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

ABSTRACT

1.	Survey Area	:	Kohima District, Nagaland
2.	Geographical Extent	:	Between 93^{o} 19 '55 " and 94^{o}20 '10 " East Longitude and 25^{o} 11 '38 " and 26 ^{o}01 '35 " North Latitude
3.	Agro Climatic Region	:	Eastern Himalayan Region-II
4.	Total area of the district	:	311400 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	:	January, 2014

9. Soil Series Association Mapped and their respective area

Sl. No.		Mapping Unit	Soil Series Association	Area (ha)	Area (%)
1	32	ACp3a1	Longnam-Jakhama-Kukidolong	2808	0.90
2	33	ACp3c1	Tuli-II-Tuli-I-Diliapur	995	0.32
3	31	ACq3a1	Jakhama-Sirhimakuki-Toshozu-I	2439	0.78
4	35	ACq3c1	Sirhima basa-Diliapur	2126	0.68
5	2	SDi4c(a)1	Maromi-Alichen-Merongkong	200	0.06
6	3	SDi4c1	Mongsiyimti-Mopungchukit-Mariama	1489	0.48
7	24	SDn6(2)a1	Zubza-I-Tuensang-Phesama-I	788	0.25
8	22	SDn6c(a)1	Yisemyong-Unger-Phesama-II	1487	0.48
9	23	SDn6c(a)2	Sutsu-Unger-Chieswema	731	0.23
10	20	SDn6c1	Longnak-Unger-Tsemenyu	3900	1.25

Sl. No.		Mapping Unit	Soil Series Association	Area (ha)	Area (%)
11	21	SDn6c2	Jhanji-Phesama-I-Longwesungu	15941	5.12
12	21.1	SDn6c3	Jhanji-Phesama-I-Longwesungu	1342	0.43
13	18	SDn7(2)a1	Phesama-I-Unger-Tuensang	1488	0.48
14	10	SDn7b1	Changki-Mongsiyimti-Unger	63	0.02
15	16	SDn7c(a)1	Mokokchung-Unger-Ungma	4957	1.59
16	17	SDn7c(a)2	Chieswema-Manguzu-Sutsu	3247	1.04
17	11	SDn7c1	Yisemyong-Longnak-Padambo	18050	5.80
18	12	SDn7c2	Zaphumi-Longnak-Unger	56817	18.25
19	13	SDn7c4	Kohima-Unger-Aizeto	3616	1.16
20	9	SDn9c(a)1	Khota-Tsemenyu-Chieswema	4490	1.44
21	7	SDn9c(a)2	Chieswema-Paglapahar-Chieswema-I	4509	1.45
22	5	SDn9c1	Changki-Mongsiyimti-Merongkong	80536	25.86
23	6	SDn9c2	Changki-Vishwema-Longsamtang	75178	24.14
24	6.1	SDn9c3	Chieswama-II-Longsamtang-Vishwema	7198	2.31
25	8	SDn9c4	Kagaki-Kohima-Chieswema	1152	0.37
26	26	SDy5a1	Zubza-II-Gwalwa	694	0.22
27	25	SDy5c1	Gwalwa-Thahiku-Dayapur	7263	2.33
28	25.2	SDy5d1	Thahiku-Gwalwa	218	0.07
29	37	SDz4a1	Medziphema-Dayapur	393	0.13
30	36	SDz4c1	Dayapur-Gwalwa	1517	0.49
31	38	SDz4d1	Gwalwa-Dayapur	43	0.01
32	39	Habitation		4716	1.51
33	40	River		869	0.28
34	41	ROC		140	0.04
			Total	**311400**	**100.0**

10. Area under different erosion classes

Sl. No.	Erosion	Area (ha)	Area (%)
1	None to slight erosion	5247	1.68
2	None to slight to moderate erosion	2276	0.73
3	Moderate erosion	6127	1.97
4	Moderate to severe erosion	167483	53.78
5	Severe erosion	124542	40.00
	Misc.	5725	1.84
	Total	**311400**	**100.0**

11. Area under different slope classes

Sl. No.	Slope Classes	Area (ha)	Area (%)
1	Very gently to gently slope	8368	2.69
2	Gently to moderately slope	3642	1.17
3	Moderately to strongly slope	694	0.22
4	Strongly to moderately steep slope	38868	12.48
5	Moderately steep to steep slope	88238	28.34
6	Very steep to extremely steep slope	165865	53.26
	Misc.	5725	1.84
	Total	**311400**	**100.0**

Salient Features:

- ❖ Alluvium – Colluvium and Sandstone are the two major landscape found in Kohima district.
- ❖ Total 46 nos soil series have been mapped in two landscape of Kohima district.
- ❖ About 89% of the area falls under Forest followed by 6.3% Jhum land.
- ❖Soils of the district, falls under six physiographic classes of which majority of the area falls under undifferentiated hill side slopes.

Sl. No	Landscape	Physiography	Area(ha)	Area %
1	**Alluvium Colluvium**	Broad hill valleys	4565	1.47
		Narrow hill valleys	3803	1.22
2	**Sandstone**	Plateau plains / hill tops / mesa	1689	0.54
		Rolling upland	8175	2.63
		Undifferentiated hills side slope	285490	91.68
		Undulating uplands	1953	0.63
3		Misc.	5725	1.84
		Total	**311400**	**100.0**

- About 165865 ha (53.26%) of survey area having very steep to extremely steep slope range followed by moderately steep to steep slope range (28.34%).

- About 78.17% of the district area is under deep soils followed by very deep soils (15.86%)

- Majority of the area suffers from moderate to severe erosion hazard (53.78%) followed by severe erosion (40.0%).

- Nearly 57.17% of total surveyed area comes under Land Capability Class VII and is not suitable for cultivation but suitable for pasture and forestry with major limitations whereas 24.04% area comes under Land Capability Class VI- VII which is not suitable for cultivation but suitable for pasture and forestry with minor to major limitations.

- Soils of the area are taxonomically classified into four orders i.e. Alfisols, Entisols Inceptisols and Ultisols.

- Nearly 81.88% of total surveyed area comes under Soil Irrigability Class C-D and with severe to very severe soil limitations for sustained use under irrigation.

- Nearly 86.30% of total surveyed area comes under Land Irrigability Class 6 which 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 Kohima 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. 7) 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 which are also essential for soil and land resource management. The genesis and classification of the soils are also discussed in **Chapter 5**.

Kohima district of Nagaland state is spread over an area of 311400 ha. The district is covered by thirteen 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. ACp3a1 (Alluvium-colluvium; narrow hill valleys; 1-5% slope; agriculture land use; Soil Series Association, describing - Longnam as dominant series in association with Jakhama and Kuikidolong 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**, A**ppendix I and II.**

The mapping unit used in soil mapping represents the five levels of mapping i.e. ALb3a1 may be referred as follows:

AC	-	Alluvium - Colluvium	-	Landscape
p	-	Narrow hill valleys	-	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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