

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

Abstract

1. **Surveyed Area** : Darbhanga district, Bihar
2. **Location** : Latitude 25° 42' 10" to 26° 26' 45" N.
Longitude 85° 40' 45" to 86° 25' 06" E.
3. **Agroclimatic Region** : Middle Gangetic Plain
(Zone – IV as per planning commission)
4. **Total Area of the District** : 2,51,623 ha.
5. **Kind of Survey** : Soil Resource Mapping using Remote Sensing and GIS Techniques
6. **Base Map** : LISS-III Geocoded Satellite Imagery (1:50,000)
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	28989	11.52
2.	ALb1a2	Bhagwanpur-Bijuliya	8618	3.42
3.	ALb1a3	Kalyana-Bhagwanpur-Rampur	10767	4.28
4.	ALb1a4	Bijuliya-Rampur-Loom	27699	11.01
5.	ALb1a5	Antaur-Ranti	3107	1.23
6.	ALb1a6	Narayanpur -Rampur	13782	5.48
7.	ALb1a7	Bela-Narayanpur-Nabtoli	10867	4.32
8.	ALb1a8	Dilahi-Rampur-Mokhnahi	17740	7.05
9.	ALb1b1	Nabtoli-Mokhnahi-Dilahi	15000	5.96
10.	ALb2a1	Ranti-Nabtoli	2722	1.08
11.	ALb2a2	Loom-Bhagwanpur-Ranti	10371	4.12
12.	ALb2a3	Kamalabari-Mokhnahi-Nabtoli	18029	7.17
13.	ALb2a4	Mehat-Mokhnahi-Nabtoli	11443	4.55
14.	ALb2b1	Ketaula- Ranti-Bhagwanpur	2910	1.16
15.	ALb2b2	Ketaula-Nabtoli	15517	6.17
16.	ALe2a1	Laukaha-Lalpur-Jatmalpur	652	0.26
17.	ALn1a1	Uren-Bela-Dilahi	25913	10.30
18.	ALn2a1	Hariyahi-Mokhnahi-Kamalabari	10425	4.14
19.	ALn2a2	Mokhnahi-Hariyahi-Mehat	2796	1.11
	H	Habitation	3580	1.42
	R	River	2570	1.02
	W	Waterbody	8126	3.23
		Grand Total	251623	100

10. District area under different following classes:

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

Physiography	Area (ha)	Area (%)
Alluvial plain	197561	78.82
Flood plain	39134	15.55
Levees	652	0.26
Miscellaneous	14276	5.67
Total	251623	100

(ii) Slope classes falling in the Darbhanga district:

Slope Classes	Area (ha)	Area (%)
Nearly level to very gentle slope	162482	64.58
Very gentle slope to gently slope	74865	29.75
Misc. land	14276	5.67
Total	251623	100

(iii) Various landuse/land cover classes

Land Use Classes	Area (ha)	Area (%)
Agriculture (RF/Single Crop)	203920	81.05
Plantation	33427	13.28
Misc. land	14276	5.67
Total	251623	100

(iv) Erosionwise Classes of the soils of Darbhanga district

Erosion Classes	Area (ha)	Area (%)
None to slight water erosion	236695	94.07
Slight to Moderate water erosion	652	0.26
Misc. land	14276	5.67
Total	251623	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
Antaur	6.76	Neutral	0.05	Normal	9.91	Slight	0.50	Low
Bela	6.68	Neutral	0.05	Normal	1.70	Slight	0.55	Medium
Bhagwanpur	7.50	Neutral	0.14	Normal	3.28	Slight	0.70	Medium
Bijuliya	7.60	Neutral	0.04	Normal	3.87	Slight	0.74	Medium
Dilahi	7.85	Neutral	0.13	Normal	0.02	Slight	0.65	Medium
Hariyahi	6.90	Neutral	0.12	Normal	0.01	Slight	0.48	Low
Jatmalpur	6.61	Neutral	0.09	Normal	1.58	Slight	0.62	Medium
Kalyana	6.61	Neutral	0.09	Normal	1.96	Slight	0.51	Medium
Kamalbari	7.60	Neutral	0.06	Normal	2.58	Slight	0.69	Medium
Ketaula	8.00	Neutral	0.04	Normal	2.98	Slight	0.21	Low
Lalpur	7.40	Neutral	0.06	Normal	4.17	Slight	0.25	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	2.95	Slight	0.38	Low
Mokhnahi	7.42	Neutral	0.12	Normal	3.01	Slight	0.22	Very low
Naboli	7.45	Neutral	0.12	Normal	2.45	Slight	0.61	Medium
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	7.60	Neutral	0.11	Normal	0.14	Slight	0.62	Medium
Uren	6.67	Neutral	0.04	Normal	2.41	Slight	0.39	Low

12. Salient features of the district:

- Total area of district is under alluvium landscape and it is divided into three physiographic units i.e. alluvial plain, flood plain and levees.
- Total 20 nos. of soil series has been identified and mapped in Darbhanga District.
- In Darbhanga district of Bihar 203920 ha (81.25%) area are under cultivation followed by plantation 33427 (13.28%) and miscellaneous land 14276 ha (5.67%).
- About 162482 (64.58%) of survey area having slope range 0-3% is plain land suitable for intensive agriculture.
- About 236695 ha (94.07%) area having none to slight erosion hazard and only 652 ha (0.26%) suffer from slight to moderate erosion needs attention for soil conservation measures.

- Nearly 78.52 % of total surveyed area comes under capability class II has good potential for agriculture development and where as 15.55 % area comes under class II-III and 0.26% comes under class III which is moderately good land with major limitation for Agriculture purpose.

- Soils of the area are taxonomically classified into two order i.e. Entisols and Inceptisols. All the 20 soil series identified in the area and are further classified into 6 suborder and 7 great group, 13 sub groups, 20 families and 20 soil series

How to Use Soil Resource Mapping Report

The report embodies the results of the Soil Resource Mapping of Darbhanga 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.

Darbhanga district of Bihar is spread over an area of 2,51,623 ha. The district is covered by 11 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. ALb1a1 (Alluvium, alluvial plain, 0-1% slope; agriculture land use; soil series association, describing Dilahi as dominant series in association with Bela & Loom 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. ALb1a1 may be referred as follows;

AL	-	Alluvium	-	Landscape
b	-	Alluvial plain	-	Physiography
1	-	0-1%	-	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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