

Inventory of Soil Resource of Madhubani District, Bihar State using Remote Sensing and GIS Technique.

Abstract

1. **Surveyed Area** : Madhubani district, Bihar
2. **Location** :
 - a) Latitude 26° 02'00" to 26° 39'56" N.
 - b) Longitude 85° 45'15" to 86° 43'40" E.
3. **Agroclimatic Region** : Middle Gangetic Plain
(Zone – IV as per planning commission)
4. **Total Area of the District** : 350312 ha.
5. **Kind of Survey** : Soil Resource Mapping using Remote Sensing and GIS Techniques
6. **Base Map** :
 - A) IRS-IB Geocoded Satellite Imagery
(1:50,000 scale).
 - B) Survey of India Topographical maps on
(1:50,000 scale).
7. **Scale of Mapping** : 1:50,000
8. **Period of Survey** : November, 2014 to January, 2015.

9. Soil Series Association mapped and their respective area:

Sl. No	Mapping Unit	Soil Association	Area (ha)	Area (%)
1	ALb1a1	Dilahi-Bela-Loom	11184	3.19
2	ALb1a9	Rampur-Bhagwanpur-Narayanpur	15919	4.54
3	ALb2a1	Ranti-Ketaula-Nabtoli	64308	18.36
4	ALb2a2	Loom-Bhagwanpur-Ketaula	39388	11.24
5	ALb2a3	Kamalabari-Mokhnahi-Nabtoli	20962	5.98
6	ALb2a4	Mehat-Mokhnahi-Nabtoli	9658	2.76
7	ALb2a5	Nabtoli-Ranti	29074	8.30
8	ALb2a6	Nabtoli-Kamalabari	28736	8.20
9	ALb2a7	Chichri-Bhagwanpur-Ranti	22952	6.55
10	ALb2a8	Sonpur-Bhagwanpur-Bijuliya	3954	1.13
11	ALb2a9	Murkidhi-Sonpur	2477	0.71
12	ALb2b1	Ketaula-Ranti-Bhagwanpur	41051	11.72
13	ALb2b2	Ketaula-Loom-Nabtoli	12790	3.65
14	ALb2b3	Murkidhi-Bhagwanpur	2800	0.80
15	ALe2a1	Laukaha-Lalpur-Jatmalpur	5394	1.54
16	ALg2a1	Jatmalpur-Laukaha	358	0.10
17	ALn2a1	Hariyahi-Mokhnahi-Kamlabari	28932	8.26
18	ALn2a2	Mokhnahi-Hariyahi-Mehat	2905	0.83
	H	Habitation	3425	0.98
	W	River and waterbody	4045	1.16
		Grand Total	350312	100

10. District area under different following classes:

(i) Physiographic division of the soils of Madhubani district of Bihar:-

Physiography	Area (ha)	Area (%)
Alluvial plain	305253	87.13
Flood plain	31837	9.09
Levees	5394	1.54
River bank	358	0.10
Habitation	3425	0.98
River and waterbody	4045	1.16
Total	350312	100

(ii) Slope classes falling in the Madhubani district:

Slope Classes	Area (ha)	Area (%)
Nearly level	27103	7.73
Nearly level to gently sloping	315739	90.13
Habitation	3425	0.98
River and waterbody	4045	1.16
Total	350312	100

(iii) Various landuse/land cover classes

Land Use Classes	Area (ha)	Area (%)
Agriculture (RF/Single Crop)	286201	81.7
Plantation	56641	16.16
Habitation	3425	0.98
River and waterbody	4045	1.16
Total	350312	100

(iv) Erosionwise Classes of the soils of Madhubani district.

Erosion Classes	Area (ha)	Area (%)
None to slight water erosion	337090	96.23
Slight to Moderate water erosion	5752	1.63
Habitation	3425	0.98
River and waterbody	4045	1.16
Total	350312	100

11. Serieswise soil health parameters:

Series Name	Range of pH		Range of Electrical Conductivity (EC)		Range of Exchangeable Sodium Percentage		Range of Organic Carbon (OC)	
	Value	Severity Class	Value	Severity Class	Value	Severity Class	Value	Severity Class
Bela	6.68	Neutral	0.10	Normal	1.70	Slight	0.55	Medium
Bhagwanpur	7.50	Neutral	0.14	Normal	3.28	Slight	0.74	Medium
Bijuliya	7.60	Neutral	0.04	Normal	3.37	Slight	0.79	High
Chichri	7.60	Neutral	0.09	Normal	2.73	Slight	0.33	Low
Dilahi	7.85	Neutral	0.13	Normal	3.02	Slight	0.63	Medium
Hariyahi	6.90	Neutral	0.12	Normal	0.00	Slight	0.48	Low
Jatmalpur	6.61	Neutral	0.09	Normal	1.96	Slight	0.62	Medium
Kamalabari	7.60	Neutral	0.06	Normal	2.58	Slight	0.69	Medium
Ketaula	8.00	Neutral	0.06	Normal	2.98	Slight	0.21	Very low
Lalpur	7.40	Neutral	0.06	Normal	4.97	Slight	0.23	Very low
Laukaha	7.60	Neutral	0.11	Normal	2.04	Slight	0.08	Very low
Loom	8.04	Alkaline	0.20	Normal	10.40	Slight	0.61	Medium
Mehat	7.40	Neutral	0.11	Normal	2.77	Slight	0.38	Low
Mokhnahi	7.42	Neutral	0.12	Normal	3.01	Slight	1.22	Very high
Murkidhi	5.80	Acidic	0.03	Normal	3.60	Slight	0.99	High
Nabtoli	6.70	Neutral	0.06	Normal	0.72	Slight	0.33	Low
Narayanpur	7.32	Neutral	0.07	Normal	1.83	Slight	0.61	Medium
Rampur	7.94	Neutral	0.11	Normal	2.66	Slight	0.59	Medium
Ranti	7.30	Neutral	0.11	Normal	0.14	Slight	0.62	Medium
Sonpur	5.70	Acidic	0.05	Normal	2.53	Slight	0.32	Low

12. Salient features of the district:

- Total area of district is under alluvium landscape and it is divided into four physiographic units i.e. alluvial plain, flood plain levees and river bank.
- Total 20 nos. of soil series has been identified and mapped in Madhubani District.
- In Madhubani district of Bihar 286201 ha (81.70%) area are under cultivation followed by plantation with cultivation near habitation 56641 (16.16%) and miscellaneous land 7470 ha (2.12%).
- About 315381 (90.02%) and 22461 (6.41%) of survey area having slope range 0-3% and 0-1% respectively are plain lands suitable for intensive agriculture.
- About 337090 ha (96.23%) area having none to slight erosion hazard and only 5752 ha (1.63%) suffer from slight to moderate erosion needs attention for soil conservation measures.

- Nearly 64.08% of total surveyed area comes under Land Capability class II-III which are good and moderately good lands with minor limitations whereas 33.79% area comes under class III which are moderately good lands with major limitations for Agriculture purpose.
- Soils of the area are taxonomically classified in to two order ie., Entisols and Inceptisols. All the nineteen soil series identified in the area are further classified into 05 suborder, 06 great groups, 14 subgroups and 20 families and 20 soil series.

How to Use Soil Resource Mapping Report

The report embodies the results of the Soil Resource Mapping of Madhubani district, Bihar providing information on the geological setting of the district, such as location, extent, physiographic relief, drainage, geology, climate, natural vegetation, agriculture, land use and soils.

The report contains other information on interpretative groupings 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.

Madhubani district of Bihar is spread over an area of 3,50,312 ha. The district is covered by 12 topographical sheets on the scale of 1:50,000 which are used as base material along with satellite imageries.

Each soil mapping units is marked by mapping unit i.e. ALb2a1 (Alluvium, alluvial plain, 0-3% slope; agriculture land use; soil series association, describing Ranti as dominant series in association with Ketaula & Nabtoli 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 in Chapter 4, Appendix I and II.

The mapping unit used in soil mapping represents the five levels of mapping i.e. ALb2a1 may be referred as follows;

AL	-	Alluvium	-	Landscape
b	-	Alluvial plain	-	Physiography
2	-	0-3%	-	Slope
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 further clarification and explanation, communication may be made to:

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