

Inventory of Soil Resources of Darjeeling and Kalimpong Districts, West Bengal Using Remote Sensing and GIS Techniques

ABSTRACT

1.	Survey Area	:	Darjeeling and Kalimpong districts of West Bengal
2.	Geographical Extent	:	a. Darjeeling district lies between 26°27' to 27°13' North latitude and 88°00' to 88°30' East longitude b. Kalimpong district lies between 88°24'-88°53' East longitude and 26°52 - 27°11' North latitude
3.	Agro Climatic Region	:	Eastern Himalayan Region (II)
4.	Total Area of the district	:	a. Area of the Darjeeling district -205283 ha b. Area of Kalimpong district - 109352 ha
5.	Kind of Survey	:	Soil resources mapping using remote sensing techniques.
6.	Base map	:	a) IRS – P6 Geocoded Satellite Imagery , LISS-III(1: 50000 scale) b) SOI –Toposheet (1:50000 scale)
7.	Scale of Mapping	:	1 : 50000
8.	Period of Survey	:	May 2012 to June 2012

9. Soil Series Association Mapped and their Respective Area

Mapping Symbol	Mapping Unit	Soil Association	Darjeeling		Kalimpong		Total Area	
			Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)
9	ACh3a1	Sepdaha-Phashidewa-I	0	0.00	1762	0.56	1762	0.56
10	ACh3b1	Naksalbari-Kurseong-Merambari	1746	0.55	1480	0.47	3226	1.03
11	ACh3c1	Marionbari-Naksalbari-Kurseong	78	0.02	769	0.24	847	0.27
1	ALb2a1	Putimari-Phashidewa-I	22442	7.13	0	0.00	22442	7.13
3	ALb3a1	Phashidewa-I-Putimari	20050	6.37	284	0.09	20334	6.46
4	ALb3b1	Kiranchadem-Muni-Tuha	23069	7.33	150	0.05	23219	7.38

5	ALb3c1	Malhibari-Garidhura	9409	2.99	129	0.04	9538	3.03
2	ALg2e1	Gosaiपुर-Phashidewa	4194	1.33	0	0.00	4194	1.33
12	GGc4b1	Mirik-Mirik-I	53	0.02	967	0.31	1020	0.32
13	GGc4c1	Mirik-I-Mirik	940	0.30	1325	0.42	2265	0.72
17	GGf6b1	Langview-Ghum	539	0.17	1705	0.54	2244	0.71
18	GGf6c1	Ghum-Langview- Bararangbang	529	0.17	981	0.31	1510	0.48
19	GGf7a1	Chatakpur-Langview	2590	0.82	6808	2.16	9398	2.99
20	GGf7b1	Okyati-Langview	4092	1.30	5719	1.82	9811	3.12
22	GGf7c1	Rangtang-Kuklang	2562	0.81	4646	1.48	7208	2.29
24	GGf8a1	Chatakpur-Langview	18055	5.74	21588	6.86	39643	12.60
25	GGf8b1	Gayumbari-Langview	43055	13.68	9880	3.14	52935	16.82
26	GGf8c1	Kailapani-Tindhuria- Rangbul	7126	2.26	9816	3.12	16942	5.38
27	GGf8c2	Rangbul-Ghum	14689	4.67	24367	7.74	39056	12.41
28	GGf8c3	Ghum-Tindhuria	18568	5.90	14116	4.49	32684	10.39
15	GGy5b1	Garidhara-Sukma	85	0.03	15	0.00	100	0.03
16	GGy5c1	Sukma-Garidhara	89	0.03	240	0.08	329	0.10
14	GGz4c1	Matigara-Sukma	321	0.10	139	0.04	460	0.15
HS	Habitation		3845	1.22	808	0.26	4653	1.48
River	River		7157	2.27	1658	0.53	8815	2.80
		Grand Total	205283	65.24	109352	34.76	314635	100.00

10. Area under different erosion classes

Erosion Class	Area(ha)			Area (%)		
	Darjeeling	Kalimpong	Total Area	Darjeeling (%)	Kalimpong (%)	%
None to slight erosion	22442	0	22442	7.13	0.00	7.13
None to slight to moderate erosion	86312	13058	99370	27.43	4.15	31.58
Moderate erosion	49531	48664	98195	15.74	15.47	31.21
Moderate to severe erosion	35996	45164	81160	11.44	14.35	25.79
Misc.	11002	2466	13468	3.50	0.78	4.28
Total	205283	109352	314635	65.24	34.76	100.00

11. Area Under different Slope Classes

Slope Classes	Area (ha)			Area (%)		
	Darjeeling	Kalimpong	Total	Darjeeling	Kalimpong	%
Nearly level to very gently slope	26636	0	26636	8.47	0.00	8.47
Very gently to gently slope	54352	4574	58926	17.27	1.45	18.73
Gently to moderately slope	1314	2431	3745	0.42	0.77	1.19
Moderately to strongly slope	174	255	429	0.06	0.08	0.14
Strongly to moderately steep slope	1068	2686	3754	0.34	0.85	1.19
Moderately steep to steep slope	9244	17173	26417	2.94	5.46	8.40
Very steep to extremely steep slope	101493	79767	181260	32.26	25.35	57.61
Misc.	11002	2466	13468	3.50	0.78	4.28
	205283	109352	314635	65.24	34.76	100.00

12. Area Under different Land Use Classes

Land Use Classes	Area(ha)			Area (%)		
	Darjeeling	Kalimpong	Total Area	Darjeeling	Kalimpong	Total
Single crop cultivation	63137	30442	93579	20.06	9.67	29.74
Tea garden	72639	19916	92555	23.08	6.32	29.42
Deciduous forest (Single Story Veg)	8916	12261	21177	2.83	3.89	6.73
Deciduous forest (Double Story Veg)	45395	44267	89662	14.42	14.06	28.50
Culturable wastelands	4194	0	4194	1.33	0	1.33
Misc	11002	2466	13468	3.49	0.78	4.28
Total	205283	109352	314635	65.21	34.72	100

13. Area Under different Land Capability Classes

Land Capability Class	Area Darjeeling (ha)	Area (%)	Area Kalimpong (ha)	Area (%)	Total Area (ha)	Area (%)
II	22442	7.13	0	0.00	22442	7.13
II-III	20050	6.37	2046	0.65	22096	7.02
III	1824	0.57	2249	0.71	4073	1.3
III-IV	4194	1.33	0	0.00	4194	1.33
IV	85	0.03	15	0.00	100	0.03
VI	64239	20.41	39981	12.7	104220	33.12
VII	4092	1.30	5719	1.82	9811	3.12
F	54233	17.23	55759	17.72	109992	34.95
Misc.	11002	3.49	2466	0.79	13468	4.28
Total	205283	65.24	109352	34.76	314635	100.00

Salient Features:

- ❖ Three types of landscape i.e. Alluvium, Alluvium-colluvium and Granite gneiss and 30 soil series are found in Darjeeling and Kalimpong district of West Bengal.
- ❖ Most of the area is under Forest (35.23%) followed by single cultivation (29.74%), tea garden (29.42%) and culturable wastelands (1.33%).
- ❖ About 181260 ha (57.61%) of survey area having slope range very steep to extremely steep slope followed by 58926 ha (18.73%) very gently sloping to gently sloping, 26636 ha(8.47%) nearly level to very gently sloping slope.
- ❖ About 98195 ha (31.21%) area having moderate erosion hazard and about 81160 ha (25.79%) suffer from moderate to severe erosion needs urgent attention for soil water conservation measures.
- ❖ Soils of the area are taxonomically classified into three orders i.e. Alfisol, Entisols and Inceptisols. All the thirty soils series identified in the survey area which is further classified into 6 sub-orders, 7 great groups, 14 subgroups and 14 families.
- ❖ Soil are acidic in nature and low in fertility state needs recommendation doses of balance fertilizer and suitable agronomy practices in addition to assured irrigation for sustained increase in agriculture production.

HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the Soil Resources mapping of Darjeeling and Kalimpong district, West Bengal providing information on the geographical setting of the district, such as location, extent, physiography, relief, drainage, climate, geology, natural vegetation, agriculture, land use and soils.

The report contains other information on Interpretative grouping of soils such as land capability classes; land irrigability classes, soil suitability grouping and hydrological grouping and also recommendation for crops; horticulture development; forest, forage and grassland development; water harvesting, water storage and water management that are essential for soil and land resource management. The genesis and classification of the soils are also discussed in **Chapter 5**.

Darjeeling district of West Bengal is spread over an area of 3,14,635 ha. The district is covered by nineteen SOI topographical sheets on the scale of 1: 50,000 which are used as base material along with satellite imageries LISS III.

Each soil mapping unit is marked by mapping unit i.e ALb2a1 (Alluvium; alluvial plain; 0-3 % slope; agriculture land use; Soil Series Association, describing Putimara as dominant series in association with Phashidewa_I series). Each soil association is restricted to a maximum of three soil series.

For the use of the soil resource report, first locate the area of your 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, help to locate the area of interest on the map. For the detailed information on soil mapping unit in respect of soil series of the area of interest, its extent, present and proposed land uses, reference may be made to **Chapter 4, Appendix I and II**.

The mapping unit used in soil mapping represents the five levels of mapping i.e. ALb2a1 may be referred as follows:

AL	-	Alluvium	-	Landscape
b	-	Alluvium plain	-	Physiography
2	-	0-3 %	-	Slope Class
a	-	Agriculture land	-	Land Use
1	-	Association of Soil series with erosion and management soil unit.		

Any comment and suggestion on the report would be welcome. For any further enquiry / or clarification, correspondence or personal contact may be established with following alternative

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