

Detailed Soil Survey and Land Use Plan of Hura block, Puruliya district, West Bengal Using Remote Sensing and GIS Techniques
Abstract

1.	Survey area	Hura block, Puruliya district, West Bengal
2.	Geographical location	23 ^o 14' to 23 ^o 18' N latitude and 86 ^o 29' to 86 ^o 40' E longitude.
3.	Type of Survey	Detailed Soil Survey using Remote Sensing Technique
4.	Base Map used	i. Toposheet (enlarged 1:50,000). ii. High Resolution satellite Imageries in the scale of 1:10,000
5.	Total map area	38235 ha
6.	Agro-climatic region	Eastern Himalayan region-II as per National Planning Commission(1989)
7.	Period of Survey	December, 2013 to January, 2014.

8. Soil series mapped and their area extent

Series Name	Mapping Unit	Area (ha)	%
Amra	2	59	0.15
Balia	2	91	0.24
Bariyarpur	1	32	0.08
Bhangabandh	17	4432	11.59
Bispuria	3	590	1.54
Chakalta	2	772	2.02
Chitra	2	51	0.13
Darasingh	1	52	0.14
Darikata	10	1398	3.66
Dumka	12	2533	6.62
Dumkadih	14	2899	7.58
Gopinathpur	1	38	0.10
Gurda	4	301	0.79
Haritarn	6	483	1.26
Hatimara	17	5244	13.72
Hura	1	295	0.77
Jobra	7	703	1.84
Kaliabasa	6	315	0.82
Kamalpur	5	391	1.02
Karandih	4	1532	4.01
Karmatarn	1	780	2.04
Kasai	1	35	0.09
Kesargarh	2	272	0.71
Ledadih	6	395	1.03
Mohangara	9	661	1.73

Series Name	Mapping Unit	Area (ha)	%
Morandih	5	2649	6.93
Napara	1	18	0.05
Nimdiha	4	245	0.64
Nischintpur	4	1062	2.78
Phuphundi	7	847	2.22
Pratappur	4	2501	6.55
Pukhuriya	4	426	1.11
Pura	7	1372	3.60
Pursudha	4	498	1.30
Purulia	2	604	1.58
Rukheddia	6	808	2.11
Tilgora	7	651	1.70
Vudeb	3	230	0.60
Misc	7	1970	5.15
Total	201	38235	100

9. Distribution of Area under different Soil Erosion Classes.

Erosion Classes	Area (ha)	%
None to slight water erosion	22372	58.51
Moderate water erosion	9502	24.85
Severe water erosion	4391	11.49
Misc.	1970	5.15
Total	38235	100

10. Distribution of Area under different Slope Classes.

SLOPE_FINAL	AREA	PERCENT
Very gently sloping(1 - 3%)	17736	46.39
Gently sloping(3 - 5%)	17208	45.01
Moderately sloping(5 - 10%)	1210	3.16
Moderately steep sloping(15 - 25%)	52	0.14
Very steep sloping(33 - 50%)	59	0.15
Misc.	1970	5.15
Total	38235	100

11. Distribution of Area under different land Capability Classes

LCC	AREA	PERCENT
II	19031	49.77
III	7523	19.68
IV	7103	18.58
VI	2549	6.67
VII	59	0.15
MISC	1970	5.15
Total	38235	100

12. Chemical Characteristics of Soil Series

Series Name	Range of pH		Range of Electrical Conductivity (EC)		Range of Organic Matter		Area (ha)
	Value	Severity Class	Value	Severity Class	%	Class	
Amra	5.35-5.61	Strong to Medium	0.01-0.02	Normal	0.6-0.9	Medium	59
Balia	5.43-6.24	Strongly to Slightly	0.01	Normal	0.3-0.6	Low to Medium	91
Bariyarpur	5.51-5.88	Strong to Medium	0.05-0.11	Normal	0.8-0.9	High	32
Bhangabandh	5.24-6.41	Strongly to Slightly	0.01-0.02	Normal	0.17-0.63	Very low to medium	4432
Bispuria	4.22-6.42	Extremely to Slightly	0.01-0.07	Normal	0.26-1.1	Low to Very High	590
Chakalta	4.97-6.60	Very strongly to neutral	0.01-0.02	Normal	0.11-0.61	Very low to medium	772
Chitra	5.76-6.59	Medium to slightly	0.01-0.02	Normal	0.50-0.66	Low to medium	51
Darasingh	5.77-6.27	Medium to slightly	0.06-0.19	Normal	3.7-5.9	Very High	52
Darikata	4.93-5.35	Very strongly to strongly	0.03-0.05	Normal	0.64-1.1	Medium to High	1398
Dumka	5.18-5.32	Strongly	0.02	Normal	0.66-1.1	Medium to High	2533
Dumkadih	6.68-6.92	Neutral	0.01-0.04	Normal	0.59-1.05	Medium to High	2899
Gopinathpur	6.95-7.99	Neutral to moderately alkaline	0.01-0.05	Normal	0.30-2.17	Low to very High	38
Gurda	4.42-6.04	Extremely acid to Medium	0.02-0.05	Normal	0.72-2.24	High-Very high	301
Haritarn	5.38-6.54	Strongly to slightly	0.01	Normal	0.19-1.32	Very low – very high	483
Hatimara	4.98-5.45	Very strongly to strongly	0.01-0.02	Normal	0.46-0.59	Low to medium	5244
Hura	4.48-5.04	Extremely to very strongly	0.01-0.03	Normal	2.50-3.23	Very high	295
Jobra	4.72-4.83	Very strongly	0.01	Normal	0.46-0.63	Low to medium	703
Kaliabasa	5.59-6.28	Strongly to medium	0.01	Normal	0.57-2.37	Medium to very high	315
Kamalpur	6.54-7.50	Slightly acid to mildly alkaline	0.01-0.02	Normal	0.63-1.43	Medium to very high	391
Karandih	4.92-6.35	Very strongly acid to slightly acid	0.01	Normal	0.46-2.2	Low to very high	1532
Karmatarn	4.77-6.94	Very strongly acid to neutral	0.02-0.08	Normal	0.198-1.298	Very low to very high	780
Kasai	5.03-7.37	Strongly acid to neutral	0.01	Normal	0.04-2.2	Very low to very high	35
Kesargarh	5.05-6.85	Very strongly acid to neutral	0.01-0.06	Normal	0.11-1.1	Very low to high	272
Ledadih	4.94-5.88	Very strongly to Medium acid	0.01-0.02	Normal	0.30-1.16	Low to very high	395
Mohangara	5.55-6.52	Strongly to slightly acid	0.01-0.03	Normal	0.92-0.99	High	661
Morandih	5.56-7.95	Medium acid to moderately alkaline	0.01-0.09	Normal	0.17-1.25	Low to very high	2649
Napara	4.37-5.71	Extremely to	0.01-0.03	Normal	0.08-0.72	Very low to	18

		medium acid				medium	
Nimdiha	5.42-7.26	Strongly acid to neutral	0.01-0.03	Normal	0.26-0.77	Low to High	245
Nischintpur	5.47-7.58	Strongly acid to mildly alkaline	0.01-0.06	Normal	0.06-1.36	Very low to very high	1062
Phuphundi	5.82-6.78	Medium acid to neutral	0.01-0.03	Normal	0.30-1.65	Low to very high	847
Pratappur	5.46-8.00	Strongly acid to moderately alkaline	0.03-0.11	Normal	0.24-2.50	Very low to very high	2501
Pukhuriya	5.11-7.35	Strongly acid to neutral	0.01-0.02	Normal	0.26-0.90	Low to High	426
Pura	4.39-5.45	Extremely to strongly acid	0.01-0.02	Normal	0.17-0.79	Very low to high	1372
Pursudha	5.67-6.27	Medium to slightly acid	0.01-0.02	Normal	0.30-0.83	Low to high	498
Purulia	6.19-7.30	Slightly acid to neutral	0.01-0.07	Normal	0.50-1.54	Medium to very high	604
Rukhedia	4.80-7.07	Very strongly acid to neutral	0.02-0.04	Normal	0.19-1.29	Very low to very high	808
Tilgora	4.81-5.87	Very strongly to medium acid	0.01-0.02	Normal	0.33-1.03	Low to high	651
Vudeb	7.56-7.88	Mildly alkaline	0.02-0.11	Normal	0.15-1.95	Very low to very high	230
Misc							1970

Salient Features of the area:-

1. Most of the survey area is under rainfed cultivation.
2. Total 38 soil series are found in the survey area.
3. Majority of the area has very gently sloping land 17736 ha (46.39%), and gently sloping 177208 ha (45.01%) coverage respectively.
4. Most of the area is affected by none to slight erosion 22372 ha (58.51%) which are mostly under cultivation followed by moderate erosion 9502 ha (24.85%) and severe erosion 4391 ha (11.48%) respectively
5. Nearly 21633 ha(56.58%) area is well managed and covered under agriculture which needs assured irrigation besides effective agronomic practices.
6. Most of the soils in the survey are very deep covering 12369 ha.(32.35%) under the soil series Balia, Bispuria, Chakalta, Gopinathpur, Karandih, Kasai, Morandih, Napara, Nimdiha, Nischintpur, Pratappur, Pukuriya, Pura, Rukhedia and Vudeb, deep soils of Bhangabandh, Chitra, Hura, Karmatarn, Kesargarh, Ledadih, Phuphundi and Pursudha soil series cover 7570 ha. (19.80%), moderately deep soils of Bariyarpur, Gurda, Haritarn, Hatimara, Jobra, Kalibasa, Rukhedia cover 7729 ha (20.21%) and shallow soils covering 8597 ha (22.48%) under the soil series Amra, Darikata, Dumka, Dumkadih, Kamalpur and Puruliyaof the survey area.
7. Soils of the area are taxonomically classified into three orders i.e. Alfisol, Inceptisols and Entisol All the 38soils series identified in the area are further classified into6 sub-orders, 9 great groups, 16 subgroups and 38 families.

How to Use Soil Survey Report

The present report furnishes a detailed account of various characteristics of the surveyed area like physiography, relief, geology, climate, natural vegetation, land use and soils. Detailed description of soil series recognized in the area and interpretation of different soil mapping units for various applied aspects of agricultural development, such as land use planning, soil and water management, soil conservation, are given in relevant chapters. Different problems of the area have been depicted and corrective measures have also been suggested.

In order to use the report, the user may locate the area of his interest on the soil map appended with the report. On the map, each soil mapping unit has been delineated and represented by symbolic expression. The abbreviated symbol of mapping unit reflects information about the name of soil series, soil depth, surface texture, land slope and gradient erosion status. The soil mapping unit is demarcated as BP5dB(A)1/C/B where 'BP' represents for 'Bispuria' Soil Series, '5' for very deep soil depth, 'd' for sandy loam surface texture, 'B(A)' for very gently sloping (1-3%) bunded with nearly level to level(0-1%), '1' for none to slight water erosion.

The details of the soil mapping units, their description and interpretative groupings have been shown in **Annexure-I** (Guide to Soil Mapping Units). The differentiating morphological characteristics of Soil Series are furnished in **Table 6** and the Pedon Description of the soil series are described in **Annexure-II**. Micro-watershed-wise mapping units along with their area extent, present land use and management status are given in **Annexure -III**.

The symbols used in the report and the analytical methods used for soil analysis are also illustrated in **Annexure-IV& V** respectively.

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