

Inventory of Soil Resources of West Midnapore District, West Bengal State Using Remote Sensing and GIS Techniques

ABSTRACT

1.	Survey Area	:	West Midnapore District, West Bengal
2.	Geographical Extent	:	Between 21° 45' 50" and 22° 57' 14" North Latitude and 86° 33' 40" and 87° 53' 38" East Longitude
3.	Agro Climatic Region	:	Part of Eastern plateau and Hill region (VII) and part of Lower Gangetic Plain Region (III)
4.	Total area of the district	:	9, 38, 258 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 (1:50,000 scale)
7.	Scale of Mapping	:	1 : 50,000
8.	Period of Survey	:	February to March 2009 & March to April 2014

9. Soil Series association mapped and their respective area

Sl. No.	Mapping symbol	Mapping Unit	Soil Series Association	Total Area (ha)	Area (%)
1	3	ALb2a1	Kharigaria-Moulara-Rantua	169060	18.02
2	4	ALb2a2	Kesugeria-Nayapatna-Madhabpur	62065	6.61
3	4.1	ALb2a3	Beliya-Barapania-Kanthi	30692	3.27
4	3.1	ALb2a4	Kharigaria - Barapania -Beliya	15540	1.66
5	5	ALb2b1	Kanthi-Rantua	22974	2.45
6	6	ALb3a1	Moulara- Kanthi -Rantua	15492	1.65
7	8	ALe3a1	Rupnarayan-Manikpara	3982	0.42
8	8.1	ALe3c1	Manikpara-Rupnarayan	203	0.02
9	9	ALg2a1	Rantua-Kanthi	10691	1.14
10	1	ALn1a1	Manikpara-Nayabasan	67994	7.25
11	2	ALn1a2	Nayabasan-Manikpara	27080	2.89
12	2.1	ALn2b1	Kanthi-Nayabasan	28968	3.09
13	10	GGn6c1	Lohardangi-Balarampur-Khudadihi	106	0.01
14	11	GGv3a1	Kendudih-Hatimara-Darikata	1235	0.13
15	12	GGv3c1	Barabhum-Champasol-Sukribasa	300	0.03
16	13	GGw2(1)a1	Upen-Pathadih-Chirudih	1098	0.12
17	14	LAr4c1	Gopagarh-Bagdubi-Enthela	280	0.03
18	16	LAv3a1	Dubrakan-Piralha-Chhagalia	14201	1.51
19	17	LAv3a2	Chhagalia-Piralha-Bhadutala	35800	3.82
20	18	LAv3b1	Piralha -Jamboni-Bhadutala	4400	0.47
21	19	LAv3c1	Andharnayan-Enthela- Bagdubi	46848	4.99
22	20	LAv3c2	Jamboni-Gansasol-Godapiasal	85993	9.17
23	21	LAv3c3	Baramasia-Binpur-Gansasol	3918	0.42
24	22	LAv3d1	Bagdubi-Bhadutala- Enthela	14194	1.51
25	23	LAv2(1)a1	Silda -Piralha	29683	3.16
26	24	LAW2(1)a1	Asude-Katul- Silda	71995	7.67
27	25	LAW2(1)a2	Katul-Asude-Silda	21272	2.27

Sl. No.	Mapping symbol	Mapping Unit	Soil Series Association	Total Area (ha)	Area (%)
28	26	SCn7c1	Thakurdanga-Keshidanga	1444	0.15
29	27	SCn6c1	Keshidanga-Thakurdanga-Lalpur	10319	1.10
30	27.2	SCn6d1	Thakurdanga-Lalpur	362	0.04
31	28	SCr4c1	Jamtalgora- Keshidanga	3571	0.38
32	29	SCr4d1	Lalpur-Jamtalgora	158	0.02
33	30	SCz4c1	Sibpur-Raghunathpur-Sidpur	3262	0.35
34	32	SCv3a1	Holdupur-Tilgora	5879	0.63
35	33	SCv3b1	Raghunathpur-Sibpur-Sidpur	333	0.04
36	34	SCv3c1	Sidpur-Sibpur-Raghunathpur	2288	0.24
37	36	SCv2(1)a1	Boro-Ladda-Chinturi	2092	0.22
38	37	SCw2(1)a1	Chandro-Gopinathpur-Boro	7177	0.77
39	AIR_BASE	Air_Base		143	0.02
40	BK_CLN	Brick_kiln		221	0.02
41	CANAL	Canal		433	0.05
42	HS	Homestead		95918	10.22
43	I_A	Industrial area		200	0.02
44	RIVER	River		17972	1.92
45	ROC	ROC		44	0.00
46	TANK	Tank		153	0.02
47	WB	Waterbody		225	0.02
			Total	9,38,258	100.0

10. Area under different erosion classes

Sl. No.	Erosion	Area (ha)	Area (%)
1	None to slight erosion	5,35,441	57.07
2	None to slight to moderate erosion	9,797	1.04
3	Moderate erosion	1,94,265	20.70
4	Moderate to severe erosion	83,084	8.86
5	Severe erosion	362	0.04
6	Misc.	1,15,309	12.29
	Total	9,38,258	100.0

11. Area under different slope classes

Sl. No.	Slope Classes	Area (ha)	Area (%)
1	Nearly level slope	95,074	10.13
2	Nearly level to very gently slope	4,73,307	50.45
3	Very gently to gently slope	2,35,066	25.05
4	Gently to moderately slope	3,262	0.35
5	Moderately slope	280	0.03
6	Moderately to strongly slope	3,729	0.40
7	Strongly to moderately steep slope	10,787	1.15
8	Moderately steep to steep slope	1,444	0.15
9	Misc.	1,15,309	12.29
	Total	9,38,258	100.0

12. Area under different depth classes

Sl. No.	Depth classes	Area (ha)	Area (%)
1	Shallow	65,051	6.93
2	Moderately deep	17,061	1.82
3	Deep	1,34,660	14.35
4	Very deep	6,06,177	64.61
5	Misc.	1,15,309	12.29
	Total	9,38,258	100.0

13. Area under different Land use / Land cover classes

Sl. No.	Land use	Area (ha)	Area (%)
1	Agriculture	5,93,028	63.20
2	Plantation	56,675	6.04
3	Degraded forest (<10 %)	47,331	5.04
4	Forest (10 - 20 %)	91,649	9.77
5	Forest (20 - 40 %)	19,552	2.08
6	Open scrub	14,714	1.57
7	Misc.	1,15,309	12.29
	Total	9,38,258	100.0

14. Area under different Land Capability Classes

Land Capability Classes	Land Capability	Area (ha)	Area (%)
II	Land suitable for cultivation, good land with minor limitations	5,57,690	59.44
III	Land suitable for cultivation, moderately good land with major limitations	1,56,997	16.73
II-III	Land suitable for cultivation, moderately good land to good land with limitations	26,183	2.79
III-IV	Land suitable for cultivation, moderately good land to fairly good land with occasional cultivation with major limitations	65,839	7.02
IV	Land suitable for cultivation, fairly good land with occasional cultivation and major limitations	4,009	0.43
VI	Land not suitable for cultivation, suitable for pasture and forestry with minor limitations.	10,787	1.15
VII	Land not suitable for cultivation, suitable for pasture and forestry with major limitations.	1,444	0.15
	Misc	1,15,309	12.29
	Total	9,38,258	100

15. Salient Features:

- ❖ Alluvium, Granite-gneiss, Laterite and Schist are four major landscapes found in West Midnapore district.
- ❖ Total 53 nos. soil series on four different landscapes have been mapped in West Midnapore district.
- ❖ About 63.20% of the area falls under Agriculture followed by forest (16.89%), plantation (6.04%) and open scrub (1.57%).
- ❖ Soils of the district fall under nine physiographic classes of which majority of the area falls under alluvial plain 33.66%, followed by upper Pedi-plains (26.34%), flood plain (13.22%), undifferentiated hill side slope (1.30%), Stream bank (1.14%), Levees (0.45%) and hillocks/hummocks/subdued hills (0.43%)

- ❖ About 473307 ha (50.45%) of survey area having nearly level to very gently slope range followed by very gently to gently slope range (25.05%), nearly level (10.13%), strongly to moderately steep slope (1.15%) as depicted in table C.
- ❖ About 64.61% of the district area is under very deep soils followed by deep soils (14.35%), moderately deep (1.82%) and shallow (6.93%) as depicted in table D.
- ❖ Majority of the area suffers from none to slight erosion (57.07%) and moderate erosion (20.70%) and moderate to severe erosion (8.86%) as depicted in table B.
- ❖ Soils of the area are taxonomically classified into three orders i.e. Alfisols, Entisols and Inceptisols. All the identified 53 soil series in the area are further classified into 7 sub-order, 13 great groups, 19 sub-groups and 38 family classes.
- ❖ About 557690 ha (59.44%) of total surveyed area comes under Land Capability Class II which are good land and suitable for cultivation with minor limitation followed by Land Capability Class III covering an area of 156997 ha (16.73%) which are moderately good land with major limitation, III-IV covering an area 65839 ha (7.02%) to fairly good land with occasional cultivation as depicted in table F.
- ❖ Valley fills / Depressional lands and Lower pedi-pains can be used for intensive agriculture with taking effective agronomic practices in addition to proper soil and water conservation measures.
- ❖ In general soils of the West Midnapore district shows acidic to neutral in reaction and low soil fertility status needs recommendation losses of balanced fertilizer and biofertilizer in addition to lime application for sustainable agriculture development.

HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the Soil Resources Mapping of West Midnapore district, West Bengal, 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 are also essential for soil and land resource management. The genesis and classification of the soils are also discussed in **Chapter 5**.

West Midnapore district of West Bengal state is spread over an area of 9,38,258 ha. The district is covered by 22 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. GGn8c1 (Granite Gneiss; Undifferentiated hill side slope; 10-25 % slope; forest land use; Soil Series Association, describing – Lohardangi as dominant series in association with Balarampur and Khudadihi 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 land uses, proposed land uses and 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. GGn8c1 may be referred as follows:

GG	-	Granite Gneiss	-	Landscape
n	-	Undifferentiated hill side slope	-	Physiography
8	-	25-50 %	-	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 enquiry / or clarification, correspondence or personal contact may be established, with

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