

Inventory of Soil Resource of East, West, North and South Districts of Sikkim Using Remote Sensing and GIS Techniques

ABSTRACT

1.	Survey Area	:	East, West, North and South districts, Sikkim
2.	Geographical Extent	:	88 ⁰ 0' to 88 ⁰ 55'E Longitudes and 27 ⁰ 05' to 28 ⁰ 09' N Latitude
3.	Agro Climatic Region	:	Humid High rainfall North Eastern Zone (3)
4.	Total area of the districts	:	709600 ha
5.	Kind of Survey	:	Soil resources mapping using remote sensing and GIS techniques.
6.	Base map	:	a) IRS-P6 LISS-III Precision Geo-coded FCC(4, 3, & 2) Satellite Imagery (1:50,000) b) SOI –topsheet (1:50000)
7.	Scale of Mapping	:	1 : 50,000
8.	Period of Survey	:	2006-2007 and 2010

9. Soil Series association mapped and their extent

Sl. No.	Mapping unit	Soil Association	East Sikkim	West Sikkim	North Sikkim	South Sikkim	Area (ha)	%
1	ALg3a1	Chhota Singtam-Ranipool-Baghakhola	376	152		40	568	0.08
2	ALj3a1	Kamling-Jorthang	226	89	33	140	488	0.07
3	ALj3d1	Melli-Jorthang				153	153	0.02
4	GGc4a1	Kitam-Singitham	58	191	116		365	0.05
5	GGc5c1	Songma-Kitam	334	582	141	494	1551	0.22
6	GGf7a1	Shagyon-Dikling	1682	1548	803	2865	6898	0.97
7	GGf7a2	Rumtek-Marchak-Namchi	6404	4574	435	2094	13507	1.90
8	GGf7c1	Thang-Tendong	2694	2243	1908	4701	11546	1.63
9	GGf7d1	Dentam-Lachen	237	267	46	70	620	0.09
10	GGf8a1	Rongli-Khandu	517	5070	1231	2095	8913	1.26
11	GGf8b1	Aha-Lincha-Masha	5725	2924	833	1221	10703	1.51
12	GGf9a1	Makha-Vasma	10263	10210	1295	17644	39412	5.55
13	GGf9c1	Thang -Ranthang-Tung	4423	7574	34674	15	46686	6.58
14	GGf9c2	Phyangla -Mangan-Tista	20510	35067	12466	10719	78762	11.10

Sl. No.	Mapping unit	Soil Association	East Sikkim	West Sikkim	North Sikkim	South Sikkim	Area (ha)	%
15	GGf9c3	Manul-Thang-Ranthang	14216	8551	41981	12892	77640	10.93
16	GGf9c4	Thang-Jilang	3672	1169	3382	3924	12147	1.71
17	GGf9c5	Lachen-Jilang	2947	2276	5120	2204	12547	1.77
18	GGf9d1	Lachen-Pakshya	3568	3703	3724	938	11933	1.68
19	GGf9d2	Lachen-Rongli	1200	1329	1906	1159	5594	0.79
20	GGf9d3	Thang-Manul	2569	10712	75457	657	89395	12.60
21	GGo5a1	Dharamdin-Radong	180	140			320	0.05
22	GM	Glacial Moraine		823	6761		7584	1.07
23	HS	Habitation	994	1254	293	84	2625	0.37
24	LS	Land slide	1966	257	158	213	2594	0.37
25	RI	River	399	381	1414	659	2853	0.40
26	SCA	Snow covered area	10140	15487	227950	10019	263596	37.15
27	WB	Water bodies	100	27	473		600	0.08
		Grand Total	95400	116600	422600	75000	709600	100.00

Salient features

- ⇒ The survey area is dominated by moderately steep to extremely steep hilly/mountainous terrain(96.23%), very gentle to gentle slopping Intermontane valley(0.08%) and River terrace(0.09 %).
- ⇒ Single crop terrace cultivation practice is done in 69050ha(9.73%) while multiple crop cultivation occupies only in 568ha(0.08%).
- ⇒ About 32.18% of the total area is covered by good forest while only 1.77% area has been suffered by forest degradation.
- ⇒ About 37.15% area comes under snow covered, both seasonal and permanent and only 0.37% area are under land slide.
- ⇒ About 36.00% of the total area are under moderately deep soil followed by deep(12.85%) and very deep(7.47%) soil.
- ⇒ About 28.18 % area is affected by moderate soil erosion, followed by severe erosion(16.95%) and moderate to severe soil erosion (1.26%).
- ⇒ About 60.08 % area is not suitable for irrigation and 0.46% & 0.02% of total area have moderate and severe limitations for sustained use under irrigation respectively.
- ⇒ Most of the area comes under Inceptisols, followed by Entisols, Mollisols and Alfisols.

HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the Soil Resources mapping of East, West, North and South district, Sikkim along with information on the geographical setting of the district, such as location, extent, physiography, relief, drainage, climate, geology, natural vegetation, agriculture, land use and soils.

It provides detail information on interpretative grouping of soils such as land capability classes; Land irrigability classes, soil suitability grouping and also broad based recommendation on crops, horticulture development, forest and grassland development, water harvesting, water storage and water management that are essential for soil and land resource management of the area. The genesis and classification of the soils are also discussed in the **Chapter 5**.

For the use of the soil resource report, it is first to locate the area of the interest on the map and to 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 units in respect of identified soil series of the area, their extent, present and proposed land uses, reference may be made to **Chapter 4 and Appendix I**.

The symbol used in soil mapping represents the five levels of mapping viz. GGf7c1 which may be referred as follows:

GG	-	Granite Gneiss	-	Landscape
f	-	Undifferentiated mountain side slope	-	Physiography
7	-	15- 33%	-	Slope Class
c	-	Forest 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 / or clarification, correspondence or personal contact may be established, with the

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