

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

## ABSTRACT

1.	Survey Area	:	Phek District, Nagaland
2.	Geographical Extent	:	Between 25°26'56" to 25°55'30" North Latitude and 94°11'24" to 94°54'18" East Longitude
3.	Agro Climatic Region	:	Eastern Himalayan Region-II
4.	Total area of the district	:	202600 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 Symbol	Mapping Unit	Soil Series Association	Area (ha)	Area (%)
1	32	ACp3a1	Longnam-Jakhama-Kukidolong	1932	0.95
2	33	ACp3c1	Tuli-II-Tuli-I-Diliapur	244	0.12
3	2	SDi4c(a)1	Maromi-Alichen-Merongkong	127	0.06
4	3	SDi4c1	Mongsiyimti-Mopungchukit-Mariama	2373	1.17
5	22	SDn6c(a)1	Yisemyong-Unger-Phesama-II	435	0.21
6	20	SDn6c1	Longnak-Unger-Tsemenyu	731	0.36
7	21	SDn6c2	Jhanji-Phesama-I-Longwesungu	2051	1.01
8	18	SDn7(2)a1	Phesama-I-Unger-Tuensang	494	0.24
9	16	SDn7c(a)1	Mokokchung-Unger	1829	0.90

Sl. No.	Mapping Symbol	Mapping Unit	Soil Series Association	Area (ha)	Area (%)
10	17	SDn7c(a)2	Chieswema-Manguzu-Sutsu	1388	0.69
11	11	SDn7c1	Yisemyong-Longnak-Padambo	4592	2.27
12	12	SDn7c2	Zaphumi-Longnak-Unger	6654	3.28
13	12.1	SDn7c3	Vishwema-Chieswema-Zaphumi	561	0.28
14	14	SDn7d1	Unger-Aizeto	540	0.27
15	9	SDn9c(a)1	Khota-Tsemenyu-Chieswema	13758	6.79
16	7	SDn9c(a)2	Chieswema-Paglapahar-Chieswema-I	13222	6.53
17	5	SDn9c1	Changki-Mongsiyimti-Merongkong	50497	24.92
18	6	SDn9c2	Changki-Vishwema-Longsamtang	67634	33.38
19	6.1	SDn9c3	Chieswema-II-Longsamtang-Vishwema	13848	6.84
20	8	SDn9c4	Kagaki-Kohima-Chieswema	16760	8.27
21	25	SDy5c1	Gwalwa-Thahiku-Dayapur	150	0.07
22	38	Habitation		2248	1.11
23	39	River		532	0.26
			<b>Total</b>	<b>202600</b>	<b>100.00</b>

#### 10. Area under different erosion classes

Sl. No.	Erosion	Area (ha)	Area (%)
1	None to slight erosion	1932	0.95
2	None to slight to moderate erosion	494	0.24
3	Moderate erosion	2617	1.29
4	Moderate to severe erosion	62751	30.97
5	Severe erosion	132026	65.17
6	Misc.	2780	1.37
	<b>Total</b>	<b>202600</b>	<b>100.0</b>

### 11. Area under different slope classes

Sl. No.	Slope Classes	Area (ha)	Area (%)
1	Very gently to gently slope	2176	1.07
2	Gently to moderately slope	2500	1.23
3	Moderately to strongly slope	150	0.07
4	Strongly to moderately steep slope	17065	8.42
5	Moderately steep to steep slope	16058	7.93
6	Very steep to extremely steep slope	161871	79.90
7	Misc.	2780	1.37
8	<b>Total</b>	<b>202600</b>	<b>100.0</b>

### 12. Area under different landscape and physiography classes

Sl. No	Landscape	Physiography	Area(ha)	Area (%)
1	<b>Alluvium Colluvium</b>	Narrow hill valleys	2176	1.07
2	<b>Sandstone</b>	Rolling upland	150	0.07
		Plateau plains / hill tops / mesa	2500	1.23
		Undifferentiated hills side slope	194994	96.25
3	<b>Misc.</b>		2780	1.37
		<b>Total</b>	<b>202600</b>	<b>100.00</b>

#### Salient Features:

- ❖ Alluvium – Colluvium and Sandstone are the two major landscape found in Phek district.
- ❖ Total 40 nos of soil series have been mapped in two landscape of Phek district.
- ❖ About 79.98% of the area falls under Forest.
- ❖ Soils of the district, falls under four physiographic classes of which majority of the area falls under undifferentiated hill side slopes.
- ❖ About 161871 ha (79.90%) of survey area having very steep to extremely steep slope range followed by strongly to moderately steep slope range (8.42%)

- ❖ About 71.26% area of the district area is under deep soils followed by moderately deep soils (21.90%)
- ❖ Majority of the area suffers from severe (65.17%) and moderate to severe erosion hazard (30.97%).
- ❖ Nearly 86.73% of total surveyed area comes under Land Capability Class VII and is not suitable for cultivation but is suitable for pasture and forestry with major limitations where as 7.68% area comes under Land Capability Class VI which is not suitable for cultivation but is suitable for pasture and forestry with minor limitations.
- ❖ Soils of the area are taxonomically classified into three orders i.e. Entisols Inceptisols and Ultisols.
- ❖ Nearly 94.88% of total surveyed area comes under Soil Irrigability Class C - D, with severe to very severe soil limitations for sustained use under irrigation.
- ❖ Nearly 94.41% 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 Phek 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 which are also essential for soil and land resource management. The genesis and classification of the soils are also discussed in **Chapter 5**.

Phek district of Nagaland state is spread over an area of 202600 ha. The district is covered by fifteen 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 Kukidolong 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. ACp3a1 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 / clarification, correspondence or personal contact may be established with

**The Chief Soil Survey Officer  
Soil and Land Use Survey of  
India, IARI Buildings, Pusa,  
New Delhi – 110012.  
Email - [cso-slusi@nic.in](mailto:cso-slusi@nic.in).  
Ph. – 011- 25841263**

Or

**The Soil Survey Officer  
Soil and Land Use Survey of India,  
Baishnabghata-Patuli Township,  
Block-E, Kolkata, Pin-700094.  
Email - [ssokolkata-slusi@nic.in](mailto:ssokolkata-slusi@nic.in).  
Ph. - 033-24301425/1581**

**WEBSITE: <http://slusi.dacnet.nic.in>**