	870	7		2	5552	4510		18951
Ernakulam	17822	2450	2917	15299	11354	838	347		3338	3988	6241		42019
Thrissur	19596	5494	7946	30438	37152	3360	54		2900	9288	13042		80690
Palakkad	42329	3595	4701	16130	15976	4154	939		1043	9179	10718		75706
Malappuram	1799	3394	3209	17689	317	1125	10324		827	5911	7781		24257
Kozhikode	780	832	597	6860	504	228	1117		11	2380	708		3717
Wayanadu	1452	3766	388	3855	84	255	410		298	8588	7065		9697
Kannur	1957	2537	1317	12869	8189	335	4		6	4637	6365		17838
Kasaragod	182	5695	11885	19842	19712	2342	NA		149	4790	12230		44158
State	100061	**43638**	47573	**149869**	100915	**18857**	**14727**		**8853**	**80791**	**105696**		**377825**

NA: Data Not Available

(Source: Agriculture Statistics, DES, GoK 2002-03, Report on 7th agricultural Census, DES, GoK 2007)

*Data for the entire State regarding each item may be given in the same format at the end of the table

4.4. Common Property Resources (CPR):

The high density of population in the State has resulted in fragmentation of holdings and all the available land resources. The extent of common property resources is very little.

Table-SPSP 11: Details of Common Property Resources in the State *(MIS Table-M (SP) 10)

1	2	3	4				5			
		CPR	Total Area (ha)				Area available for treatment (ha)			
		Particulars	Area owned/ In possession of							
				Govt.		Any		Govt.		Any
S. No.	Names of Districts		Pvt. persons	(Specify deptt.)	PRI	other (Pl. Specify)	Pvt. persons	(specify deptt.)	PRI	other (Pl. Specify)
		(i) Wasteland/ degraded land	137485				137485			
		(ii) Pastures								
		(iii) Orchards								
		(iv) Village Woodlot								
		(v) Forest		1133847			1133847			
		(vi) Village Ponds/ Tanks								
		(vii) Community Buildings								
		(viii) Weekly Markets								
		(ix) Permanent markets								
		(x) Temples/ Places of worship								
		(xi) Others (Pl. specify)								

*Data for the entire State regarding each item may be given in the same format at the end of the table.

Chapter 5

5.0 Trends in agriculture and food productivity

The growth rate of agriculture and allied sectors was 1.95 per cent during Tenth Plan while the growth rate at the national level for agriculture and allied sectors was 2.5 per cent during the period. The growth rate of agricultural and allied sectors has declined in the first year of the Eleventh plan to 1.60 per cent from 3.40 per cent in 2006-07 in the state while the growth rate of the agriculture and allied sector at the country level declined to 2.6 per cent in 2007-08 from 3.8 per cent during 2006-07. Further decline in growth rate is expected during 2008-09.

Nearly 50% of the State's population depends upon agriculture. A unique feature of the State is the predominance of cash crops. Kerala is a major producer of coconut, rubber, pepper, cardamom, ginger, cocoa, cashew, arecanut, coffee and tea. Tree spices like nutmeg, cinnamon, cloves etc. are also cultivated. Rice and tapioca are important food crops. Coconut production was 5,167 million nuts in 2000 and 2001.

The agriculture sector in the State recorded an average growth rate of 3.6% against the target of 2.5%. A review of the long term performance of the crop sector, over the last decade, shows that the total output from the sector has recorded an average annual growth 2.5%. There was, of course, a large scale shift from high volume low value crops like tapioca and rice to low volume, high value crops like pepper and rubber. The crop wise analysis is given below.

Rice: Rice, which is the staple food of Kerala has experienced continuous decline in area over two decades. Total cultivating area of rice in 1999-2000 is 3, 50,000 hectares. The average productivity of rice at its current level is 2,203 kg. /ha. (National average is 1930 Kg. /ha). The total rice production in 1999-2000 was 7.71 lakh tonnes. (in 1991-2000 it was 7.27 lakh tonnes). Rice production touched its peak of around 14 lakhs tonnes in mid seventies. Even this was hardly sufficient to meet the state's requirements.

Coconut: Coconut occupies 40% of the total net cropped area of 8.99 lakhs ha. It provides livelihood for over 3.5 million families. The productivity is 5747 nuts/ha. in 1999-2000.

Pepper: The State enjoys a near monopoly in area and production of pepper, accounting for 97% in the country. Total cultivating area in 1999-2000 is 1, 84,000 ha. Total production was 56.43 lakh tonnes. Productivity is 306 Kg. /ha. currently.

Cashew: The share of Kerala in the area under cashew in the country is 12% in 1998-99. The State's share in all India production is 11%. In 1999-2000 the net cropped area of cashew was 8.63 lakh ha. production was 4.64 tonnes and productivity was 537 kg./ha.

Plantation Crops: Rubber, tea, coffee and cardamom together accounting for 28% of the net cropped area in the State and 45% of the area under these crops in the country. In 1999-2000 in the state they together occupied 6.35 lakh ha.

Rubber: Kerala accounts for 85% out of the area under rubber in the country of 5.58 lakh ha. Total area of rubber in the state is 4.73 lakh ha. and production 5.85 lakh tonnes (All India production 6.22 lakh tonnes) in 1999-2000. Total value of rubber produced in Kerala at current price level is 3000 crores. Productivity in 1999-2000 is 1211 kg./ha.

Coffee: About 25% of the country's coffee production and 21% of the total cultivating area is in Kerala (0.84 lakh ha. and 0.60 lakh tonnes in Kerala and 3.40 lakh ha. and 2.92 lakh tonnes in India).

Tea: Against the total area of 4.37 lakh ha. under tea (1999) in the country, Kerala accounts for only 0.37 lakh ha. (11%). In respect to production, Kerala could retain only 9% share of nation's productivity. About 84,000 people are working in the organized tea plantation sector in Kerala.

Cardamom: The productivity which was more or less stagnant around 50 kg. /ha. in 1980's has improved to average 120 kg./ha. by 1999-2000. Now Kerala's share in the production at all India level has increased from 32% to 70%. The total area of production now (2000) is 40,867 ha.

Other crops : Besides these, seasonal/annual crops like sugarcane, ginger, turmeric, banana, tapioca, sesame and groundnut are also cultivated largely in the State.

Horticulture: Though there is vegetable and fruit production in Kerala, the opportunity for raising a variety of fruits and vegetables by taking advantage of the varying climate and other favourable features remain largely untapped. Even though, the productivity and production is on the increasing trends, generally, various types of plantain, leafy vegetables and other horticultural products are cultivated in Kerala.

Table-SPSP 12: Crops production and productivity as per Agricultural Statistics, 2008 (MIS Table-M(PO)C1, C2 & C3 pre-project status)

1.	2	3	4						5						6					
Sl. No.	Names of the Districts	Name of crops	**Kharif**						**Rabi**						**Zaid**					
			Area (ha)		Average Yield (Qtl) per ha.		Total Production (Qtl)		Area (ha)		Average Yield per ha (qtl)		Total production (qtl)		Area (ha)		Average Yield per ha (qtl)		Total production (qtl)	
			Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.	Irri	Rf.
	Details separately furnished in SPSP additional Tables 12(1) , 12 (2), 12(3)																			
	Total for the District																			
	Total for the State																			

***** From column no. 2, total number of Districts; from column no.3, total no. of crops; from column no. 4 to 8, the totals for the area, average yield per ha and total production, category-wise, season-wise for the entire state may be given at the end of the Table.

Irri. – Irrigated **Rf. – Rain fed**

Table-SPSP 12(1): Crops production and productivity as per Agricultural Statistics **AREA UNDER CROPS 2004-05** Area in hectare

No.	District	Paddy				Jower	Ragi	Other cereals	Total cereals/ millets	Pulses including Tur				Total food grains
		Autumn	Winter	Summer	Total					Autumn	Winter	Summer	Total	
1	Thiruvananthapuram	2621	2573	2	5196				5196	19	8	27	54	5250
2	Kollam	3589	5360	-	8949				8949	65	83	401	549	9498
3	Pathanamthitta	834	1803	1702	4339				4339	7	1	19	27	4366
4	Alappuzha	6366	13801	11991	32158				32158	0	0	11	11	32169
5	Kottayam	2881	7108	3172	13161				13161	0	0	455	455	13616
6	Idukki	1147	1862	157	3166	2	65	154	3387	36	112	208	356	3743
7	Ernakulam	10797	12486	4862	28145		1		28146	0	0	116	116	28262
8	Thrissur	9641	18052	8658	36351				36351	211	38	88	337	36688
9	Palakkad	54409	56200	420	111029	2564	1310	794	115697	216	4093	392	4701	120398
10	Malappuram	4697	10462	1590	16749		5		16754	52	5	286	343	17097
11	Kozhikode	431	3548	644	4623				4623	8	0	132	140	4763
12	Wayanadu	0	9007	2324	11331		2	6	11339	0	0	631	631	11970
13	Kannur	4877	4107	118	9102				9102	0	136	549	685	9787
14	Kasaragod	3059	2524	92	5675			1	5676	3	0	20	23	5699
	State	105349	148893	35732	289974	2566	1383	955	294878	617	4476	3335	8428	303306

Source: Agricultural Statistics 2004-05, DES, GoK

Table-SPSP 12 (2): Crops production and productivity as per Agricultural Statistics **Production of Important Crops 2004-05** Production in tonnes

Sl. No.	Name of district	Rice				Jowar	Ragi	Other cereals	Sugarcane	Black pepper	Green chillies	Pulses	Cured ginger	Cured turmeric	Ground nut	Coconut (million Nuts
		Autumn	Winter	Summer	Total											
1	Thiruvananthapuram	6423	5930	3	12356				0	2028	102	89	306	85		568
2	Kollam	8695	11951		20646				30	3743	124	999	1418	304		444
3	Pathanamthitta	1852	4233	4699	10784				601	1328	1	53	1358	234		114
4	Alappuzha	18345	32466	27680	78491				1035	181	20	21	182	12		328
5	Kottayam	8270	17228	7291	32789				227	2074	23	391	595	333		187
6	Idukki	2943	4445	394	7782	1	52	120	6667	38787	116	291	3181	702		87
7	Ernakulam	21349	24400	8752	54501		1		13	1014	54	1013	800	947		313
8	Thrissur	19964	40613	26886	87463				10	1126	128	112	260	203		709
9	Palakkad	126966	132403	749	260118	1308	1061	620	6723	991	120	3533	3316	1287	996	344
10	Malappuram	9907	21236	5396	36539		4		31	1146	21	505	282	347		900
11	Kozhikode	583	4844	1300	6727				0	1934	2	169	362	886		854
12	Wayanadu		22928	6278	29206		1	5	20	13897	5	479	32376	367		40
13	Kannur	9257	7692	149	17098				65	4716	2	555	529	389		642
14	Kasaragod	7270	5160	175	12605			1	8	2015	57	180	340	148		471
State		241824	335529	89752	667105	1309	1119	746	15430	74980	775	8390	45305	6244	996	6001

Source: Agricultural Statistics 2004-05, DES, GoK

Table-SPSP 12 (3): Crops production and productivity as per Agricultural Statistics **ESTIMATED PRODUCTIVITY OF CROPS 2004-05 in kg/Ha**

Sl. No.	District	Paddy			Coconut (Nos)	Arecanut	Tapioca	Raw Cashew nuts	Black Pepper	Banana	Plantain	Jack (No's)	Cocoa	Sesame
		Autumn	Winter	Summer										
1	Thiruvananthapuram	3730	3508	2111	6756	433	23547	369	277	6341	8388	5078	339	0
2	Kollam	3687	3394	0	6712	551	26474	677	276	6936	7510	4868	333	481
3	Pathanamthitta	3380	3573	4202	5244	829	28406	557	235	7112	11931	4887	472	333
4	Alappuzha	4386	3581	3514	5823	423	23727	271	87	6605	7080	2586	424	273
5	Kottayam	4369	3688	3499	4572	596	28353	323	211	9333	8411	3373	568	0
6	Idukki	3905	3634	3820	3584	1073	34891	533	471	6555	10232	4172	616	750
7	Ernakulam	3010	2974	2740	5329	748	29454	467	149	8493	6896	3717	585	177
8	Thrissur	3152	3424	4727	8330	958	23594	526	189	7352	5462	3792	411	213
9	Palakkad	3552	3586	2714	6195	967	24335	506	136	8041	8066	3831	1123	123
10	Malappuram	3210	3090	5165	7953	858	30797	404	98	7553	9590	3457	503	298
11	Kozhikode	2059	2078	3073	6576	1071	25174	581	138	8948	5896	2512	312	0
12	Wayanadu	-	3875	4112	3528	560	42971	700	334	8798	7521	2471	284	100
13	Kannur	2889	2851	1922	6792	1070	25688	982	208	8860	4744	3317	428	0
14	Kasaragod	3617	3112	2895	8134	1819	26067	938	293	8342	7845	4940	213	0
State		3494	3430	3823	6673	1026	27123	743	316	8076	7619	3568	542	294

Source: Agricultural Statistics 2004-05, DES, GoK

Table-SPSP 13: A. comparative average yield of major crops of the State and India during Triennia 1972-73 to 1974 -75 and 1992-93 to 1994-95 (in Kg/Ha.)

1	2		3		4	
Major Crop/crop group	Period I: 1972-73 to 1974-75		Period II: 1992-93 to 1994-95		Post 1994-95#	
	State	India	State	India	State	India

May be filled if data is available with the State Government

Source of data may be indicated for columns 2 and 3 and separately for column 4.

Chapter 6

6.0 Implementation of watershed programmes in the State at present

a) Administrative structure for implementing watershed programmes in the State

The Panchayat Raj Institutions are the Project implementing Agencies. Wherever the Panchayats resolve to entrust the works to an accredited NGO, the NGO will be considered as the PIA. The list of accredited NGOs will be prepared for the State by the State Level Co ordination committee.

The Panchayats can avail the technical support of the NGOs, Research organizations, Universities etc where it is found essential. The payments on this account can be met from the concerned allocation for the item of work/administration cost etc.

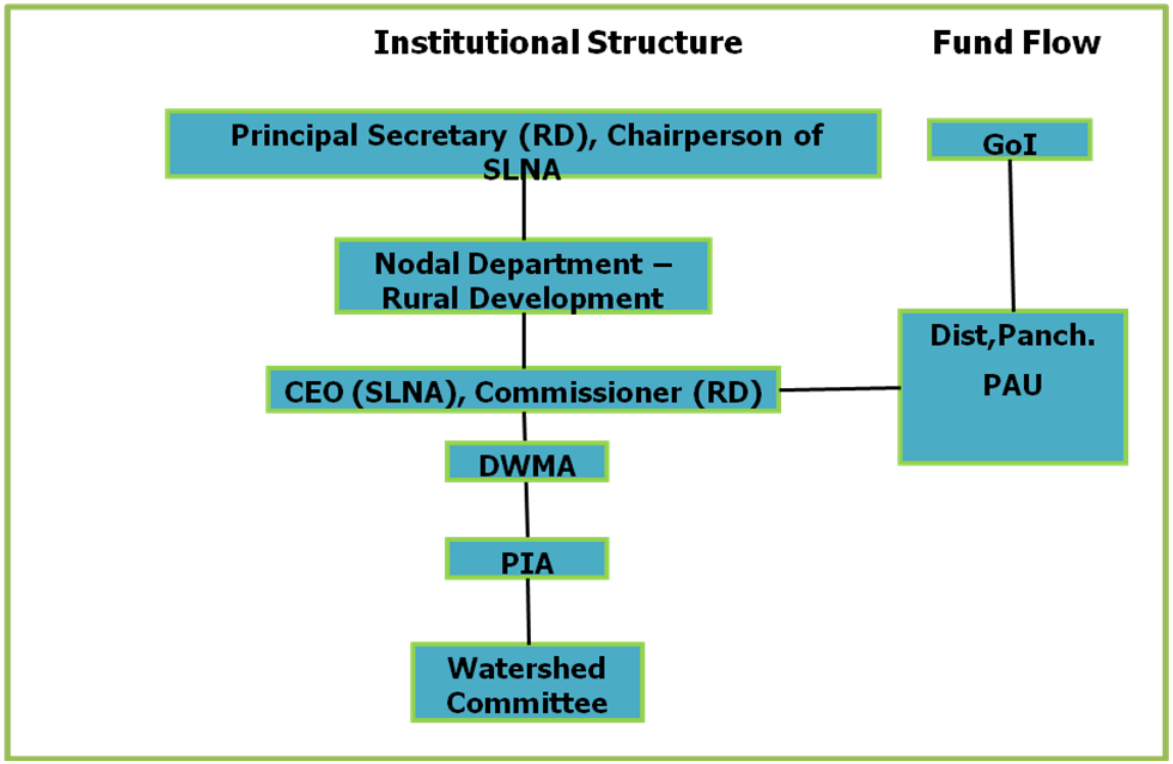
The watershed programmes are to be carried out in a n integrated manner by converging it with other programmes being implemented in the area. NREGA offers wide scope for this kind of convergence.

For effective implementation of watershed programmes with the objective of sustainable development the Grama Panchayats have to prepare watershed maser plans by involving people. These master plans have to be integrated at the District level and also at the State level. The objective is to achieve a river basin based development with scientific priorities.

People's participation is the key for success. The Grama Panchayats have to ensure people's participation at all levels- planning, implementation, monitoring. Various people's committees have to be constituted from the Grama Sabhas to achieve this objective. Waterhshed committees and monitoring committees etc are constituted at the watershed level. At the District Level the District Panchayat Committee gives approval for the projects, and coordinated the programmes. Block Level Technical committees and Watershed teams will render necessary technical assistance. The Poverty Alleviation Unit of the Rural Development Department at the district level is responsible for the effective implementation and utilization of funds.

At the State Level there will be State Level Nodal Agency with Principal Secretary, LSGD as the Chairman and Commissioner for Rural development as the Convener.

ORGANOGRAM FOR IMPLEMENTATION OF IWMP



b) Area covered under watershed programmes in the State

Watershed programmes have in operation in Kerala since the early 1970s. Command Area Development Programmes, Western Ghats Development programme (WGDP), National Watershed Development Programme for Rain fed Agriculture (NWDPRA), HARIYALI, RIDF, IWDP etc have in operation in the State. Besides, watershed schemes aided by external agencies like AHADS programme in Attappady area are also being implemented. Recently NABARD assisted watershed projects are also taken up. The departmental schemes and the Panchayat schemes utilizing the State funds also run parallel to the Centrally aided programmes. The area covered under various programmes is summarized in Table SPSP 16(1)

Table-SPSP 14: Status of District-wise area covered under the watershed programme (ha) * (MIS Table-M(SP)2)

1	2	3		4						5	
No.	Names of Districts	Total micro-watersheds in the District		Micro-watersheds covered so far						Net watersheds to be covered	
				Dept. of Land Resources		Other Ministries/ Depts.		Total watersheds covered			
				Pre-IWMP projects (DPAP +DDP +IWDP)		Any other watershed project					
		No.	Area (ha.)	No.	Area (ha.)	No.	Area (ha.)	No.	Area (ha.)	No.	Area (ha.)
1	Alapuzha	91	140638	4	14301	12	13656	16	27957	73	107373
2	Eranakulam	258	305830			64	95906	64	95906	94	83628
3	Idukki	412	436330	3	20080	61	59700	64	79780	129	132422
4	Kozhikkode	327	231667	3	23865	78	12386	63	56095	187	119035
5	Kannur	640	296558	1	7406	69	64112	70	71518	307	130127
6	Kollam	183	248763	3	13164	59	91052	62	104216	66	61298
7	Kasargode	472	199168	1	2869	62	53226	84	36251	378	146349
8	Malappuram	474	355448	2	10000	104	78113	106	88113	229	164350
9	Palakkad	411	444242	4	18363	103	77369	106	94687	154	135337
10	Kottayam	217	219498	3	20815	82	92030	85	112845	113	97984
11	Pathanamthitta	221	265280	3	7599	63	68992	66	76591	58	54109
12	Thrissur	310	299215	3	13414	61	58630	66	72044	110	101314
13	Thiruvananthapuram	182	218929	2	10000	49	57025	51	67025	74	77552
14	Wyanad	331	212968			80	55965	80	55965	95	48938
-	**Total**	**4529**	**3874535**	**32**	**161876**	**947**	**878162**	**983**	**1038991**	**2067**	**1459817**

*from column no.2, total no. of districts; from columns 3 to 5 the totals for the entire State may be given at the end of the table.

Table-SPSP 15: Details regarding the watershed projects sanctioned by DoLR in the State:

1	2	3	4		
No.	Item	Total	Pre-IWMP scheme details		
			DPAP	DDP	IWDP
1	Area sanctioned in ha. (as per column 4 of DoLR area in ha. Table SSP 14)	161877	0	0	161877
2	Names of the districts covered	12	0	0	12
3	Number of Blocks covered	40	0	0	40
4	Number of watershed projects sanctioned by DoLR	32	0	0	32
5	No. of projects completed out of those taken at Row (4)	4	0	0	4
6	Number of projects foreclosed of Row (4)	0	0	0	0
7	Number of on-going projects of Row (4)	28	0	0	28
8	Area already treated by completed projects of Row (5)	22964	0	0	22964
9	Area for treatment by on-going projects of Row (5)	138913	0	0	138912
10	Total area treated and under treatment (8)+ (9)	161877	0	0	161877
11	Area yet to be treated and proposed to be treated by DoLR (column 1-column 10)				

Table-SPSP 16: Details of the watershed projects implemented in the State with the financial assistance other than DoLR

1	2	3	4						
No	Item	Total	Watershed schemes of other Ministries						
			Ministry of Agriculture GoI	Ministry of E & F, GoI	Planning Commission	NABARD	State Govt.	EAP	#Others (Pl. Specify)
1	Area sanctioned in ha. (as per column 4 of Table 14)		Table SPSP 16(1)	Table SPSP 16(1)	Table SPSP 16(1)				
2	Names of the districts covered								
3	Number of Blocks covered								
4	Number of watershed projects sanctioned other than DoLR		NWDPRA		WGDP	NABARD	Dept. schemes		AHADS
5	Number of projects completed out of those taken at Row (4)								
6	Number of projects foreclosed of Row (4)								
7	Number of on-going projects of Row (4)								
8	Area already treated by completed projects of Row (5)								
9	Area for treatment by on-going projects of Row (5)								
10	Total area treated and under treatment (8)+ (9)								
11	Area yet to be treated and proposed to be treated by other than DoLR resources (column 1-column 10)								

If required please add more columns

Table-SPSP 16 (1): Details of the watershed projects implemented in the State with the financial assistance other than DoLR

District	Planning Commission WGDP	MoA NWDPRA	EAP AHADS	Total area treated (Ha)excluding State Govt.
Thiruvananthapuram (incl.Model)	19977	15334		35311
Kollam	17068	25234		42302
Alappuzha	0	7220		7220
Kottayam	20019	22235		42254
Pathanamthitta	24240	15786		40026
Idukki	37919	18481		56400
Ernakulam	18161	16530		34691
Thrissur	16820	14925		31745
Palakkad	15290	13883	74500	103673
Malappuram	19654	21249		40903
Kozhikode (incl. Model)	17715	18573		36288
Waynadu	22615	7115		29730
Kannur	15976	15054		31030
Kasaragod	14148	11366		25514
Sub Total	**259602**	**222985**		**557087**
Schemes of State Govt.				**321073**
DoLR				**161877**
Total				**1040037**

6.1 **Details of pending utilization certificates and unspent balance** available with State under DPAP, DDP & IWDP, reasons for not sending due UCs, reasons for unspent balances which should have been utilized, time-frames proposed for clearing the backlog, fixing of responsibilities for slow progress and pendencies and also for clearing backlog, interest earned on unspent balances and its utilization, etc.

Table- SPSP 17 : Details of pending UCs (MIS Table-M(FM)5)

Table - SPSP 17 : Details of pending UCs (MIS Table-M(FM)5)													
1	2	3	4	5	6	7	8		9		10	11	
S. No.	**District**	**Project**	**Installment no.**	**Financial year of release of fund**	**Amount released (Rs. in lakh)**	**Amount utilized (Rs.in lakhs)**	**Submission of UC**		**Date of submission of UC**		**Reasons for not submitting/ delayed submission of UC**	**Pending UCs**	
							Due date	**Amount (Rs. In lakhs)**	**Date**	**Amount (Rs. In lakhs)**		**Period**	**Amount**
1	Thiruvananthapuram I	Perumkadavila	1	2005-06	45	41.35							
2	Thiruvananthapuram II	Parassala	1	2005-06	45	47.09							
3	Kollam I	Anchal	2	1-2005-06 II-2008-09	135	71.96							
4	Kollam II	Kottarakara	2	I-2005-06 II-2008-09	59.89	56.99							
5	Kollam III	Chadauamangalam	2	I-2006-07 II-2008-09	213.27	101.36						2006-07 to 2008-09	
6	Pathanamthitta I	Koipram	2	I-2005-06 II-2008-09	48.22	47.37							
7	Pathanamthitta II	Parakkode	2	I-2005-06 II-2008-09	56.67	53.51							

8	Pathanamthitta III	Pandalam	2	I-2005-06 II-2008-09	100.28	27.75							
9	Alappuzha I	Veliyanad	1	2005-06	17.91	18.07							
10	Alappuzha II	Aryad	1	2005-06	26.28	25.73							
11	Alappuzha III	Ambalappuzha	1	2006-07	51.17	36.59							
12	Alappuzha IV	Pattanakkaud	1	2006-07	33.36	34.71							
13	Kottayam I	Madappally(E)	2	I-2005-06 II-2008-09	135	77.57							
14	Kottayam II	Lalam	1	2005-06	45	43.99							
15	Kottayam III	Madappally(W)	1	2005-06	97.34	99.01							
16	Idukki II	Devikulam	1	2003-04	45	33.95						2003-04 to 2008-09	
17	Idukki III	Elamdesam	2	I-2005-06 II-2008-09	135	34.16							
18	Thrissur II	Ollukkara	2	I-2005-06 II-2008-09	135	73.09							
19	Thrissur III	Pazhayannur	2	I-2005-06 II-2008-09	173.61	173.64							
20	Palakkad III	Ottappalam-Chittur	2	I-2003-04 II-2007-08	135	98.45						From 2003-04	
21	Palakkad IV	Malampuzha	2	I-2005-06 II-2008-09	66.37	19.03							
22	Malappuram II	Eranad	2	I-2003-04 II-2007-08	135	124.06							
23	Malappuram III	Thirurangadi	2	I-2005-06 II-2007-08	135	83.14							

24	Kozhikode I	Chelannur	1	2005-06	25.82	24.94							
25	Kasargod II	Nileswaram	2	I-2006-07 II-2008-09	159.3	53.31							
26	Kasargod III	Manjeswaram	2	I-2006-07 II-2008-09	159.3	57.41							
27	Kannur I	Kannur	6	2000-01	399.13	365.75							
28	Kasargod I	Kasargod	5	2000-01	532.17	492.4							
29	Idukki 1	Idukki-1		1995-96	388.97	388.97							

Table- SPSP 17 (1) Performance of Ongoing Watershed Programmes

No. of projects sanctioned	No. of projects due for completion	No. of projects completed	No. & amount of pending UCs	Unspent balance
29	28	1	**nil**	Rs.932.59 Lakh

Table-SPSP 18: Details of Unspent balance (MIS Table-M(FM)8)

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
S. No.	**District**	**Project**	**Installment no.**	**Financial year of release of fund**	**Amount released (Rs. in lakh)**	**Amount utilized (Rs.in lakhs)**	**Unutilized funds (Rs. In lakhs)**
1	Thiruvananthapuram I	Perumkadavila	1	2005-06	47.31	47.09	0.22
2	Thiruvananthapuram II	Parassala	1	2005-06	45	41.35	3.65
3	Kollam I	Anchal	2	1-2005-06 II-2008-09	83.29	71.96	11.33
4	Kollam II	Kottarakara	2	I-2005-06 II-2008-09	60.63	56.69	3.94
5	Kollam III	Chadayamangalam	2	I-2006-07 II-2008-09	213.27	101.36	111.91
6	Pathanamthitta I	Koipram	2	I-2005-06 II-2008-09	48.22	47.39	0.83
7	Pathanamthitta II	Parakkode	2	I-2005-06 II-2008-09	56.67	53.51	3.16
8	Pathanamthitta III	Pandalam	2	I-2005-06 II-2008-09	100.28	27.75	72.53
9	Alappuzha I	Veliyanad	1	2005-06	18.46	18.07	0.39
10	Alappuzha II	Aryad	1	2005-06	26.28	25.73	0.55
11	Alappuzha III	Ambalappuzha	1	2006-07	51.17	36.59	14.58
12	Alappuzha IV	Pattanakkaud	1	2006-07	35.38	34.71	0.67
13	Kottayam I	Madappally(E)	2	I-2005-06 II-2008-09	135	77.57	57.43
14	Kottayam II	Lalam	1	2005-06	47.88	43.99	3.89
15	Kottayam III	Madappally(W)	1	2005-06	97.33	99.01	-1.68

16	Idukki II	Devikulam	1	2003-04	46.74	33.95	12.79
17	Idukki III	Elamdesam	2	I-2005-06 II-2008-09	136.52	34.16	102.36
18	Thrissur II	Ollukkara	2	I-2005-06 II-2008-09	135	73.09	61.91
19	Thrissur III	Pazhayannur	2	I-2005-06 II-2008-09	178.52	173.64	4.88
20	Palakkad III	Ottappalam-Chittur	2	I-2003-04 II-2007-08	139.5	98.45	41.05
21	Palakkad IV	Malampuzha	2	I-2005-06 II-2008-09	66.5	19.03	47.47
22	Malappuram II	Eranad	2	I-2003-04 II-2007-08	135	124.06	10.94
23	Malappuram III	Thirurangadi	2	I-2005-06 II-2007-08	135	83.14	51.86
24	Kozhikode I	Chelannur	1	2005-06	26.71	24.94	1.77
25	Kasargod II	Nileswaram	2	I-2006-07 II-2008-09	160.26	53.31	106.95
26	Kasargod III	Manjeswaram	2	I-2006-07 II-2008-09	160.56	57.41	103.15
27	Kannur I	Kannur	6	2000-01	399.13	365.75	33.38
28	Kasargod I	Kasargod	5	2000-01	151.07	80.39	70.68
29	Idukki-1	Idukki		1995-96	388.97	388.97	0.0
Total					**2936.68**	**2004.09**	**932.59**

Chapter 7

7.0 Strategy for implementation of Integrated Watershed Management Programme (IWMP)

a) Prioritization of available area based on the criteria as per the Operational Guidelines of DoLR

The watershed selection is based purely on the basis of weightage by applying a set of parameters set out in the Guidelines and specified in the formats of DoLR. The watershed maps in GIS layers of the various parameters are prepared and overlaid. The GIS maps are available with Soil Survey Organization, Kerala and Kerala land Use board. Of the 12 criteria specified, 9 have been applied. The criteria for actual wages, moisture index, and soil productivity potential could not be applied in the present exercise because of delayed availability of data on those aspects. However, it will also be incorporated shortly.

Table .7.1 Criteria and weightage for selection of watershed

S. No.	Criteria	Maximum score	Ranges & scores			
i	Poverty index (% of poor to population)	10	Above 80 % (10)	80 to 50 % (7.5)	50 to 20 % (5)	Below 20 % (2.5)
ii	% of SC/ ST population	10	More than 40 % (10)	20 to 40 % (5)	Less than 20 % (3)	
iii	Actual wages	5	Actual wages are significantly lower than minimum wages (5)	Actual wages are equal to or higher than minimum wages (0)		
iv	% of small and marginal farmers	10	More than 80 % (10)	50 to 80 % (5)	Less than 50 % (3)	
v	Ground water status	5	Over exploited (5)	Critical (3)	Sub critical (2)	Safe (0)
vi	Moisture index/ DPAP/ DDP Block	15	-66.7 & below (15) DDP Block	-33.3 to -66.6 (10) DPAP Block	0 to -33.2 (0) Non DPAP/ DDP Block	
vii	Area under rain-fed agriculture	15	More than 90 % (15)	80 to 90 % (10)	70 to 80% (5)	Above 70 % (Reject)
viii	Drinking water	10	No source (10)	Problematic village (7.5)	Partially covered (5)	Fully covered (0)
ix	Degraded land	15	High – above 20 % (15)	Medium – 10 to 20 % (10)	Low- less than 10 % of TGA (5)	
x	Productivity potential of the	15	Lands with low production &	Lands with moderate	Lands with high production	

	land		where productivity can be significantly enhanced with reasonable efforts (15)	production & where productivity can be enhanced with reasonable efforts (10)	& where productivity can be marginally enhanced with reasonable efforts (5)	
xi	Contiguity to another watershed that has already been developed/ treated	10	Contiguous to previously treated watershed & contiguity within the micro watersheds in the project (10)	Contiguity within the micro watersheds in the project but non contiguous to previously treated watershed (5)	Neither contiguous to previously treated watershed nor contiguity within the micro watersheds in the project (0)	
xii	Cluster approach in the plains (more than one contiguous micro-watersheds in the project)	15	Above 6 micro-watersheds in cluster (15)	4 to 6 micro watersheds in cluster (10)	2 to 4 micro watersheds in cluster (5)	
	Cluster approach in the hills (more than one contiguous micro-watersheds in the project)		Above 5 micro-watersheds in cluster (15)	3 to 5 micro watersheds in cluster (10)	2 to 3 micro watersheds in cluster (5)	

b) List of watershed projects, along with area coverage, selected for treatment for the next 18 years; listing of these watershed projects and area coverage year-wise for next 18 years

The List of watershed projects, along with area coverage, selected for treatment for the next 18 years is furnished in Table SPSP 19 to 21

Table-SPSP 19: Plan-wise phasing of physical (area in ha) & financial (Rs. in Crore) targets of IWMP for next 18 years*

No	District	Remaining period of XI Plan (2009-10 to 2011-12)		XII Plan (2012-13 to 2016-17)		XIII Plan (2017-18 to 2021-22)		XIV Plan (2022-23 to 2026-27)		Total for 18 years	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Alapuzha	12709	1525	31711	3805	31499	3780	31454	3775	107373	12885
2	Ernakulam	10256	1231	25799	3096	28517	3422	17216	2066	81788	9815
3	Idukki	16901	2535	39961	5994	39294	5894	36265	5440	132422	19863
4	Kannur	15358	1843	36366	4364	36436	4372	33058	3967	121218	14546
5	Kasargode	21871	2625	40505	4861	41843	5021	42130	5056	146349	17562
6	Kollam	11091	1331	19282	2314	13606	1633	17319	2078	61298	7356
7	Kottayam	11185	1342	27244	3269	28479	3417	31077	3729	97984	11758
8	Kozhikode	10832	1300	32405	3889	31882	3826	24332	2920	99451	11934
9	Malappuram	19174	2301	53800	6456	48651	5838	42081	5050	163707	19645
10	Palakkad	27189	3263	30927	3711	41810	5017	35410	4249	135337	16240
11	Pathanamthitta	11622	1395	11353	1362	15906	1909	15229	1827	54109	6493
12	Thiruvananthapuram	14295	1715	18645	2237	22608	2713	21632	2596	77180	9262
13	Thrissur	16248	1950	25349	3042	27249	3270	30187	3622	99033	11884
14	Wayanadu	17839	2676	11649	1747	10389	1558	9061	1359	48938	7341
	Total	**216569**	**27031**	**404996**	**50148**	**418169**	**51671**	**386453**	**47734**	**1426187**	**176583**

*Data for the entire State regarding each item may be given in the same format at the end of the table

Table-SPSP 20: Year-wise phasing of physical (area in '000 ha) & financial (Rs. in lakh) targets of IWMP for remaining period of XI Plan *: Part A

1	2	3									
		Remaining period of XI Plan									
		2009-10					**2010-11**				
		Phy.				**Fin.**	**Phy.**				**Fin.**
		No. of projects		**Area**			**No. of projects**		**Area**		
S. No	District	H&D	O	H&D	O		H&D	O	H&D	O	
1	Alappuzha		0		0	0.00		5		5889	706.73
2	Ernakulam		0		0	0.00		6		5897	707.68
3	Idukki		0		0	0.00	7		6708		1006.17
4	Kozhikode		0		0	0.00		11		5712	685.45
5	Kannur		0		0	0.00		15		5369	644.32
6	Kollam		0		0	0.00		7		4917	589.99
7	Kasargode		46		16738	2008.58		14		5133	615.92
8	Malappuram		0		0	0.00		19		9466	1135.90
9	Palakkad		20		17560	2107.18		8		9630	1155.55
10	Kottayam		0		0	0.00		7		5365	643.77
11	Pathanamthitta		0		0	0.00		5		6784	814.07
12	Thrissur		0		0	0.00		17		11361	1363.30
13	Thiruvananthapuram		0		0	0.00		6		7492	899.04
14	Wyanad	28		17839		2675.83	0		0		0.00
_	**Total**	**28**	**66**	**17839**	**34298**	**6792**	**7**	**120**	**6708**	**83015**	**10968**

Part B

1	2	3									
		Remaining period of XI Plan									
		2011-12					**Total**				
		Phy.				**Fin.**	**Phy.**				**Fin.**
		No. of projects		**Area**			**No. of projects**		**Area**		
S. No	District	H&D	O	H&D	O		H&D	O	H&D	O	
1	Alappuzha		8		6819	818.30	0	13	0	12709	1525.03
2	Ernakulam		5		4359	523.09	0	11	0	10256	1230.77
3	Idukki	5		5563		834.38	12	0	12270	0	1840.54
4	Kozhikode		7		5120	614.36	0	18	0	10832	1299.81
5	Kannur		22		9989	1198.69	0	37	0	15358	1843.01
6	Kollam		8		6174	740.90	0	15	0	11091	1330.89
7	Kasargode		0		0	0.00	0	60	0	21871	2624.50
8	Malappuram		16		9708	1164.99	0	35	0	19174	2300.89
9	Palakkad		0		0	0.00	0	28	0	27189	3262.73
10	Kottayam		7		5820	698.39	0	14	0	11185	1342.16
11	Pathanamthitta		5		4838	580.53	0	10	0	11622	1394.60
12	Thrissur		8		4887	586.46	0	25	0	16248	1949.76
13	Thiruvananthapuram		8		6803	816.37	0	14	0	14295	1715.41
14	Wyanad	0		0		0.00	28	0	17839	0	2675.83
-	**Total**	**5**	**94**	**5563**	**64517**	**8576**	**40**	**280**	**30109**	**181830**	**26336**

H&D- Hilly & Difficult area; O- Others

*Data for the entire State regarding each item may be given in the same format at the end of the table

Table-SPSP 21: Details of district wise and category-wise area proposed to be taken up under IWMP during next 3 years i.e. up to 11th Five Year Plan.

1	2	3	4	5	6			7	
S. No.	District	Year	Total area available for treatment	Total area proposed to take up under IWMP in the next 3 years	Terrain of the proposed area			Land use type of proposed area	
					Hilly	Desert	Others (Pl. specify)	cultivated rain fed area	Uncultivated Wasteland
	Alappuzha	2009-10	0	0		Nil	Plains	0	0
	Alappuzha	2010-11	5889	5889		Nil	Plains	5889	0
	Alappuzha	2011-12	6819	6819		Nil	Plains	6819	0
-	-	-	**12709**	**12709**	-	-	-	12709	-
	Ernakulam	2009-10	0	0		Nil	Plains	0	0
	Ernakulam	2010-11	5897	5897		Nil	Plains	5897	0
	Ernakulam	2011-12	4359	4359		Nil	Plains	4359	0
-	-	-	**10256**	**10256**	-	-	-	10256	-
	Idukki	2009-10	0	0	Hilly	Nil		0	0
	Idukki	2010-11	6708	6708	Hilly	Nil		6708	0
	Idukki	2011-12	5563	5563	Hilly	Nil		5563	0
-	-	-	**12270**	**12270**	-	-	-	12270	-
	Kasargode	2009-10	17428	16738		Nil	Plains	16738	0
	Kasargode	2010-11	5469	5133		Nil	Plains	5133	0
	Kasargode	2011-12	0	0		Nil	Plains	0	0
-	-	-	**22904**	**22904**	-	-	-	22904	-

	Kannur	2009-10	0	0		Nil	Plains	0	0
	Kannur	2010-11	5369	5369		Nil	Plains	5369	0
	Kannur	2011-12	10261	9989		Nil	Plains	9989	0
			15630	**15358**				15358	
	Kollam	2009-10	0	0		Nil	Plains	0	0
	Kollam	2010-11	4917	4917		Nil	Plains	4917	0
	Kollam	2011-12	6174	6174		Nil	Plains	6174	0
			11091	**11091**				11091	
	Kozhikode	2009-10	0	0		Nil	Plains	0	0
	Kozhikode	2010-11	5712	5712		Nil	Plains	5712	0
	Kozhikode	2011-12	5709	5120		Nil	Plains	5120	0
			11421	**10832**				10832	
	Malappuram	2009-10	0	0		Nil	Plains	0	0
	Malappuram	2010-11	9466	9466		Nil	Plains	9466	0
	Malappuram	2011-12	9708	9708		Nil	Plains	9708	0
			19174	**19174**				19174	
	Palakkad	2009-10	18315	17560		Nil	Plains	17560	0
	Palakkad	2010-11	11740	9630		Nil	Plains	9630	0
	Palakkad	2011-12	0	0		Nil	Plains	0	0
			28497	**27261**				27261	
	Kottayam	2009-10	0	0		Nil	Plains	0	0
	Kottayam	2010-11	5365	5365		Nil	Plains	5365	0
	Kottayam	2011-12	5820	5820		Nil	Plains	5820	0
			11185	**11185**				11185	
	Pathanamthitta	2009-10	0	0		Nil	Plains	0	0
	Pathanamthitta	2010-11	6784	6784		Nil	Plains	6784	0
	Pathanamthitta	2011-12	4838	4838		Nil	Plains	4838	0
			11622	**11622**				11622	

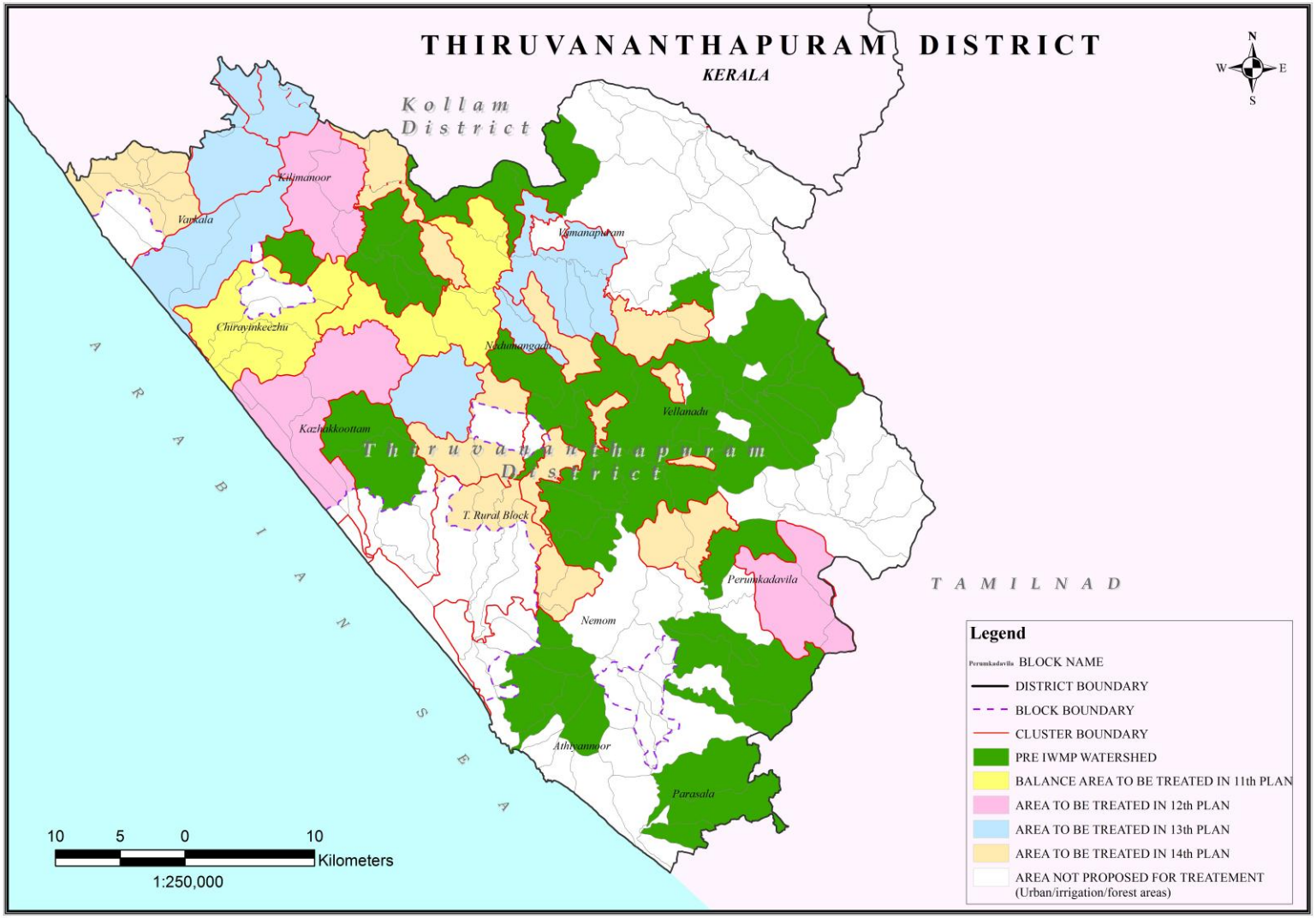
	Thrissur	2009-10	0	0		Nil	Plains	0	0
	Thrissur	2010-11	11639	11361		Nil	Plains	11361	0
	Thrissur	2011-12	4887	4887		Nil	Plains	4887	0
			16526	**16248**				16248	
	Thiruvananthapuram	2009-10	0	0		Nil	Plains	0	0
	Thiruvananthapuram	2010-11	11361	11361		Nil	Plains	11361	0
	Thiruvananthapuram	2011-12	4887	4887		Nil	Plains	4887	0
			16248	**16248**				16248	
	Wayanadu	2009-10	21957	17839	Hilly	Nil		17839	0
	Wayanadu	2010-11	0	0	Hilly	Nil		0	0
	Wayanadu	2011-12	0	0	Hilly	Nil		0	0
			21957	**17839**				17839	

Table-SPSP 21 (Contd.): Details of district wise and category-wise area proposed to be taken up under IWMP during next 3 years i.e. up to 11th Five Year Plan.

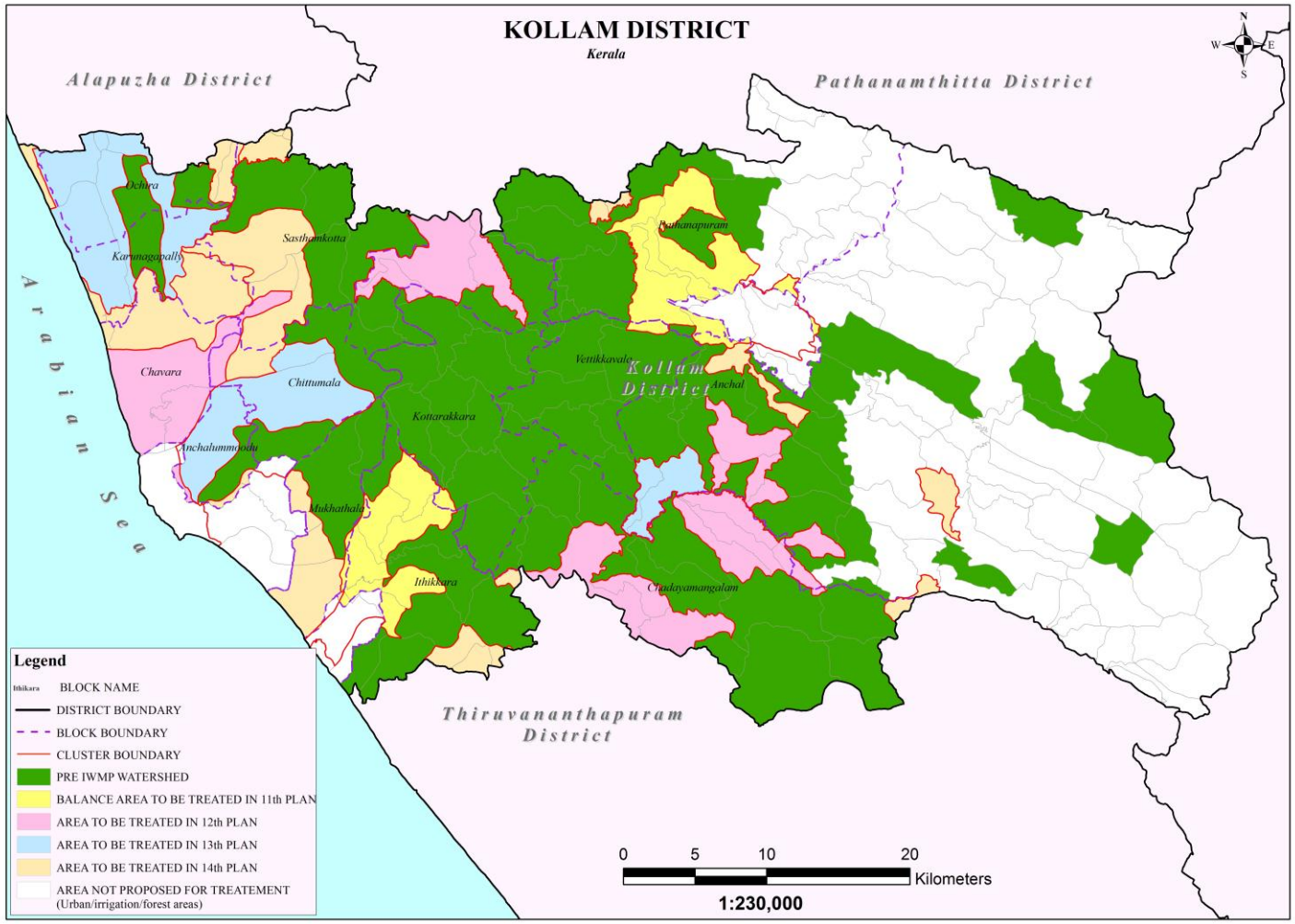
7					8					9			
Ownership pattern of the proposed area					No. of beneficiaries covered					Identified DPAP/ DDP Blocks covered			
										DPAP		DDP	
Private	Community	Forest	Others (pl. specify)	Total area	MF	SF	LF	Landless	Total	No. of blocks	Area	No. of blocks	Area
0		0		0					0				

5889		0		5889					6521				
6819		0		6819					22234				
12709		**0**		**12709**					**28755**				
0		0		0					0				
5897		0		5897					29628				
4359		0		4359					15788				
10256		**0**		**10256**					**45415**				
0		0		0					0				
6708		0		6708					6512				
5167		396		5563					3801				
11874		**396**		**12270**					**10313**				
16048		690		16738					12701				
4797		336		5133					4258				
0		0		0					0				
20845		**1026**		**21871**					**16960**				
0		0		0					0				
5369		0		5369					4633				
9877		112		9989					6415				
15247		**112**		**15358**					**11048**				
0		0		0					0				
4917		0		4917					18321				
5282		893		6174					13078				
10198		**893**		**11091**					**31398**				
0		0		0					0				
5712		0		5712					8820				
5120		0		5120					10599				
10832		**0**		**10832**					**19419**				
0		0		0					0				

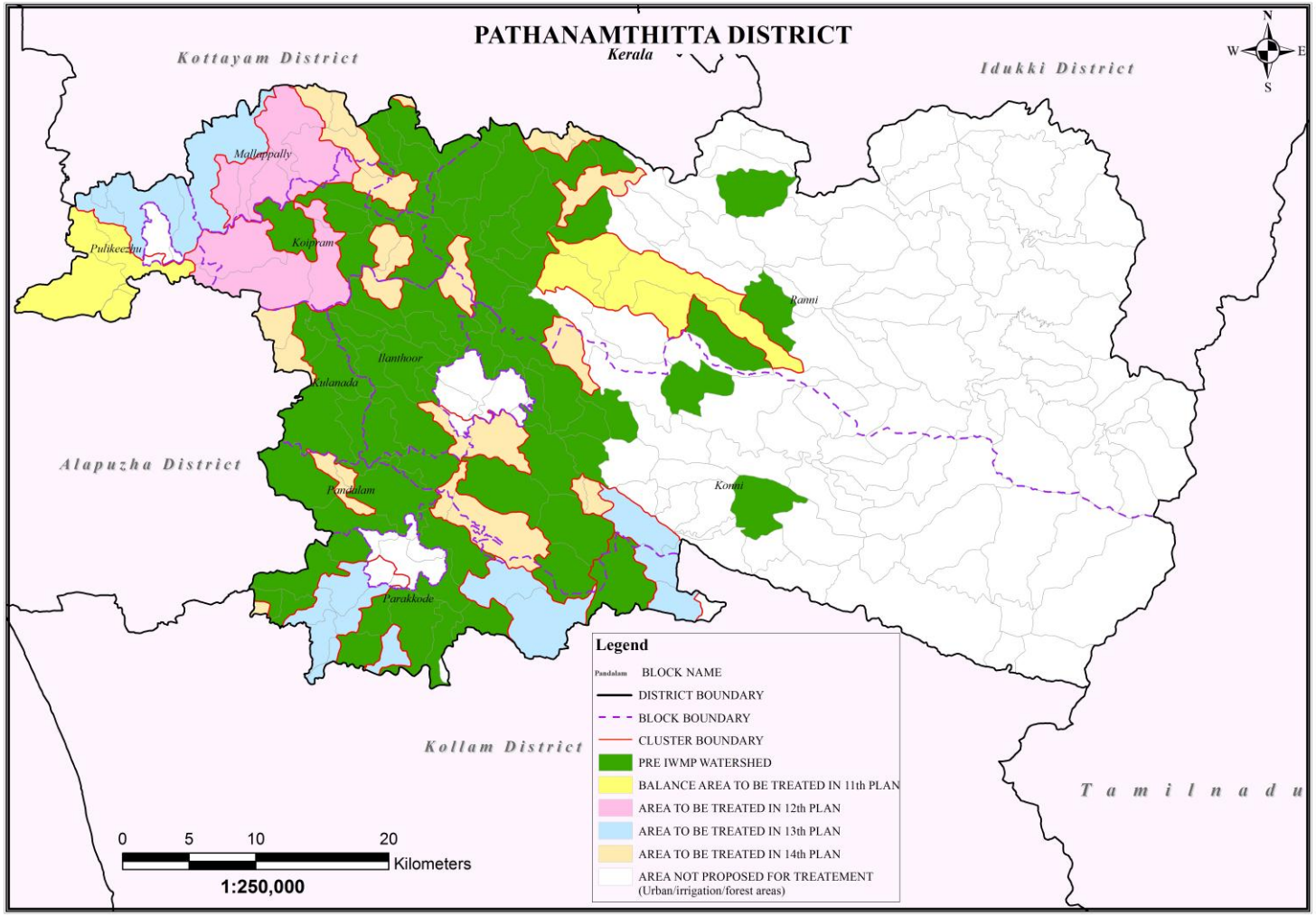
9048		418		9466					17240				
9126		582		9708					17246				
18174		**1000**		**19174**					**34486**				
17442		118		17560					29109				
9630		0		9630					19561				
0		0		0					0				
27072		**118**		**27190**					**48670**				
0		0		0					0				
5365		0		5365					4606				
5820		0		5820					6881				
11185		**0**		**11185**					**11487**				
0		0		0					0				
5582		1201		6784					5147				
4838		0		4838					14626				
10420		**1201**		**11622**					**19773**				
0		0		0					0				
10893		467		11361					21972				
4887		0		4887					11891				
15781		**467**		**16248**					**33863**				
0		0		0					0				
10893		467		11361					21972				
4887		0		4887					11891				
15781		**467**		**16248**					**33863**				
15242		2597		17839					9990				
0		0		0					5440				
0		0		0					0				
15242		**2597**		**17839**					**15429**				


THIRUVANANTHAPURAM DISTRICT
KERALA
Kollam District
Kilimanoor
Varkala
Vamanapuram
Chirayinkeezhu
Nedumangadu
Vellanadu
Kazhakkoottam
Thiruvananthapuram District
T. Rural Block
Perumkadavila
Nemom
Athiyannoor
Parasala
TAMILNAD
ARABIAN SEA
N
W
E
S
10 5 0 10
Kilometers
1:250,000
Legend
Perumkadavila BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)

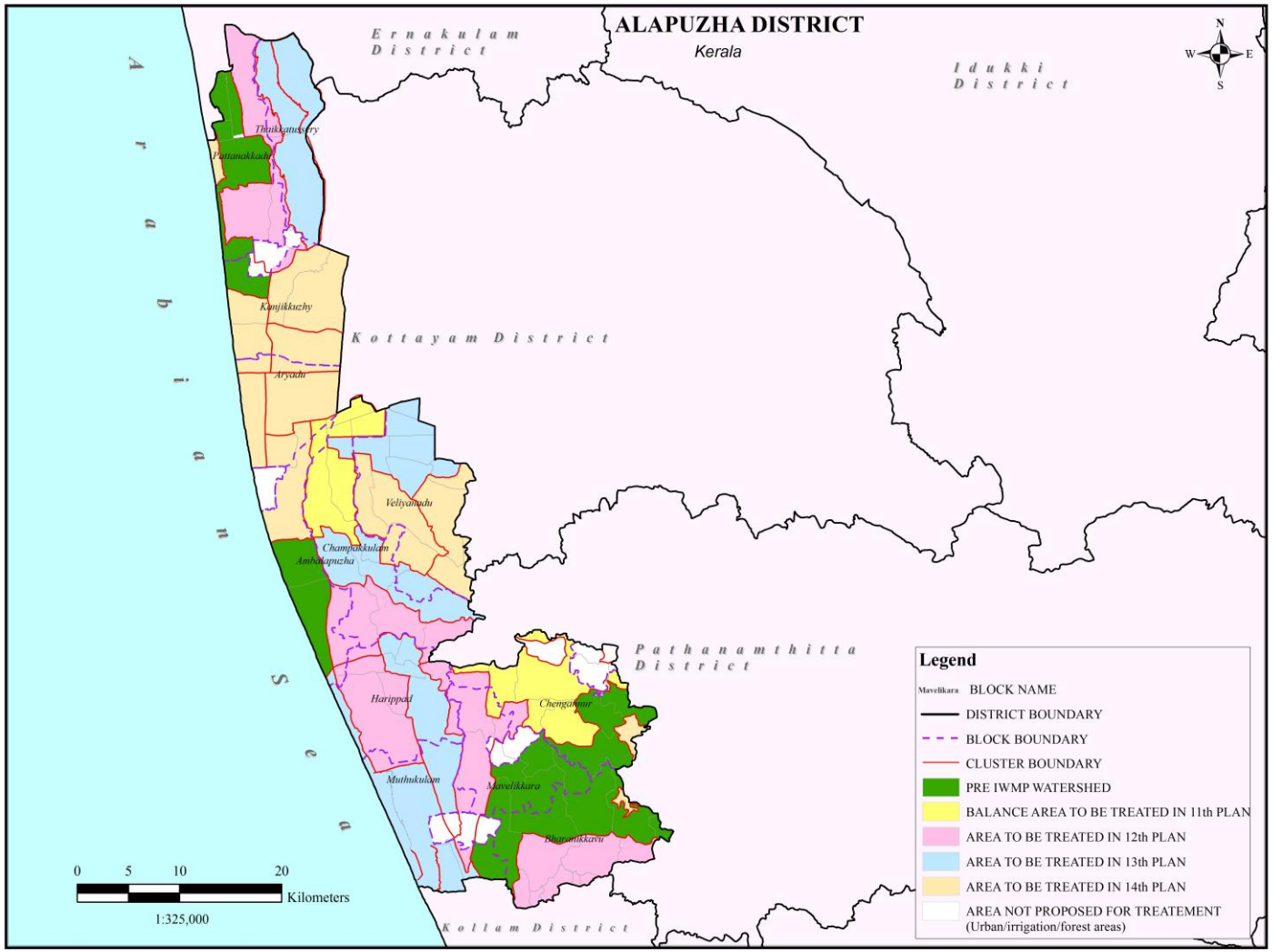
No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Vamanapuram A	63	6	7492	0	7492	7492
2	Chirayankeezhu A	62	8	6803	0	6803	6803
3	Perumakkadavila A	60	3	5242	0	5242	5242
4	Kazhakoottam A	59	6	8088	0	8088	8088
5	Kilimanoor C	58	3	5315	0	5315	5315
6	Kilimanoor A	55	5	6409	337	6072	6072
7	Vamanapuram C	54	5	5650	0	5650	5650
8	Varkkala B	51	3	6208	0	6208	6208
9	Nedumangad C	54	3	4677	0	4677	4677
10	Nedumangad B	59	3	4388	0	4388	4388
11	Varkkala A	56	8	4049	0	4049	4049
12	Vellanadu A	57	3	2918	0	2918	2918
13	Vellanad E	60	2	2433	0	2433	2433
14	Kilimanoor B	57	3	2048	0	2048	2048
15	Nemam A	54	3	1748	34	1714	1714
16	Nedumangad A	56	1	1228	0	1228	1228
17	Vamanapuram B	51	1	1026	0	1026	1026
18	Trivandrum Rural A	63	5	713	1	711	711
19	Vellanad B	51	1	231	0	231	231
20	Vellanad C	51	1	384	0	384	384
21	Vellanad D	51	1	503	0	503	503
	TOTAL	**1178**	**74**	**77552**	**372**	**77180**	**77180**


KOLLAM DISTRICT
Kerala
Alapuzha District
Pathanamthitta District
Thiruvananthapuram District
Kollam District
Arabian Sea
Ochira
Karunagapally
Sasthamkotta
Pathanapuram
Chavara
Chittumala
Venikkavalu
Anchal
Kottarakkara
Anchalummoodu
Mukhathala
Ithikkara
Chadayamangalam
N
W
E
S
Legend
Ithikara BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)
0 5 10 20
Kilometers
1:230,000

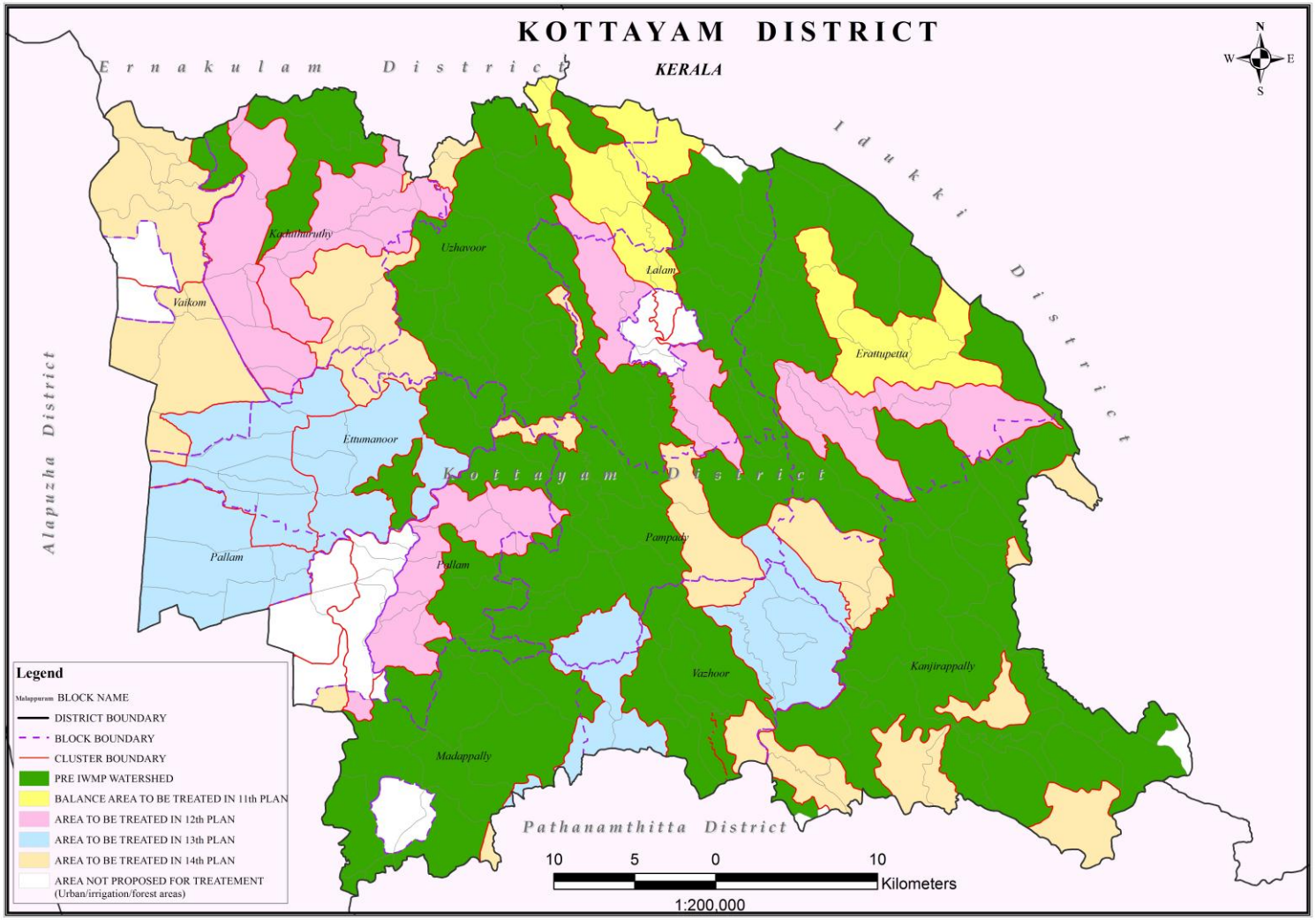
No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Ithikkara A4	71	7	4917	0	4917	4917
2	Pathanapuram A7	66	8	6174	0	6174	6174
3	Vettikkavala A3	63	3	4189	0	4189	4189
4	Chadayamangalam B5	62	5	3657	0	3657	3657
5	Chadayamangalam A2	59	3	3990	0	3990	3990
6	Anchal F3	59	4	2144	0	2144	2144
7	Chavara A1	59	3	5301	0	5301	5301
8	Chittumala A1	58	1	5916	0	5916	5916
9	Ochira A5	58	5	4102	0	4102	4102
10	Anchal E1	58	2	1772	0	1772	1772
11	Karunagappilly B1	56	1	1816	0	1816	1816
12	Sasthamkotta A2	56	3	4908	0	4908	4908
13	Mukuthala A3	54	3	2835	0	2835	2835
14	Karunagappilly C2	53	2	4406	0	4406	4406
15	Ithikkara B1	53	3	1039	0	1039	1039
16	Ochira B1	63	2	752	0	752	752
17	Anchal G1	60	2	850	0	850	850
18	Anchal A1	50	1	386	0	386	386
19	Anchal B1	42	1	787	0	787	787
20	Karunagappilly A1	48	1	282	0	282	282
21	Pathanapuram B1	58	2	296	0	296	296
22	Ithikkara C1	51	1	171	0	171	171
23	Sasthamkotta B3	51	3	608	0	608	608
	TOTAL	-	**66**	**61298**	**0**	**61298**	**61298**


PATHANAMTHITTA DISTRICT
Kerala
Kottayam District
Idukki District
Alapuzha District
Kollam District
Tamilnadu
Mallappally
Pulikeezhu
Koipram
Ranni
Ilanthoor
Kulanada
Pandalam
Konni
Parakkode
N
W
E
S
Legend
Pandalam BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)
0 5 10 20
Kilometers
1:250,000

No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Ranni B	66	5	6784	0	6784	6784
2	Pulikeezhu A	62	5	4838	0	4838	4838
3	Mallappilly A	59	5	5541	0	5541	5541
4	Koippram A	59	4	5812	0	5812	5812
5	Pulikeezhu B	48	4	6127	0	6127	6127
6	Parakkode C	56	2	3570	0	3570	3570
7	Parakkode B	67	5	3351	0	3351	3351
8	Parakkode D	61	3	2857	0	2857	2857
9	Konni A	59	2	2771	0	2771	2771
10	Mallappilly B	49	4	2584	0	2584	2584
11	Konni C	58	2	1842	0	1842	1842
12	Illathoor A	56	3	1488	0	1488	1488
13	Kulanada A	60	2	1227	0	1227	1227
14	Ranni C	56	1	1084	0	1084	1084
15	Ranni D	56	1	1072	0	1072	1072
16	Ranni A	51	1	958	0	958	958
17	Ranni E	61	3	717	0	717	717
18	Pandalam A	58	2	732	0	732	732
19	Konni B	58	2	538	0	538	538
20	Parakkode A	51	1	120	0	120	120
21	Mallappilly C	51	1	95	0	95	95
	TOTAL		**58**	**54109**	**0**	**54109**	**54109**

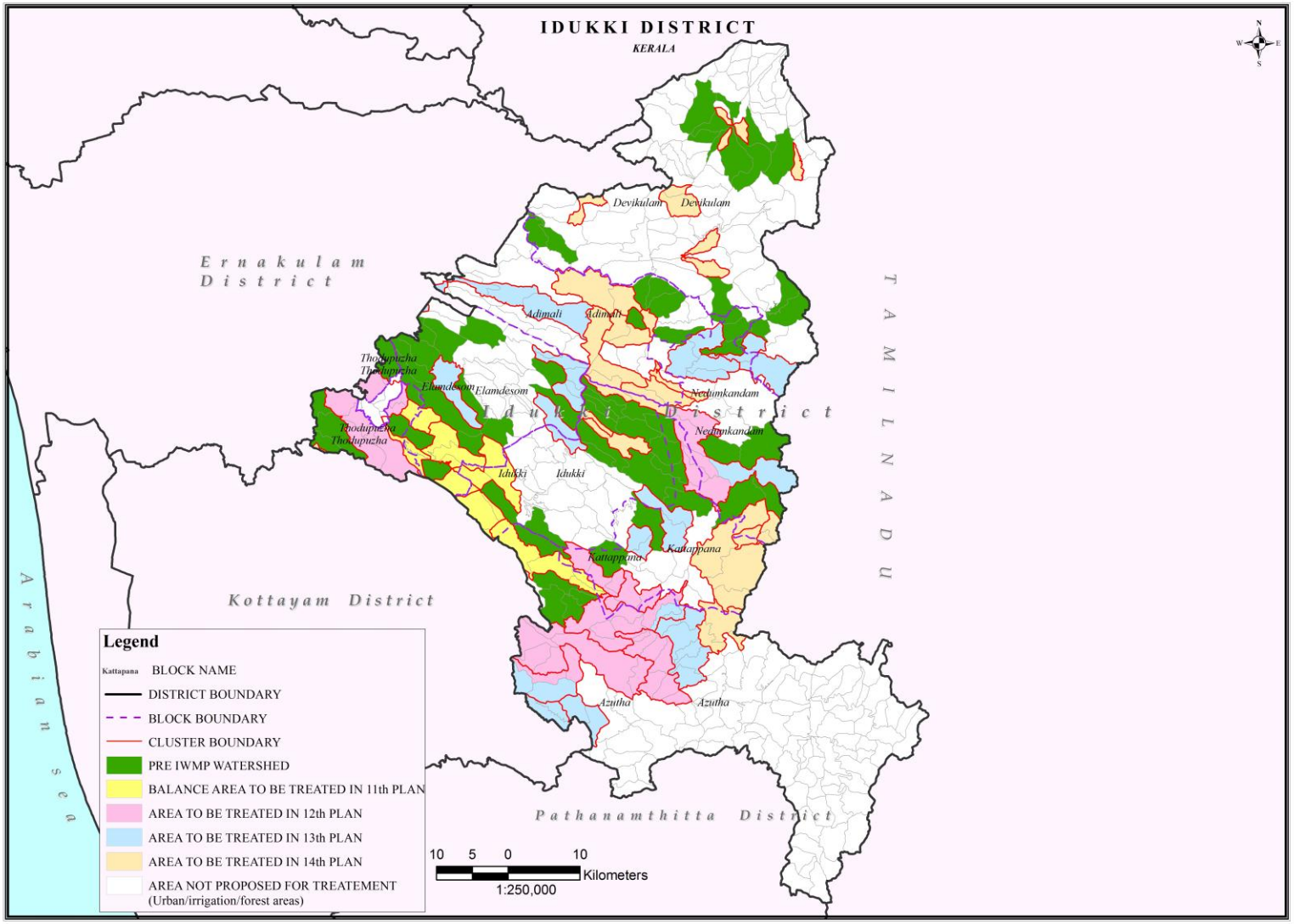

ALAPUZHA DISTRICT
Kerala
Ernakulam District
Idukki District
Kottayam District
Pathanamthitta District
Kollam District
Arabian Sea
N
W
E
S
Thaikattussery
Pattanakkad
Kanjikkuzhy
Aryadu
Veliyanadu
Champakkulam
Ambalapuzha
Harippad
Muthukulam
Chengannur
Mavelikkara
Bharanikkavu
0 5 10 20
Kilometers
1:325,000
Legend
Mavelikara BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)

No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Champakkulam C	67	5	5889	0	5889	5889
2	Chengannur B	64	8	6819	0	6819	6819
3	Bharanikkavu B	62	8	5820	0	5820	5820
4	Mavelikkara A	57	3	6490	0	6490	6490
5	Champakkulam A	56	3	6230	0	6230	6230
6	Pattanakkadu B	56	3	7101	0	7101	7101
7	Harippad B	56	3	6070	0	6070	6070
8	Veliyanadu C	53	6	5162	0	5162	5162
9	Thykkattussery A	52	3	7887	0	7887	7887
10	Muthukulam A	52	4	6876	0	6876	6876
11	Harippad A	52	4	5669	0	5669	5669
12	Champakkulam B	52	4	5906	0	5906	5906
13	Kanhikkuzhi A	51	2	5260	0	5260	5260
14	Kanhikkuzhi B	51	3	5760	0	5760	5760
15	Veliyanadu A	49	3	5486	0	5486	5486
16	Aryadu A	46	2	5650	0	5650	5650
17	Veliyanadu B	48	4	4124	0	4124	4124
18	Ambalappuzha A	58	2	3942	0	3942	3942
19	Pattanakkadu A	68	1	417	0	417	417
20	Bharanikkavu A	61	1	237	0	237	237
21	Chengannur A	56	1	578	0	578	578
	TOTAL	**1165**	**73**	**107373**	**0**	**107373**	**107373**


KOTTAYAM DISTRICT
KERALA
Ernakulam District
Idukki District
Alapuzha District
Kottayam District
Pathanamthitta District
Kaduthuruthy
Uzhavoor
Lalam
Vaikom
Erattupetta
Ettumanoor
Pampady
Pallam
Pallam
Vazhoor
Kanjirappally
Madappally
N
W
E
S
Legend
Malappuram BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)
10 5 0 10
Kilometers
1:200,000

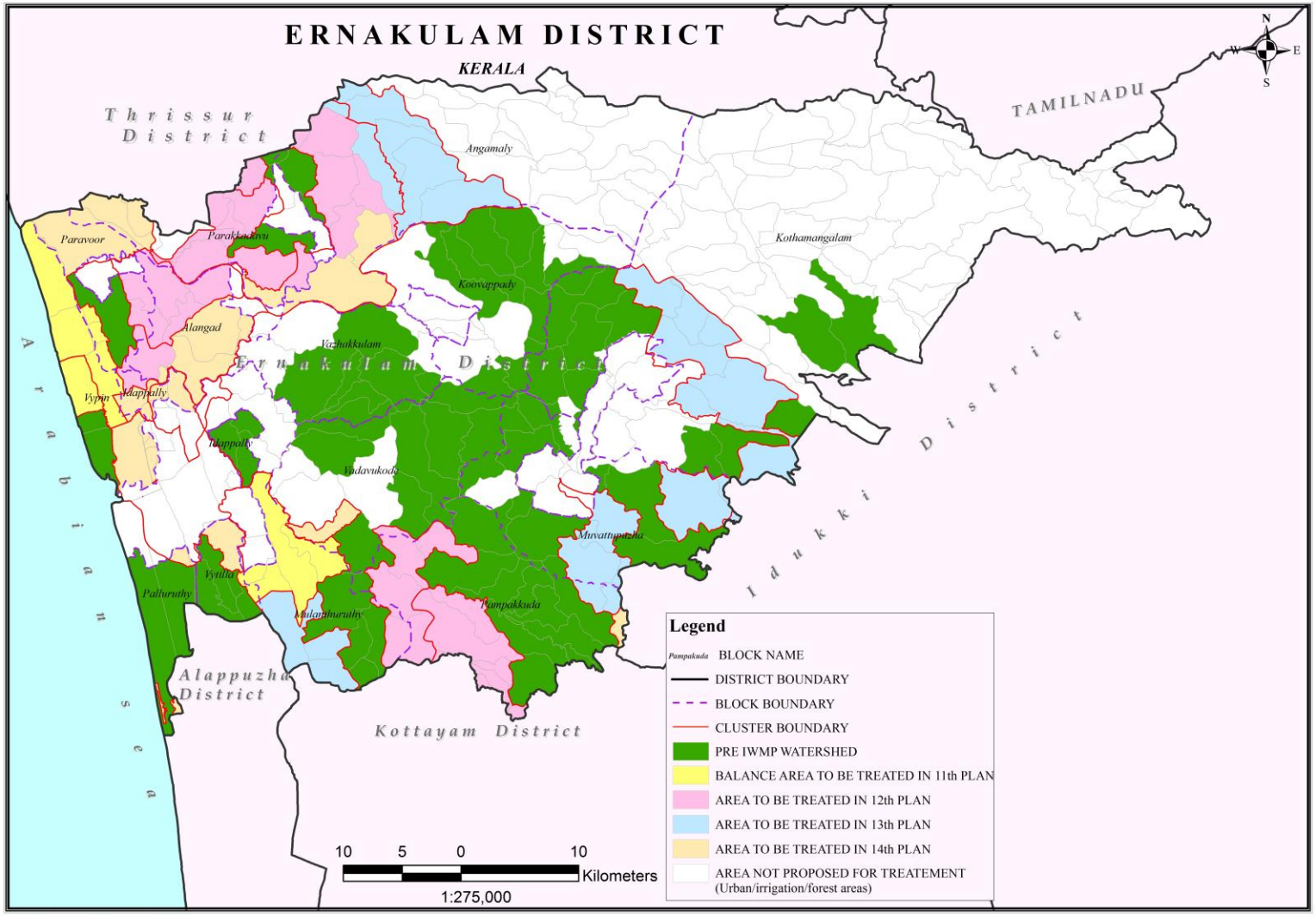
No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Erattupetta A	71	7	5365	0	5365	5365
2	Uzhavoor A	68	7	5820	0	5820	5820
3	Pallam B	65	9	5499	0	5499	5499
4	Erattupetta B	64	7	6089	0	6089	6089
5	Kadathuruthi A	63	8	5474	0	5474	5474
6	Kadathuruthi C	61	8	5751	0	5751	5751
7	Lalam A	61	5	4431	0	4431	4431
8	Ettumanoor A	60	7	6542	0	6542	6542
9	Vazhoor C	60	5	5745	0	5745	5745
10	Vazhoor A	59	3	3898	0	3898	3898
11	Pallam A	58	6	6497	0	6497	6497
12	Ettumanoor B	58	5	5797	0	5797	5797
13	Vaikam A	57	6	5022	0	5022	5022
14	Kadathuruthi B	49	4	5103	0	5103	5103
15	Vaikam B	48	5	5261	0	5261	5261
16	Pampady A	56	2	3054	0	3054	3054
17	Kanjirapally C	56	2	1949	0	1949	1949
18	Kanjirapally B	56	3	1539	0	1539	1539
19	Madapally B	56	1	191	0	191	191
20	Uzhavoor B	56	2	601	0	601	601
21	Kanjirapally A	54	3	2919	0	2919	2919
22	Kanjirapally E	54	1	964	0	964	964
23	Kanjirapally G	54	1	525	0	525	525
24	Vazhoor B	54	1	787	0	787	787

25	Uzhavoor C	51	1	257	0	257	257
26	Kanjirapally D	49	1	1821	0	1821	1821
27	Madapally A	46	1	281	0	281	281
28	Pampady B	41	1	645	0	645	645
29	Kanjirapally F	39	1	156	0	156	156
	TOTAL	-	**113**	**97984**	**0**	**97984**	**97984**


IDUKKI DISTRICT
KERALA
Ernakulam District
Kottayam District
Pathanamthitta District
TAMILNADU
Arabian sea
Devikulam
Adimali
Thodupuzha
Elamdesom
Nedumkandam
Idukki
Kattappana
Azutha
Legend
Kattapana BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT (Urban/irrigation/forest areas)
10 5 0 10
Kilometers
1:250,000

No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Elamdesom A6	68	7	6708	0	6708	6708
2	Idukki C5	66	5	5563	0	5563	5563
3	Azutha H1	63	4	4631	0	4631	4631
4	Azutha D1	62	9	5734	0	5734	5734
5	Azutha B5	62	6	5897	0	5897	5897
6	Azutha C1	61	2	5118	0	5118	5118
7	Kattappana C4	60	6	4465	0	4465	4465
8	Azutha E3	58	5	4964	0	4964	4964
9	Thodupuzha A1	56	4	5739	0	5739	5739
10	Thodupuzha B4	55	4	2125	0	2125	2125
11	Nedumkandam B1	54	5	5920	0	5920	5920
12	Elamdesom D1	66	5	2716	0	2716	2716
13	Elamdesom B1	54	1	2423	0	2423	2423
14	Elamdesom C1	54	1	2054	0	2054	2054
15	Elamdesom E1	39	1	62	0	62	62
16	Nedumkandam A3	53	4	4604	0	4604	4604
17	Adimali A1	52	3	5227	0	5227	5227
18	Azutha A1	52	6	5773	0	5773	5773
19	Kattappana D1	51	2	1284	0	1284	1284
20	Kattappana E1	51	2	2670	0	2670	2670
21	Davikulam G1	50	2	3618	0	3618	3618
22	Nedumkandam C1	50	2	3098	0	3098	3098
23	Azutha F1	48	8	5764	0	5764	5764
24	Kattappana B2	46	2	4946	0	4946	4946
25	Adimali B3	43	4	5881	0	5881	5881
26	Adimali C2	42	4	4955	0	4955	4955

27	Kattappana A1	41	2	4720	0	4720	4720
28	Adimali D1	38	3	2773	0	2773	2773
29	Azutha G1	38	3	3043	0	3043	3043
30	Idukki B1	48	2	1312	0	1312	1312
31	Idukki A1	47	3	1947	0	1947	1947
32	Davikulam F1	55	1	805	0	805	805
33	Davikulam E1	45	2	1649	0	1649	1649
34	Davikulam D1	40	2	1753	0	1753	1753
35	Davikulam A1	48	2	664	0	664	664
36	Davikulam C1	45	1	485	0	485	485
37	Davikulam B1	42	1	280	0	280	280
38	Nedumkandam D1	45	2	972	0	972	972
39	Thodupuzha C1	49	1	81	0	81	81
	TOTAL		**129**	**132422**	**0**	**132422**	**132422**


ERNAKULAM DISTRICT
KERALA
TAMILNADU
Thrissur District
Idukki District
Alappuzha District
Kottayam District
Ernakulam District
Arabian Sea
Angamaly
Paravoor
Parakkadavu
Kothamangalam
Koovappady
Alangad
Vazhakkulam
Vypin
Edapally
Idappally
Vadavukode
Muvattupuzha
Vyttila
Palluruthy
Pampakkuda
Mulanthuruthy
N
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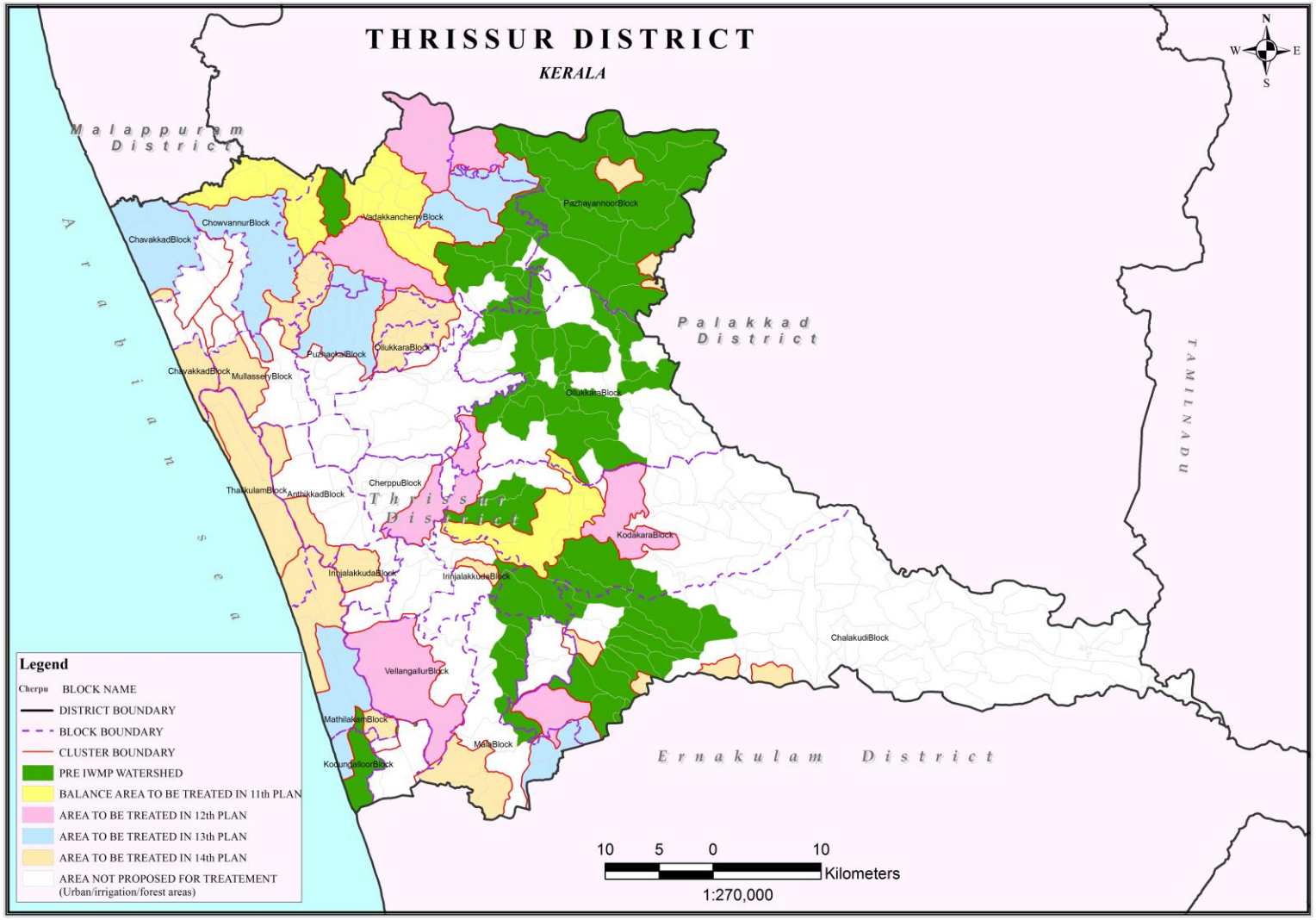
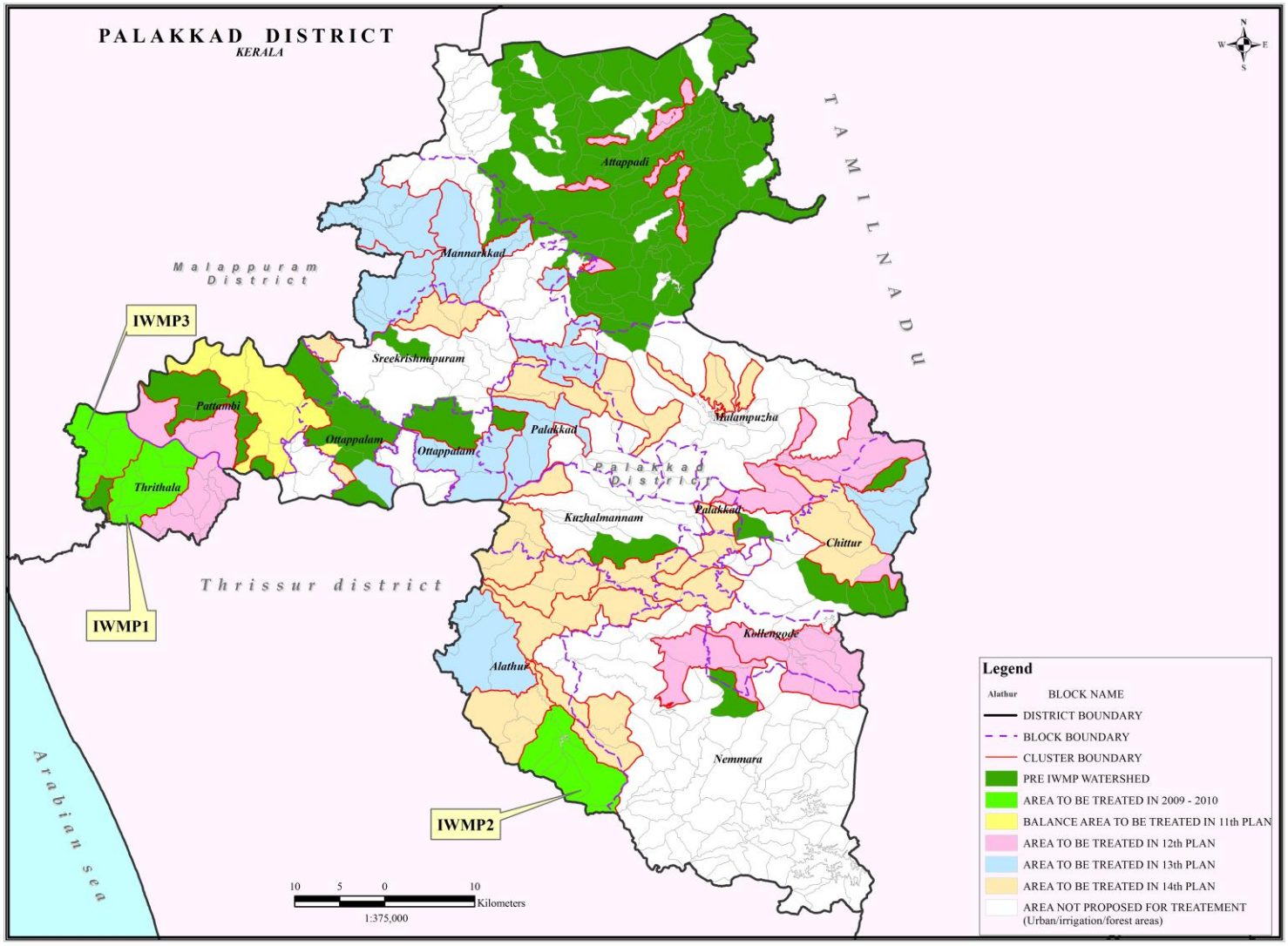
10 5 0 10
Kilometers
1:275,000
Legend
Pampakuda BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)

No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Vypin A1	74	6	5897	0	5897	5897
2	Mulamthuruthy A1	66	5	4359	0	4359	4359
3	Parakadavu A8	65	8	5453	186	5267	5267
4	Pampakkuda B1	65	6	4473	0	4473	4473
5	Pampakkuda A4	65	4	5083	121	4962	4962
6	Alangode A3	64	5	5600	176	5424	5424
7	Angamali C1	64	5	5689	16	5673	5673
8	Mulamthuruthy B1	63	4	3348	0	3348	3348
9	Kothamangalam B2	62	4	5274	0	5274	5274
10	Kothamangalam A3	59	4	4420	364	4057	4057
11	Moovattupuzha A3	59	3	4003	0	4003	4003
12	Moovattupuzha B3	59	3	2877	0	2877	2877
13	Angamali A2	59	2	4623	76	4548	4548
14	Angamali B5	59	5	4410	0	4410	4410
15	Angamali D5	54	2	4335	454	3881	3881
16	Parakadavu B3	53	3	4355	254	4102	4102
17	Alangode B2	48	4	3594	0	3594	3594
18	Vyttila A1	69	5	1208	0	1208	1208
19	Edapally A1	66	8	1515	0	1515	1515
20	Vypin B3	64	4	1867	0	1867	1867
21	Vadavukode A1	44	1	798	194	604	604
22	Pampakkuda C1	51	1	296	0	296	296
23	Palluruthy B 1	66	2	149	0	149	149
	TOTAL	**1394**	**94**	**83628**	**1839**	**81788**	**81788**


THRISSUR DISTRICT
KERALA
N
W
E
S
Malappuram District
Palakkad District
TAMILNADU
Ernakulam District
Thrissur District
Arabian Sea
PazhayannoorBlock
VadakkancherryBlock
ChowvannurBlock
ChavakkadBlock
PuzhakkalBlock
OllukkaraBlock
MullasseryBlock
CherppuBlock
ThalikulamBlock
AnthikkadBlock
KodakaraBlock
InjalakkudaBlock
ChalakudiBlock
VellangallurBlock
MathilakamBlock
MalaBlock
KodungalloorBlock
Legend
Cherpu BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)
10 5 0 10
Kilometers
1:270,000

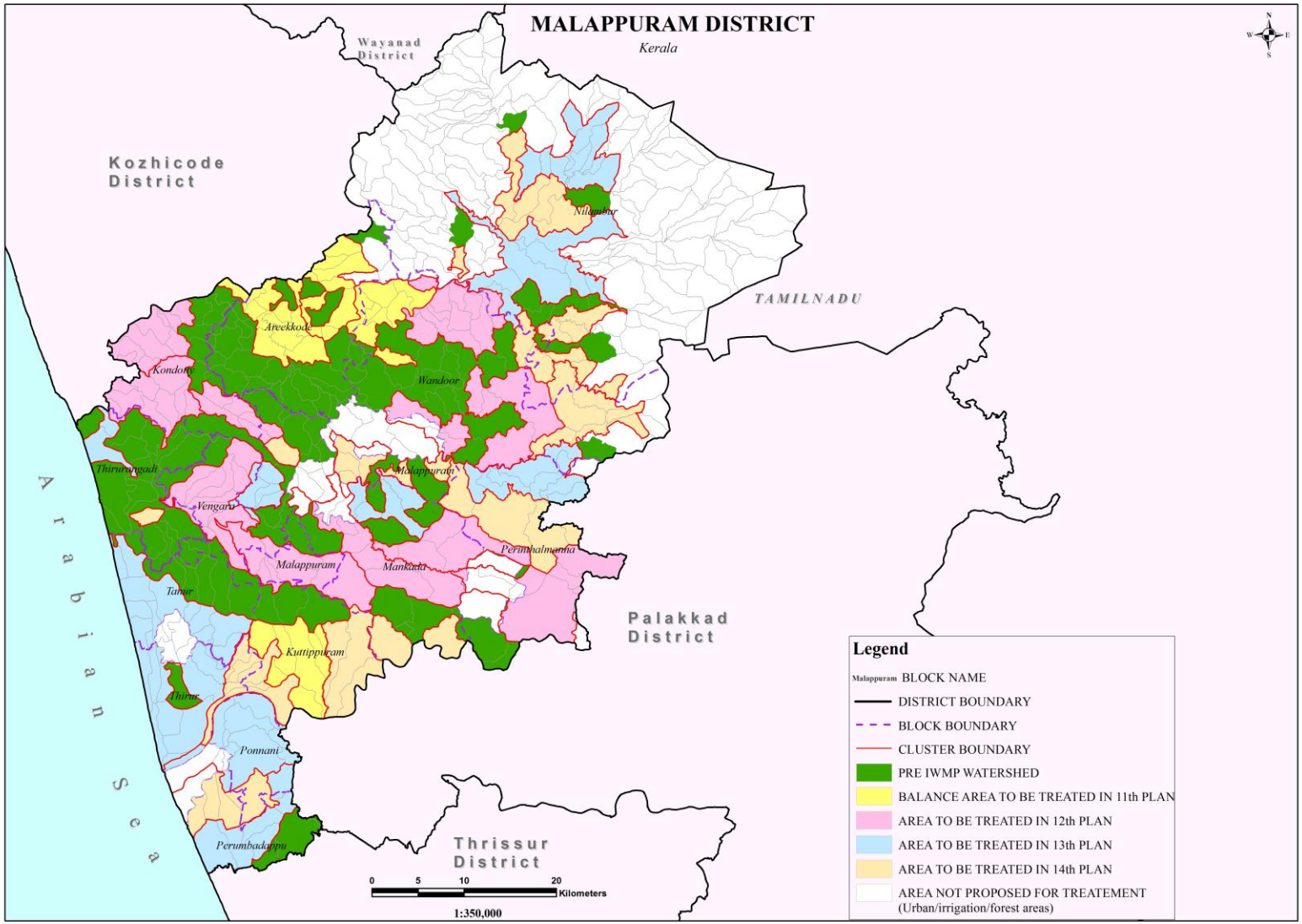
No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	kodakara A1	65	7	5712	278	5434	5434
2	Wadakkanchery B5	58	10	5927	0	5927	5927
3	Chovannur A2	58	8	4887	0	4887	4887
4	Vellagaloor A2	57	6	6908	167	6741	6741
5	Kodakara B3	57	4	3610	0	3610	3610
6	Cherpu A3	56	3	3796	413	3384	3384
7	Chalakkudy A1	56	2	1991	0	1991	1991
8	Wadakkanchery A3	54	5	5488	0	5488	5488
9	Wadakkanchery C1	54	6	4135	0	4135	4135
10	Mathilakam B1	54	3	3965	0	3965	3965
11	Chovannur B4	54	5	6812	0	6812	6812
12	Pazhayannur A1	53	1	2816	0	2816	2816
13	Chavakkad A4	52	5	4803	0	4803	4803
14	Puzhakkal A6	52	6	4788	214	4574	4574
15	Wadakkanchery D1	52	2	2289	0	2289	2289
16	Mala B1	52	4	1991	0	1991	1991
17	Thalikulam A4	50	3	5419	0	5419	5419
18	Chovannur C1	50	3	2603	0	2603	2603
19	Chavakkad B1	50	3	1934	0	1934	1934
20	Mathilakam A3	49	3	4079	0	4079	4079
21	Kodungaloor A2	64	2	726	0	726	726
22	Pazhayannur B1	58	1	847	0	847	847
23	Pazhayannur C1	58	2	503	0	503	503
24	Irinjalakuda B1	51	1	432	62	370	370
25	Chalakkudy C1	51	1	283	0	283	283
26	Chalakkudy D1	48	1	666	0	666	666
27	Chalakkudy E1	48	1	537	0	537	537
28	Mullasery A1	47	2	2216	0	2216	2216
29	Anthikad A1	46	1	1332	0	1332	1332

30	Anthikad B1	46	1	823	0	823	823
31	Puzhakkal B1	44	3	3968	250	3718	3718
32	Mala A3	44	3	3132	535	2596	2596
33	Irinjalakuda A1	41	1	1433	243	1190	1190
34	Chalakkudy B1	38	1	464	120	345	345
	TOTAL	**1761**	**110**	**101314**	**2281**	**99033**	**99033**


PALAKKAD DISTRICT
KERALA
N
W
E
S
TAMILNADU
Attappadi
Mannarkkad
Malappuram District
IWMP3
Sreekrishnapuram
Pattambi
Ottappalam
Ottappalam
Palakkad
Mulampuzha
Palakkad District
Thrithala
Kuzhalmannam
Palakkad
Chittur
Thrissur district
IWMP1
Kollengode
Alathur
Nemmara
IWMP2
Arabian Sea
10 5 0 10
Kilometers
1:375,000
Legend
Alathur BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
AREA TO BE TREATED IN 2009 - 2010
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)

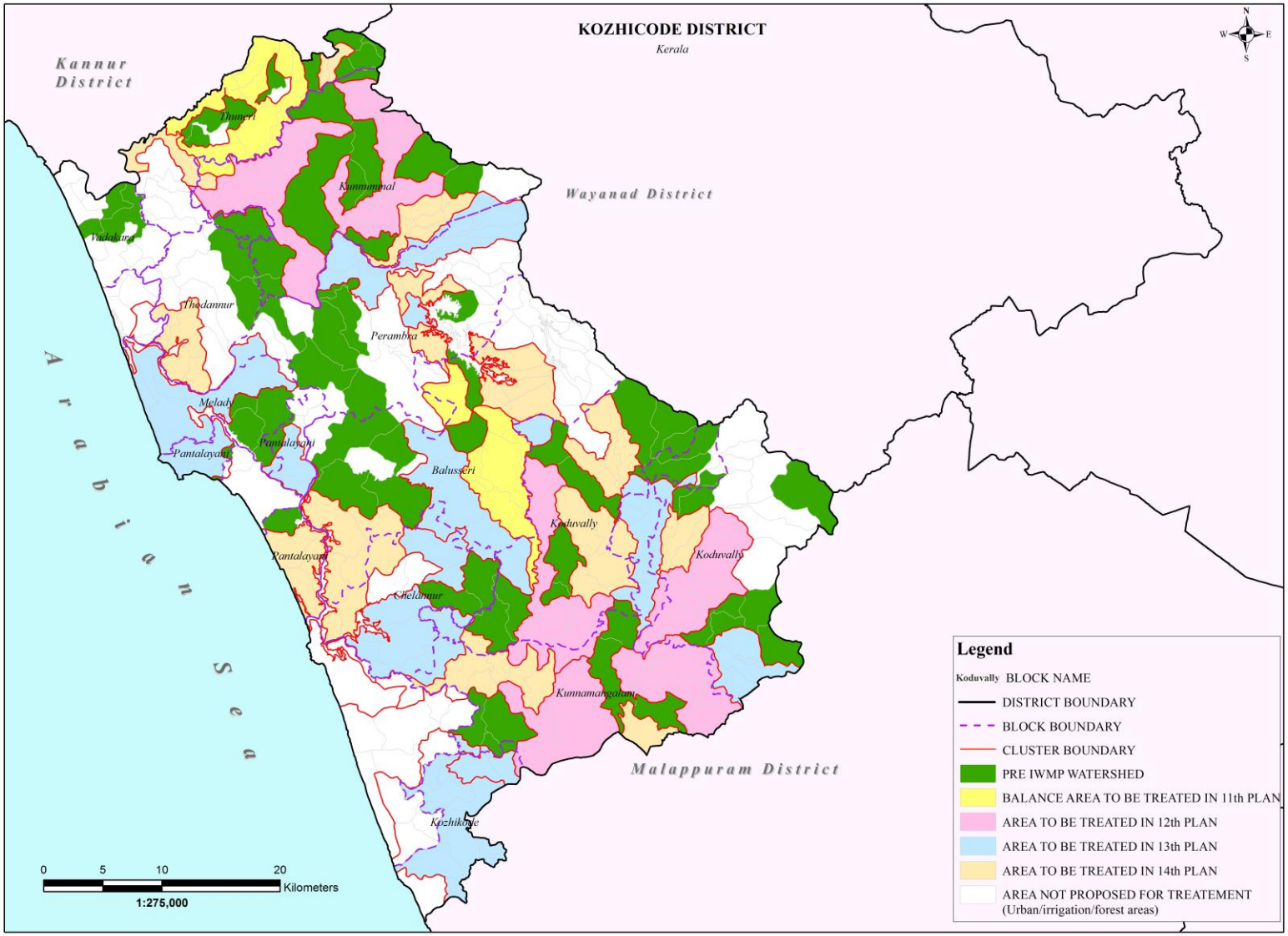
No	Name of the Project	Weightage	No. MWS	Total Area (ha)	Urban	Irrigated area	Forest area (ha)	Proposed for treatment (ha)
1	Thrithala B7	66	7	5912	0	0	0	5911
2	Alathur D1	63	7	7183	0	636	118	6428
3	Thrithala A1	63	6	5221	0	0	0	5221
4	Pattambi B6	62	8	11740	1559	552	0	9630
5	Nenmara B3	61	3	6120	0	495	1186	4439
6	Malampuzha E7	61	7	10367	2	1845	573	7948
7	Thrithala C2	60	12	5235	0	8	0	5226
8	Attappadi C1	65	1	341	0	0	163	178
9	Attappadi A1	63	3	1041	0	0	317	724
10	Attappadi B1	60	1	403	0	0	170	233
11	Attappadi D1	60	1	462	0	0	226	237
12	Attappadi E1	60	1	365	0	0	0	365
13	Attappadi F1	60	1	296	0	0	69	227
14	Attappadi G1	58	1	364	0	0	128	236
15	Kollengode A3	58	7	8339	1	1347	1053	5938
16	Pattambi A1	58	3	5349	0	175	0	5174
17	Alathur C5	58	5	8097	0	393	0	7704
18	Chittur A1	57	4	4734	1	160	0	4574
19	Mannarkkad B8	56	11	7277	1	0	844	6433
20	Ottappalam A5	56	6	10192	2989	1710	0	5493
21	Mannarkkad A2	54	5	5611	0	243	0	5367
22	Mannarkkad C1	53	4	7553	1	1193	1315	5045
23	Mannarkkad D2	53	5	4076	0	966	721	2389
24	Mannarkkad E1	43	1	674	0	355	0	319

25	Palakkad A3	52	4	5476	0	988	0	4488
26	Alathur A1	50	3	4301	0	1410	0	2891
27	Kuzhalmanam B2	49	3	5121	0	1210	0	3911
28	Nenmara A1	48	3	4004	1	804	1101	2099
29	Alathur E4	48	4	5379	0	577	0	4802
30	Kollengode B1	46	3	5810	1	2314	0	3495
31	Malampuzha F1	45	3	3423	194	453	0	2776
32	Palakkad B3	44	3	3484	0	961	0	2523
33	Chittur B2	43	3	6995	1	2872	0	4122
34	Sreekrishna puram A1	38	1	899	0	603	0	297
35	Sreekrishna puram B2	41	3	2834	0	1440	0	1394
36	Malampuzha C2	40	2	3825	0	981	1205	1640
37	Alathur B2	39	3	7892	1	4199	0	3693
38	Malampuzha D1	46	1	607	0	0	357	250
39	Malampuzha A2	36	2	1703	0	321	843	538
40	Malampuzha B1	31	1	843	0	238	492	113
41	KuzhalmanamA1	35	1	1364	0	844	0	520
42	Ottappalam B1	33	1	1902	1485	71	0	346
	TOTAL	**2165**	**154**	**182818**	**-**	**30359**	**10880**	**135337**


MALAPPURAM DISTRICT
Kerala
Wayanad District
Kozhicode District
Nilambur
TAMILNADU
Areekkode
Kondotty
Wandoor
Thirurangadi
Malappuram
Vengara
Perinthalmanna
Malappuram
Mankada
Tanur
Palakkad District
Kuttippuram
Thirur
Ponnani
Perumbadappu
Thrissur District
Arabian Sea
0 5 10 20
Kilometers
1:350,000
Legend
Malappuram BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)

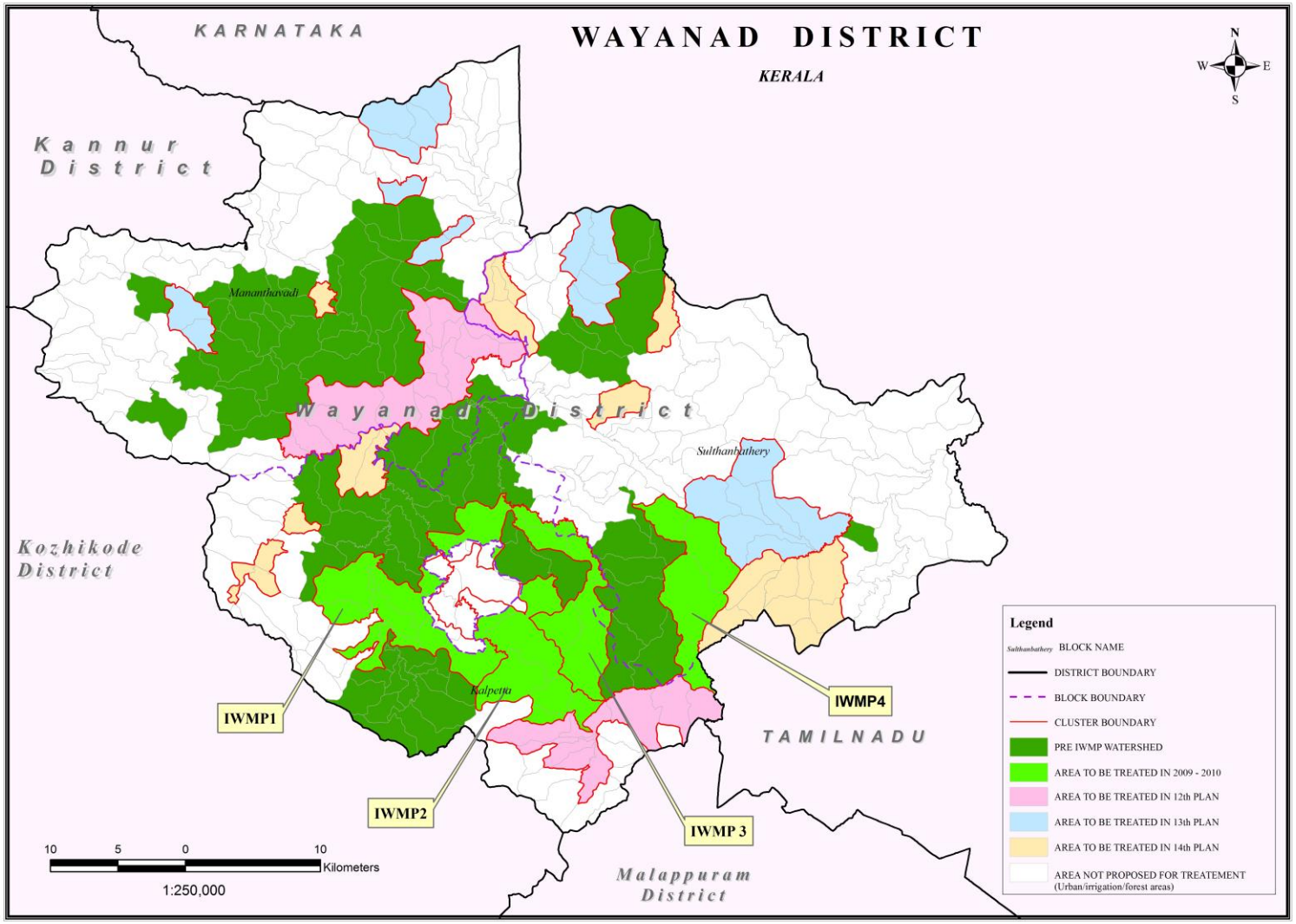
No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Wandoor B1	69	8	4203	0	4203	4203
2	Areekode A1	69	11	5263	0	5263	5263
3	Areekode B2	67	8	4126	0	4126	4126
4	Kuttipuram A5	67	8	5583	0	5583	5583
5	Wandoor C1	66	4	1988	0	1988	1988
6	Vengara A1	66	10	6350	0	6350	6350
7	Wandoor D1	65	4	6291	0	6291	6291
8	Kondotty A1	65	10	5207	0	5207	5207
9	Kondotty B1	65	8	4113	0	4113	4113
10	Kondotty C1	65	5	2442	0	2442	2442
11	Mankada C2	65	4	5208	0	5208	5208
12	Wandoor A8	65	10	5553	0	5553	5553
13	Mankada D8	65	8	5333	0	5333	5333
14	Malappuram A1	64	6	4551	0	4551	4551
15	Perunthalmanna C2	63	7	7406	643	6762	6762
16	Tirur A	62	9	5606	0	5606	5606
17	Perunthalmanna A2	61	7	5303	0	5303	5303
18	Tanur	60	13	8062	0	8062	8062
19	Malappuram B1	61	4	1991	0	1991	1991
20	Thirurangadi B1	60	2	1441	0	1441	1441
21	Ponnani A1	59	8	6660	0	6660	6660
22	Nilambur A1	59	9	5612	0	5612	5612
23	Mankada E4	58	4	2816	0	2816	2816
24	Permpadappu A2	58	6	5182	0	5182	5182
25	Nilambur C2	58	8	5978	0	5978	5978
26	Kuttipuram B3	58	3	4971	0	4971	4971
27	Nilambur E1	58	3	1944	0	1944	1944

28	Perunthalmanna B1	57	4	6619	0	6619	6619
29	Nilambur F4	57	4	2683	0	2683	2683
30	Wandoor E1	56	6	5145	0	5145	5145
31	Mankada A1	56	1	1280	0	1280	1280
32	Mankada B1	56	1	1737	0	1737	1737
33	Malappuram D1	56	1	14	0	14	14
34	Malappuram E1	56	3	1830	0	1830	1830
35	Malappuram F1	56	1	454	0	454	454
36	Nilambur D1	55	1	31	0	31	31
37	Thirur B5	54	5	3863	0	3863	3863
38	Malappuram C1	53	1	759	0	759	759
39	Thirurangadi A1	53	1	461	0	461	461
40	Permpadappu B3	52	5	3829	0	3829	3829
41	Nilambur B1	51	6	5485	0	5485	5485
42	Nilambur G1	40	1	471	0	471	471
	TOTAL		**228**	**163841**	**643**	**163198**	**163198**

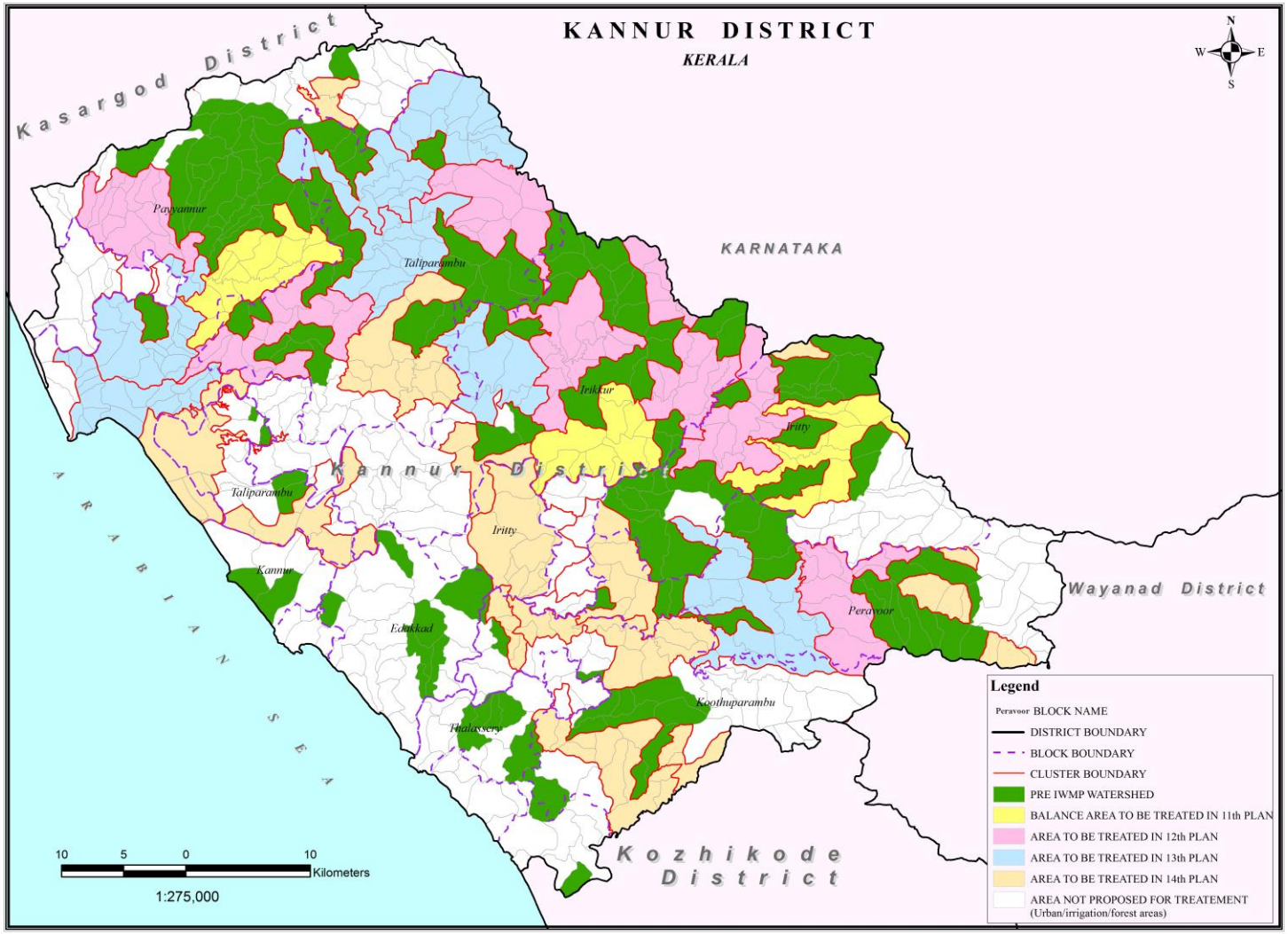

KOZHICODE DISTRICT
Kerala
Kannur District
Wayanad District
Malappuram District
Arabian Sea
Vadakara
Thodannur
Perambra
Balussri
Koduvally
Kunnamangalam
Kozhikode
Legend
Koduvally BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)
0 5 10 20
Kilometers
1:275,000

No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Thuneri A28	55	11	5712	0	5712	5712
2	Balussery C3	54	7	5709	589	5120	5120
3	Kunnamangalam A16	53	6	5338	0	5338	5338
4	Koduvally A10	52	9	5910	0	5910	5910
5	Kunnamangalam B8	52	12	5617	0	5617	5617
6	Kunnamangalam A7	52	12	6231	1054	5177	5177
7	Kunnamangalam D19	51	9	5045	0	5045	5045
8	Koduvally F14	50	9	5317	0	5317	5317
9	Kozhikode A21	48	16	5337	0	5337	5337
10	Perambra A24	48	12	5869	1078	4791	4791
11	Chelannur B6	48	2	1809	1237	572	572
12	Panthalayan A23	47	7	7602	1977	5625	5625
13	Koduvally D13	46	6	2953	0	2953	2953
14	Kozhikode B22	46	2	1234	0	1234	1234
15	Panthalayan B25	46	2	1420	1171	249	249
16	Balussery B2	45	4	5703	2427	3276	3276
17	Kunnamangalam E20	45	6	3652	0	3652	3652
18	Chelannur A5	44	5	5548	1356	4192	4192
19	Balussery D4	44	6	3462	0	3462	3462
20	Koduvally B11	44	4	3980	0	3980	3980
21	Kunnamangalam C9	43	6	1948	0	1948	1948
22	Balussery A1	42	4	5852	4798	1054	1054
23	Koduvally C12	41	4	2588	0	2588	2588
24	Kunnamangalam B17	41	6	3464	0	3464	3464
25	Perambra B26	41	4	2611	1566	1044	1044
26	Kunnamangalam C18	41	1	953	0	953	953

27	Thuneri C30	49	2	497	0	497	497
28	Thuneri B29	40	2	1296	765	531	531
29	Thodanuur A31	39	5	2374	1566	808	808
30	Koduvally G15	38	3	1550	0	1550	1550
31	Panthalayan C27	29	3	2453	0	2453	2453
	TOTAL	**1410**	**187**	**119035**	**19584**	**99451**	**99451**

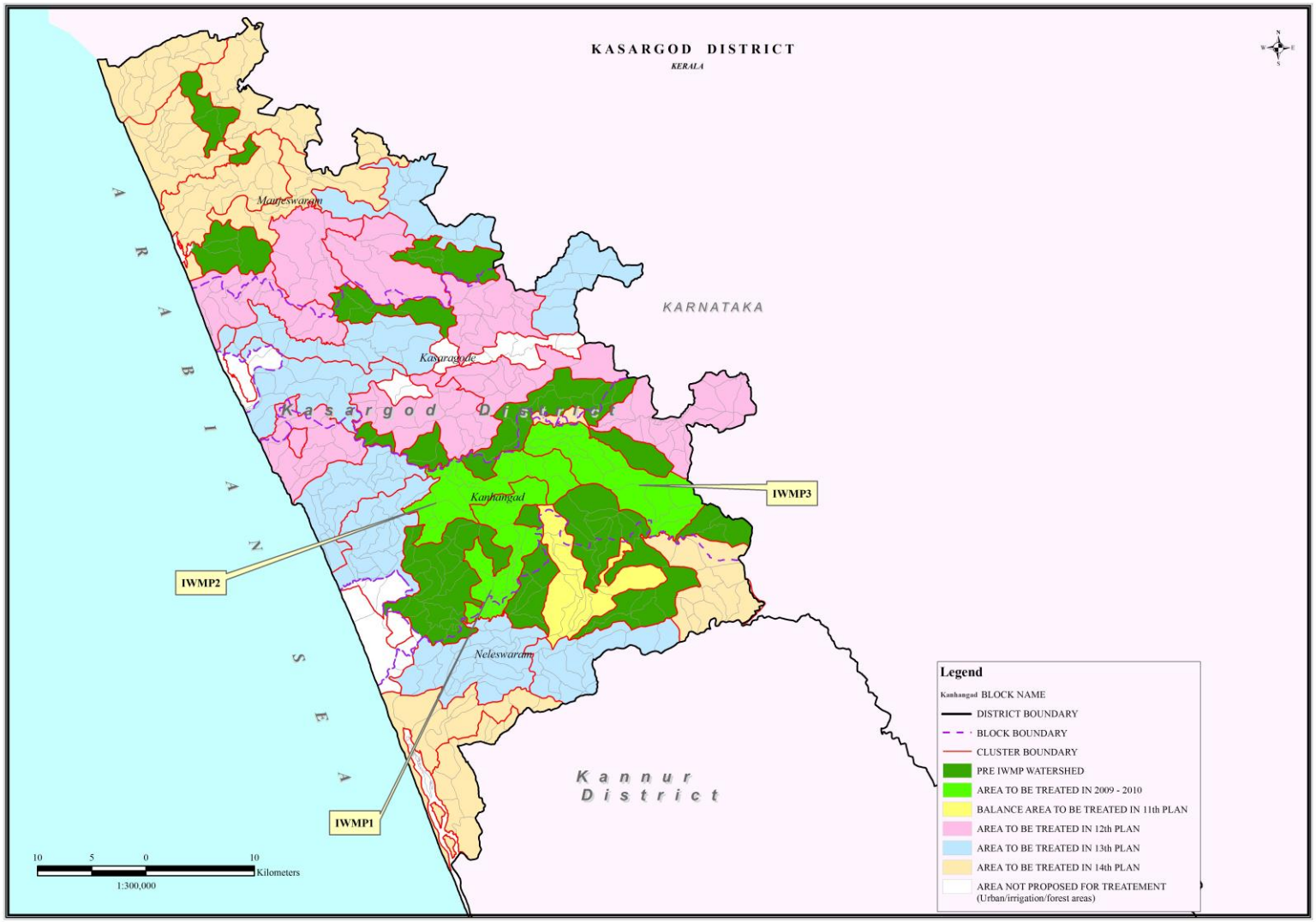

WAYANAD DISTRICT
KERALA
KARNATAKA
Kannur District
Wayanad District
Kozhikode District
Malappuram District
TAMILNADU
Mananthavadi
Sulthanbathery
Kalpetta
IWMP1
IWMP2
IWMP 3
IWMP4
N
W
E
S
10 5 0 10
Kilometers
1:250,000
Legend
Sulthanbathery BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
AREA TO BE TREATED IN 2009 - 2010
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)

No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Forest area	Proposed for treatment (ha)
1	Kalpetta G1	57	10	6122		998	4403
2	Kalpetta F1	55	7	5316		1284	3663
3	Kalpetta D1	55	7	5875		268	5175
4	Sulthan Batheri H5	54	4	4644		46	4597
5	Kalpetta E1	53	10	5233		1887	3347
6	Mananthody E1	52	14	8318		13	8302
7	Mananthody B1	50	4	2446		851	1595
8	Mananthody C1	58	1	465		185	280
9	Mananthody A2	50	2	606		138	468
10	Mananthody D1	50	2	1096		432	664
11	Sulthan Batheri E2	46	5	2864		253	2612
12	Sulthan Batheri I1	44	7	5771	158	842	4770
13	Sulthan Batheri D2	43	4	1419		389	1030
14	Kalpetta C1	48	3	862		346	514
15	Kalpetta B1	46	1	368		122	246
16	Kalpetta A1	43	2	1468			1471
17	Sulthan Batheri G9	42	9	5035		441	4594
18	Sulthan Batheri A1	40	1	843	234	168	441
19	Sulthan Batheri C1	40	1	689		245	445
20	Manthody F	36	1	335		14	321
	TOTAL	**959**	**95**	**59776**	**393**	**8923**	**48938**


KANNUR DISTRICT
KERALA
N
W
E
S
Kasargod District
KARNATAKA
Payyannur
Taliparambu
Irikkur
Iritty
Kannur District
Taliparambu
Iritty
Kannur
Edakkad
Wayanad District
Peravoor
Koothuparambu
Thalassery
Kozhikode District
ARABIAN SEA
10 5 0 10
Kilometers
1:275,000
Legend
Peravoor BLOCK NAME
DISTRICT BOUNDARY
BLOCK BOUNDARY
CLUSTER BOUNDARY
PRE IWMP WATERSHED
BALANCE AREA TO BE TREATED IN 11th PLAN
AREA TO BE TREATED IN 12th PLAN
AREA TO BE TREATED IN 13th PLAN
AREA TO BE TREATED IN 14th PLAN
AREA NOT PROPOSED FOR TREATEMENT
(Urban/irrigation/forest areas)

No	Name of the Project	Weightage	No. MWS	Project Area (ha)	Irrigated area	Rain fed area (ha)	Proposed for treatment (ha)
1	Payyannur C1	70	15	5369	0	5369	5369
2	Iritty B6	69	11	5112	58	5054	5054
3	Irikkur A7	68	11	5149	214	4935	4935
4	Iritty D3	66	13	5049	172	4876	4876
5	Irikkur D1	66	13	5256	0	5256	5256
6	Payyannur B13	66	16	5053	0	5053	5053
7	Thalipparambu F10	65	11	5342	0	5342	5342
8	Irikkur B12	65	15	5469	0	5469	5469
9	Thaliparambu C6	64	13	5586	398	5188	5188
10	Peravoor D7	64	9	5181	0	5181	5181
11	Thaliparambu E2	63	15	5036	0	5036	5036
12	Peravoor E10	62	13	7801	233	7568	7568
13	Payyannur D12	62	19	5215	0	5215	5215
14	Thaliparambu H9	62	12	4572	0	4572	4572
15	Irikkur E 7	62	9	4859	137	4722	4722
16	Payyannur E18	61	18	4209	40	4169	4169
17	Thaliparambu G8	61	12	5153	0	5153	5153
18	Iritty A6	60	10	5237	173	5063	5063
19	Thaliparambu D1	60	12	5524	578	4946	4946
20	Koothuparambu C1	58	11	5044	623	4421	4421
21	Koothuparambu A1	62	11	4712	1017	3695	3695
22	Peravoor F7	64	7	3553	338	3215	3215
23	Peravoor B1	62	3	1421	0	1421	1421
24	Iritty C1	56	1	421	0	421	421
25	Payyannur A2	56	2	1009	0	1009	1009
26	KoothuparambuB2	54	3	1219	0	1219	1219

27	Irikkur C1	52	3	1952	148	1804	1804
28	Peravoor C1	51	1	336	0	336	336
29	Koothuparambu D1	50	4	1001	228	773	773
30	Peravoor A1	50	3	816	0	816	816
31	Thalipparambu A5	48	6	3463	1850	1613	1613
32	Thaliparambu B1	46	5	5006	2702	2303	2303
	TOTAL		**307**	**130127**	**8909**	**121218**	**121218**



No	Name of the Project	Weightage	No. MWS	Total Area (ha)	Urban	Irrigated area	Forest area (ha)	Proposed for treatment (ha)
1	Kanjangad D3	72	15	5693	0	0	282	5411

2	Kanjangad E1	72	17	5066	0	0	94	4971
3	Kanjangad G1	71	14	6670	0	0	314	6356
4	Neeleswaram A10	71	14	5469	0	0	336	5133
5	Kasargod D11	70	15	6016	0	0	316	5700
6	Manjeswaram G 2	70	7	5090	0	0	0	5090
7	Kasargod A1	69	14	5753	0	0	0	5753
8	Manjeswaram H 4	69	5	5425	0	0	0	5425
9	Kasargod F 1	67	12	4627	0	0	414	4212
10	Kanjangad F1	67	18	5993	0	0	38	5955
11	Kasargod E4	66	11	4743	0	0	934	3809
12	Kanjangad A1	66	13	4561	0	0	0	4561
13	Neeleswaram D1	66	22	6901	1818	0	0	5083
14	Kanjangad B 8	65	17	5303	0	0	0	5303
15	Manjeswaram E 1	65	10	5448	0	0	0	5448
16	Kanjangad C12	65	18	6239	1088	0	0	5150
17	Neeleswaram C1	63	15	5048	0	0	0	5048
18	Kasargod C 2	62	14	7107	1054	0	33	6021
19	Kasargod G 5	61	8	4275	0	0	125	4151
20	Kasargod B 4	60	14	6621	613	0	369	5639
21	Neeleswaram B1	60	13	5603	71	0	484	5049
22	Manjeswaram D 1	60	12	5519	0	0	0	5519
23	Manjeswaram B 1	58	13	5405	0	0	0	5405
24	Neeleswaram E1	58	10	6449	1154	0	0	5295
25	Manjeswaram A 5	58	14	5013	0	0	0	5013
26	Manjeswaram C 4	58	14	5661	0	0	0	5661
27	Neeleswaram F 10	55	11	4700	335	0	0	4364
28	Manjeswaram 7	52	15	4978	0	0	0	4978
29	Manjeswaram F1	56	1	291	0	0	0	291
30	Kasargod H1	60	1	530	0	0	0	530
31	Kanjangad H1	70	1	564	538	0	0	26
	TOTAL	**1980**	**378**	**156761**	**-**	**0**	**3740**	**146349**

C) Briefly describe the convergence of IWMP with other Schemes in the State

Table-SPSP 22: Details of Convergence of IWMP with other Schemes* (MIS Table-M(P)3)

1	2	3	4	5		6	7
No.	Name of the District	Names of Departments with Schemes converging with IWMP	Funds to be made available to IWMP due to convergence (Rs.)	Was this fund included in Rs.12,000/15,000 per ha.		Name of activity/task/structure to be undertaken with converged funds	Level at which decision for convergence was taken[$]
				Yes	No		
		Agriculture Animal Husbandry Dairy Fisheries Forest NREGS	Will be worked out shortly, before the Detailed Project Report preparation				

***** from Column no. 2, total no. of districts implementing the programme, from column no. 4, total amounts may be mentioned at the end of the table for the entire State.

$ DRDA cell/ZP/DPC/SLNA/DoLR

d) Public – Private Partnership

Not yet worked out

Table-SPSP 23: Summary of Public-Private Partnership in the IWMP projects* (MIS Table-M(P)4)

1	2	3	4	5	6	7
S. No.	District	Name of Private Sector Partner Agency	Type of agreement signed (MoU/contract others pl. specify)	Financial contribution	Partnership Interventions	Expected Outcomes

***** from Column no. 2, total no. of districts implementing the programme, from Column no. 3, total no. of private companies/ agencies, from column no. 5, total amounts may be mentioned at the end of the table for the entire State.

7.1 Planning Process - Details of Scientific criteria/Inputs used in Planning (MIS Table-M(P)6)

Briefly describe about various scientific inputs used in planning watershed projects in the State.

Scientific criteria/ inputs used
(A) Planning
Cluster approach: Cluster approach is followed, Clusters of 5-10 micro watersheds having area around 1000-5000 ha are selected based on other criteria for selection
Whether technical back-stopping for the project has been arranged? If yes, mention the name of the Institute.: Technical backstopping is arranged with R&D Institutions like CESS and CWRDM, technical departments under Govt. like Soil Survey Organization, Soil Conservation Department, Ground Water Department, Minor Irrigation, Agriculture etc
Baseline survey: An intensive base line survey for ascertaining the pre project status, resource potential, problems, and possibilities based on socio economic and environmental needs will be conducted in participatory mode
Hydro-geological survey : Hydrogeological surveys already conducted by the Ground water Depts. ,CWRDM CGWB, CESS etc will be made use of
Contour mapping: Contour maps are provided by the Soil Survey Organization, and State Land Use Board
Participatory Net Planning (PNP) : PNP will form a part of the PRAs and it will be carried out in each selected watershed through

volunteers, and accredited NGOs
Remote sensing data-especially soil/ crop/ run-off cover: The data available with the Kerala State Remote Sensing and Environmental Agency under the State Govt. are used in watershed prioritization . the data from NRSA available through the Soil Survey Organization and SLUB are also used.
Ridge to Valley treatment: Ridge to Valley approach is followed in watershed management treatments especially for soil and water conservation activities.
Online IT connectivity: Online connectivity is ensured for all Grama Panchayats between Commissionerate of Rural Development (SLNA Head quarters)
(1) Project and DRDA cell/ZP: Available
(2) DRDA and SLNA: Available
(3) SLNA and DoLR: Available
Availability of GIS layers
1. Cadastral map: Available with Information Kerala Mission(IKM) under the Govt. of Kerala in the scale 1:5000
2. Village boundaries: Available with IKM
3. Drainage : Available with soil Survey and LUB
4. Soil (Soil nutrient status): Soil Fertility and Productivity layers are already available with Soil Survey and have been used in prioritization
5. Land use: The SLUB and the KRSEA are expected to provide the layers
6. Ground water status: Data from the Ground water department will be processed and special data collected will be incorporated by Soil Survey/ LUB
7. Watershed boundaries: Already available and is used in planning watershed master plans. Prepared by Soil Survey as well as land Use Board
8. Activity: The information collected at the time of base line survey will be processed to prepare special data layers on activities to be carried out in each watershed
Crop simulation models[#] : Studies will be taken up by R&D institutions and Universities
Integrated coupled analyzer/ near infrared visible spectroscopy/ medium spectroscopy for high speed soil nutrient analysis: The Central Soil Analytical and Cartogragraphic Laboratory under the Soil Survey Organization is having advanced facilities
Normalized difference vegetation index (NDVI)#:

The Kerala Agricultural University can be requested to take up studies in that respect as part of NARP
Weather Stations: The Weather stations maintained by the Revenue Department, Kerala Agricultural University, CWRDM, the Kerala State Electricity Board, private estates, Other Institutions/agencies and departments under the GoI supply the weather data
(B) Inputs
1. Bio-pesticides: the KAU is providing lot of extension support in popularizing bio pesticides
2. Organic manures: Organic farming practices will be encouraged in all watersheds
3. Vermicomposting: Vermicompost is gaining popularity in Kerala and many Govt. and non-governmental agencies are providing support for its popularization
4. Bio-fertilizer: KAU provides support in this respect. The results of their NARP research projects are disseminated through extension net work. The Bio Control Lab at Mannuthi in Thrissur District is functioning under the Department of Agriculture and bio control agents like Tricho gramma, is produced and supplied. Bio fertilizers like Nitrogen, Nitrozomonas, Phospho bacteria etc are supplied through Agriculture Department. There are two bio fertilizer laboratories under the Agriculture Department, one at Nalanchira, Thiruvananthapuram and the other at Pattambi, Palakkad District.
5. Water saving devices: Micro irrigation techniques like sprinkler irrigation and drip irrigation are popularized in the watersheds. Agriculture department has schemes which can be converged with the watershed development projects
6. Mechanized tools/ implements: Kerala Agro Industries Corporation is providing support for agro machinery related aspects. The Agricultural Engineering department of the KAU is doing research in this area. The agriculture department and the district Panchayats have schemes to provide agricultural machineries like combine harvesters to Karshaka Samithies and Pada Sekhara Samithies through the Grama Panchayats.
7. Bio-fencing: Many local species are currently used by watershed communities in raising bio fencing. Fodder species are preferred as it will meet the requirements also. In some areas crops like Pine Apple are also widely used.
8. Nutrient budgeting: Integrated Nutrient management system is popularized by the KAU and the Agricultural Department.
9. Automatic water level recorders & sediment samplers: The soil conservation department can undertake such studies. Already there is a sediment monitoring station in Konni, Pathanamthitta District, and also in Attappady in Palakkad
Any other (please specify)

Chapter 8

8.0 Livelihood concerns:

(a) Brief description about the livelihoods in the State-traditional livelihoods-reasons for development of traditional livelihoods-other raw materials and potential available in the State – livelihoods that can be developed on the basis of these raw materials and potential-reasons for not developing these livelihoods so far-factors necessary for developing these livelihoods-potential in rural areas and potential in urban areas-backward-forward linkages available and yet to be created-facilities for capacity building available and yet to be created-workforce available in the State by age group-per capita income in the State and comparison with national average – likely per capita income to be generated through enhancement of livelihoods etc.

Table- SPSP 24:(A) Details of livelihoods created for landless people*(MIS Table-M(PO)D2:(i))

1	2	3	4					5	6	7	8				
S. No.	District	Name of activity	No. of beneficiaries					Pre-project income (Rs.)	Expected change in income from project intervention	Funds required for the activity (Rs.)	Sources of funding (Rs.)				
			SC	ST	Others	Women	Total				Project Fund	Beneficiary	Financial institution	NGO	Others

* From column no.2 total number of Districts; from column no.3 total no. of activities, from column no. 4, category-wise total no. of beneficiaries, from column no. 5 to 8, category wise totals, for the entire State may be given at the end of the Table.

Table. SPSP 24(1). Rural Micro enterprise (group) - Status (as on 10-02-2005)

No	District	No. of Units		Amount of Subsidy	
		Sanctioned	Released	Sanctioned	Released
1	Thiruvananthapuram	34	33	3238569	3138569
2	Kollam	14	14	1300000	1300000
3	Pathanamthitta	13	13	1002500	1002500
4	Alappuzha	27	27	2257500	2257500
5	Kottayam	16	16	1290000	1290000
6	Idukki	80	80	6230000	6230000
7	Ernakulam	34	32	3102500	2902500
8	Thrissur	27	27	2202500	2202500
9	Palakkad	20	20	1264000	1264000
10	Malappuram	121	94	13985000	9025000
11	Kozhikode	79	79	6130000	6130000
12	Wayanadu	32	32	2305000	2305000
13	Kannur	14	12	1443500	1243500
14	Kasaragod	43	43	3277000	3277000
	State	**554**	**522**	**49028069**	**43568069**

Source: Statistics for Planning, 2005, DES. GoK)

Table-SPSP 25: (B) Details of other livelihoods created for farmers*(MIS Table- M(PO)D2:(ii))

1	2	3	4					5	6	7	8				
S. No.	District	Name of activity	No. of beneficiaries					Pre-project income (Rs.)	Expected change in income from project intervention	Funds required for the activity (Rs.)	Sources of funding (Rs.)				
			SF	MF	LF	Other	Total				Project Fund	Beneficiary	Financial institution	NGO	Others

* From column no.2 total number of Districts; from column no.3 total no. of activities, from column no. 4, category-wise total no. of beneficiaries, from column no. 5 to 8, category wise totals, for the entire State may be given at the end of the Table.

Chapter 9

9.0 Institutional arrangements

Briefly describe the Institutional arrangements for implementation of IWMP in the State at various levels

9.1 SLNA

A State Level Nodal Agency (SLNA) has been constituted in Kerala in accordance with the Common guidelines for watershed Development Projects with the following composition. (G.O (MS) 258/2008/LSGD dated 18-8-2008)

1. Chairman: Principal Secretary LSGD
2. Convener: Commissioner for Rural Development
3. Members:
    (a) Director of Agriculture
    (b) Director, Soil Survey
    (c) Mission Director, NREGS
    (d) Director, Land Use Board
    (e) Director, Animal Husbandry
    (f) Chief Conservator of forests
    (g) Representative of ISRO
    (h) Chief General manager, NABARD

Sanction was also accorded by the Govt. for opening an SB account in any of the Nationalized Banks in the name of the Convener, SLNA

Table-SPSP 26: Details of SLNA (MIS Table-M(IS)1)

1	2	3	4	5
S. No.	Date of Notification	Type of SLNA[#]	Date of MoU with DoLR	Total no. of members of SLNA
	18-9-2008	Mission		10 incl. convener and Chairman

[#]Whether it is a Department/ Mission/ Society/ Authority/ Others (pl. specify)

Table-SPSP 27: Details of SLNA (MIS Table-M(IS)1) (Contd..)

6		7					
Chairperson		CEO/Commissioner for RD					
Name	Designation[#]	Name	Designation	Date of Appointment	Nature of appointment [$]	Tenure (No. of years)	Contact Ph. No./ Fax/ E-mail
Sri. S.M. Vijayanand	Principal Secretary, LSGD		Commissioner for Rural Development	G.O (MS) 258/2008/LSGD dated 18-8-2008			0471 2314526 0471 2313634

[#] APC/ ACS/ Dev. Commissioner/ Others (pl. specify)

[$] Deputation/ Contract

Table-SPSP 28: Details of functionaries in the SLNAs* (MIS Table-M(IS)2)

1	2	3	4									
S. No.	Total no. of persons working in the SLNA for IWMP	Monthly emoluments of all the persons working in the SLNA for IWMP	Details of the persons engaged in the SLNA funded by DoLR									
			Names & Designation	Monthly remuneration	Date of Appointment	Nature of appointment [$]	Tenure (No. of years)	Contact Ph. No./ Fax/ E-mail	Subject of Expertise	Qualification	Experience	Role

* from column no. 2, total no. of persons working in the SLNA for IWMP; from column no. 3, total monthly emoluments for all the persons working in the SLNA for IWMP; from column no. 4, total no. of persons to be funded by DoLR, total monthly remuneration of the persons funded by DoLR may be indicated for the entire State at the end of the table.

* Chart indicating organizational structure of the SLNA with all the officers & staff may be enclosed

$ Deputation/ Contract

Table-SPSP 29 : Details of State Level Data Cell (SLDC) functionaries*# (MIS Table-M(IS)3)

1	2	3	4								
S. No.	Total no. of persons working in the SLDC for IWMP	Monthly emoluments of all the persons working in the SLDC for IWMP	Details of the persons engaged in the SLDC to be funded by DoLR								
			Names & Designation	Monthly remuneration	Date of Appointment	Nature of appointment $	Tenure (No. of years)	Contact Ph. No./ Fax/ E-mail	Qualification	Experience	Role

* from column no. 2, total no. of persons working in the SLDC for IWMP; from column no. 3, total monthly emoluments for all the persons working in the SLDC for IWMP; from column no. 4, total no. of persons to be funded by DoLR, total monthly remuneration of the persons funded by DoLR may be indicated for the entire State at the end of the table.

$ Deputation/ Contract

#Chart indicating organizational structure of the SLDC with all the officers & staff may be enclosed

Table-SPSP 30: Details of functionaries in the DWDU/ DRDA Watershed Cell*(MIS Table-M(IS)4)

1	2	3	4	5	6	7	8								
S. No.	Name of the District	Name of the executing Agency#	Status of Chairman @	Date of signing of MoU with SLNA	Total no. of persons working for IWMP	Monthly emoluments of all persons working for IWMP	Details of the two personnel engaged in the Watershed Cell funded by DoLR								
							Name and Designation	Monthly Remuneration	Date of Appointment	Nature of appointment $	Tenure (No. of years)	Contact Ph. No./ Fax/ e-mail	Qualification	Experience	Role

a) * from column no.2, no. of districts; from column no. 3, no. of executive agencies; from column no.6, no. of persons working in the executive agencies; from column no. 7, total monthly emoluments for all the persons working in the watershed cell, from column no. 8 total no. of persons to be funded by DoLR, total monthly remuneration of the persons for the entire State may be indicated at the end of the table.

b) #DRDA/Zilla Parishad (ZP)/ State Department/ Any other (Please specify)

c) @collector/CEO ZP/ CDO/ DDO/ PD/ Any other (please specify)

9.3 PIA

Intermediate Panchayats are the PIAs. "Common guidelines for watershed development projects "will be followed.

9.4 WDT

As per the "Common Guidelines for Watershed Development Projects". Each PIA will have a WDT with four to five members having knowledge and experience in in agriculture, soil science, water management, social mobilization and institutional building.

9.5 Institutional arrangements at village level and people's participation

SHGs, UGs, WCs will be constituted in each watershed by the watershed Grama sabha, in accordance with the "Common Guidelines for Watershed Development Projects".

Chapter 10

10.0 Capacity building

a) Stake holders and capacity building requirements

No	Project Stakeholder	Critical capacity gaps
1	Target community	Lack of awareness about the operational guidelines, watershed concept, location specific management technology for NRM, Livelihood opportunities, knowledge on soil and water conservation techniques, scientific horticultural practices.
2	GPs	Organizational issues, leadership and coordination, knowledge in watershed concept
3	Watershed Committees	PRA and Base line, Preparation of watershed plans, organizing the watershed activities
4	SHGs	Empowerment, Livelihood issues, common property management
5	UGs	Good Agricultural Practices, Marketing, Processing
6	WDTs	Execution of works, watershed master plans, watershed action plans, technical knowledge on soil, water, bio mass conservation , Base line surveys, impact assessment
7	PIAs	Monitoring, Evaluation, Technical assistance
8	DRDA/ZP cell	Monitoring and Evaluation, Social audit
9	SLNA	Coordination , Watershed Prioritization criteria, Fund management, Evaluation studies, Impact Assessment studies, Case Studies

b) Strategies for capacity building

Capacity Building programmes will be taken up at the State level, district level, and watershed level. ToT programmes will be arranged at State and district level.

c) Capacity building programme to be taken up

Residential training programs for the WDT members, WC members and elected representatives of the Panchayats. Exposure visits, Skill development programmes, entrepreneurial training, training in processing technology to the SHGs, training in organic farming to the UGs and the SHGs

d) Institutional arrangements made for capacity building at State level, District level, Block level and Village level.

The Institutional arrangements made at State are furnished in Table SPSP 31

e) Training manuals developed for training programme and field training proposed

Kerala Institute of Local Administration (KILA) and State Institute of Rural Development (SIRD) will prepare additional necessary training manuals. Already handbooks on watershed management, preparation of watershed master plans, Operational Guide lines of watershed projects etc have been prepared.

Table-SPSP 31: List of Training Institutes[@] identified for Capacity Building at State level (MIS Table-M(CB)1)

1	*2*	*3*	*4*	*5*	*6*	*7*
No	Name of the Training Institute	Full Address with contact no., website & e-mail	Name & Designation of the Head of Institute	Type of Institute[#]	Area(s) of specialization[$]	Accreditation details
1	State Institute of Rural Development	SIRD, ETC.P.O., Kottarakara Kollam District Pin 691531 Ph.0474-2454618	G. Anandapadmanabha Pillai, Director	Government (autonomous)	Rural Development	
2	Kerala Institute of Local Admn.	KILA, Mulankunnathukavu.P.O. Thrissur District Pin 680581 0487-2201062	Prof. Ramakantan Director	Government (Autonomous)	Decentralized Admn	
3	Centre for Earth Science Studies	Akkulam, Thiruvananthapuram	Director	Government (Autonomous)	Resource mapping, Planning	
4	Centre for Water Resources Development and Management	Kunnamangalam, Kozhikode	Executive Director	Government (Autonomous)	Water Resources, Watershed management	
5	Kerala Agricultural University	Mannuthi Thrissur	Vice Chancellor	Government (Autonomous)	Agriculture Development, Crop Production, Horticultural Practices	
6	Mahatma Gandhi University	Kottayam	Vice chancellor	Government (Autonomous)	GIS Environmental Impacts, Eco preservation	
7	Tropical Botanic	Palode	Director	Government	Bio diversity	

	Garden and Research Institute	Thiruvananthapuram		(Autonomous)	Eco restoration	
8	Soil Conservation Training Institute under the Soil Conservation Dept.	Kakkanad Ernakulam	Additional Director of Soil Conservation, Thiruvananthapuram	Government	Soil Conservation	
9	Soil Survey Organization	Chalai Thiruvananthapuram	Additional Director of Soil Survey Thiruvananthapuram	Government	Resource Mapping, Watershed Management GIS	
10	Krishi Vinjan Kendras	All Districts		Govt.	Agricultural Practices	
11	Extension Training Centre	Kottarakara, Kollam	Principal ETC	Government	Participatory Planning Extension Techniques , PRA, RRA Poverty Alleviation Watershed Management	
12	IRTC	Mundus, Palakkad	Director	Autonomous	Appropriate Technology Watershed Development GIS Application	
13	Cost ford	Thrissur	Director	Autonomous	Appropriate Technology Participatory Rural Development	
14	Maithri	Palakkad	Director	Non-governmental organization	Watershed Management, Participatory Planning, GIS Application	

15	Socio Economic Unit Foundation (SEUF)	Thiruvananthapuram	Director	Non-governmental organization	Sanitation Gender and Development	

Central govt. Dept./ State govt. Dept./ Autonomous Body/ Research Institutes/ Universities/ Others (pl. specify)

$ Capacity Building/ Agriculture/ Horticulture/ Animal Husbandry/ Pisciculture/ Remote Sensing/ Water conservation/ Ground water/ Forestry/ livelihoods/ entrepreneurship development/ others (pl. specify)

@ The training institutes must fulfill the conditions mentioned in the operations guidelines.

(i) Technical experts in fields required by IWMP
(ii) Past experiences
(iii) Annual Turnover
(iv) Receives funds either from the Central or State Government
(v) Publications
(vi) Not blacklisted by any Govt. organizations
(vii) Audited accounts
(viii) Organizational structure

(In the same format furnish District wise, Block-wise Institutions identified for Capacity Building)

f) Information, Education & Communication (IEC) Activities:

Details being compiled

Table: SPSP 32: Details of IEC activities* (MIS Table-M(CB)3)

1	2	3	4	5	6
S. No.	District	Activity	Executing agency	Estimated expenditure for XI Plan period (Rs. in lakh)	Expected Outcome (may quantify, wherever possible)

***** From Column no. 2, total no. of Districts implementing the programme, from column no.3 no. of activities, from Column no. 4, total no. of agencies, from column no. 5 total estimated expenditure may be given at the end of the table for the entire State.

Chapter 11

11.0 Monitoring and Evaluation (M & E)

a) Performance monitoring of projects
   Reputed Scientific Organizations , Management Institutes, Universities, and Institutes of national reputation will be entrusted
b) Institutional performance monitoring
   Audits by governmental and social organizations
c) Internal learning
   Action Research through participatory approach
d) Evaluation
   State level and national level external evaluators
e) institutional arrangements made for M & E at State level, District level, Block level and Village level.

State Level-SLNA
District Level –District Level Coordination Committee District Level Support Group
Block – Block Panchayat
Village Level- Grama Panchayat level monitoring committee.

Table-SPSP 33: List of Institutes[@] identified for M & E at State level

1	2	3	4	5	6	7
No	Name of the Training Institute	Full Address with contact no., website & e-mail	Name & Designation of the Head of Institute	Type of Institute[#]	Area(s) of specialization[$]	Accreditation details
1	Centre for Rural and Urban Studies (CRUST)	Thiruvananthapuram	Director	Autonomous	Water conservation	No.2-11020/5/12005 M&E/GOI(DoLR) dated 21-11-2005
2	Kerala Agriculture and Rural Development Agency(KARDA)	do	Director	do	Agriculture	do
3	Centre for Water Resources Development and management (CWRDM)	Kozhikode	Executive Director	State Govt.	Water Resource	Do
4	Centre for Earth Science Studies(CESS)	Thiruvananthapuram	Director	do	Soil-Agriculture	Do
5	IRTC	Mundur, Palakkad Ph:0491-28323224	Director	Autonomous	Appropriate Technology Watershed Development GIS Application	

6	Costford	Thrissur Contact No. 0471-2530031	Director	Autonomous	Appropriate Technology Participatory Rural Development	
7	Maithri	Palakkad Ph:0491 2531324	Director	Non Governmental organization	Watershed Management, Participatory Planning, GIS Application	
8	Socio Economic Unit Foundation (SEUF)	Thiruvanantha puram	Director	Non Governmental organization	Sanitation Gender and Development	
9	KVK	All Districts		Govt.	Agricultural Practices	

Central govt. Dept./ State govt. Dept./ Autonomous Body/ Research Institutes/ Universities/ Others (pl. specify)

$ Capacity Building/ Agriculture/ Horticulture/ Animal Husbandry/ Pisciculture/ Remote Sensing/ Water conservation/ Ground water/ Forestry/ livelihoods/ entrepreneurship development/ others (pl. specify)

@ The M&E institutes must fulfill the conditions mentioned in the operations guidelines.

Chapter 12

12.0 Expected outcomes

a) Expected outcomes due to implementation of IWMP in the State

Through the implementation of IWMP the problem of water scarcity is expected to be overcome to a large extent. The ground water status is to be augmented through more infiltration of rain water to the deeper layers of the soil and the geologic strata. The water quality problems faced by the inhabitants in certain areas especially the low lying coastal belt is expected to be solved to a considerable extent. The sea water intrusion into the rivers consequent to inadequate river flow will be controlled by enhancing the river flow. Agricultural productivity will be enhanced through organic production strategies. The bio diversity of the region will be preserved and protected. The per capita income will be increased and the living standards of the people will be enhanced, food security will be assured.

In some areas of coastal regions, low pH, iron, chloride, hardness, TDS, and salinity are the water quality problems reported Groundwater quality problems reported in the midland region is generally associated with iron, acidity and total dissolved solids Water quality problems due to high fluoride content are reported from Palakkad and Alappuzha districts of Kerala. The permissible concentration of fluoride in drinking water, according to Bureau of Indian Standards is, 1 mg/l.. Fluoride content of 1.5 to 2.6mg/l is observed from the deeper aquifers tapping Warkali formations in the Alappuzha town. Few deep wells in Chittur thaluk, Kanjikode area and some shallow wells in Muthalamada area in Palakkad district contain fluoride concentration greater than 1 mg/l. Open wells of Kerala have the problem of bacteriological contamination. The open character of the wells, conventional habits like use of buckets and rope to draw the water, discharge of kitchen waste in the surroundings of the wells and unscientifically constructed pit latrines are some of the factors which are found to be contributing to the bacteriological contamination. Groundwater contamination due to industrial pollution has been reported from places of Cochin (eastern parts of Alwaye), Ambalamedu , Palakkad and some parts of Kollam, Kozhikode and Kannur.

The municipal and industrial landfills operating in various parts of Kerala is causing great concern to the quality of ground water. The landfills have little or no regard to their sitting, construction and operation, for the potential impact of leachate generated within the landfill on ground water quality The results of the analyses of groundwater samples near the burial grounds indicated that pH, nitrate, calcium, total hardness and coliforms are present in excess concentration The samples collected from the burial ground in Cochin area contained calcium and total hardness at concentration higher than the permissible limit prescribed by

Bureau of Indian Standards. Out of the 15 samples collected six wells was found to be bacteriologically contaminated. All the samples were hard to very hard. Nitrate and phosphate were found to be on the higher side, when compared to the analysis of well samples, which were taken as controls. Nitrate-nitrogen as high as 26.8 mg/l and phosphate concentration of 0.55 mg/l was detected in the wells of Cochin and Pathanamthitta areas.

The analyses of the samples collected from the wells near a municipal solid waste site in Kozhikode indicated that eighty percent of the samples are bacteriologically contaminated with coliform densities as high as 11×105 MPN/100 ml. Other contaminants detected are nitrate, chloride, etc. which exceeded the permissible limit in most of the samples. The pollution was observed spatially within a distance of 250-300 m.]

The major water quality problem associated with rivers of Kerala is bacteriological pollution. The assessment of rivers such as Chalakudy, Periyar, Muvattupuzha, Meenachil, Neyyar, Kabbini & Pamba indicate that the major quality problem is due to bacteriological pollution and falling under "B" or "C" category of CPCB classification. The downstream of Periyar River (which receives industrial effluents) and Pamba River during the pilgrimage season are polluted. There are localized quality problems faced by all the rivers due to dumping of solid waste, bathing and discharge of untreated sewage water.

The short, fast flowing, monsoon fed rivers of Kerala often encounter salinity intrusion into their lower reaches during the summer months. When the fresh water flow reduces, two major problems are encountered in these water bodies i)salinity propagates more into the interior of the river ii) the flushing of the system becomes less effective. Both these aspects have an impact on drinking water supply in addition to other schemes in the downstream reaches.

Reclamation is one of the major problems faced by the wetlands and backwaters of Kerala. Indiscriminate discharge of municipal waste, agrochemicals, oil from ships & fishing vessels are contributing to the pollution of these water bodies. Pollution due to industrial wastes is considerable in some backwaters. Coir retting processes result in release of polyphenols along with hydrogen sulphide creating anoxic conditions in many of the backwaters.

Eutrophication is a major environmental issue face by many of the water ways and lakes. A study of the eutrophication of the Vembanad Lake indicated that the problem is mainly phosphorous limited. The lake is infested with phytoplankton growth especially during pre monsoon and beginning of monsoon months. The simulation analyses of the lake predicted eutrophication of the lake with high concentration of phytoplankton growth and decrease of clarity indicated by lower seechi depth. The simulation also indicates that, the total phosphorous load to the lake should be regulated to 12.5 % to the present load for the lake to change to oligotrophic level

b) Expected/Estimated Outcomes are Summarized in the table SPSP:34

Table-SPSP 34: Expected/Estimated Outcomes *(MIS Table-M(PO)F1)*

Expected / Estimated Outcomes				
No.	**Item**	**Unit of Measurement**	**Pre-Project Status**	**Expected Post Project Status**
1	Depth to Water Table (Midland, High land Av. Min-Max)	Meter	6-8. 6.2-10.66	Depth to WT to be reduced by 1m in Mid lands and 1-1.5 m in High lands
2	Ground water recharge	MCM	6841.33	7183
3	Quality of Drinking Water	Qualitative	Fluoride / Nitrates contamination, Saline & Brackish Water in some villages of the Project Area	Clean and Safe drinking water. (Through recharge of ground water through project interventions & through convergence)
4	Availability of Drinking Water-problem affected villages	No. of Villages	773	Nil
5	Increase in Irrigation Potential	Lakh Ha	3.8	4.3
6	Change in Cropping Pattern	Type	Paddy lands are left fallow and conversion paddy lands for other uses. single cropped in a considerable part.	Paddy land conversion to be o curtailed Single tier systems to be converted into multi tier cropping systems, Mon cropping systems to Mixed cropping systems and Single cropped areas to be converted to Multiple cropped areas.

			Mono cropping in Plantations Per capita food grain production 22.48 kg/ annum (06-07)	Food crop production will be improved. Per capita food grain production 27 kg /annum. (+20%)
7	Productivity of Rice	Kg/Ha	2437	3000
8	Area under Single Crop	Ha	85859	72980 (-15%)
9	Area under Double Crop	Ha	143724	150600
10	Area under Multiple Crop	Ha	35946	41950
11	Area under tree plantation	Ha	632864	664500
12	Area under Horticulture(Fruits)	Ha	387416	406750
13	Area under Fuel & Fodder	Ha	4571	4800
14	Milk Production	Lakh Tonnes	21.19	24
15	SHGs	No.	152997	153500
16	Livelihoods Activities	No.	102	110
17	Per capita Income at current prices (2001-02)	Rs.	21310	22375