

Inventory of Soil Resources of Dimapur District, Nagaland State Using Remote Sensing and GIS Techniques

ABSTRACT

1.	Survey Area	:	Dimapur District, Nagaland
2.	Geographical Extent	:	Between 93° 30'54 " and 94°01 '16 " East Longitude and 25° 38'53 " and 25°01 '43 " North Latitude
3.	Agro Climatic Region	:	Eastern Himalayan Region-II
4.	Total area of the district	:	92700 ha.
5.	Kind of Survey	:	Soil Resources Mapping using Remote sensing techniques.
6.	Base map	:	a) IRS – ID Geocoded Satellite Imagery (1: 50000 scale) b) SOI – Toposheet (1:50000 scale)
7.	Scale of Mapping	:	1 : 50000
8.	Period of Survey	:	December, 2010 and January, 2014

9. Soil Series Association Mapped and their respective area

Sl. No.	Mapping symbol	Mapping Unit	Soil Series Association	Total Area (ha)	Area (%)
1	32	ACp3a1	Longnam-Jakhama-Kukidolong	1299	1.40
2	33	ACp3c1	Tuli-II-Tuli-I-Diliapur	1699	1.83
3	31	ACq3a1	Jakhama-Sirhimakuki-Toshozu-I	5529	5.96
4	35	ACq3c1	Sirhima basa-Diliapur	1461	1.58
5	27	ALb2a1	Singrijan-Dimapur-Dhansiripar	11107	11.98
6	28	ALb3a1	Tenyiphe-I-Dhansiripar-Rangapahar	1386	1.50
7	29	ALb3c1	Rangapahar-Tenyiphe-II-Chumukedima-I	4607	4.97
8	30	ALb3d1	Rangapahar-Tenyiphe-II	3903	4.21

Sl. No.	Mapping symbol	Mapping Unit	Soil Series Association	Total Area (ha)	Area (%)
9	2	SDi4c(a)1	Maromi-Alichen-Merongkong	28	0.03
10	3	SDi4c1	Mongsiyimti-Mopungchukit-Mariama	166	0.18
11	22	SDn6c(a)1	Yisemyong-Unger-Phesama-II	110	0.12
12	23	SDn6c(a)2	Sutsu-Unger-Chieswema	236	0.25
13	20	SDn6c1	Longnak-Unger-Tsemenyu	1855	2.00
14	21	SDn6c2	Jhanji-Phesama-I-Longwesungu	2604	2.81
15	18	SDn7(2)a1	Phesama-I-Unger-Tuensang	23	0.03
16	10	SDn7b1	Changki-Mongsiyimti-Unger	20	0.02
17	16	SDn7c(a)1	Mokokchung-Unger	276	0.30
18	17	SDn7c(a)2	Chieswema-Manguzu-Sutsu	308	0.33
19	11	SDn7c1	Yisemyong-Longnak-Padambo	7502	8.09
20	12	SDn7c2	Zaphumi-Longnak-Unger	8068	8.70
21	12.1	SDn7c3	Vishwema-Chieswema-Zaphumi	34	0.04
22	9	SDn9c(a)1	Khota-Tsemenyu-Chieswema	379	0.41
23	5	SDn9c1	Changki-Mongsiyimti-Merongkong	18438	19.89
24	6	SDn9c2	Changki-Vishwema-Longsamtang	5013	5.41
25	6.1	SDn9c3	Chieswema-II-Longsamtang-Vishwema	306	0.33
26	26	SDy5a1	Zubza-II-Gwalwa-Thahiku	575	0.62
27	25	SDy5c1	Dayapur-Thahiku-Gwalwa	5440	5.87
28	25.2	SDy5d1	Thahiku-Gwalwa	284	0.31
29	37	SDz4a1	Medziphema-Dayapur	470	0.51
30	36	SDz4c1	Dayapur-Gwalwa	2991	3.23
31	38	SDz4d1	Gwalwa-Dayapur	374	0.40
32	43	Airport		62	0.07
33	39	Habitation		5693	6.14
34	40	River		414	0.45
35	41	ROC		6	0.01
36	42	Tank		34	0.04
			Total	92700	100.00

10. Area under different erosion classes

Sl. No.	Erosion	Area (ha)	Area (%)
1	None to slight erosion (e0-e1)	17936	19.35
2	None to slight to moderate erosion (e1-e2)	1409	1.52
3	Moderate erosion (e2)	10923	11.78
4	Moderate to severe erosion (e2-e3)	46382	50.03
5	Severe erosion (e3)	9841	10.62
6	Misc.	6209	6.70
	Total	92700	100.0

11. Area under different slope classes

Sl. No.	Slope Classes	Area (ha)	Area (%)
1	Nearly level to very gently slope	11107	11.98
2	Very gently to gently slope	19884	21.45
3	Gently to moderately slope	4029	4.35
4	Moderately to strongly slope	6299	6.79
5	Strongly to moderately steep slope	4805	5.18
6	Moderately steep to steep slope	16232	17.51
7	Very steep to extremely steep slope	24135	26.04
8	Misc.	6209	6.70
	Total	92700	100.0

12. Area under different landscape and physiography

Sl. No	Landscape	Physiography	Area(ha)	Area (%)
1	Alluvium	Alluvial plains	21003	22.66
2	Alluvium Colluvium	Broad hill valleys	6990	7.54
		Narrow hill valleys	2998	3.23
3	Sandstone	Plateau plains / hill tops / mesa	194	0.21
		Rolling upland	6299	6.79
		Undifferentiated hills side slope	45173	48.73
		Undulating uplands	3835	4.14
4		Misc.	6209	6.70
		Total	92700	100.0

Salient Features:

- ❖ Alluvium, Alluvium – Colluvium and Sandstone are the three major landscape found in Dimapur district.
- ❖ Total 47 nos soil series have been mapped in Dimapur district.
- ❖ About 64.9% of the area falls under Forest.
- ❖ Soils of the district, falls under seven physiographic classes of which majority of the area falls under undifferentiated hill side slopes followed by alluvial plains.
- ❖ About 23829 ha (26.04%) of surveyed area having very steep to extremely steep slope range followed by very gently to gently slope range (21.45%).
- ❖ About 54.56% of the district area is under very deep soils followed by deep soils (38%)
- ❖ Majority of the area suffers from moderate to severe erosion hazard (50.03%) followed by none to slight erosion hazard (19.32%).
- ❖ Nearly 26.04% of total surveyed area comes under capability Class VII and is not suitable for cultivation but suitable for pasture and forestry with major limitations where as 24.25% area comes under Class II-III which is moderately good to good land suitable for cultivation, with minor limitations.
- ❖ Soils of the area are taxonomically classified into four orders i.e. Alfisols, Entisols Inceptisols and Ultisols.
- ❖ Nearly 43.15% of total surveyed area comes under Soil Irrigability Class B with moderate soil limitations for sustained use under irrigation and 26.07% under Class D having very severe soil limitations for sustained use under irrigation.
- ❖ Nearly 43.52% of total surveyed area comes under Land Irrigability Class 6 and is not suitable for sustained use under irrigation.
- ❖ Cultivation on steep hills may be avoided and terraced cultivation with proper soil and water conservation measures is highly recommended.
- ❖ Plantation crops may be taken in abandoned Jhum lands with proper soil water conservation measures.
- ❖ Valley lands can be used for intensive agriculture with taking effective agronomic practices in addition to proper soil and water conservation measures.

HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the Soil Resources Mapping of Dimapur district, Nagaland 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 (Chapter 8) such as land capability classes; land irrigability classes, soil suitability grouping and hydrological grouping, the crops suitability, horticulture development, forest, forage and grassland development; water harvesting, water storage and water management are also essential for soil and land resource management. The genesis and classification of the soils are also discussed in **Chapter 5**.

Dimapur district of Nagaland state is spread over an area of 92700 ha. The district is covered by five SOI topographical sheets on the scale of 1: 50,000 which are used as base material along with satellite imageries.

Each soil mapping unit is marked by mapping unit i.e. ALb3a1 (Alluvium; alluvial plain; 1-5% slope; agriculture land use; Soil Series Association, describing - Tenyiphe-I as dominant series in association with Dhansiripar and Rangapahar 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. ALb3a1 may be referred as follows:

AL	-	Alluvium	-	Landscape
b	-	Alluvium plain	-	Physiography
3	-	1-5 %	-	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 the

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