

INVENTORY OF SOIL RESOURCES OF KASARGOD DISTRICT, KERALA STATE USING REMOTE SENSING TECHNIQUES

ABSTRACT

1.	Survey Area	Kasargod District, Kerala State, India
2.	Geographical Extent	74 ⁰ 58' 46" and 75 ⁰ 25' 05" East Longitudes 12 ⁰ 02' 37" and 12 ⁰ 47' 35" North Latitudes
3.	Agro-climatic Region	Agro-climatic Zone-XII (West Coast Plains & Ghat Region)
4.	Total Geographical Area	1,99,088 hectare
5.	Type of Survey	Soil Resource Mapping (SRM) using Remote Sensing Techniques
6.	Base Maps	(i) Survey of India Toposheets (scale 1:50,000) 48 L/13, 48L/14, 48 L/15, 48 P/1, 48 P/2, 48 P/3, 48 P/4, 48 P/6, 48 P/7 and 48 P/8 (ii) Geology Map (scale 1:2,50,000) of Geological Survey of India (iii) Satellite Imagery (scale 1:50,000) , LISS-III (IRS-ID)
7.	Scale of Mapping	1:50,000
8.	Period of Survey	December 2016 to January, 2017

9. Mapping unit wise soil association and their extent:

Sl. No.	Mapping Unit	Series Association	Area (ha)	Area (%)
1	CAI2b1	Bella-Padannakad	11089	5.57
2	CKn6b1	Pandikandam-Katipoyil	23870	11.99
3	CKn6c1	Bhimanadi-Pandikandam	838	0.42
4	CKn8b1	Puncha-Mylatti	46165	23.19
5	CKn8c1	Chulli-Payaswami	8338	4.19
6	LAI3b1	Chayath-Parambu	348	0.17
7	LAn6b1	Cheralath-Ramacheram	38372	19.27
8	LAn6c1	Yedavanur-Cheralath	1082	0.54
9	LAn6d1	Anantapura	2359	1.18
10	LAp3a1	Udayanagar-Madikoi	5647	2.84
11	LAU4b1	Chirapuram-Kozhithatta	21667	10.88
12	LAU4c1	Eriyani	830	0.42
13	LAU4d1	Yechikonam-Karmar	16072	8.07
14	LAV3b1	Pallikere-Allampalli	6072	3.05
15	LAW2a1	Mudiyakal-Ichalngodu	6566	3.30
16	f	Habitation	2380	1.20
17	e	ROC	1827	0.92
18	g	Waterbodies	5566	2.80
	TOTAL		199088	100.00

10. Distribution of area under different Landscape/Geology classes:

Sl. No.	Geology	Area (ha)	Area (%)
1	Charnockite	79211	39.79
2	Coastal Alluvium	11089	5.57
3	Laterite	99015	49.73
4	Habitation	2380	1.20
5	ROC	1827	0.92
6	Waterbodies	5566	2.80
	TOTAL	199088	100.00

11. Distribution of area under different Physiography classes:

S.No.	Physiography	Area (ha)	Area (%)
1	Coastal Alluvial Plains	11089	5.57
2	Lower pediplains	6566	3.30
3	Narrow hill valleys	5647	2.84
4	Pediments	38569	19.37
5	Plateau plains / hill tops / mesa	348	0.17
6	Undifferentiated hills side slope	121024	60.79
7	Upper pediplains	6072	3.05
8	Habitation	2380	1.20
9	ROC	1827	0.92
10	Waterbodies	5566	2.80
	TOTAL	199088	100.00

12. Distribution of area under different Depth classes:

Sl. No.	Depth	Depth (cm)	Area (ha)	Area (%)
1	Very shallow	0-10	2359	1.18
2	Shallow to moderately deep	10-50	16072	8.07
3	Moderately deep to deep	25-100	21667	10.88
4	Deep	50-100	25782	12.95
5	Deep to very deep	>50	90957	45.69
6	Very deep	>100	32478	16.31
7	<i>Habitation</i>		2380	1.20
8	<i>ROC</i>		1827	0.92
9	<i>Waterbodies</i>		5566	2.80
	TOTAL		199088	100.00

13. Distribution of area under different Slope classes:

Sl. No.	Slope Classes	Slope %	Area (ha)	Area (%)
1	Nearly level to very gently	0-3	17655	8.87
2	Very gently to gently	1-5	12067	6.06
3	Gently to moderately	3-10	38569	19.37
4	Strongly to moderately steep	10-25	66521	33.41
5	Steep to very steep	25-50	54503	27.38
6	<i>Habitation</i>		2380	1.20
7	<i>ROC</i>		1827	0.92
8	<i>Waterbodies</i>		5566	2.80
	TOTAL		199088	100.00

14. Distribution of area under different Erosion classes:

S.No	Erosion Class	Erosion	Area (ha)	Area (%)
1	e1	None to slight water erosion	12213	6.13
2	e1-e2	Slight to Moderate erosion	39176	19.68
3	e2-e3	Moderate to Severe erosion	135567	68.09
4	e3	Severe water erosion	2359	1.18
5	<i>Habitation</i>		2380	1.20
6	<i>ROC</i>		1827	0.92
7	<i>Waterbodies</i>		5566	2.80
	TOTAL		199088	100.00

15. Distribution of area under different Management classes:

Sl. No.	Management Class	Management	Area (ha)	Area (%)
1	M1	Unmanaged(UB)	3197	1.61
2	M1-M2	Unmanaged(UB) to Poorly managed(PB)	79144	39.75
3	M2	Poorly managed(PB)	54503	27.38
4	M2-M3	Poorly managed(PB) to Moderately managed(MB)	1082	0.54
5	M3	Moderately managed(MB)	6420	3.22
6	M3-M4	Moderately managed(MB) to Well managed(WB)	21667	10.88
7	M4	Well managed(WB)	23302	11.70
8		<i>Habitation</i>	2380	1.20
9		<i>ROC</i>	1827	0.92
10		<i>Waterbodies</i>	5566	2.80
	TOTAL		199088	100.00

16. Distribution of mapping units under different Land Capability Classes

S. No.	Land Capability Class	Mapping Units	Area (ha)	Area (%)
1	II-III	LAW2a1	6566	3.30
2	III	LAi3b1 , LAp3a1,	5995	3.01
3	III-IV	CAI2b1, LAu4b1, LAV3b1	38828	19.50
4	IV	CKn6b1	23870	11.99
5	IV-VI	LAn6b1, LAu4d1	54444	27.34
6	VI	LAn6d1	2359	1.18
7	VII	CKn8b1	46165	23.19
5	Forest	CKn6c1, CKn8c1, LAn6c1, LAu4c1	11088	5.57
	f	<i>Habitation</i>	2380.00	1.20
	e	<i>ROC</i>	1827.00	0.92
	g	<i>Waterbodies</i>	5566.00	2.80
		Total	199088.00	100.00

17. Distribution of mapping units under different Soil Irrigability classes:

S. No.	Soil Irrigability Class	Mapping Units	Area (ha)	Area (%)
1	A-B	LAW2a1	6566	3.30
2	B-C	LAi3b1, LAp3a1, LAV3b1	12067	6.06
3	C-D	CAI2b1, CKn6b1, LAN6b1, LAU4b1	94998	47.71
4	D	CKn8b1, LAU4d1	62237	31.26
5	E	LAn6d1	2359	1.18
6	Forest	CKn6c1, CKn8c1, LAn6c1, LAU4c1	11088	5.57
7	f	<i>Habitation</i>	2380	1.20
8	e	<i>ROC</i>	1827	0.92
9	g	<i>Waterbodies</i>	5566	2.80
		Total	199088	100.00

18. Distribution of mapping units under different Land Irrigability classes:

S. No.	Land Irrigability Class	Mapping Units	Area (ha)	Area (%)
1	2	LAW2a1	6566	3.3
2	2-3	LAi3b1, LAp3a1	5995	3.01
3	3	LAV3b1	6072	3.05
4	3-4	CAI2b1, LAU4b1	32756	16.45
5	4	LAV4d1	16072	8.07
6	6	CKn6b1, CKn8b1, LAN6b1, LAn6d1	110766	55.63
7	Forest	CKn6c1, CKn8c1, LAn6c1, LAU4c1	11088	5.57
	f	<i>Habitation</i>	2380	1.20
	e	<i>ROC</i>	1827	0.92
	g	<i>Waterbodies</i>	5566	2.80
		Total	199088	100.00

19. Distribution of mapping units under different Hydrologic Soil Groupings:

S. No.	Hydrologic Soil Grouping	Mapping Units	Area (ha)	Area (%)
1	A	CAI2b1	11089	5.57
2	B-C	CKn6b1, LAu4b1, LAv3b1, LAw2a1	58175	29.22
3	C	CKn8b1	46165	23.19
4	C-D	LAI3b1, LAn6b1, LAu4d1	54792	27.51
5	D	LAn6d1, LAp3a1	8006	4.02
6	Forest	CKn6c1, CKn8c1, LAn6c1, LAu4c1	11088	5.57
	f	<i>Habitation</i>	2380	1.20
	e	<i>ROC</i>	1827	0.92
	g	<i>Waterbodies</i>	5566	2.80
		Total	199088	100.00

SALIENT FEATURES:

- ❖ The interpretative grouping on land capability class (LCC) falls under eight classes. LCC class IV-VI dominated accounting to 27.34 per cent of the area followed by class VII accounting 23.19 per cent. Forest accounts 5.57 per cent of the surveyed area.
- ❖ Nearly 47.71 per cent comes under Soil Irrigability class C-D and 31.26 per cent under class D followed by class B-C and A-B classes accounting 6.06 per cent and 3.30 per cent respectively of the total area. Forest accounts for 5.57 per cent of the surveyed area.
- ❖ Majority of the area i.e 55.63 per cent comes under Land Irrigability class-6 followed by class-3-4 comprising an area of 16.45 per cent and class-4 accounting 8.07 per cent of the total area
- ❖ Majority of the area i.e. 29.22 per cent comes under Hydrological Soil grouping B-C followed by C-D accounting 27.51 per cent and forest area accounting 5.57 per cent of the surveyed area
- ❖ Fifteen mapping units have been established in the survey area, of which, CKn8b1 unit occupies maximum area of 23.19 per cent followed by LAn6b1 unit (19.27%).

- ❖ Kasargod district falls in two major landscape/geology classes; these are Charnockite and Laterite. Among them Laterite occupied 49.73% whereas Charnockite occupied 39.79% of the total area.
- ❖ The physiography of Kasargod district is dominated by Undifferentiated Hill side slopes (60.79%) followed by Pediments (19.37 %) while Coastal Alluvial Plains and Lower pediplains constitutes 5.57 % and 3.30 % of surveyed area.
- ❖ An area of 90957 ha (45.69%) of Kasargod district comes under Deep to very deep slopes followed by very deep slope (16.31%) while an area of 25782 ha (12.95%) comes under Deep slope whereas Moderately deep to deep slope occupied 21667 ha (10.88%).
- ❖ Most of the soils of the area are coming under Strongly to moderately steep slope (33.41%) category followed by Steep to very steep soils (27.38%).
- ❖ Major area comes under Moderate to Severe erosion (68.09%) and Slight to Moderate erosion (19.68%). None to slight water erosion occupies 6.13% whereas Severe water erosion consist of 1.18 per cent only of the total area.

HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the Soil Resource Mapping of Kasargod district of Kerala, State and furnishes information on the geographical setting of the state vis-à-vis location, extent, physiography, relief, drainage, climate, geology, natural vegetation, agriculture, land use and soils.

The report contains information on nature and kind of soil resources with its extent on landscape and interpretative grouping of soils and land resources which includes land capability classification that helps to prepare scientific land use plan for agriculture, horticulture, forestry, grassland development and providing suggestive management guidelines for crop suitability and crop recommendations. The soils of the area have also been differentiated as per soil characteristics based on Soil Taxonomy (USDA) to enable the users for scientific land use planning.

Kasargod District which spreads over an area of **1,99,088 hectare** have its district headquarters at Kasargod. There are two taluks in the district viz Kasargod and Hosdurg Survey of India Toposheets on 1:50,000 scale and the same have been used as reference maps for the survey. Satellite data (NRSC Imagery) has been used for image interpretation and soil mapping. In the report each soil mapping unit is marked by a symbol which represent the five levels of generalization as features within mapping units viz.

Geology (parent material)	LA	-	Laterite
Physiography	v	-	Upper pediplains
Slope	3	-	1-5 % Slope
Land use	b	-	Plantation
Soils	1	-	Association of soil series

Each soil association is restricted to a maximum of three soil series found within concerned soil mapping unit.

For the use of the soil resource report, first user needs to locate the area of interest on the map and note down the soil mapping units. Permanent features such as road, stream, lakes and village habitation etc. shown on the map will help user to locate the area of interest on the map. For the detailed information on soil mapping unit in respect of soil series in the area of interest, its extent, present and proposed land uses reference may be made to **chapter 3.7, 4 and Appendix-I and II.**

Any comments and/or suggestions on the report are welcome. For any additional information and clarification, further correspondence or personal contact may be established with:

<p>The Chief Soil Survey Officer Soil & Land Use Survey of India IARI Buildings, New Delhi 110 012. Phone: 011-25841263 Fax 011-25843811 Email: csso-slusi@nic.in, slusi-agri@nic.in Visit us at http://slusi.dacnet.nic.in</p>	<p>The Soil Survey Officer Soil & Land Use Survey of India Survey No.207, Kodigehalli Vidyaranyapura post, Bangalore 560097. 080- 23640761, 23641119 Fax -080-23640751 Email: soilkar@nic.in, ssobanglore@nic.in Visit us at http://slusi.dacnet.nic.in</p>
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