

Inventory of Soil Resources of Kamrup District, Assam Using Remote Sensing and GIS Techniques

ABSTRACT

1.	Survey Area	:	Kamrup Districts, Assam
2.	Geographical Extent	:	25 ⁰ 43' to 26 ⁰ 48' N Latitudes 90 ⁰ 56' to 92 ⁰ 11' E Longitudes
3.	Agro Climatic Region	:	Eastern Himalayan Region (as per planning commission 1989)
4.	Total area of the district	:	4,34,500 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 2013 to January 2014

A. Soil Series Association Mapped and their Respective Area

Map Symbol	Mapping Uuit	Soil Association	Area (ha)	Area (%)
8	ACp2a1	Sanyasipara-Lepgaon	2348	0.54
7	ACx2a1	Lepgaon-Sanyasipara	7211	1.66
31/1	ACx3a1	Bamanjuli-Tangla	514	0.12
Airport	Airport		229	0.05
5	ALb2a1	Naopara	22391	5.15
6	ALb2a2	Amguri-Harimura	74237	17.09
3	ALb2b2	Dakuapara	56143	12.92
1	ALb2c1	Deldabhita-Sotomatia	11037	2.54
4	ALb2d1	Simlitola	1508	0.35
29	ALb3c1	Mansa RF	984	0.23
14	ALd2a1	Pahartati-Garugaon	3303	0.76
15	ALd2d1	Garugaon	3643	0.84
15/2	ALf2a1	Keotpara	90	0.02
10	ALg2a1	Majguri-Maicongri	8738	2.01
9	ALk1d1	Korigaon-Lasipara	5650	1.3
11	ALn2a1	Jiyapur-Santhali Charali-Tangalmari	26979	6.21
11/1	ALn2a2	Santhali Charali-Tangalmari	23760	5.47
12	ALn2d1	Jiyapur-Garugaon	1008	0.23
16	GGc4c1	Damalgi	3996	0.92
20	GGn6a1	Barkhola	1381	0.32
19/2	GGn6b1	Darka-Rongru Asim	983	0.23
19	GGn6c1	Jorabat	35129	8.08
19/1	GGn6d1	Rongru Asim-Rongkhongiri	311	0.07
18/1	GGn7b1	Jorabat-Rongkhongiri	756	0.17
18	GGn7c1	Rongkhongiri-Jorabat	34559	7.95
22/1	GGn7c2	Barkhola-Rongkhongiri	3649	0.84
17	GGn8c1	Bamuni-Jhabukbari	21831	5.02
22	GGn8c2	Barkhola-Jhabukbari	12545	2.89
24	GGo3c1	Gangakhuli	1530	0.35
21	GGr6c1	Chakrachila	6811	1.57
28/1	GGy4b1	Gangakhuli-Milmilia	339	0.08
28/2	GGy4d1	Gangakhuli-Milmilia	59	0.01
28	GGz4b1	Gangakhuli	786	0.18
27	GGz4c1	Gangakhuli-Milmilia	3896	0.9
HS	Homestead		17614	4.05
RI	River		15352	3.53
SB	Sand Bar		10492	2.41
W	Water body		12708	2.92
Total			434500	100

B. Distribution of Area Under Different Landscape and Physiography

Landscape	Physiography	Area(ha)	Area(%)
Alluvium	Alluvial Plain	166300	38.27
	Flood Plain	51747	11.91
	Marshy lands	5650	1.30
	Paleo channels	90	0.02
	Point bar complex	6946	1.60
	Steam bank	8738	2.01
Alluvium Colluvium	Narrow hill valleys	2348	0.54
	Piedmont plains	7725	1.78
Granite gneiss	Foot hill slopes	1530	0.35
	Hill tops	3996	0.92
	Hummocky	6811	1.57
	Rolling upland	398	0.09
	Undifferentiated hills side slope	111144	25.58
	Undulating Upland	4682	1.08
Misc.		56395	12.98
Total		434500	100.00

C. Mapping units Wise Land Capability Classification and their respective area:

Land Capability Classes		Mapping Unit	Area (ha)	Area (%)
Classes	Description			
II	Land suitable for cultivation, good land with minor limitations	ALn2a1, ALb2a2, ALb2a1, ACx2a2, ALn2a2	154578	35.58
III	Land suitable for cultivation, moderately good land with major limitations	ALn2d1	1008	0.23
II-III	Land suitable for cultivation, moderately good land to good land with limitations	ALd2a1, ACx3a1, ACx2a1, ALb2b2, ALk1d1, ALg2a1, ALf2a1	76786	17.67
III-IV	Land suitable for cultivation, moderately good land to fairly good land with occasional cultivation with major limitations	GGz4b1, GGy4d1, ALd2d1, GGy4b1, ALb2d1	6335	1.46
IV-V	Land suitable for cultivation, fairly good land to suitable for Cultivation, suitable for pasture	GGo6c1	983	0.23

	and forestry with no limitations.			
VI-VII	Land not suitable for cultivation, suitable for pasture and forestry with minor to major limitations.	GGn6d1, GGn6a1, GGn7b1	2448	0.56
F	Forest area	ACx3c1, ALb2c1, GGr6c1, GGn7c1, GGn7c2, GGz4c1, GGn8c1, GGc4c1, GGn8c2, GGn6c1, GGo3c1	135967	31.29
Misc.			56395	12.98
Total			434500	100.00

D. Area Under Different Erosion Classes

Erosion	Area(ha)	Area (%)
Moderate erosion	160446	36.93
Moderate to severe erosion	34687	7.98
None to slight erosion	161212	37.10
None to slight to moderate erosion	20379	4.69
Severe erosion	1381	0.32
Misc.	56395	12.98
Total	434500	100.00

E. Area Under Different Slope Classes

Sl.No	Slope Classes	Area (ha)	Area (%)
1.	Nearly level to very gently slope	248046	57.09
2.	Very gently to gently slope	3028	0.70
3.	Strongly to moderately steep slope	44615	10.27
4.	Moderately steep to steep slope	38964	8.97
5.	Steep to very steep slope	12545	2.89
6.	Gently to moderately slope	9076	2.09
7.	Very steep to extremely steep slope	21831	5.02
8.	Misc.	56395	12.98
	Total.	434500	100.00

F. Area Under Different Depth Classes

Sl.No	Depth Classes	Area (ha)	Area (%)
1.	Moderately deep	73965	17.02
2.	Deep	4510	1.04
3.	Very deep	299630	68.96
4.	Misc. Land	56395	12.98
	Total.	434500	100.00

Salient Features:

- ❖ Three types of landscape i.e. Alluvium, Alluvium-colluvium and Granite -Gneiss found in Kamrup district of Assam.
- ❖ Total 38 nos. of soil series have been identified and mapped in Kamrup districts of Assam.
- ❖ About 170952 ha (39.34%) area are under cultivation followed by Open scrub 1878 ha (0.43%), Plantation 2864 ha (0.65%), Forest land 135967ha (31.29%), Grasslands 10301 ha (2.38%), Home state surrounding orchard & mixed tree land 56143 ha (12.92%), and Misc. land 56395 ha (12.98%).
- ❖ About 162593 ha (37.42%) area having none to slight erosion hazard and only 20379 ha (4.69%) suffer from slight to moderate soil erosion and 34687 ha (7.98%) area affected from moderate to severe soil erosion needs urgent attention for soil conservation measures.
- ❖ Nearly 38.35% of total surveyed area comes under capability Class II having good potential for Agriculture/Horticulture development on sustainable basis where as 13.6% area comes under Class II- III & 3.03% comes under class III-IV which is moderately good land with major limitation for Agriculture propose whereas 0.17% comes under class VII-VIII which is not suitable for cultivation, suitable for pasture and forestry with major limitations to Suitable for wildlife and watershed 31.29 % comes under Forest land .
- ❖ Soils of the area are taxonomically classified into three orders i.e. Alfisols, Entisols, Inceptisols and Ultisols. All the thirty Eight soil series identified in the area are further classified into 4 order, 8 Sub-orders, 12 Great groups, 18 Subgroups and 26 Families.
- ❖ In the total survey area about 165316 ha (38.05%) area are under Alluvial plain (Alluvium) followed by Flood plain 51747ha (11.91%), Marshy lands 5650ha (1.30%), Paleo channels 90ha (0.02%), Steam bank 6946 ha (1.60%), Broad hill valley 7211ha (1.66%) and Narrow hill valley 2348 ha (0.54%)

HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the Soil Resources mapping of Kamrup district, Assam 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**.

Kamrup district of Assam is spread over an area of 434500 ha. The district is covered by twelve 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 Naopara as dominant 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. ALb1a1 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

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