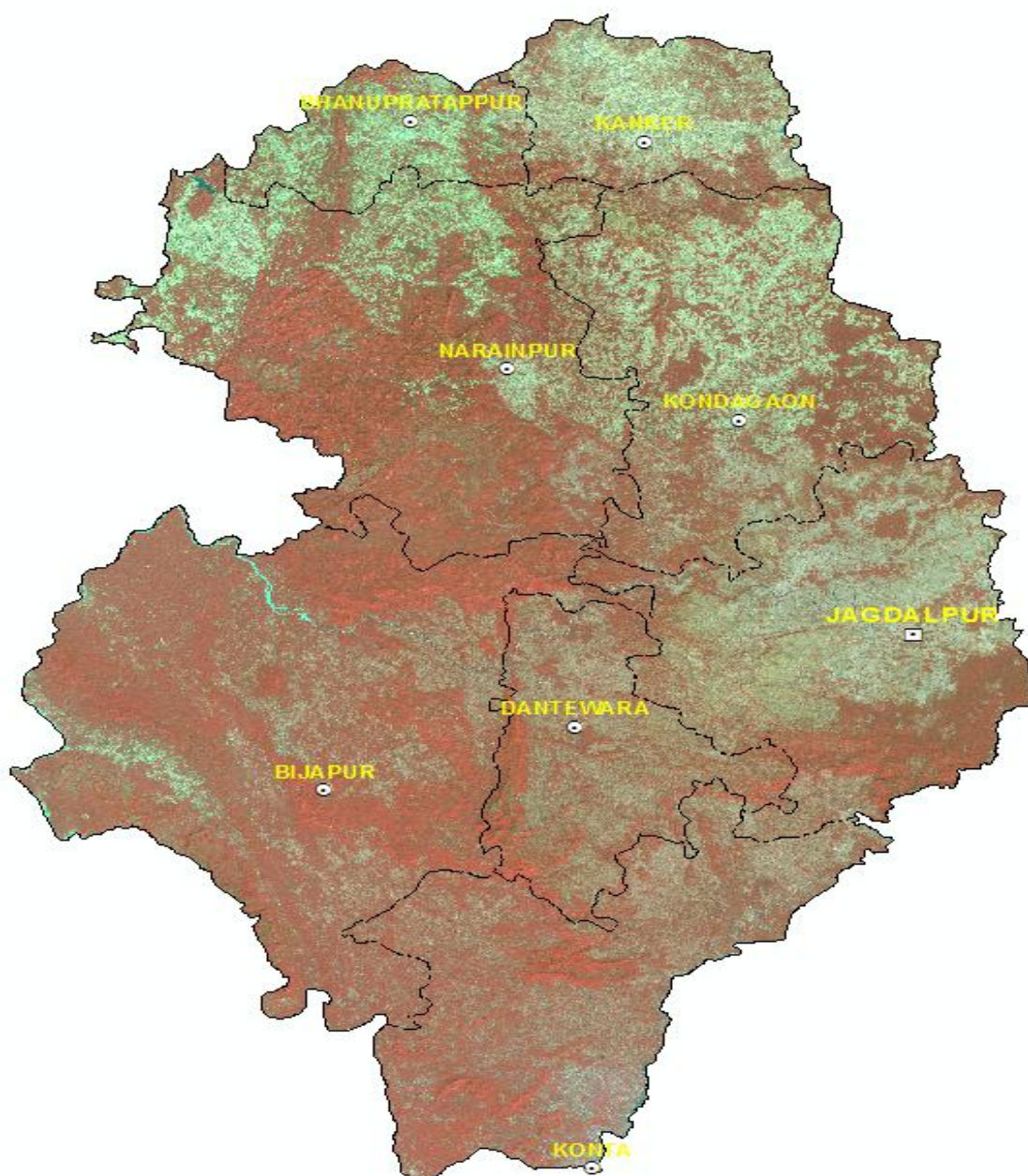


SOILS OF BASTAR DISTRICT

MADHYA PRADESH



REGIONAL CENTRE
NAGPUR

National Bureau of Soil Survey & Land Use Planning

(Indian Council of Agricultural Research)

Nagpur - 440 033, Maharashtra, India



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Soil Survey Report of Bastar District (Madhya Pradesh)

Meta Data for Soil Reports of Bastar District, Madhya Pradesh

Sr.No.	Elements	Scheme	Value
1.	Identification Information	Name of the Dataset	Soils of Bastar District Madhya Pradesh
		Contents	Soil Survey Reports, Maps and Imagery
		Keywords	Soil Survey Report
		Report/Map Language	English
		Map Scale	1:250,000
		Survey Year	1978-1981
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		Access Constraints	Permission Required
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3.	Spatial Domain	Bound Left	80°88' E
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		Area/Coverage	39, 06,100 ha.
		Projection	UTM
		Datum	WGS 1984
		Unit	Meter
		Administrative Location	State: Madhya Pradesh, District: Bastar
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		Associated Project	S .T. Gaikawa
		Associated Value- additions	-
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		Coordinator Value- added Publication	-
5.	Storage	Data Format	PDF/GeoPDF
		Data File Size	
		Data Physical Location	\\GIST6\D:\GeoPDF Mapping Project _2013\Bastar
		Download Location	-
6.	Quicklook	Graphic file in jpg format	Y
7.	Image Data	Name of the Satellite	Landsat
		Sensor	ETM+
		Date of Image	29 October 2002 and 27January 2003
		File Format	TIFF
		Spatial Resolution	30 m
		Image Downloaded From	http://earthexplorer.usgs.gov/
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1.

INTRODUCTION

Bastar district of Madhya Pradesh is a tribal district included under Intensive Rural Development Programme. Rapid reconnaissance soil survey was carried out for making resource inventory using 1:250,000 scale bases by the Regional Centre, Nagpur of National Bureau of Soil Survey and Land Use Planning, during the period 1978-81. The objectives of the survey were to provide basic information on soils, their distribution, characteristics, problems and potentials. Information on landscapes geology, vegetation, cropping pattern and socio-economic conditions of the area were also collected during the survey. In the district about 700 soil profiles and 1500 auger bores were studied and 25 soil series were identified. The soil map showing 72 soil series association was prepared.

2.

GENERAL DESCRIPTION OF THE AREA

2.1 Location and Extents

Baster district lies between 19°45' and 20°30' N latitude and 80°88' and 82°15' E longitude (Fig. 1). It is bounded by Rajnandgaon, Durg and Raipur districts in the north, Koraput district of Orissa in the east, Karimnagar and Khammam districts of Andhra Pradesh in the south and Gadchiroli district of Maharashtra in the west. Total geographical area of the district is 39, 06,100 ha distributed in 8 talukas having 31 blocks.

2.2 Physiography, relief and drainage

The district is having complex and heterogeneous physiographic setting. Nearly half of northern part of district is undulating comprising plateau and piedmonts. The plateaus are scattered or disconnected chains of low hills. The main river is Indravati. Other important rivers are Katri, Khandi, Kuha, Sabri and Mahanadi and their tributaries. South of Indravati river are Dailadila range which run from north to south. In the eastern part of the district, Tulsadongari range run westward encircling the main plateau. The Albaka range forms p-art of the western boundary with Andhra Pradesh.

The district has a complex geomorphology. Surface configurations are brought about through geological times by intermittent intrusions and residual terrestrial peneplanation processes and overall change in climate. The resultant changes have rendered diversified landscape pattern. Important geomorphic units are plateau, escarpment, intervening basin gently sloping subdued plateau, upper piedmont, valley bottom, lower piedmont and flood plain.

2.3 Geology

The region belongs to older Archean shield of Peninsular region which has remained stable for a long time and has kept its geologic antiquity in spite of various phases of diastrophic movements occurred in the area. The southern and northern portions of the district are dominated by the foliated section of schistose and gneisses of Arch man era. In northern and eastern portions the disintegrated granitoids predominate. Towards Eastern Ghat section of the district, numerous lenses of charnockites are noticed in gneissic formations.

The constituent minerals of the Archean gneiss are orthoclase, plagioclase, feldspar, oligoclase, muscovite, quartz, biotite and hornblende with variable amount of accessory minerals like tourmaline, apatite, magnetite, zircon, chlorite and epidote, kaolin and Orthoclases are the most abundant constituents and give the characteristic pink or white colour to the rocks.

2.4 Climate

There are three main climatic seasons as summer, winter and rainy. The winter season sets at the beginning of November and lasts till middle of February. The summer season starts from middle of February to May and June to October is the rainy season. July is the peak rainfall month in the district. The climate of the area (Fig. 2) is tropical sub humid with mean annual air temperature of 27.0°C and mean annual rainfall of 1534 mm. The estimated mean annual soil temperature (MAST) is 26.0°C and mean soil summer temperature (MAST) is 29.3°C. The temperature regime is isohyperthermic whereas moisture regimes are udic and ustic (Table. 1).

LOCATION MAP

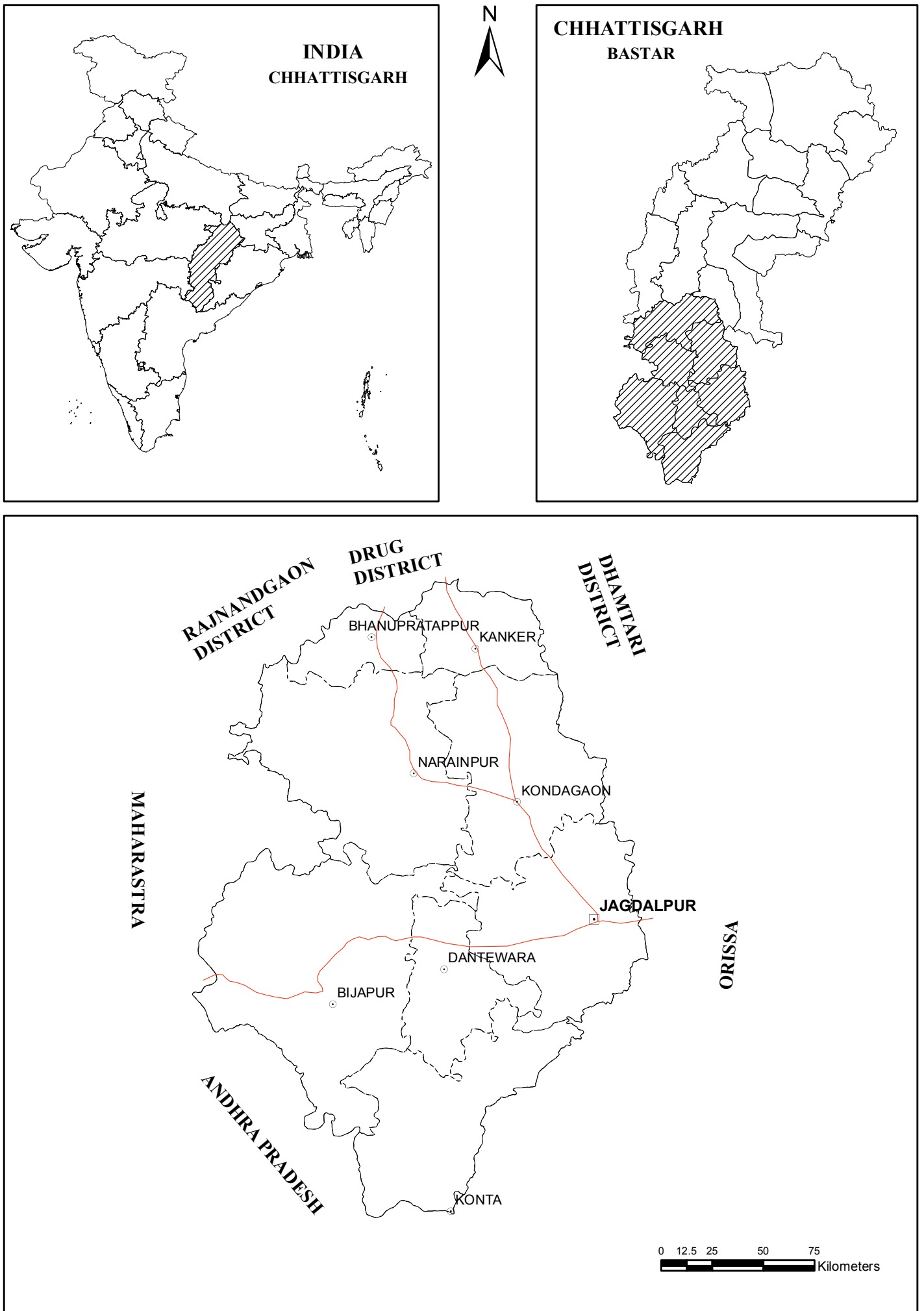


Fig. 1: Location Map

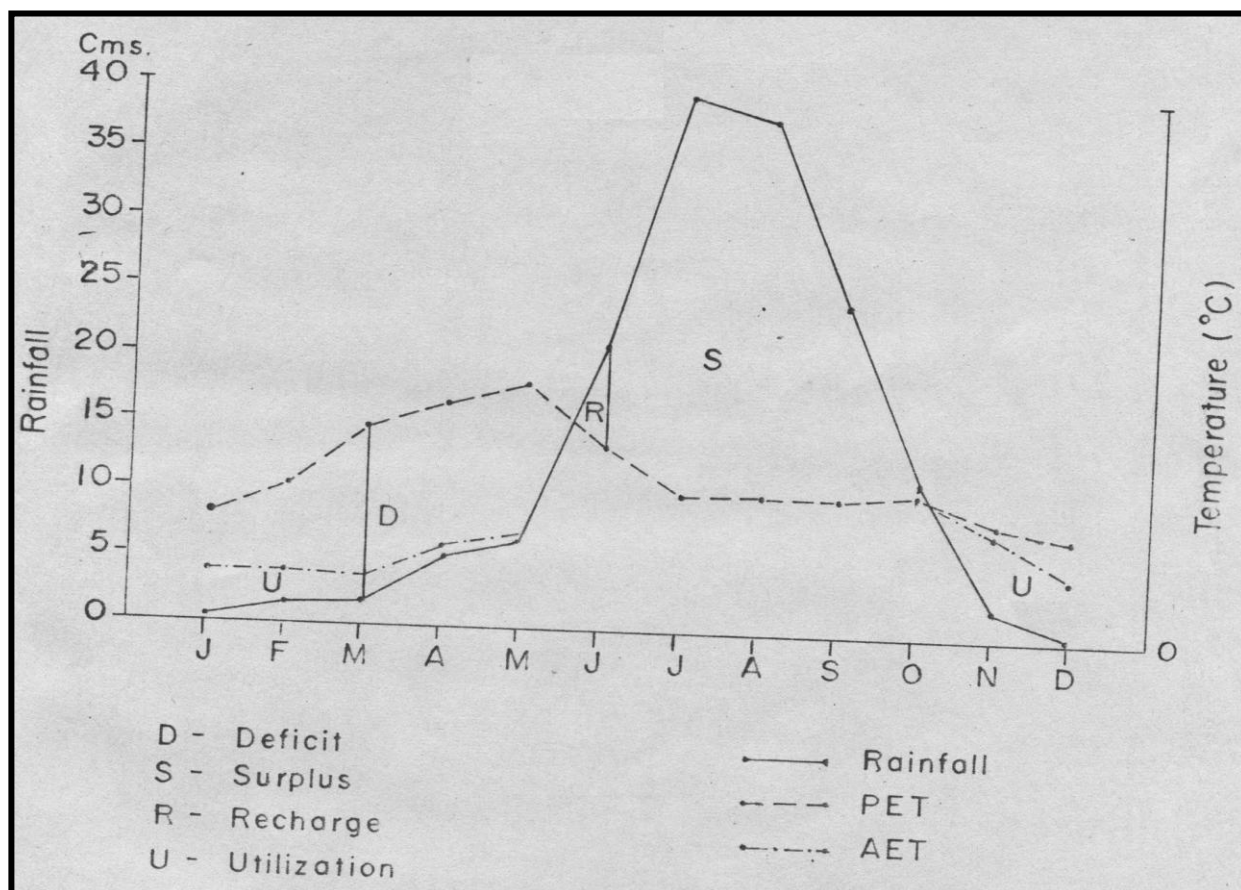


Fig-2. Climate and Water Balance, Bastar

2.5 Land utilization

(i) Present Land Use:

Land utilization statistics is given in table 2. It is seen from the table 2 that 64.37% of total geographical area is under forest out of which 24.60% under reserved forest and 39.77% under dry deciduous mixed forest. The total cropped area is 20.67%. Out of which 19.10% is under *kharif* crop, 1.35% under *rabi* crop and 0.22% under irrigated crops. This indicates that there is a lot of scope to bring more area under agriculture, irrigation and forest species plantations.

(ii) Agriculture:

Nearly 80% of the population of the district is engaged in agriculture. Most of the cultivated area in the district is under paddy and minor millets. The cultivation is being done by following traditional methods of crop cultivation. Most of the farmers do not use manure, fertilizers, plant protection measure, irrigation, improved seeds and improved implement for crop cultivation. The district has about 8.5 million scattered tribal population. They are engaged during *kharif* season in agriculture operations while for rest of the year, they are busy in collection of forest products, construction of roads and other works.

Table 1. Meteorological data of Jagdalpur and Kanker station (1901-1960)

Months	Stations	Temperature °C			Rainfall (mm)		Relative humidity		Potential evapotranspiration	Mean wind speed km/hr
		Max.	Min.	Mean	Monthly total (mm)	No. of rainy days	8.30 hrs ISI	17.30 hrs ISI		
Jan.	a.	28.5	11.0	19.75	5.3	8.4	73	41	64.2	2.8
	b.	27.9	12.1	20.00	0.7	8.7	72	41	79.6	2.2
Feb.	a.	31.0	14.3	22.65	14.5	1.3	66	36	104.3	3.9
	b.	30.2	14.6	22.4	17.5	1.6	67	36	99.8	3.7
Mar.	a.	34.7	18.4	26.55	17.1	1.5	54	26	147.1	4.5
	b.	34.4	18.3	26.35	25.6	1.9	54	30	149.3	5.5
Apr.	a.	36.9	22.2	29.5	51.1	4.0	54	31	166.5	5.7
	b.	37.8	23.6	30.8	27.0	2.2	46	30	174.4	6.7
May	a.	38.3	24.6	31.45	65.6	4.7	53	37	160.3	6.6
	b.	40.3	27.2	33.75	24.8	2.1	43	29	201.7	6.7
Jun.	a.	33.5	23.9	27.7	211.8	11.6	71	61	136.0	7.2
	b.	35.4	26.0	30.7	204.5	9.0	64	55	154.9	9.7
Jul.	a.	28.1	22.2	25.15	397.9	20.1	06	82	102.0	9.1
	b.	29.1	23.6	26.35	359.0	16.7	82	79	117.0	10.0
Aug.	a.	26.4	22.2	25.3	301.2	19.0	06	01	101.5	7.0
	b.	29.1	23.5	25.3	359.2	15.4	86	79	103.4	8.2
Sep.	a.	29.5	22.3	25.90	245.5	13.9	05	80	100.1	5.6
	b.	29.1	23.1	26.1	257.0	11.8	02	77	103.6	6.0
Oct.	a.	29.5	19.3	24.4	115.0	6.5	00	57	105.5	3.7
	b.	30.2	20.1	25.15	97.2	5.1	79	64	109.0	3.5
Nov.	a.	20.1	14.7	21.40	24.4	1.5	76	56	06.0	3.0
	b.	20.3	14.2	21.25	12.9	0.7	75	52	05.2	3.0
Dec.	a.	27.4	11.3	19.65	3.9	0.3	76	50	76.3	2.5
	b.	27.1	11.2	19.15	1.4	0.2	73	44	72.9	2.3
Annual	a.	31.2	18.9	25.05	1534.1	84.3	72	54	1392.4	5.2
	b.	31.6	19.9	25.75	1394.3	67.4	69	51	1452.2	5.8

*a) Jagdalpur

b) Kanker

Source: Indian Meteorological Deptt. Climatological Deptt. of Observations in India 1901-1960.

Table 2. Land Utilisation in Bastar district (M.P.) (Year 1978-79*)

S. No.	Land Utilisation	Area in ha	Percentage of total
1.	Total geographical area	39,06,100	100
2.	Forest (Reserved)	9,61,084	24.60
3.	Unculturable and barren	1,23,199	3.15
4.	Thin and thick forest hilly/ barren land	15,53,442	39.77
5.	Cultural land	1,55,405	3.98
6.	Permanent pasture and other grazing land	1,57,264	4.03
7.	Land under miscellaneous trees, crops, grasses not included in the area sown.	82,551	2.11
8.	Current fallows	51,250	1.31
9.	Other fallows	48,407	1.24
10.	Net area sown	7,73,448	19.80
11.	Area under rainfed crops	7,61,704	19.50
12.	Area under <i>rabi</i> crops	11,744	0.30
13.	Area under irrigated crops	8,682	0.22
14.	Area sown more than once	33,835	0.87
15.	Total cropped area	8,07,283	20.67

**Source: District Statistical Year Book (M.P.) 1979.*

2.6 Vegetation

Most of the area of the district is covered by tropical dry deciduous forest and mixed vegetation. Plantation of teak, bamboo, eucalyptus and sal have been done at number of places. Important trees and grasses noticed in the district are given below.

(a) Trees:

Common name	Scientific name
1.Neem	<i>Azadirachta indica</i>
2.Imli	<i>Tamarindus indica</i>
3.Pipal	<i>Ficus religiosa</i>
4.Umber	<i>Ficus racemosa</i>
5.Palos	<i>Butea monosperma</i>
6.Der	<i>Ziziphus jujube</i>
7.Amla	<i>Phyllanthus emblica</i>
8.Hurra	<i>Terminalia chebua</i>
9.Jamun	<i>Syzygium cumilinn</i>
10.Kusum	<i>Schleichera oleosa</i>
11.Mahue	<i>Madhuca latifolia</i>
12.Teak	<i>Tectona grandis</i>
13.Sohaja(Ain)	<i>Terminalia tomentosa</i>
14.Sal	<i>Shorea robusta</i>
15.Tendu	<i>Diospyrus melanoxylon</i>
16.Dhawada	<i>Anegeissum latifolia</i>
17.Arjuna	<i>Terminalia arjuna</i>

(b) Grasses:

1.Dhub	<i>Cynodon dactylon</i>
2.Chhir	<i>Imporate cylindrica</i>
3.Ghonad	<i>Themoda guodrivalis</i>
4.Kens	<i>Sakharun spartana</i>
5.Kusal	<i>Heteropogan contortus</i>
6.Phulbanori	<i>Arundenilla sectrotrin</i>

3. SOILS

3.1 Soil Survey Technique

The soil survey was carried out as per the procedure laid down in the soils survey manuals (AIS&LUS, 1970, USDA, Hand b 18, 1951) by using the Survey of India toposheet (1:250,000 scale). The brief about the procedure is given below. Traverse in the area, identified the landforms, elevation, slope, drainage, soils, vegetation, present land use and based on this named the landform setting. Studied the soils for morphological and soil site characteristics and collected the soil samples horizonwise for laboratory characterization. After proper characterization, kept the soils in particular series and classified it according to Soil Taxonomy (USDA Hand book 436, 1970). The soil boundaries have been delineated actually in the field itself after the examination of profiles and auger. The permanent features (contours etc.) and landscape analysis used for proper delineation of Soils. The mapping units were as soil series association (Two to three series in a unit).

3.2 Soils of the area

The soils of the district are developed from feldspathic quartzitic schist, granite gneiss and ferruginous rocks. The area is having complex geology including shale, sandstone, limestone, mica schist, gneisses, etc. The landscape sequence is plateau, escarpment, gently sloping subdued plateau, upper piedmont, valley bottom, lower piedmont; intervening basin and flood plain (Fig.3). The natural vegetation includes dry deciduous mixed plant species and a few patches were under plantation of Sal, teak, bamboo and coarse grasses while patches along the drainage line and on plains are cultivated for paddy and minor millets respectively (Table 3).

The soils of Baster district are red sandy, red and brown sandy loam, red and black skeletal and black. The entire area of the district to the east of longitude 81°E excluding certain patches and northeastern area is dominated by light yellowish brown and black soils. They have abundant supply of moisture. The soils occurring on piedmont plain, gently sloping subdued plateau are lighter in texture, porous nature, low moisture holding and retentive capacity and are well suited for rain fed crops like rice, minor millets, groundnut and mustard. The soils occurring on lower piedmont, valley bottom and flood plain have heavier texture, high water holding end retentive capacity and suited for wheat, gram, linseed vegetables and sugarcane crop. The soils occurring on plateau, gently sloping subdued plateau and escarpment which form by far the largest proportion of the area covered by a thin rock outcrops stony yellow to brown soils.

The soils identified in the district are heterogeneous in nature and complex in respect of soil depth, morphological characteristics and physico-chemical properties. The soils are formed under the influence of tropical sub-humid climate having thin to thick mixed dry deciduous xerophytic and heplophytic vegetative cover. As such the normal process of soil development would lead to formation of shallow to deep, light to dark coloured, coarse to medium textured non-calcareous soils.

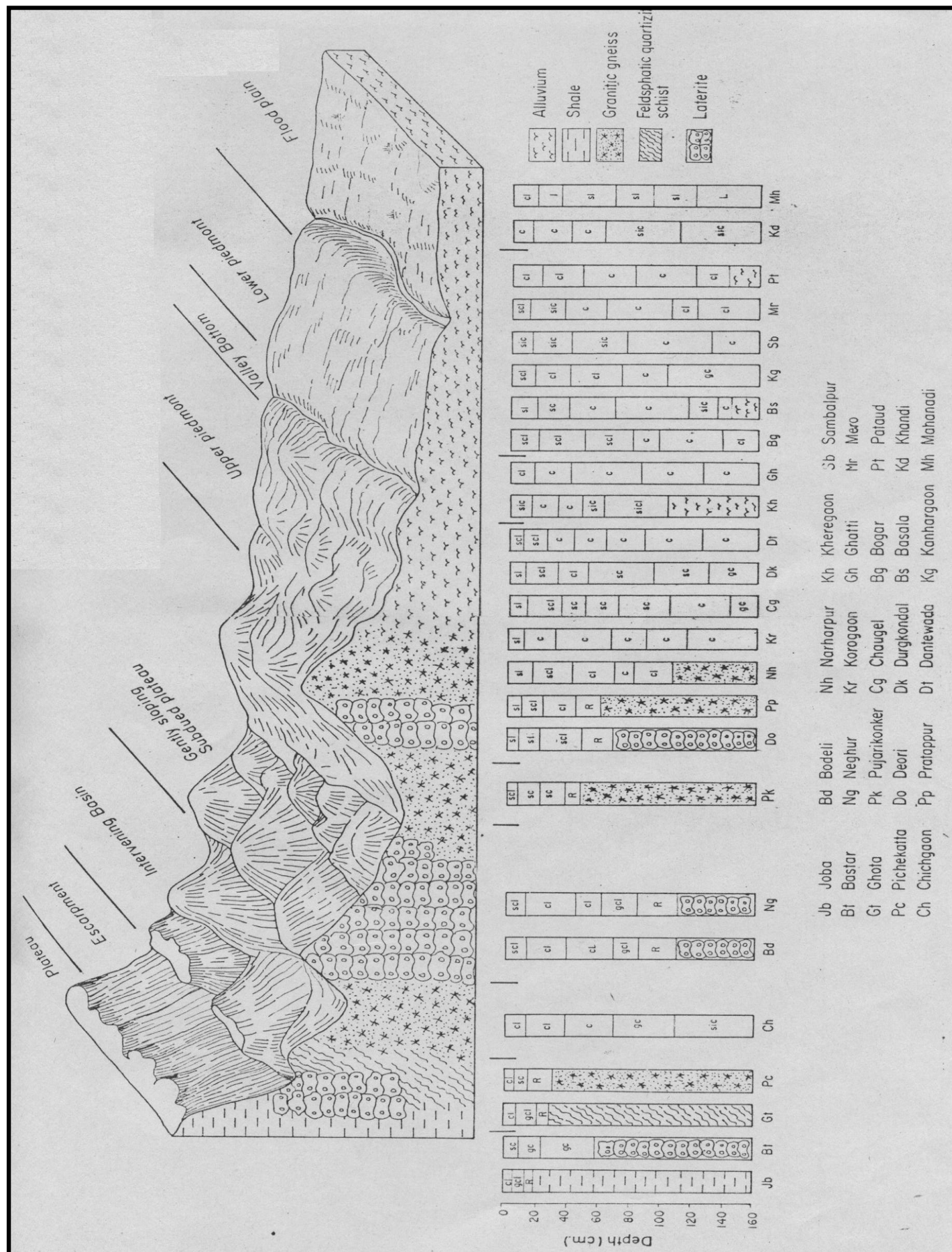


Fig. 3: Soil-landscape map of the Bastar District, Madhya Pradesh

Table 3. Geomorphic units and soils

S. No.	Geomorphic Unit	Soil series	Soil series Abb.
1.	Plateau	1.Joba	Jb
		2.Bastar	Bt
2.	Escarpment	3.Ghota	Gt
		4.Pichekatla	Pc
3.	Intervening basin	5.Chichgaon	Ch
		6.Bodeli	Bd
4.	Gently sloping subdued plateau	7.Neghur	Ng
		8.Pratarppur	Pp
		9.Pujarikankar	Pk
		10.Chaugel	Cg
		11.Durgkondal	Dk
5.	Upper piedmont	12.Bogor	Bg
		13.Mori	Do
		14.Narharpur	Nh
6.	Valley bottom	15.Korogaon	Kr
		16.Ghatti	Gh
		17.Kharogaon	Kh
		18.Kenhargaon	Kg
		19.Basala	Bs
7.	Lower piedmont	20.Mero	Mr
		21.Pataud	Pt
		22.Sambalpur	Sb
		23.Dantewada	Dt
8.	Flood plain	24.Khandi	Kd
		25.Mahanadi	Mh

Table 4. Landscapes, soil series associations occupied and percentages of each constituent soil series.

S. No.	Geomorphic units	Soil series Association No.	Soil series Association	Area Approx. % for each unit	Area in ha under each unit
1.	Plateau-Gently sloping subdued plateau	1	Bastar-Joba-Bodeli	60-25-15	19383
2.	Escarpment-Plateau	3	Ghota-Pichekatta-Joba	50-35-15	15621
3.	Escarpment-Gently sloping subdued plateau	4	Ghota-Pichekatta-Hilly	50-30-20	91050
		5	Ghota-Pichekatta-Neghur	50-30-20	91050
		6	Ghota-Pujisri-kankar-Pichekatta	40-35-25	85586
		7	Bodeli-Ghota-Hilly	60-30-10	58689
		8	Bodeli-Pichekatta-Hilly	50-30-20	53288
4.	Escarpment-Gently sloping subdued plateau Upper piedmont	9	Ghota-Bastar- Durgkondal	45-35-20	15059
		10	Ghota-Pratappur-Chaugel	50-30-20	9949
5.	Escarpment Upper piedmont	11	Ghota-Pichokatta-Chaugel	50-30-20	49536
		12	Ghota-Pichekatta-Narharpur	45-35-20	10960
		13	Ghota-Pichekatta-Durgkondal	50-30-20	66831
6.	Escarpment-Intervening basin	14	Ghota-Pichekatta-Chichgaon	45-35-20	15845
7.	Gently sloping sub-dued plateau-Flood plain-Upper piedmont	2	Joba-Pratappur-Mero	60-25-15	5099
8.	Gently sloping sub-dued plateau	15	Bodeli-Neghur-Hilly/Rocky	70-20-10	37061
9.	Gently sloping-sub-dued plateau- Upper piedmont	16	Bastar-Joba-Chaugel	60-25-15	219580
		17	Neghur-Durgkondal-Bodeli	50-30-20	23426
		18	Neghur-Durgkondal-Bastar	50-30-20	15115
		19	Joba-Neghur- Durgkondal	50-30-20	61777
		20	Deori-Bodeli- Chaugel	45-35-20	26907
		21	Bodeli-Durgkondal-Neghur	50-30-20	13206
		22	Bodeli-Narharpur-Durgkondal	50-30-20	32186
		23	Bodeli-Neghur- Chaugel	50-30-20	42461
		24	Joba-Chaugel- Bodeli	40-35-25	18316
		25	Bodeli-Durgkondal-Hilly	60-30-10	8760
10.	Gently sloping sub-dued plateau-valley bottom-Upper piedmont	37	Pratappur-Durgkondal	70-30	6277
		38	Bodeli-Kheregaon-Chaugel	45-35-20	2415
11.	Gently sloping sub-dued plateau-Lower piedmont	40	Bodeli-Korogaon-Hilly/ Rocky	70-20-10	3538
		41	Deori-Kanhargaon-Hilly/ Rocky	50-40-10	1291
12.	Upper piedmont-Gently sloping-subdued plateau-Escarpment.	26	Chaugel-Narharpur-Ghota	50-30-20	24380
		27	Narharpur-Neghur-Pichekatta	45-30-25	14161
		28	Durgkondal- Neghur-Ghota	45-35-20	6289
		29	Chaugel-Naghur- Ghota	40-35-25	10394
13.	Upper piedmont-Gently sloping subdued plateau	30	Chaugel-Bodeli- Durgkondal	50-30-20	303244
		31	Chaugel-Narharpur-Pratappur	50-30-20	41001
		32	Deori-Durgkondal-Chaugel	40-35-25	14666

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		33	Chaugel-Bodeli-Neghur	50-35-15	69649
		34	Chaugel-Durgkondal-Neghur	50-30-20	360577
		35	Chaugel-Narharpur-Neghur	50-30-20	105249
		36	Chaugel-Neghur-Pratappur	50-30-20	16960
14.	Upper piedmont	49	Chaugel-Durgkondal	60-40	41057
15.	Upper piedmont-Lower piedmont	50	Chaugel-Narharpur-Mero	60-25-15	112212
		51	Chaugel-Durgkondal-Kanhargaon	60-25-15	4155
		52	Durgkondal-Mero-Hilly/Rocky	10-30-20	69782
		53	Narharpur-Mero-Kanhargaon	45-30-20	6289
16.	Upper piedmont-Flood plain-Gently sloping subdued plateau	54	Chougel-Mahanadi-Bodeli	50-30-20	2415
17.	Upper piedmont-Flood plain-Lower piedmont	55	Chaugel-Khandi- Kanhargaon	50-30-20	51109
		56	Dantewada-Khandi- Kanhargaon	50-30-20	67898
18.	Lower piedmont-Upper piedmont-Gently sloping subdued plateau	39	Sambalpur- Chaugel-Neghur	50-30-20	6963
19.	Lower piedmont	42	Kanhargaon- Bosala-Mero	50-30-20	2471
		43	Sambalpur-Kanhargaon-Prataud	50-30-20	15115
20.	Lower piedmont-Escarpment-Valley bottom	44	Kanhargaon-Ghota-Ghatti	50-30-20	3200
21.	Lower piedmont- Intervening basin	45	Sambalpur- Chichgaon	60-40	44932
		46	Chichgaon- Bogar-Hilly/ Rocky	60-30-10	5222
22.	Lower piedmont-Upper piedmont-Intervening basin	47	Kanhargaon- Chaugel-Chichgaon	50-30-20	16597
23.	Lower piedmont-Upper piedmont	48	Mero-Korogaon- Durgkondal	45-35-20	30643
24.	Lower piedmont-Flood plain	57	Sambalpur-Kanhargaon-Mahanadi	50-30-20	6269
		58	Kanhargaon- Khandi-Pataud	45-35-20	196045
		59	Kanhargaon-Mahanadi-Mero	50-35-15	55152
25.	Flood plain-Lower piedmont	60	Khandi-Mahanadi-Mero	50-30-20	269499
		61	Khandi-Mahanadi-Sambalpur	45-35-20	212505
		62	Khandi-Mahanadi-Kanhargaon	50-30-20	191610
		63	Khandi-Sambalpur-Bogar	50-40-10	9321
		64	Khandi-Sambalpur-Kanhargaon	50-35-15	29663
		65	Khandi-Kanhargaon-Mero	45-35-20	30643
		66	Khandi-Mero- Sambalpur	50-30-20	91402
26.	Flood plain-Lower piedmont-Upper piedmont	67	Khandi-Mero-Chaugel	60-25-15	55039
		68	Khandi-Mero-Durgkondal	53-30-20	20330
		69	Mahanadi-Chaugel-Kanhorgaon	50-30-20	4717
27.	Florid plain-Upper piedmont-Lower Piedmont	70	Khandi-Basala- Chichgaon	50-30-20	69133
28.	Flood plain-Intervening basin	71	Khandi-Mohanadi-Chichgaon	50-30-20	63181
29.	Flood plain-Lower piedmont-Gently sloping-subdued plateau	72	Khandi-Kanhargaon-Pujarikankar	50-30-20	51311

Table 5. Soil series and their area coverage in the district (Area in ha)

S. No.	Soil Series name	Abbreviation	Area in ha	Percentage of total area
1.	Bodeli	Bd	285468	7.30
2.	Basala	Bs	16981	0.43
3.	Bogar	Bg	333004	0.53
4.	Bastar	Bt	133015	3.40
5.	Chaugel	Cg	657964	16.04
6.	Chichgaon	Ch	54144	1.40
7.	Durgkondal	Dk	202465	5.20
8.	Deori	Do	19479	0.50
9.	Dantewada	Dt	24449	0.62
10.	Ghota	Et	106654	4.70
11.	Ghatti	Gh	640	0.01
12.	Joba	Jb	130530	2.60
13.	Kanhargaon	Kg	221320	5.67
14.	Khandi	Kd	636001	16.30
15.	Korogaon	Kr	16155	0.41
16.	Kheregaon	Kh	845	0.02
17.	Mero	Mr	170003	4.50
18.	Mahanadi	Mh	243717	6.24
19.	Neghur	Ng	193307	4.95
20.	Narharpur	Nh	99305	2.51
21.	Picheketta	Pc	113160	2.91
22.	Pataud	Pt	5476	0.14
23.	Pratappur	Pp	10204	0.26
24.	Pujarikankar	Pk	26007	0.69
25.	Sambalpur	Sb	106101	2.72
26.	Hilly/Rocky area	H/R	41707	1.07
			39,06,000	100

3.3 Brief characterization of soil series

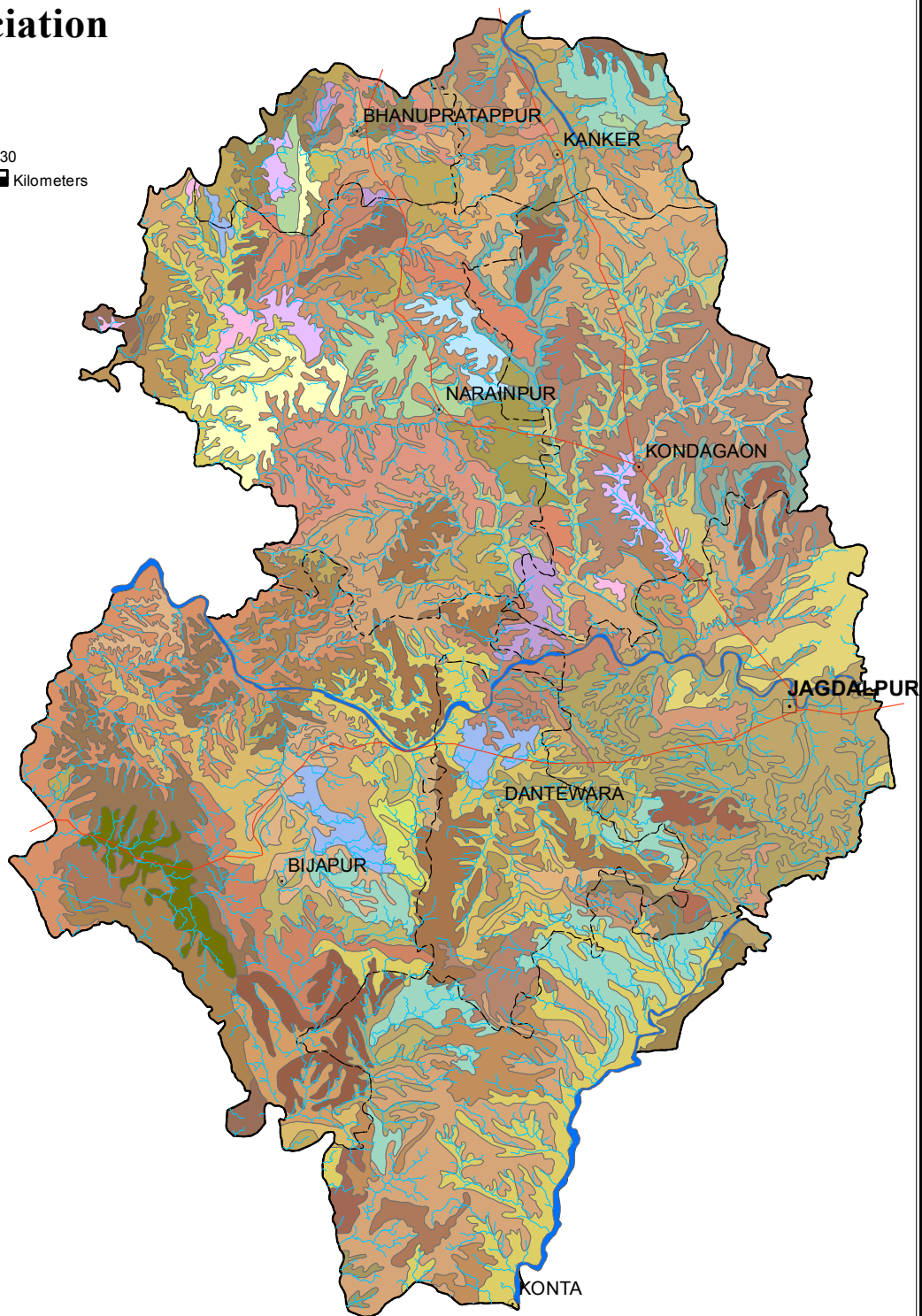
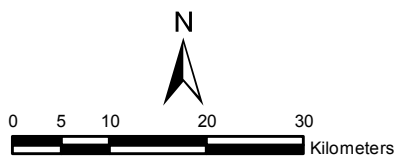
Soil series are arranged as per their geomorphic settings and are given in table 3, and also shown in a schematic diagram (Fig. 3). The laboratory data is given in Appendix I. Similarly area occupied by each series from various associations have been computed and presented in table 4. It is observed that Chaugel, Khandi, Bogor, Bodeli, Mahanadi, Kanhargaon, Durgkondal, Ghota, Mero and Neghur are major soils and occupy bulk of the area table 5. Brief description of each soil series is given below. Soil series association map of the district is shown in fig. 4

1. Joba series (Jb):

Joba soils is a member of coarse loamy kaolinitic isohyperthermic shallow family of Lithic Ustorthents. This series include shallow, well drained, soils developed over shale and occurring on level to gently sloping plateau. The soil pedon exhibits very pale brown to yellowish brown (10 YR 5/4M) to (10YR 7/3M) clay loam to sandy loam A horizon grading to AC horizon of light brown to reddish brown (7.5 YR 6/4 to 5 YR 4/4 M), clay loam to gravelly clay loam with medium moderate sub angular blocky peds over shale. They have poor moisture holding and retentive capacity. The rooting depth extends up to 15 cm. Rapid permeability. The soils are mostly under mixed bushy vegetation while a few patches are barren lands.

BASTAR

Soil Series Association



Legend

Bastar-Joba-Bodoli	Chaugel-Neghur-Pratappur	Kanhargaon-Mahanadi-Mero
Bastar-Joba-Chaugel	Dantewada-Khandi-Kanhargaon	Khandi-Basala-Chaugel
Bastar-Neghur-Hilly	Deori-Bodoli-Chaugel	Khandi-Kanhargaon-Mero
Bodoli-Durgkondal-Hilly	Deori-Durgkondal-Chaugel	Khandi-Kanhargaon-Pujanikankar
Bodoli-Durgkondal-Neghur	Deori-Kanhargaon	Khandi-Mahanadi-Chaugel
Bodoli-Ghota-Hilly	Durgkondal-Mero-Hilly	Khandi-Mahanadi-Kanhargaon
Bodoli-Kheragaon-Chaugel	Durgkondal-Neghur-Ghota	Khandi-Mahanadi-Sambalpur
Bodoli-Koragaon-Hilly	Ghota-Bastar-Durgkondal	Khandi-Mero-Chaugel
Bodoli-Narharpur-Durgkondal	Ghota-Pichekatta-Chaugel	Khandi-Mero-Durgkondal
Bodoli-Neghur-Chaugel	Ghota-Pichekatta-Chichgaon	Khandi-Mero-Sambalpur
Bodoli-Pichekatta-Hilly	Ghota-Pichekatta-Durgkondal	Khandi-Sambalpur-Bogar
Chaugel-Bodoli-Durgkondal	Ghota-Pichekatta-Hilly	Khandi-Sambalpur-Kanhargaon
Chaugel-Bodoli-Neghur	Ghota-Pichekatta-Joba	Mahnadi-Chaugel-Kanhargaon
Chaugel-Bogar-Hilly	Ghota-Pichekatta-Narharpur	Mero-Koragaon-Durgkondal
Chaugel-Dantewada-Kanhargaon	Ghota-Pichekatta-Neghur	Narharpur-Mero-Neghur
Chaugel-Durgkondal	Ghota-Pratappur-Chaugel	Narharpur-Neghur-Pichekatta
Chaugel-Durgkondal-Neghur	Ghota-Pujanikankar-Pichekatta	Neghur-Durgkondal-Bastar
Chaugel-Kheragaon-Kanhargaon	Joba-Chaugel-Bodoli	Neghur-Durgkondal-Bodoli
Chaugel-Mahanadi-Mero	Joba-Neghur-Durgkondal	Pratappur-Durgkondal
Chaugel-Narharpur-Bodoli	Joba-Pratappur-Mero	Sambalpur-Chaugel-Neghur
Chaugel-Narharpur-Ghota	Kanhargaon-Basala-Mero	Sambalpur-Chichgaon
Chaugel-Narharpur-Neghur	Kanhargaon-Chaugel-Chichgaon	Sambalpur-Kanhargaon-Mahanadi
Chaugel-Narharpur-Pratappur	Kanhargaon-Ghota-Chichgaon	Sambalpur-Kanhargaon-Pataud
Chaugel-Neghur-Ghota	Kanhargaon-Khandi-Pataud	

References

	District HQ
	Tehsil HQ
	District Boundary
	Road
	Drainage
	River



Fig. 4: Soil Series Association

2. Bastar series (Bt):

Bastar soils is a member of fine loamy, kaolinitic, isohyperthermic family of Lithic Haplustalf. This series includes moderately deep, well drained soils developed over laterite and occurring on level to gently sloping upper piedmont. The soil pedon exhibits reddish brown to dark reddish brown (5 YR 4/4 to 5 YR 3/4 M), sandy clay loam to sandy clay A horizon grading to Bt horizon of dark reddish brown to dark red (2.5 YR 3/4 to 2.5 YR 3/6 M) gravelly clay loam to clay loam with, weak to medium, moderate sub angular blocky peds, underlain by massive unconsolidated laterite. They have poor moisture holding and retentive capacity. Rooting depth is up to 20 cm and moderate permeability. The most of the soils are under bushy and dry deciduous mixed vegetation and a few patches are of fallow land.

3. Ghota series (Gt):

Ghota soils is a member if coarse loamy, kaolinitic, isohyperthermic shallow Lithic Ustorthent. This series include shallow, excessively drained, soils developed from granite and occurring on strongly to steeply sloping of escarpment. The soil pedon exhibits brown (7.5y YR 5/4) to reddish brown (5 YR 4/4M) clay sandy loam to sandy clay loam, A horizon underlain by reddish brown to dark reddish brown (2.5 YR 4/4 to 3/4 M) gravelly clay to clay loam AC horizon. The structure is medium moderate sub angular blocky underlain by ferruginous rocks. The rooting zone is up to 15 cm and rapid permeability. The most of the soils are having dense and mixed vegetation.

4. Pichekatta series (Pc):

Pichekatta soils is a member of coarse loamy kaolinitic, isohyperthermic shallow family of Lithic Ustorthent. This series include shallow, excessively drained, soils developed from granite and occurring on strongly to very strongly sloping steep slopes of escarpment. The soil pedon exhibits dark brown to very dark grayish brown (10 YR 5/3 to 7.5 YR 4/4 M) sandy loam to sandy clay loam A horizon grading to AC horizon of gravelly dark brown to very dark grayish brown (10 YR 3/2 to 10 YR 3/3 M) sandy clay loam to gravelly clay loam underlain by weathered granite with cobbles, pebbles and quartz particles in C horizon. They have poor water holding and retentive capacity. The effective rooting zone is up to 20 cm and rapid permeability. The most of the soils are under dry deciduous mixed and dense forest.

5. Chichgaon series (Ch):

Chichgaon soils is a member of fine, montmorillonitic, deep family of Typic Chromustert. This series includes very deep, well drained, developed from alluvium and colluvium and occurring in intervening basin. They are brown to yellowish brown (10 YR 5/4 to 10 YR 4/3 M) clay loam to clay, A horizon followed by olive to greyish brown (5 Y 5/4 to 2.5 Y 5/2M) sandy clay to clay in AC horizon. Cracks 0.5 to 1 cm wide extend up to 40 cm. Intersecting slickenside tilted at an angle of 30 to 45° to the horizontal axis. The pedality ranges from medium to coarse strong sub angular to angular blocky. They have high moisture holding and retentive capacity. Rooting depth is up to 1 m and has moderately slow permeability. The soils are mostly cultivated for paddy and a few patches are under kodo, kutaki and vegetables.

6. Bodeli series (Bd):

Bodeli soils is a member of fine loamy, kaolinitic, isohyperthermic family of Typic Paleustalf. This series include deep, well drained soils, developed from feldspathic, quartzitic schist and granite gneiss and occurring on nearly level to gently sloping subdued plateau. The soil pedon exhibits reddish brown to dark reddish brown (2.5 YR 4/4 to 5 YR 3/3 M) sandy clay loam to clay loam, A horizon grading to Bt horizon of red to dark red (2.5 YR 4/6 to 2.5 YR 3/6 M) clay loam to clay with medium moderate sub-angular blocky peds underlain by massive unconsolidated bedrock. They have medium moisture holding and retentive capacity. Rooting depth is up to 80 cm, moderately rapid permeability. Most of the soils are under forest and a few patches are under coarse grasses.

7. Neghur series (Ng):

Naghur soils is a member of fine loamy, kaolinitic, isohyperthermic, deep family of Udic Rhodustalf. This series include deep, well drained soils, developed from feldspathic quartzitic schist and occurring on level to gently sloping subdued plateau. The soil pedon exhibits dark brown to dark reddish brown (7.5 YR 4/4 to 2.5 YR 4/4 M) sandy clay loam to clay loam A horizon grading to B horizons of dark red to dark red (2.5 YR 3/6 to 10 R 3/6 M) sandy clay to clay following by lateritic nodules in C horizon. The thick patchy clay skin on ped faces are in B horizon. The pedality is medium moderate sub angular blocky, rooting depth is up to 90 cm and have moderate permeability. The soils are mostly under dry deciduous mixed vegetation and occasionally under cultivation for kodo and kutaki.

8. Pujarikanker series (Pk):

Pujarikanker soils is a member of loamy skeletal, mixed, isohyperthermic, shallow family of Lithic Haplustalf. This series include shallow, well drained soils developed from weathered granite and occurring on nearly level to moderately sloping and on gently sloping subdued plateau. The soil pedon exhibit brown to very dark greyish brown (10 YR 5/3 to 10 YR 3/2 M) sandy clay loam to clay loam A horizon grading to B horizon of dark brown to very dark grayish brown (10 YR 4/3 to 10 YR 3/2 M) clay loam to sandy clay with weak to medium moderate sub angular blocky peds underlain by unconsolidated rock with pebbles, cobbles and quartz particles. They have medium moisture holding and storage capacity. The rooting depth is up to 100 cm and has rapid permeability. The soils are under dry deciduous mixed forest vegetation and coarse grasses.

9. Deori series (Do):

Deori soils is a member of fine-loamy, kaolinitic, isohyperthermic, shallow family of Typic Ustropepts. This series include well drained soils developed from feldspathic quartzitic schist and granite gneiss and occurring on upper piedmont. The soil pedon exhibits Brown to dark brown (10 YR 4/3 to 10 YR 3/3 M) sandy loam to sandy clay loam A horizon grading to B horizon of light yellowish brown to yellowish brown (10 YR 6/4 to 10 YR 5/4 M) sandy clay loam to sandy clay C horizon. They have poor moisture holding and retentive capacity. The rooting depth is up to 30 cm and has rapid permeability. The soils are mostly under forest and patches are under kodo and kutaki.

10. Pratappur series (Pp):

Pratappur soils is a member of fine loamy, kaolinitic, isohyperthermic, deep family of Typic Ustropepts. This series include, deep, well-drained soil developed from granite gneiss and quartzitic schist, and occurring on gently sloping upper piedmont. They are brown to dark brown (10 YR 4/3 to 10 YR 3/3 M) sandy loam to sandy clay loam A horizon grading to B horizon of dark brown to very dark grayish brown (7.5 YR 4/4 to 10 YR 3/2 M) sandy clay to clay B horizon underlain by weathered granitic in C horizon. Cracks 1 to 2 cm wide extend up to 40 cm. The rooting depth is up to 20 cm. They have poor moisture holding and retentive capacity and has moderate permeability. The soils are under dry deciduous mixed forest.

11. Narharpur series (Nh):

Narharpur soils is a member of fine loamy, kaolinitic, isohyperthermic, deep family of Typic Haplustalfs. This series include deep, moderately well drained soils, developed from feldspathic quartzitic schist gneiss and banded granite gneiss and occurring on gently sloping upper piedmont. They are sandy loam at surface to sandy clay loam and gravelly clay towards the depth. The soil pedon exhibits yellowish brown to strong brown (10 YR 5/6 to 7.5 YR 5/6 M) sandy clay loam to clay loam A horizon, grading to Bt horizon of yellowish brown to reddish yellow (10 YR 5/6 to 7.5 YR 6/6 M) sandy clay loam to clay followed by weathered material in C horizon. The pedality is medium moderate sub angular blocky peds with thick patchy clay skin on ped faces. The rooting depth is extends up to 80 cm and have moderate permeability. The soils are mostly under forest vegetative cover like hars, karra, tendu, mahua and occasionally cultivated for kodo and kutaki.

12. Korogaon series (Kr):

Korogaon soils is a member of fine loamy, kaolinitic, isohyperthermic, deep family of Udic Haplustalfs. This series include, very deep, moderately well drained soils developed from feldspathic quartzitic schist and occurring on nearly level to gently sloping in valley bottom. They have brown to yellowish brown (10 YR 5/3 to 10 YR 3/4 M) sandy loam to clay loam A horizon grading to Bt horizon of reddish brown to strong brown (7.5 YR 3/6 to 5 YR 3/4 M) silty clay to clay with evidence of thin to thick patchy clay skin on ped faces. They have medium moisture holding and retentive capacity. Rooting depth extends up to 100 cm and has moderately slow permeability. These soils are mostly under dry deciduous mixed, forest species (hurrs, karra, mahua, tendu) and occasionally under cultivation for paddy, kodo and kutaki.

13. Chaugel series (Cg):

Chaugel soils is a member of fine loamy, kaolinitic, isohyperthermic, deep family of Plinthustalfs. This series includes deep, well drained soils developed over feldspathic, quartzitic schist and granite gneiss and occurring on nearly level to gently sloping upper piedmont. The soil pedon exhibits light yellowish brown to yellowish brown (10 YR 6/4 to 10 YR 5/3 M) loamy sand to sandy loam A horizon grading to Bt horizon of light yellowish brown to yellowish brown (10 YR 6/4 M) sandy clay to clay with medium moderate sub angular blocky peds underlain by plinthite layer. The rooting depth is up to 100 cm. They have medium moisture holding and retentive capacity and have moderately slow permeability. Most of the soils are fallow lands with a few patches are under paddy minor millets and eucalyptus plantation.

14. Durgkondal series (Dk):

Durgkondal soils is a member of fine loamy, kaolinitic, isohyperthermic, deep family of Typic Haplustalf. This series include deep, well drained soils developed from feldspathic quartzitic schist and granite gneiss and occurring on level to gently sloping, upper piedmont. The soil pedon exhibits strong brown to dark brown (7.5 YR 4/6 to 7.5 YR 4/4M) sandy clay loam to sandy clay A horizon followed by Bt horizon of red to dark red (2.5 YR 4/6 to 2.5 YR 3/6 M) clay loam to clay with thick patchy clay skin on ped faces underlain by pebbles, cobbles, and quartz particles in C horizon. The pedality is medium moderate sub angular blocky. They have medium moisture holding and retentive capacity and moderately slow permeability. The rooting depth is up to 100 cm. The soils are mostly under mixed forest occasionally under cultivation for kodo and kutaki.

15. Dantewada series (Dt):

Dantewada soils is a member of fine loamy, kaolinitic, isohyperthermic, deep family of Udic Haplustalfs. This series include deep, moderately well drained soils developed from alluvium and occurring on nearly level to gently sloping upper piedmont. The soil pedon exhibits yellowish brown to brown (10 YR 5/4 to 10 YR 5/3 M) sandy clay to sandy clay loam A horizon grading to B horizon yellowish brown to olive brown (10 YR 5/4 to 2.5 Y 4/4 M) sandy clay to clay with medium strong subangular to angular blocky peds, slickensides underlain by pale olive to olive brown (5 Y 6/3 to 5 Y 5/3 M) clayey C horizon. The rooting depth is up to 60 cm. They have medium moisture holding and retentive capacity, moderately slow permeability. The most of the soils are under dry deciduous mixed, thin to thick vegetation with patches under cultivation for paddy and minor millets.

16. Kheregaoon series (Kh):

Kheregaoon soils is a member of fine loamy, kaolinitic, isohyperthermic deep family of Udic Haplustalf. This series include very deep imperfectly well drained, soils developed from feldspathic quartzitic schists and gneiss and occurring on level to gently sloping lower piedmont. The soil pedon exhibits pale brown to very pale brown (10 YR 7/3 to 10 YR 6/3 M) sandy clay loam to clay loam. A horizon grading to Bt horizon of dark grayish brown to dark brown (10 YR 4/2 to 10YR 4/3 M) clay loam to clay with thick patchy clay skin on ped faces. The pedality ranges from medium moderate sub angular to weak sub angular blocky peds. They have common fine many dark red mottles. They have medium moisture holding retentive capacity and moderately slow

permeability. Rooting depth extends up to 60 cm. The soils are mostly under forest cover while occasionally cultivated for kodo, kutaki and mustard crops.

17. Ghatti series (Gh):

Ghatti soils is a member of fine, mixed, isohyperthermic, deep family of Vertic Haplustalfs. This series include very deep, well drained soils developed from alluvium and colluvial and occurring on nearly level to gently sloping in valley bottom. The soil pedon exhibits light yellowish brown to dark brown (10 YR 6/4 to 7.5 YR 3/2 M) sandy clay loam to clay loam A horizon grading to Bt horizon of dark grayish brown to very dark grayish brown (10 YR 4/2 to 10 YR 3/2 M) clay to silty clay loam with medium moderate sub angular blocky peds coated with thick patchy clay skin on pad faces. They have high moisture holding and retentive capacity and slow permeability. Cracks 1 to 2 cm wide extends up to 43 cm. Rooting depth is up to 80 cm. The soils are mostly under hills and hillocks and a few patches along with drainage (channel) are under cultivation for paddy, kodo and kutaki.

18. Bogar series (Bo):

Bogar soils is a member of kaolinitic, isohyperthermic, deep, family of Typic Haplustalfs. This series include very deep, well drained, soils developed from feldspathic quartzitic schist and occurring on level to gently sloping lower piedmont. They ore brown to dark brown (7.5 YR 5/4 to 7.5 YR 4/4 M) sandy loam to sandy clay loam A horizon followed by Bt horizon of reddish brown to dark brown (5 YR 4/4 to 7.5 YR to 4/4 M) and brown at places strong/(7.5 YR 5/6 M) sandy clay to clay underlain by granite gneiss in C horizon. They have medium moisture holding and retentive capacity and slow permeability. Rooting depth extends up to 110 cm. They have thin to thick clay skin on pad faces. Most of the soils are under forest and a few patches are cultivated for paddy.

19. Basala series (Bs):

Basala soils is a member of fine, loamy Mixed, isohyperthermic, deep family of plinthustalf. This series includes deep, moderately well drained soils developed from alluvium and occurring on level to gently sloping lower piedmont. They have yellowish brown to dark yellowish brown (10 YR 5/4 to 10 YR 6/4 M) sandy loam to sandy clay A horizon followed by Bt horizon of grayish brown to olive brown (10 YR 5/2 to 2.5 Y 4/4 M) sandy clay to clay with thick clay skin on ped faces. They have medium to high moisture holding and storage capacity. Thu rooting depth extends up to 100 cm. The pedality ranges from medium moderate to coarse strong sub angular to angular blocky. The soils are mostly under dry deciduous mixed vegetation while a few patches are occasionally cultivated for paddy, kodo and kutaki.

20. Kanhargaon series (Kg):

Kanhargaon soils is a member of fine. loamy, kaolinitic, isohyperthermic, deep family of plinthustalfs. This series include deep, well drained soils developed from feldspathic quartzitic schist, and occurring on level to gently sloping lower piedmont. The soil potion exhibits brown to dark brown (10 YR 4/3 to 10 YR 3/4) sandy clay loam to gravelly clay loam A horizon followed by B horizon of dark brown to dark reddish brown (7.5 YR 3/2 to 5 YR 3/4 M) sandy clay to clay underlain by weathered material in C horizon. They have thin to thick clay skin on ped faces in B horizon and also have a plinthite layer. They have medium moisture holding and retentive capacity rooting depth is up to 100 cm. The soils are under forest cover and moderately slow permeability occasionally and cultivated to kodo, kutaki and mustard.

21. Sambalpur series (Sb):

Sambalpur soils are a member of fine, montmorillonitic, kaolinitic, isohyperthermic, deep family of Typic Chromustert. This series include deep, well-drained soil developed from alluvium and occurring on gently

sloping in flood plain. They have pale brown to olive gray (10 YR 6/4 to 5 Y 5/2 M) silty clay to clay A horizon grading to AC horizon of olive to light olive brown (5 Y 5/4 to 2.5 Y 4/4 M) clay intersecting slickensides tilted at an angle of 40° to 60° to the horizontal axes. The pedality is medium to coarse strong subangular to angular blocky and have high moisture holding and retentive capacity. Rooting depth is up to 100 cm. The soils are mostly under cultivation, for paddy along with drainage line.

22. Mero series (Mr):

Mero soils is a member of fine, kaolinitic, isohyperthermic, deep family of Aquic Vertic Plinthaqualfs. This series include deep, well drained soils developed from alluvium and occurring on nearly level to gently sloping lower piedmont. The soil pedon have dark yellowish brown to yellowish brown (10 YR 4/4 to 10 YR 4/2 M) clay loam to sandy clay loam A horizon grading to Bt horizon of brown to dark brown (10 YR 5/3 to 10 YR 4/3 M) clay loam to clay underlain by feldspathic quartzitic schist in C horizon with evidence of ground water laterization. The structure is medium moderate sub angular blocky peds with thin patchy clay skin on ped faces and thick discontinuous clay skin on ped faces and also thick discontinuous clay skin in lower parts of the soil profile. The soil matrix has bright to dull red and light gray mottles throughout the depth. They have high moisture holding/retentive capacity and moderately slow permeability. Rooting depth is up to 100 cm. Cracks 1-2 cm wide extends up to 40 cm. Most of the soils are under paddy cultivation while a few patches are occasionally cultivated for gram after paddy.

23. Pataud series (Pt):

Pataud soil is a member of fine, mixed, isohyperthermic, deep, family of Vertic Haplustalfs. This series includes deep, well-drained soil developed from alluvium and colluvium and occurring on level to gently sloping lower piedmont. The soil pedon exhibits dark grayish brown to very dark grayish brown (10 YR to 10 YR 3/2 M) sandy clay loam to sandy clay A horizon grading to Bt horizon of light olive brown to olive (2.5 Y 5/4 to 5 Y 5/3 M), silty clay to clay with evidence of thin to thick patchy clay skin on pad faces. They have well developed pressure faces and slickensides. They have medium to high moisture holding and retentive capacity and moderately slow permeability. Cracks 0.5 to 1.5 cm wide extend up to 35-40 cm. Rooting depth is up to 100 cm. pedality range's from, moderate to strong subangular to angular blocky. The soils are mostly under cultivation for paddy and a few patches for kodo and kutaki crops.

24. Khandi series (Kd):

Khandi soil is a member of fine, montmorillonitic, isohyperthermic, deep family of Vertic Ustropepts. This series include deep, well drained soils developed from alluvium and occurring on nearly level to gently sloping in flood plain. The soils pedon exhibits light yellowish brown to yellowish brown (10 YR 6/4 to 10 YR 5/4 M) clay loam to clay A horizon grading to Bt horizon of light yellowish brown to light olive brown (2.5 Y 6/4 to 2.5 Y 5/4 M) clay with medium moderate sub angular blocky peds underlain by olive to olive brown (5Y 5/4 to 2.5 Y 4/4 M) clayey in C horizon. The pedality ranges from weak to medium sub angular blocky peds. Cracks 1 to 2 cm extend up to 40 cm. They have medium to high moisture holding and retentive capacity and moderately slow permeability. Rooting depth is up to 80 cm. The soils are under dry deciduous mixed forest and a few patches are cultivated for paddy, minor millets and vegetables.

25. Mahanadi series (Mh):

Mahanadi soils is member of coarse loamy, kaolinitic, isohyperthermic, deep family of Fluventic Ustorthent. Mahanadi includes deep, well drained soils developed from alluvium and occurring on gently sloping in floodplain. They have yellowish brown to dark yellowish brown (10 YR 5/4 to 10 YR 1/4 M) sandy loam to sandy clay loam A horizon grading to AC horizon of yellowish brown to dark yellowish brown (10 YR 5/4 to 10 YR 4/4 M) sandy clay loam to gravelly sandy clay loam. The pedality is weak moderate subangular blocky. They have poor moisture holding and retentive capacity and moderately rapid permeability. The soils are mostly under cultivation and a few patches are under wheat, gram (after paddy).

3.4 Mapping Unit:

Twenty five soil series have been identified in the district. They have mapped into 72 soil series association as mapping units. Each mapping unit consists of the association of 2 or 3 major soil series on landscape and/or segment of it. Area occupied by each series association along with percentage area occupied by each associated member series are worked. The above information has been presented in table 5 and descriptive legend in Table 6 and fig. 4.

Table 6. Descriptive legend of soils in Bastar district, Madhya Pradesh

Map ping Unit No.	Soil series Association	Description	Suggested Land
1	Bt-Jb-Bd	Moderately deep, fine-loamy, Bastar soils, on 0-5% slope of plateau and shallow, coarse loamy Joba soils, 0-5% slope, on plateau and deep, fine loamy on gently sloping subdued plateau, Bodeli soils on 0-3% slope.	Kodo, Kutaki <i>kharif</i> Eucalyptus
2	Jb-Pp-Mr	Shallow, coarse loamy, Joba soils on Plateau of 0-5% slope and moderately deep, fine loamy, Pratappur soils on 3-5% slope of gently sloping subdued plateau.	Kodo, Kutaki, mustard Eucalyptus
3	Gt-Pc-Jb	Shallow to moderately deep, coarse loamy, strongly sloping soils of Ghota, Pichekatta on escarpment am shallow, coarse-loamy, Joba soils on 5% slope on plateau.	Teak, bamboo, coarse grasses
4	Gt-Pc-H	Shallow to moderately deep, coarse-loamy, strongly sloping soils of Ghota, Pichekatta on escarpment with hilly terrain.	-do-
5	Gt-Pc-Ng	Shallow to moderately deep, coarse-loamy, strongly sloping soils of Ghota, Pichekatta soils on escarpment, and very deep, fine-loamy of Neghur on gently sloping subdued plateau	-do-
6	Gt-Pk-Pc	Shallow to moderately deep, coarse-loamy, Ghota and Pichakatta soils on strongly sloping escarpment and Pujarikankar, 0-5% slope on gently sloping subdued plateau	-do-
7	Bd-Gt-H	Deep, coarse loamy, Bodeli soils, 0-3% slope, on gently sloping plateau and shallow to moderately deep, coarse-loamy on strongly sloping escarpment and hilly.	Teak, bamboo, coarse grasses Minor millets
8	Bd-Pc-H	Deep, coarse-loamy, Bodeli soils on 0-5% slope of gently sloping subdued plateau and shallow, coarse loamy, on strongly sloping Pichekatta soils on escarpment	Teak, bamboo, coarse grass Minor millets
9	Gt-Bt-Dk	Moderately deep, coarse-loamy, Ghota soils on strongly sloping 10-15% slope on escarpment moderately deep, fine-loamy, Bastar soils on 0-5% of slope on plateau and very deep, fine loamy, Durgkondal soils on 0-3% slope of piedmont	Kodo, Kutaki, mustard, mada Teak, Sal, Bamboo
10	Gt-Pp-Cg	Moderately deep, coarse-loamy, Ghota soils on 10-15% slope of escarpment moderately deep, fine-loamy, Pratappur soils on 0-5% of gently sloping subdued plateau and very deep, fine loamy soils of Chaugel on 0-3% slope of upper piedmont.	Kodo-Kutaki mustard Eucalyptus, teak
11	Gt-Pc-Cg	Moderately deep, coarse-loamy, Ghota soils on 10-15% slope of escarpment Pichekatta soils on escarpment and very deep, fine-loamy soils of Chaugel on 0-3% slope of upper piedmont.	-do-
12	Gt-Pc-Nh	Shallow to moderately deep, coarse-loamy Ghota and Pichekatta soils on 10-15% slope strongly sloping escarpment and very deep, fine-loamy soils of Narharpur on 0-5% slope of upper piedmont	Eucalyptus, teak, bamboo

13	Gt-Pc-Dk	Shallow to moderately deep, coarse-loamy Ghota and Pichekatta soils on 10-15% slope strongly sloping escarpment and very deep, fine-loamy soils of Durgkondal on 3-5% slope of upper piedmont	Eucalyptus, teak, bamboo
14	Gt-Pc-Ch	Shallow to moderately deep, coarse-loamy Ghota and Pichekatta soils on 10-15% slope strongly sloping escarpment and very deep, fine-loamy soils of Chichgaon on 0-3% slope of intervening basin	Teak, bamboo Paddy, wheat
15	Bt-Ng-H	Deep to very deep, fine loamy soils of Bodeli and Neghur on 3-5% slope of gently sloping subdued plateau and hilly.	Eucalyptus, teak
16	Bt-Jb-Cg	Moderately deep, fine-loamy Bastar soils and shallow, coarse-loamy Joba soils on 3-5% slope of plateau and very deep fine-loamy, Chaugel soils on 0-3% slope of upper piedmont.	Eucalyptus, teak
17	Ng-Dk-Bd	Deep to very deep, fine-loamy soils of Neghur and Bodeli on 3-5% slope, gently sloping subdued plateau and very deep, fine loamy Durgkondal soils on 3-5% slope of upper piedmont	-do-
18	Ng-Dk-Bt	Moderately deep, coarse-loamy Bastar soils on plateau, very deep, fine loamy Neghur soils on 3-5% slope of gently sloping subdued plateau and very deep fine-loamy Durgkondal soils on 0-5% of upper piedmont.	-do-
19	Jb-Ng-Dk	Shallow, coarse-loamy Joba soils on 3-5% slope of plateau, very deep, fine loamy soils of Neghur on 3-5% slope of gently sloping subdued plateau and Durgkondal soils on upper piedmont.	Eucalyptus, teak, bamboo
20	Do-Bd-Cg	Fine-loamy, deep, Deori and Bodeli soils on gently sloping subdued plateau and very deep, find loamy, Chaugel soils on 0-3% slope on upper piedmont.	Paddy, Minor millets. Eucalyptus, teak.
21	Bd-Dk-Ng	Deep to very deep, fine-loamy, Bodeli and Neghur soils on 3-5% slope of gently sloping subdued plateau and very deep, fine loamy Durgkondal soils on 1-3% slips of upper piedmont.	-do-
22	Bd-Nh-Dk	Deep, fine-loamy, Bodeli soils on 3-5% slope of gently sloping subdued plateau and very deep, fine-loamy soils of Narharpur and Durgkondal on 1-3% slope of upper piedmont.	-do-
23	Bd-Ng-Cg	Deep to very deep, fine-loamy, Bodeli and Neghur soils on 3-5% slope of gently sloping subdued plateau and very deep, fine loamy Durgkondal soils on 1-3% slips of upper piedmont.	-do-
24	Jb-Cg-Bd	Shallow, coarse-loamy Joba soils on plateau and very deep, fine loamy Chaugel soils on 3-5% slope of upper piedmont and deep fine-loamy, Bodeli soils of gently sloping subdued plateau.	Paddy, Minor millets. Eucalyptus, teak.
25	Dd-Dk-H	Deep, fine loamy Bodeli soils on 3-5% slope of gently sloping subdued plateau and very deep fine-loamy Durgkondal soils on 1-3% slope of upper piedmont.	-do-
26	Cg-Nh-Gt	Very deep, fine loamy soils on 3-5% slope of Chaugel and Nerharpur in upper piedmont and moderately deep, coarse loamy soils of Ghota on Escarpment	-do-
27	Nh-Ng-Gt	Very deep, fine loamy soils of Narharpur on 3-5% slope of upper piedmont, very deep, fine loamy Neghur Soils of gently sloping subdued plateau and shallow coarse, loamy soils of Pichekatta on strongly sloping 10-15% slope of escarpment	-do-
28	Nh-Ng-Pc	Very deep, fine loamy Durgkondal and Neghur soils on 0-3% slope of upper piedmont and gently sloping subdued plateau and moderately deep, coarse loamy, Ghota soils/strongly sloping, 10-15% slope of escarpment	-do-
29	Cg-Ng-Gt	Very deep, fine-loamy Chaugel and Neghur soils on 0-1% slope of upper piedmont and gently sloping subdued plateau and moderately deep, coarse loamy, on 10-15% slope of strongly sloping escarpment.	Paddy, Kodo, Kutaki, mustard Eucalyptus, sal, teak, bamboo
30	Cg-Bt-Dk	Very deep, fine loamy Chaugel series on 0-3% of upper piedmont and Bodeli soils on 0-3% slope of gently sloping, subdued plateau and Durgkondal soils on 0-3% upper piedmont.	-do-
31	Cg-Nh-Pp	Very deep, fine loamy Chaugel soils on 0-3% slope of upper	Paddy, Kodo,

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		piedmont, very deep, fine loamy mixed Narharpur soils on 0-3% slope of upper piedmont and moderately deep fine loamy soils of Pratappur on nearly level to gently sloping subdued plateau.	Kutaki, mustard Eucalyptus, sal, teak, bamboo
32	Do-Dk-Cg	Deep, Deori soils on gently sloping subdued plateau, very deep, fine, mixed, Chaugel & Durgkondal soils on 0-3% slope of upper piedmont.	-do-
33	Cg-Bd-Ng	Very deep, fine loamy Chaugel soils on 0-3% slope upper piedmont, deep to very deep, fine-loamy soils of Bodeli and Neghur on 0-3% slope of gently sloping subdued plateau	-do-
34	Cg-Dk-Ng	Very deep, fine loamy, mixed Chaugel and Durgkondal soils on 0-3% slope of upper piedmont, very deep, fine loamy, mixed Neghur soils on 0-3% slope, of gently sloping, subdued plateau.	-do-
35	Cg-Nh-Ng	Very deep, fine loamy, mixed soils of Chaugel, Narharpur and Neghur on 0-3% slope of upper piedmont and gently sloping subdued plateau respectively.	-do-
36	Cg-Ng-Pp	Very deep, fine loamy, mixed Chaugel soils on 0-3% slope upper piedmont, very deep, fine loamy, mixed Durgkondal soils on 0-3% slope of gunny subdued plateau and deep, fine loamy Pratappur soils on 0-3% slope of gently sloping subdued plateau	-do-
37	Pp-Dk	Deep, fine loamy. Pratappur soils on 3-5% slope of gently subdued plateau and very deep, fine loamy, mixed Durgkondal soils on 3-5% slope of upper piedmont.	-do-
38	Bd-Kh-Cg	Deep, fine loamy Bodeli soils on 3-5% slope of gently sloping subdued plateau, very deep, fine loamy, mixed hyperthermic soils on 3-5% slope in valley bottom and very deep, fine loamy, mixed Chaugel soils on 0-3% slope of upper piedmont.	-do-
39	Sb-Cg-Ng	Very deep, fine, montmorillonitic Sambalpur soils on 0-3% slope of lower piedmont very deep, fine loamy, mixed Chaugel soils on 3-3% slope et upper piedmont and very deep, fine loamy, mixed Neghur soils on 0-3% slope of gently sloping subdued plateau	Paddy, mustard, gram-linseed vegetables Eucalyptus, Sal Teak, bamboo
40	Bd-Kr-Hilly	Deep, fine-loamy, mixed. Bodeli soils on 3-5% slope of gently sloping sloping subdued plateau, very deep, fine loamy, mixed, Korogaon soils on 3.75% slope of lower piedmont with hilly terrain.	-do-
41	Do-Kg	Deep, fine loamy, mixed Deori soils on 0-3% slope of gently sloping subdued plateau and very deep, fine loamy, Kanhargaon soils on 0-3% slope of lower piedmont	-do-
42	Kg-Bs-Mr	Very deep, fine loamy, mixed. Kanhargaon soils on 0-3% slope of lower piedmont, very deep, fine montmorillonitic. Basala soils on 0-3% slope of lower piedmont and fine loamy, mixed Mero soils on 0-3% slope of lower piedmont	-do-
43	Sb-Kg-Pt	Very deep, fine, Sambalpur soils on 0-3% slope of lower piedmont very deep, fine loamy, mixed, on 0-3% slope Kanhargaon soils of lower piedmont and very deep, fine, montmorillonitic on 0-3% slope Pataud soils of lower piedmont	-do-
44	Kg-Gt-Ch	Very deep, fine loamy, mixed on 0-3% slope of Kanhargaon soils of lower piedmont moderately deep, coarse loamy, strongly sloping Ghoti soils of escarpment, very deep, fine, montmorillonitic 0-3% slope of Ghatta soils in valley bottom.	-do-
45	Sb-Ch	Very deep, fine, montmorillonitic, soil of Sambalpur and Ghatti on nearly level to sloping lower piedmont and in valley bottom respectively	Paddy, wheat, gram, sugarcane
46	Ch-Bg-Hilly	Very deep, fine, montmorillonitic Bogar soils on 0-3% slope, Chichgaon soils in intervening basin and Bogar soils of lower piedmont.	Paddy,wheat, sugarcane.
47	Kg-Cg-Ch	Very deep, fine, mixed on 3-3% slope of Kanhargaon on lower piedmont, Chaugel on upper piedmont and very deep, fine, montmorillonitic on 0-3% slope Chichgaon soils in intervening basin	Paddy, wheat, gram, linseed, vegetables

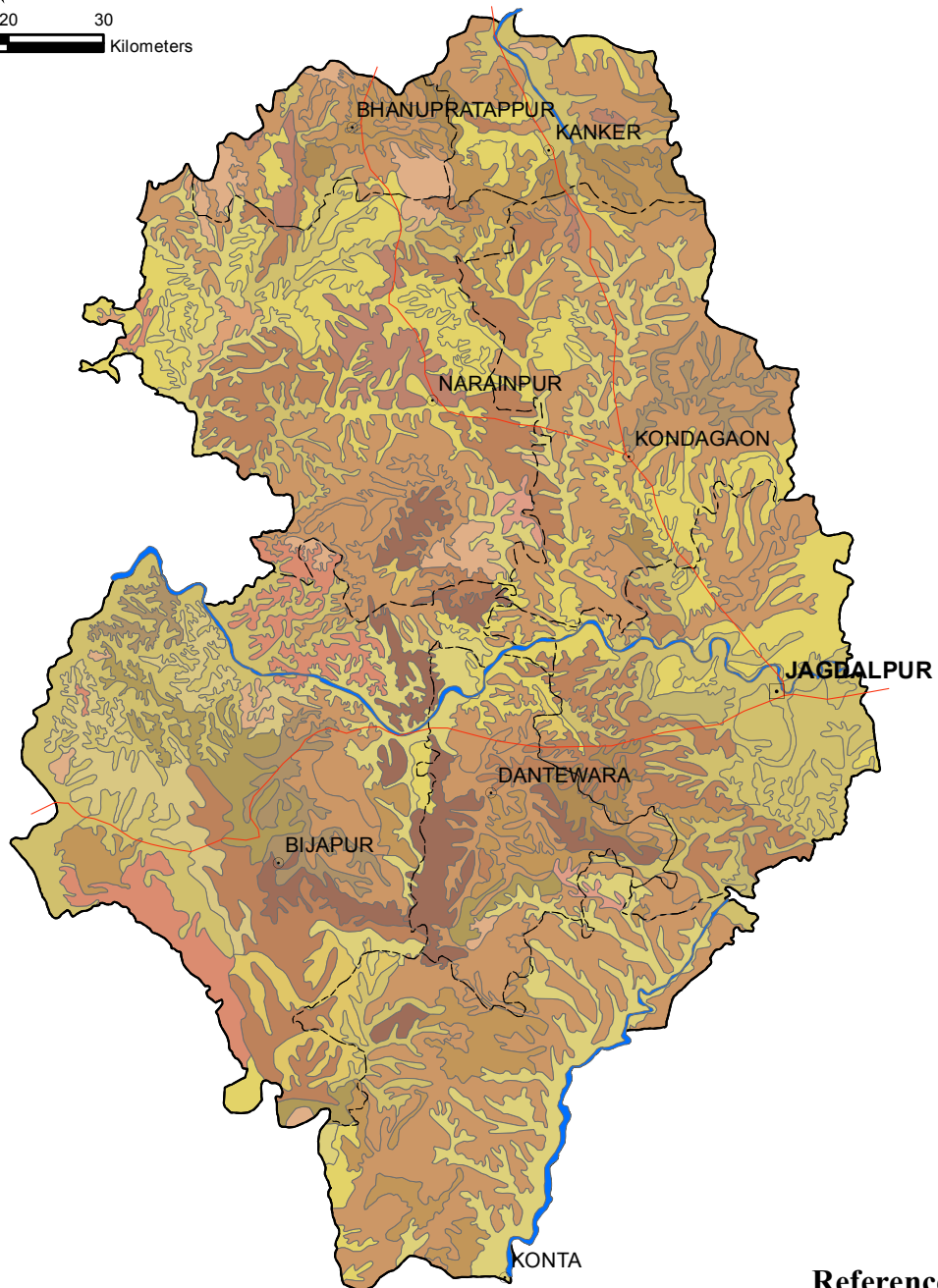
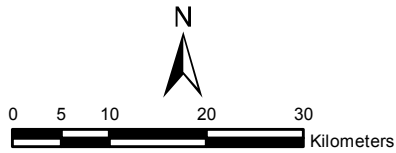
48	Mr-Kr-Dk	Very deep, fine, mixed on 0-3% slope of Mero and Korogaon on lower piedmont and very deep, mixed on 3-5% slope Durgkondal soils of upper piedmont	Paddy, kodo, kutaki, pulses, vegetables.
49	Cg-Dk	Very deep, fine loamy, mixed on 3-5% slope Chaugel and Durgkondal soils of upper piedmont.	-do-
50	Cg-Mh-Mr	Very deep, fine loamy, mixed on 3-5% slope of Chaugel on lower piedmont very deep, coarse loamy on 0-3% slope Mahanadi in flood plain and very deep, fine loamy, mixed on 0-5% slope Mero soils of lower piedmont	Paddy, wheat, pulses, vegetables
51	Cg-Dt-Kg	Very deep, fine loamy, mixed in 3-3% slope Chaugel and Durgkondal soils of upper piedmont and very deep, fine loamy, mixed on 0-3% slope Kanhargaon soils of lower piedmont	-do-
52	Dk-Mr-H	Very deep, fine loamy, mixed 3-5% slope of Durgkondal soils on upper piedmont and very deep, fine loamy, mixed on 0-3% slope of Mero soils of lower piedmont and hills.	Kodo, Kutaki, mustard, pulses.
53	Nh-Mr-Ng	Very deep, fine loamy, on 0-3% slope of Narharpur soils of upper piedmont, very deep, fine loamy, mixed on 0-3% slope Mero soils of lower piedmont and very deep, fine loamy, mixed on 0-3% slope Neghur soils on strongly sloping of gently sloping subdued plateau	-do-
54	Cg-Mh-Bd	Very deep, fine loamy, mixed on 0-3% slope of Chaugel soils of upper piedmont very deep, coarse loamy 0-3% slope Mahanadi soils in flood plain and very deep, fine loamy, mixed on 0-5% slope of Bodeli soil of Ghatti on gently sloping subdued plateau.	Kodo, kutaki, mustard, mod.pulses Eucalyptus, Sal, bamboo, teak
55	Cg-Kh-Kg	Very deep, fine loamy, mixed on 0-5% slope of Chaugel soils on upper piedmont, Kharegaon soils in valley bottom and Kanhargaon soils of lower piedmont	Paddy, kodo, kutaki, pulse, madia, linseed mustard
56	Dt-Kd-Kg	Very deep, fine, montmorillonitic on 0-5% slope Dantewada of upper piedmont, Khandi soils on lower piedmont and very deep, fine loamy, mixed on 0-5% slope Kanhargaon soils of lower piedmont	Paddy, wheat, kodo, kutaki, mustard, pulses. Sal, eucalyptus
57	Sb-Kg-Mh	Very deep, fine, montmorillonitic on 0-5% slope Sambalpur soils of lower piedmont, very deep, fine loamy, mixed on 0-3% slope Kanhargaon soils of lower piedmont and very deep, coarse loamy on 0-5% slope Mahanadi soils in flood plain	-do-
58	Kg-Kd-Pt	Very deep, fine loamy, Kanhargaon, Khandi and Pataud soils on nearly level to gently sloping 0-3% slope of lower piedmont	-do-
59	Kg-Mh-Mr	Very deep, fine loamy, mixed, Kanhargaon, Mahanadi, Mero, soils on nearly level to gently sloping 0-3% slope of lower piedmont, flood plain and lower piedmont respectively	Paddy, wheat; pulses, vegetables, kodo, kutaki, mustard, madia Sal, eucalyptus, teak, bamboo
60	Kg-Mh-Mr	Very deep, fine loamy, mixed Kanhargaon Mahanadi, Mero soils on nearly level to gently sloping 0-3% slope of lower piedmont, flood plain and lower piedmont respectively	-do-
61	Kd-Mh-Sb	Very deep, fine, montmorillonitic soils on 0-5% slope of Khandi, Sambalpur in flood plain and lower piedmont and Mahanadi in flood plain respectively	Paddy, wheat; pulses, vegetables, kodo, kutaki, mustard, madia Sal, eucalyptus, bamboo
62	Kd-Mh-Kg	Very deep, fine loamy, montmorillonitic soils on 0-3% slope of Khandi of lower piedmont, very deep, fine Mahanadi soils on 0-5% slope in flood-plain and very deep, fine mixed Kanhargaon soils of lower piedmont	Paddy, wheat, sugarcane, linseed, vegetables Eucalyptus, sal, bamboo
63	Kd-Sb-Bg	Very deep, fine, montmorillonitic, Khandi, Sambalpur soils of	-do-

		lower piedmont and very deep, fine Boger soils of lower piedmont	
64	Kd-Sb-Kg	Very deep, fine, montmorillonitic soils of Khandi, Sambalpur on 0-3% slope and very deep, fine, mixed Kanhargaon soils on 0-3% slope of lower piedmont	-do-
65	Kd-Kg-Mr	Very deep, fine, montmorillonitic soils on 0-5% slope Khandi soils lower piedmont, very deep, fine, mixed, soils on 0-3% slope of Kanhargaon and Mero of lower piedmont	Paddy, wheat; vegetables Eucalyptus, sal, bamboo
66	Kd-Mr-Sb	Very deep, fine, montmorillonitic Khandi soils in flood plain, very deep, fine loamy, mixed, Mero soils on 0-3% slope of lower piedmont and very deep, fine, montmorillonitic Sambalpur soils of lower piedmont	-do-
67	Kd-Mr-Cg	Very deep, fine, montmorillonitic Khandi soils 0-3% slope of lower piedmont, very deep, fine, mixed Mero soils on 0-3% slope of lower piedmont and very deep fine loamy Chaugel soils on 0-5% slope of upper piedmont.	Paddy, wheat; vegetables, kutaki, mustard Eucalyptus, teak
68	Kd-Mr-Dk	Very deep, fine, montmorillonitic Khandi soils of lower piedmont on 2-3 slope; very deep, fine, mixed Mero soils on 0-3% slope of lower piedmont and very deep, fine loamy, mixed Durgkondal soils on 0-3% slope of upper piedmont	-do-
69	Mh-Cg-Kg	Very deep, fine loamy, mixed Mahanadi soils in flood plain, very deep, fine loamy, mixed Chaugel soils on 0-3% slope of upper piedmont and very deep, fine loamy, mixed Kanhargaon soils on 1-3% slope of lower piedmont	-do-
70	Kd-Bs-Ch	Very deep, fine, montmorillonitic Khandi, Basala, Chichgaon soils on 0-3% slope of lower piedmont and intervening basin respectively.	-do-
71	Kd-Mh-Ch	very deep, fine, montmorillonitic Khandi soils on 0-5% slope of lower piedmont very deep, fine loamy, mixed Mahanadi soils on 0-5% slope of flood plain and very deep, montmorillonitic Chichgaon soils on 1-3% slope in intervening basin	Paddy, wheat; vegetables, kodo, kutaki
72	Kd-Kg-Pk	Very deep, fine, montmorillonitic Khandi soils on 1-3% slope of lower piedmont, very deep, fine loamy, mixed Kanhargaon soils on 0-3% slope of lower piedmont and moderately deep, coarse loamy, Pujarikankar soils on 3-5% slope of gently sloping subdued	-do-

The thematic maps on Slope, Parent Materials, Surface Form, Soil Depth, Surface Drainage, Particle Size, Texture and Soil Reaction (pH) are shown in Fig. 5 to 12, respectively.

BASTAR

Slope



Legend

Level to Nearly Level-Gently Sloping
Level to Nearly Level-Very Gently Sloping
Level to Nearly Level-Very Gently Sloping-Gently Sloping
Level to Nearly Level-Very Gently Sloping-Steeplly Sloping
Very Gently Sloping-Gently Sloping
Very Gently Sloping-Gently Sloping-Level to Nearly Level
Very Gently Sloping-Level to Nearly Level
Very Gently Sloping-Level to Nearly Level-Gently Sloping
Very Gently Sloping-Steeplly Sloping
Very Gently Sloping-Very Steeplly Sloping
Very Gently Sloping
Gently Sloping-Level to Nearly Level-Very Gently Sloping
Gently Sloping-Very Gently Sloping
Steeplly Sloping-Gently Sloping-Level to Nearly Level
Steeplly Sloping-Gently Sloping-Very Steeplly Sloping
Steeplly Sloping-Very Gently Sloping
Steeplly Sloping-Very Steeplly Sloping-Level to Nearly Level
Steeplly Sloping-Very Steeplly Sloping

References

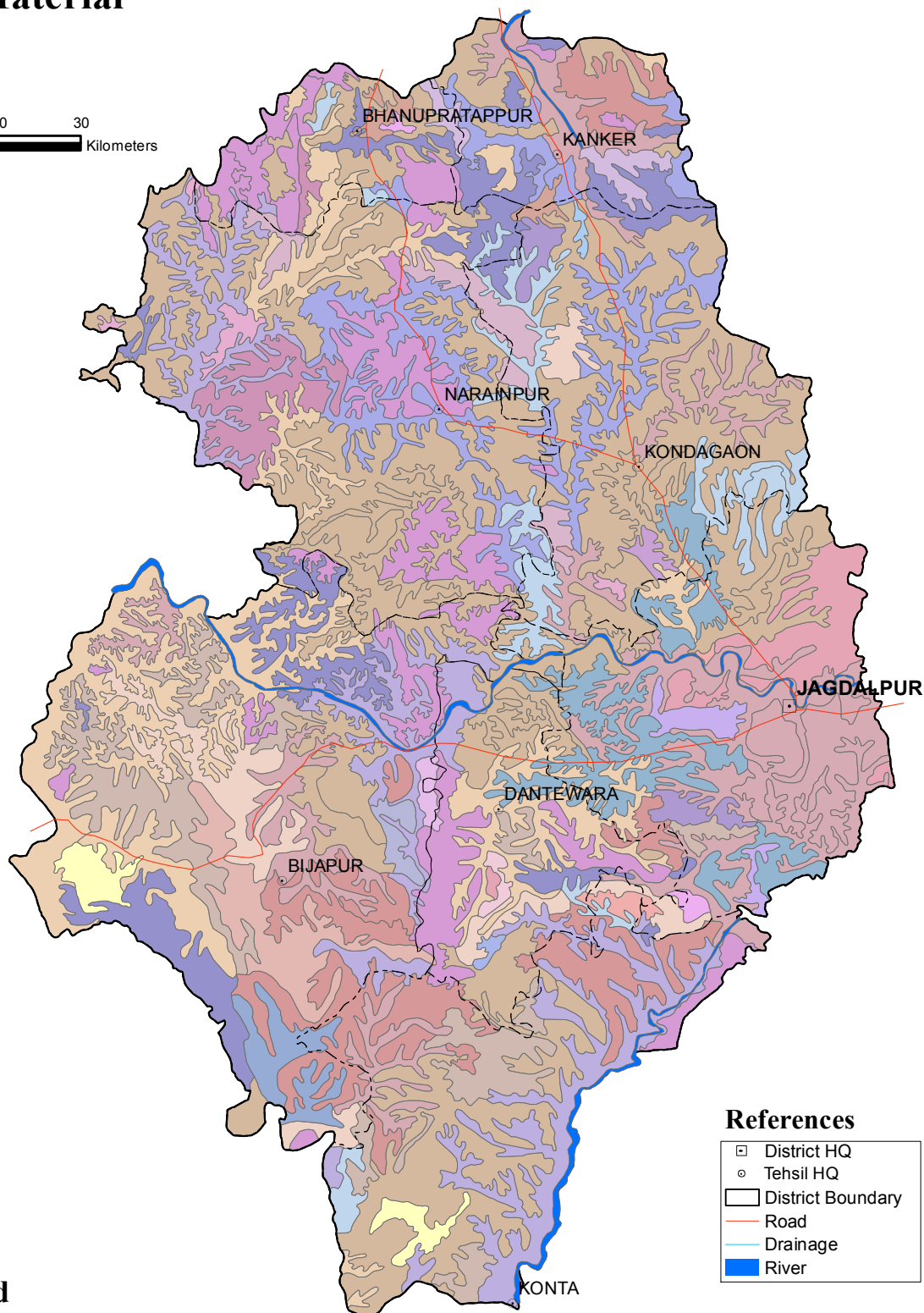
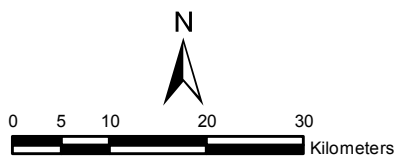
□ District HQ
○ Tehsil HQ
▭ District Boundary
— Road
— Drainage
— River



Fig. 5: Slope

BASTAR

Parent Material



Legend

Alluvium	Laterite-Quartzite Schist
Alluvium-Colluvium	Laterite-Shale-Quartzite Schist-Granite Gneiss
Alluvium-Quartzite Schist-Granite Gneiss	Quartzite Schist-Alluvium
Alluvium-Quartzite Schist	Quartzite Schist-Alluvium-Colluvium
Alluvium-Colluvium-Quartzite Schist	Quartzite Schist-Granite Gneiss-Alluvium
Alluvium-Quartzite Schist-Colluvium	Quartzite Schist-Granite Gneiss-Granite
Alluvium-Quartzite Schist-Granite	Quartzite Schist-Granite Gneiss
Granite Gneiss-Quartzite Schist	Quartzite Schist-Granite Gneiss-Schist
Granite-Granite Gneiss-Quartzite Schist	Quartzite Schist-Granite Gneiss-Schist-Gneiss
Granite-Alluvium-Colluvium	Quartzite Schist-Granite-Alluvium-Colluvium
Granite-Quartzite Schist	Quartzite Schist-Granite Gneiss-Laterite
Granite-Quartzite Schist-Granite Gneiss	Schist-Gneiss-Alluvium-Quartzite Schist
Granite-Schist-Gneiss	Schist-Gneiss-Quartzite Schist-Granite
Granite-Shale	Shale-Granite Gneiss-Quartzite Schist-Alluvium
Granite	Shale-Quartzite Schist-Granite Gneiss
Granite-Laterite-Quartzite Schist-Granite Gneiss	

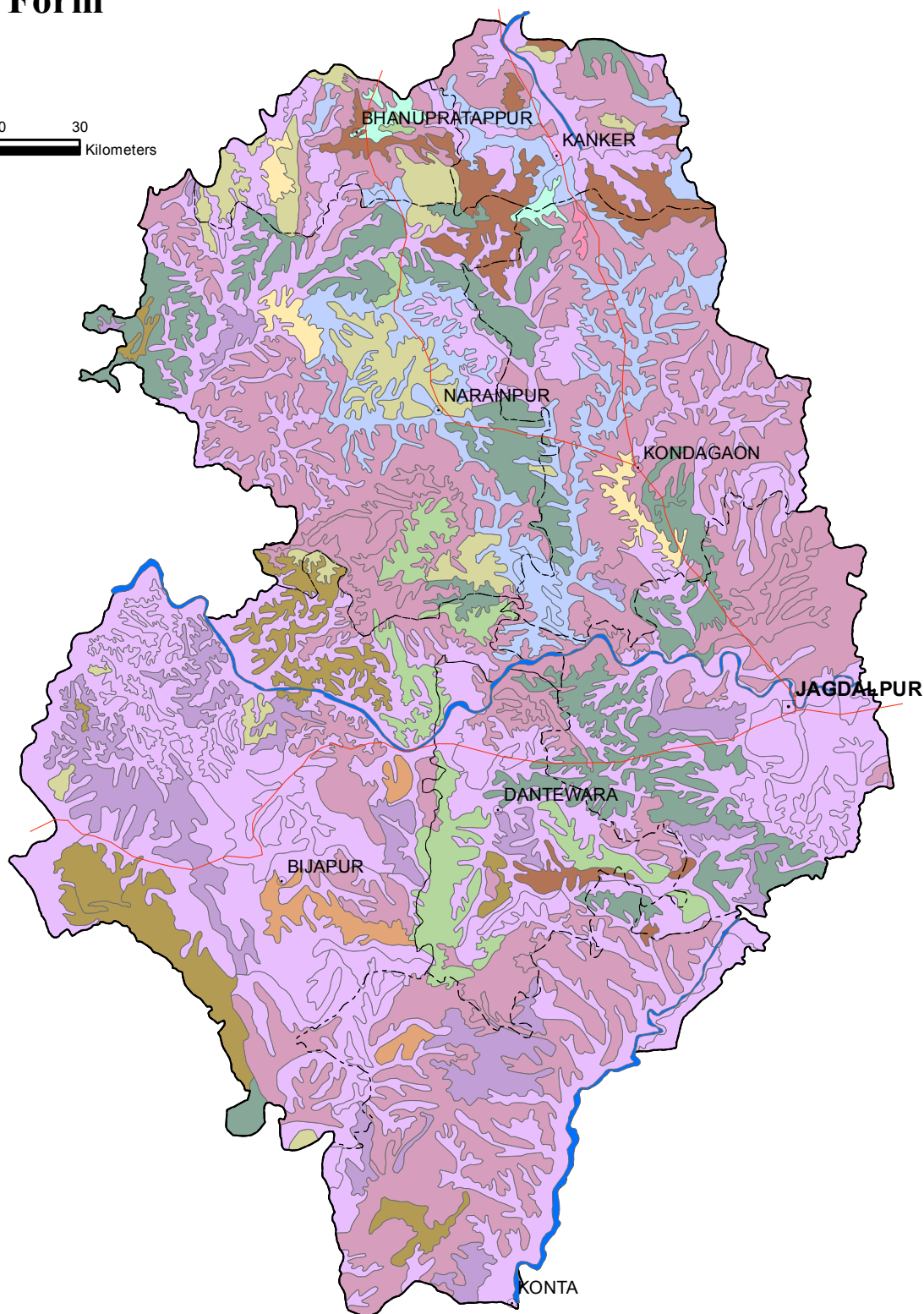
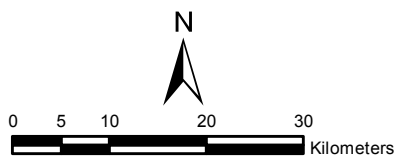
References

□	District HQ
○	Tehsil HQ
□	District Boundary
—	Road
—	Drainage
—	River



BASTAR

Surface Form



Legend

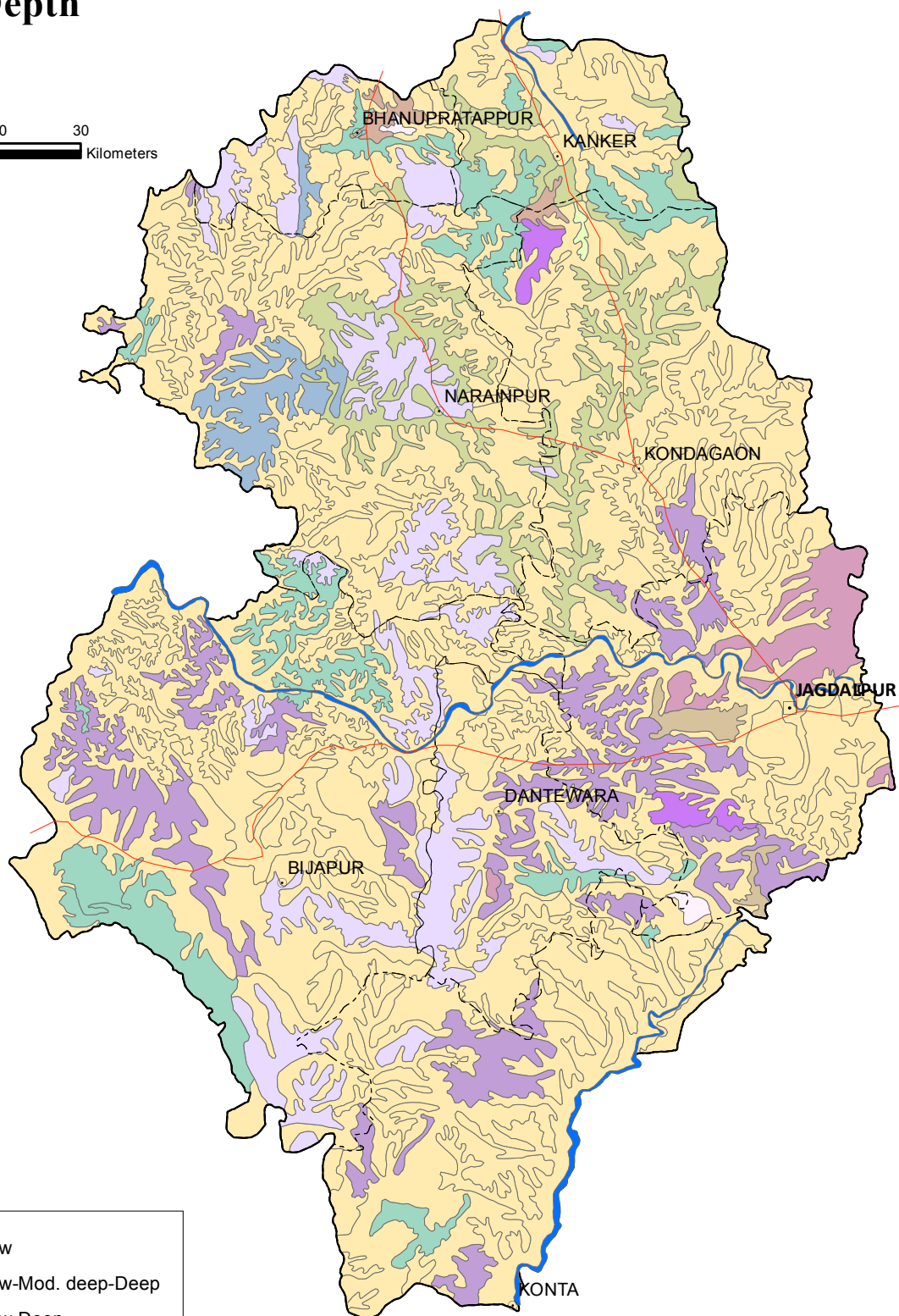
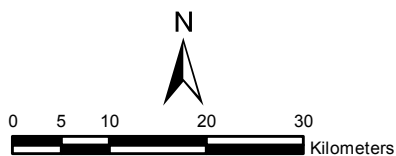
Level	Plateau-Steep
Level-Plateau	Plateau-Valleys
Level-Plateau-Steep	Steep
Level-Steep	Steep-Level
Level-Steep-Valleys	Steep-Plateau
Level-Valleys	Steep-Valleys
Plateau-Level	Valleys-Level

References

□	District HQ
○	Tehsil HQ
—	District Boundary
—	Road
—	Drainage
—	River



BASTAR Soil Depth



Legend

- Shallow
- Shallow-Mod. deep-Deep
- Shallow-Deep
- Shallow-Very deep
- Mod. deep-Shallow-Deep
- Mod. deep-Deep
- Deep
- Deep-Shallow
- Deep-Shallow-Very deep
- Deep-Mod. deep
- Deep-Very deep
- Very deep-Deep

References

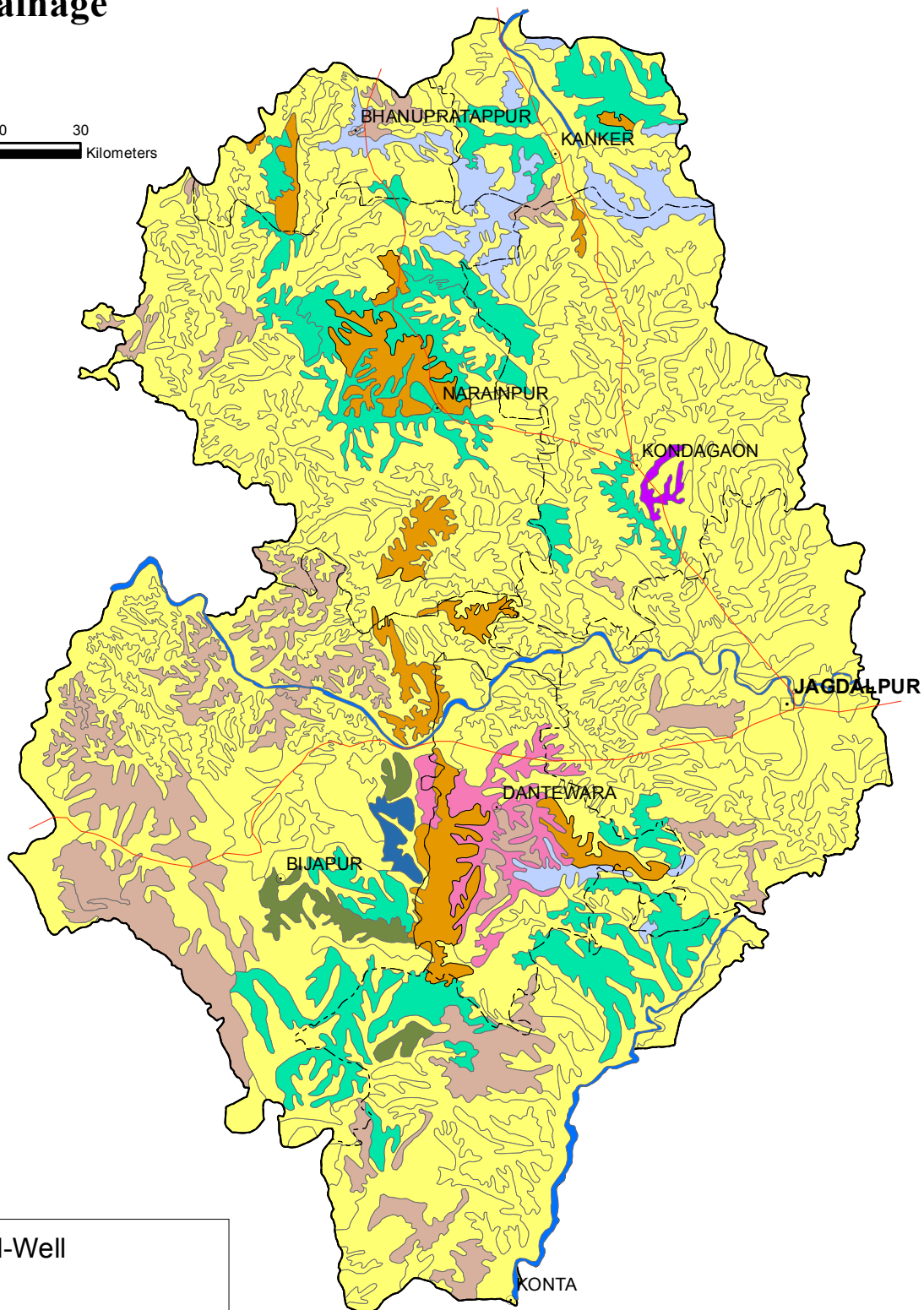
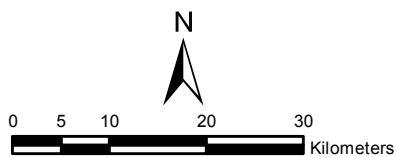
- District HQ
- Tehsil HQ
- District Boundary
- Road
- Drainage
- River



Fig. 8: Soil Depth

BASTAR

Soil Drainage



Legend

- Mod.Well-Well
- Well
- Well-Imperfect
- Well-Mod.Well-Excessive
- Well-Mod.Well
- Well-Excessive
- Excessive
- Excessive-Mod.Well
- Excessive-Well

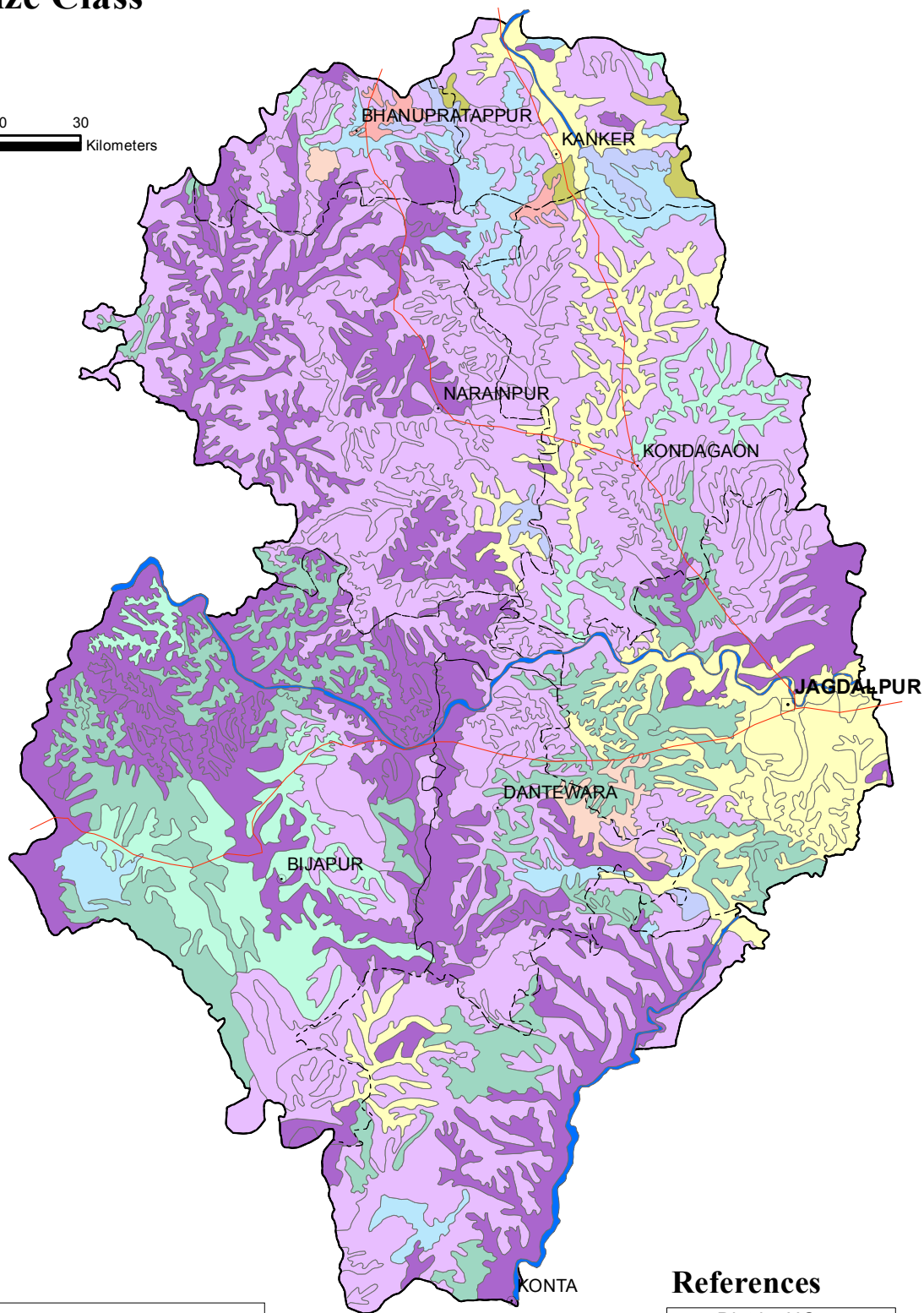
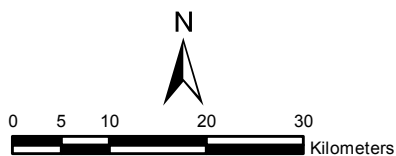
References

- District HQ
- Tehsil HQ
- District Boundary
- Road
- Drainage
- River



BASTAR

Particle Size Class



Legend

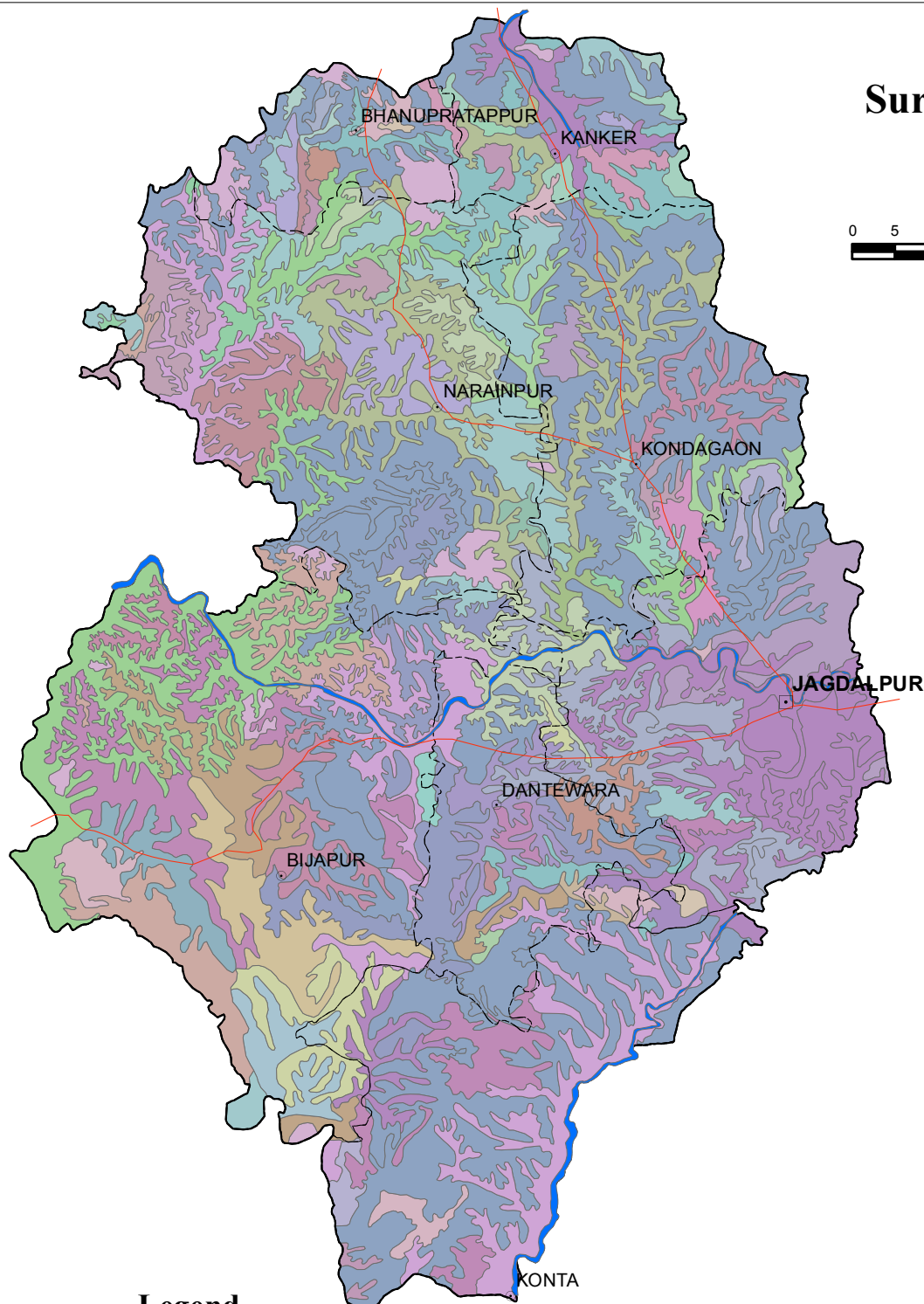
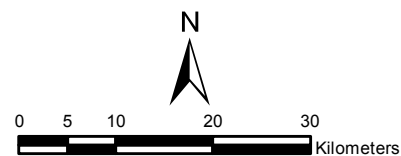
	Fine
	Fine loamy
	Fine-Fine loamy
	Fine loamy-Fine
	Fine loamy-Coarse loamy
	Fine loamy-Coarse loamy-Fine
	Fine-Fine loamy-Coarse loamy
	Coarse loamy
	Coarse loamy-Fine
	Coarse loamy-Fine loamy

References

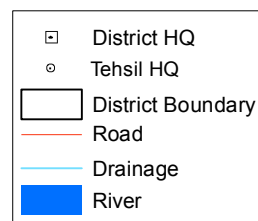
	District HQ
	Tehsil HQ
	District Boundary
	Road
	Drainage
	River



BASTAR Surface Texture



References



Legend

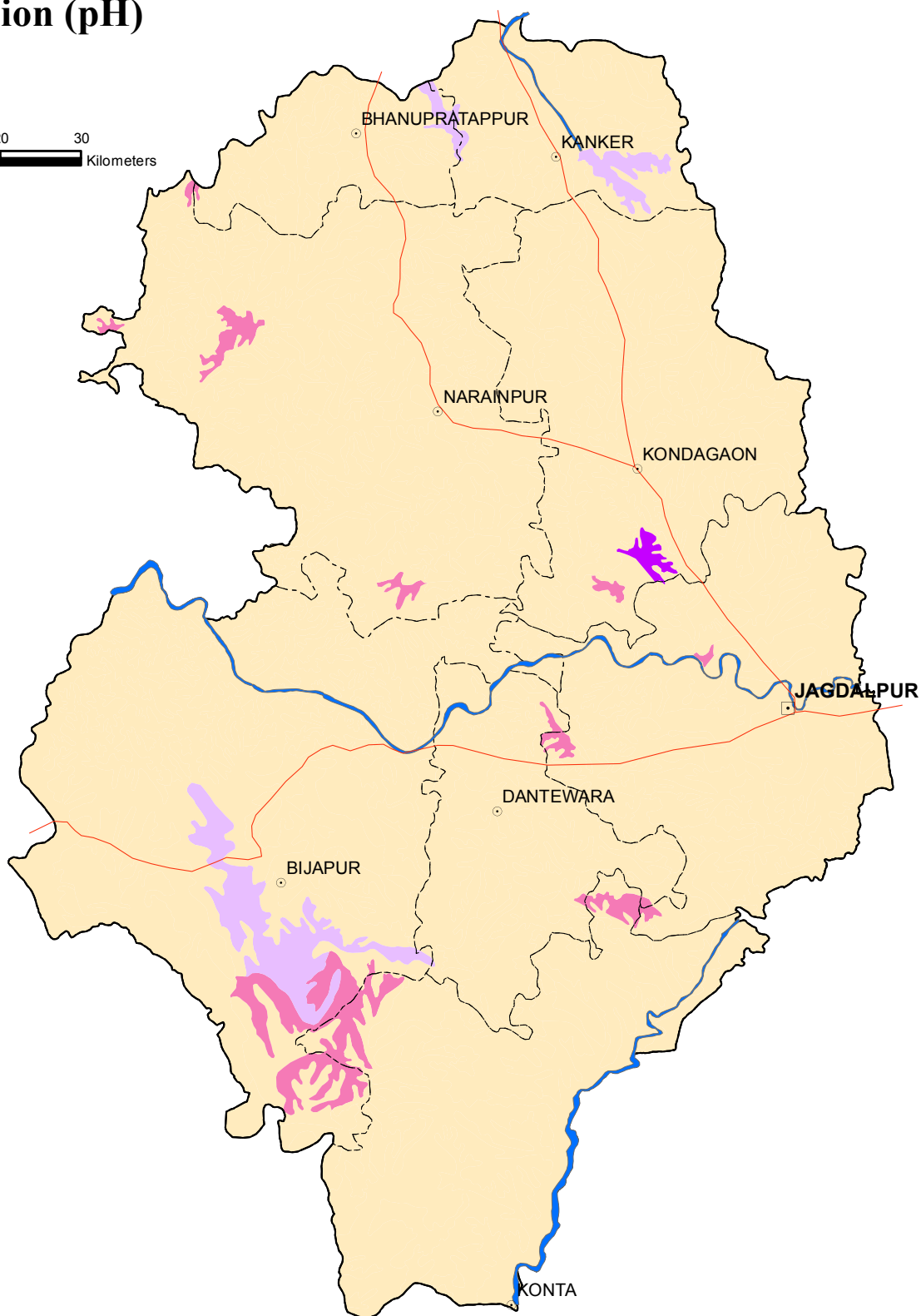
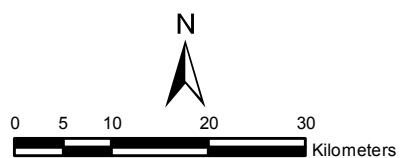
Clay loam to Clay-Clay loam-Loamy sand	Loamy sand to Sandy loam-Sandy loam-Clay loam
Clay loam to Clay-Clay loam-Sandy clay loam	Sandy clay loam to Clay loam-Clay loam
Clay loam to Clay-Clay loam-Silty clay	Sandy clay loam to Clay loam-Clay loam-Sandy clay loam
Clay loam to Clay-Sandy clay loam	Sandy clay loam to Clay loam-Sandy clay loam
Clay loam to Clay-Sandy clay loam-Clay loam	Sandy clay loam to Clay loam-Sandy clay loam-Loamy sand
Clay loam to Clay-Sandy loam-Loamy sand	Sandy clay loam to Clay loam-Sandy clay loam-Sandy loam
Clay loam to Clay-Sandy loam-Sandy clay loam	Sandy clay loam to Clay loam-Sandy loam
Clay loam to Clay-Sandy loam-Silty clay	Sandy clay loam to Gravely clay loam-Clay loam
Clay loam to Clay-Silty clay-Sandy clay loam	Sandy clay loam to Gravely clay loam-Clay loam-Sandy clay loam
Clay loam to Clay-Silty clay-Sandy loam	Sandy clay loam to Gravely clay loam-Loamy sand-Clay loam
Clay loam to Sandy clay loam-Loamy sand-Sandy clay loam	Sandy clay loam to Gravely clay loam-Sandy loam-Clay loam
Clay loam to Sandy clay loam-Sandy clay loam	Sandy clay loam to Sandy clay-Clay loam
Clay loam to Sandy clay loam-Sandy loam-Sandy loam	Sandy clay loam to Sandy clay-Sandy clay loam
Clay loam to Sandy clay loam-Sandy loam	Sandy clay loam to Sandy clay-Sandy clay loam-Clay loam
Clay loam to Sandy clay loam-Sandy loam-Clay loam	Sandy clay to Sandy clay loam-Clay loam-Sandy clay loam
Clay loam to Sandy clay loam-Sandy loam-Loamy sand	Sandy loam to Sandy clay loam-Loamy sand-Sandy clay loam
Clay loam to Sandy clay loam-Sandy loam-Sandy clay loam	Sandy loam to Sandy clay loam-Sandy clay loam
Loamy sand to Sandy loam-Sandy clay loam	Sandy loam to Sandy clay loam-Sandy clay loam-Loamy sand
Loamy sand to Sandy loam-Sandy clay loam-Clay loam	Silty clay to Clay-Clay loam
Loamy sand to Sandy loam-Sandy clay loam-Sandy loam	Silty clay to Clay-Loamy sand-Sandy clay loam
Loamy sand to Sandy loam-Sandy clay-Sandy clay loam	Silty clay to Clay-Sandy clay loam
Loamy sand to Sandy loam-Sandy loam	Silty clay to Clay-Sandy clay loam-Sandy loam



Fig.11: Surface Texture

BASTAR

Soil Reaction (pH)



Legend

- Mod.acidic-Neutral
- Mod.acidic-Strongly acidic
- Mod.acidic
- Strongly acidic-Mod.acidic

References

- District HQ
- Tehsil HQ
- District Boundary
- Road
- Drainage
- River



4.

INTERPRETATION OF SOIL SURVEY INFORMATION

Soil survey interpretation includes the organization and presentation of knowledge about characteristics, qualities and behaviour of soils as they are classified and their boundaries shown on maps. The soil map and taxonomic information are useful for agriculture and other uses. This involves consideration of productivity potential of soils. Soil management, soil and crop suitability, feasibility of irrigation, suitability for engineering purposes and other non-agricultural uses including pasture and forest.

During the conduct of soil survey, characteristics, distribution and extent, classification of taxonomic units (soil series association) used for mapping under different geomorphic settings have been synthesized. The information thus collected has been synthesized and interpreted for:

1. Land capability grouping for sustained use under defined set of management practices.
2. Soil and land irrigability classification.
3. Vegetative grouping or crop adaptability grouping.

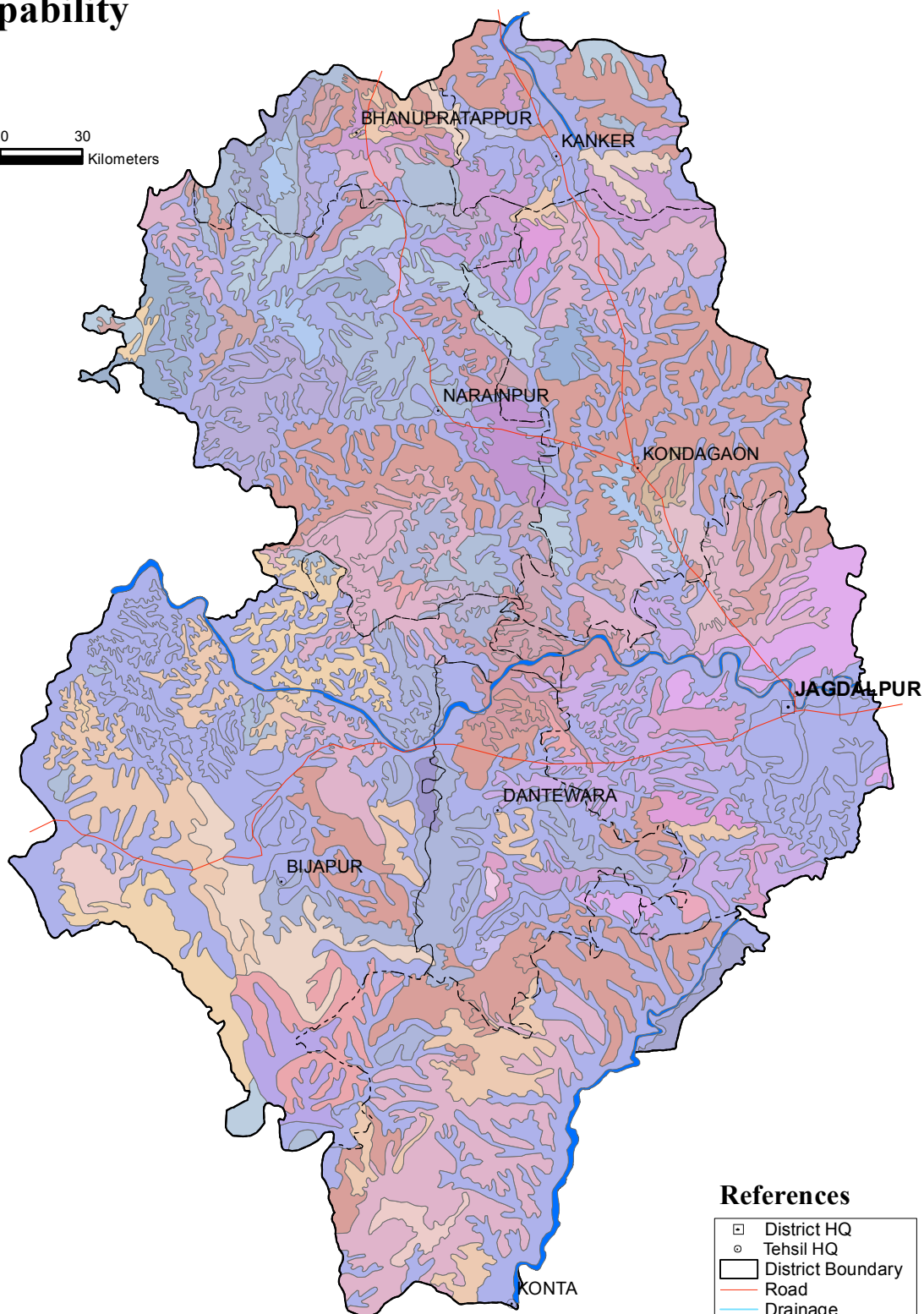
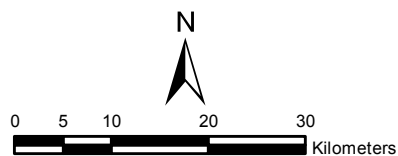
4.1 Land capability classification:

The land capability classification is an interpretative grouping of soils that provides information at three different levels i.e. (i) class, (ii) subclass, (iii) units. The grouping of soils is based on actual soil condition, inherent characteristics, external land features, environmental factors and ability of soils to produce commonly cultivated crops without being detrimental to soil over a long period of time. The lands are grouped according to their potentialities and limitations for sustained crop production. (Table 7 and fig. 13).

The land capability classes are based on permanent characteristics and limitation of soil that effect the kind of use, management needs and risk of soil damage. The soils grouped under Class I to IV are arable lands and those under Class V to VII non-arable but suitable for pastures and forestry. The class VIII lands are neither suited for agriculture nor for forestry but for recreation, wild life sanctuaries etc.

The land capability subclasses provide information with respect to kind and degree of limitation which need specific ameliorative measures. Kind of measures recognized, at subclass level are risk of erosion (e), wetness, drainage, overflow (w), root zone limitation (s) and climatic limitation (c).

BASTAR Land Capability



References

- District HQ
- Tehsil HQ
- District Boundary
- Road
- Drainage
- River

Legend

Iles-Iles: Iles	Iles-Iles: IVes : Iles	Iles-IVes: Iles : Hills	IVes-VIles : Iles
Iles-Iles: Iles : Iles	Iles-Iles : Vles : Iles	Iles-IVes : IVes	IVes-VIles : Iles : Hills
Iles-Iles: Iles : Illew	Iles-IVes	Iles-IVes : Vles - Hills	IVes-VIles : IVes : Iles
Iles-Iles : Iles : IVes	Iles-IVes : Iles	IVes-IVes : Iles	Vles-VIles : IVes
Iles-Iles: Iles : Hills	Iles-IVes: Iles : Iles	IVes-Ves : Iles	Vles-VIles : IVes : Iles
Iles-Iles: Iles	Iles-IVes: Iles : Hills	IVes-Ves: Iles	Vles-VIles : IVes : Iles
Iles-Iles: Iles : Iles	Iles-IVes : Iles	IVes-Ves : Iles : Iles	Vles-VIles : IVes : Vles
Iles-Iles: Iles : IVes	Iles-IVes: Iles : Iles	IVes-Ves : Iles : Hills	Vles-VIles : IVes : Hills
Iles-Iles: Iles : Vles	Iles-IVes : Iles : Vles	IVes-VIles : Iles-Iles	Vles-VIles : Vles : Iles



Table 7. Land capability class and sub-class

S. No.	Soil series	Land capability class and sub-class	Limitations
1	Mero	IIes-IIIes	Very deep, well drained, fine to fine loamy, slow to very slow permeability, moderate to high water holding and storage capacity, a few patches are cultivated for paddy, wheat, gram, vegetables and sugarcane (irrigated) crops. Better harvest can be possible provided irrigation facilities and improved management practices.
2	Chichgaon		
3	Khandi		
4	Sambalpur		
5	Basala		
6	Kanhargaon		
7	Mahanadi	IIes-IIIes	Very deep, well drained, fine loamy to fine, moderate to slow permeability, moderate water holding and storage capacity, a few patches cultivated to paddy, wheat gram and vegetables..
8.	Kheregaon		
9	Danteswada		
10	Bogar		
11	Chaugel	IIIes-IVes	Very deep, well drained, fine loamy, moderate to rapid permeability, low to medium moisture holding and retentive capacity and acidic in nature. A few patches cultivated for kodo, kutaki, mustard, madia lesser millets and plantation of teak, bamboo, eucalyptus and sal.
12	Bodeli		
13	Neghur		
14	Durgkondal		
15	Koregaon		
16	Narharpur		
17	Ghatti	IIIew	Very deep, well drained, fine loamy to fine, moderately slow permeability, medium to high water holding and storage capacity. A few patches cultivated to paddy and rest of area under forest.
18.	Pataud		
19	Bastar	IVes-VIIes	Shallow to moderately deep, well drained, coarse loamy, very rapid to rapid permeability, low water holding and retentive capacity, shallow rooting depth, not suitable for normal crop husbandry, severely eroded and a few patches
20	Joba		
21	Deori		
22	Pratappur	IVes-Ves	Shallow to moderately deep, well drained, coarse loamy, very rapid to rapid permeability, low to medium water holding and storage capacity not conducive for normal crop husbandry. A few patches are
23	Pujarikankar		
24	Ghota	VIes-VIIes	Very shallow to shallow, very severe erosion, gravelly surface and substrata, shallow rooting. depth, very rapid to rapid permeability, low water holding and retentive capacity and generally plantation
25	Pichekatta		

The soil mapping units identified during the survey have been grouped. The land capability classes from II to VII and subclasses e, w, s and c are given in table 7.

4.2 Soil and land irrigability classification:

The interpretation of soil and land for irrigation is concerned mainly with the characteristics of land and soils and facilities/resources available in the area. Interpretation are required to indicate the areas suitable for irrigated crops, that can be grown with expected yield, keeping in view the potential problems like development of salinity, deterioration in drainage conditions etc. the soils and land have been classified for irrigation point of view.

Recently Sys (1976) has proposed a parametric approach for evaluating the suitability of soil for irrigation. Capability Index (Ci) = A.B.C.D.E.F.G.

Where A - rating for soil texture, B - rating for soil depth.

C - rating for CaCO_3 status, D - rating for gypsum status.

E - rating for salinity/Alkalinity, F - rating for drainage and

G - rating for topography (slope) have been used A,B,F and G ratings for Ci.

Ci more than 80 (class I), Ci 60-80 (Class II), Ci 45-60 (Class III), Ci 30-45 (Class IV) and Ci less than 30 (class V-VII).

The land suitability for irrigation depends upon physical condition of land surface and socio-economic condition of farming community in addition to soil irrigability classes. The land suitability classes are defined in terms of degree of limitations. The dominant limitations for sustained use under irrigation are indicated by the sub-classes appending the letter 's' for soil, 't' for topography and 'd' for drainage. The different soil and land irrigability classes assigned to the mapping units are described below. Land irrigability map of the district is shown in fig. 14.

Soil irrigability classes:

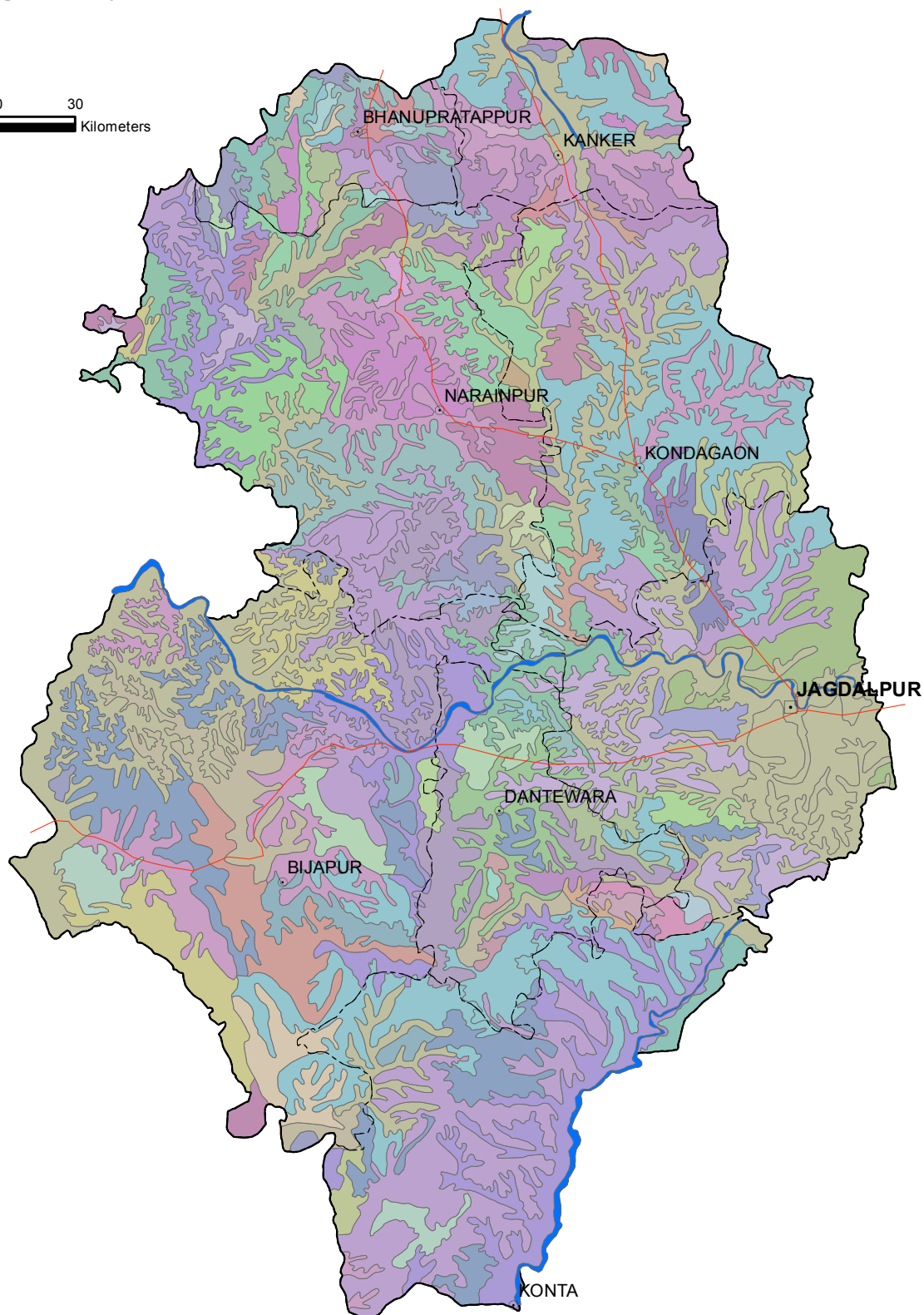
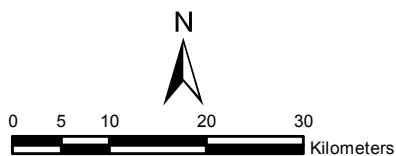
- A Slight or no soil limitation for sustained use under irrigation.
- B Moderate soil limitation for sustained use under irrigation.
- C Severe soil limitations for sustained use under irrigation.
- D Very severe soil limitations for sustained use under irrigation.
- E Soils are not suited for irrigation.

Land irrigability classes:

1. Lands that have slight or no limitations for sustained use under irrigation.
2. Lands that have moderate limitations for sustained use under irrigation.
3. Lands that have severe limitations for sustained use under irrigation.
4. Lands that have very severe limitations for sustained use under irrigation.
5. Lands that are not suited for sustained use under irrigation (Temporarily)
6. Lands that are not suitable for sustained use under irrigation (Permeability).

BASTAR

Land Irrigability



Legend

2d-3d : 2d	3st-4st : 6std : Hills	4d-3s : 2d : Hills	4st : 6std : 3st
2d-3d : 2s : 2d	3st-4st : 2d	4d-3s : 2s : 2d	4st : 6std : 4d
2d-3d : 4d : 2d	3st-4st : 2d : 4d	4d-3s : 2s : 3st	6std
2s-3s : 4d : 2d	3st-4st : 3d : Hills	4d-3s : 3st	6std : 2d
2d-3d : 6std : 2d	3st-4st : 3st : 4d	4d-3s : 3st : 2d	6std : 3st
2d : 3d : 4d	3st-4st : 4d	4d-3s : 3st : 6std	6std : 3st : 2d
2d-4d : 2d	3st-4st : 4d : 3st	4d-3s : 3st : 6std	6std : 3st : 4d
2d-4d : 2d : 2s	3st-4st : 4d : 4st	4d-3s : 4d	6std : 4d
2d-4d : 2d : 4d	3st-4st : 4d : Hills	4d-3s : 4d : 2d	6std : 4d : 3st
2d-4d : 2d : 4st	3st-4st : 6std : Hills	4d-3s : 4d : 3st	6std : 4st : 4d
2d-4d : 2s : 2d	4d-3d : 2d	4d-3s : 4d : 6std	6std : 4st : 6std
2d-4d : 3st	4d-3d : 2d	4d-3s : 4st : 4d	6std : Hills
2d-4d : 4st : Hills	4d-3s : 2d : 3st	4st : 3st : Hills	

References

□	District HQ
○	Tehsil HQ
—	District Boundary
—	Road
—	Drainage
—	River



Subclasses:

- A - Soil limitation
- t - Topographical limitation
- d - Drainage limitation

The soil and land irrigability class and subclasses for each of the soil series identified in the area are given below (table 8) with soil irrigability classes ranging from A to E and land irrigability sub-classes 1 to 6 with sub-classes 's', 't' & 'd'.

4.3 Vegetative grouping:

The soil properties like effective rooting depth, texture, structure, permeability classes, drainage, erosion, soil depth to hardpan (rock/C horizon) groundwater table, topography and cropping pattern are the major considerations used as criteria to place soils into various vegetative groups (Table 9).

- A - The choice of plants limited by rapid permeability.
- B - The choice of plants limited by droughtiness and low fertility level.
- C - The choice of plants limited by fine texture.
- D - The choice of plants limited by very slowly permeable soils.
- E - The choice of plants limited by salinity or alkalinity.
- F - The choice of plants limited by depth of soils.
- G - The choice of plants limited by iron concentration.

Table 8. Soil and land irrigability class and sub-class

S. No.	Soil series	Irrigability			Limitations
		Soil class	Land class	Sub class	
1	Ghota	E	6	6std	Shallow rooting depth, ground water table low, very rapid to rapid permeability, low moisture holding and retentive capacity
2	Pichekatta				
3	Joba				
4	Neghur	C-D	3-4	3st-4st	Very rapid to rapid permeability; undulating topography; low moisture retentive capacity
5	Bodeli	B-D	3-4	3st-4st	Very rapid to rapid permeability, undulating topography, gravelly substrata, low moisture holding and retentive capacity
6	Deori				
7	Pratappur				
8	Kheregaon	C-D	4	4st	In optimum rooting depth, difficult fit cultivation due to land with thick dry deciduous mixed forest excessive slope, etc
9	Ghatti				
10	Bogar				
11	Pujarikankar	C-D	4	4st	Shallow rooting depth, undulating topography low moisture holding and retentive capacity
12	Dantewada	B-C	4-3	4d-3d	Rapid permeability, low moisture holding and retentive capacity
13	Korogaon	D-C	3	3d	Slope gradient 3-5 per cent and drainage hazard
14	Bastar	D-E	4	4st	Shallow rooting depth, gravelly substrata, ground water, laterites and undulating topography
15	Mahanadi	C-D	2-3	2-3s	Very rapid, rapid permeability, medium water holding and storage capacity, lighter texture
16	Durgkondal	B-C	4-3	4-3s	Moderately rapid to moderately slow permeability, low moisture holding and storage capacity, slope gradient 3-5 per cent slope
17	Narharpur				
18	Chaugel				
19	Sambalpur	B	2-4	2d-4d	Moderately well drained, slow to moderately slow permeability, fine to very fine. slope gradient 3-5 per cent
20	Khandi				
21	Chinchgaon				
22	Basala	B-C	2-3	2d-3d	Moderately well drained, moderate to moderately slow permeability
23	Kanhargaon				
24	Pataud				
25	Mero	B-C	2	2d	Poorly drained, water logging, very slow/ slow permeability

4.4 Soils and their suitability for various crops:

The recommendation gives general guidelines for cropping and management practices which are made by Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), Jabalpur and the State Department of Agriculture, Madhya Pradesh. The agricultural agencies need to give due importance for crop production to soils, use of improved seeds, use of manure and fertilizers, use of plant protection measures and use of irrigation. It is noticed that most of the tribal farmers do not use improved implements for farming plant protection measures export these no. taluka/blocks/big villages and villages along the road sides. They need to be convinced about modern technique in Agriculture through demonstrations. The productivity potential of soils is assessed based on soil properties discussion with research workers/agencies working in the area and average yield data received from district statistical record books. The estimated productivity potentials for different crops graded as if it is more than 80% high; 80-40% for medium and less than 40% for low: Based on these grading the soils have been grouped and brief about the same is as follows. Most of the plant spaces need well drained moderate fine to medium textured soils with no salinity and having optimum physical environment. Several systems have been proposed (Storie 1954, Ricquier *et. al.*, 1970, FAO 1976) based on climate topography.

Table 9. Vegetative grouping and their limitation

S. No.	Vegetative grouping class	Soil series	Limitations
1	D	Khandi Pataud Chichgaon Sambalpur Basala	Choice of plants limited by slowly permeable, heavier textured soil. Limiting root proliferation, moderately well drained soils and medium nutrient status.
2	B	Bastar, Pratappur, Joba	Choice of plant limited because of low fertility level, coarse gravelly, excessively drained, low available moisture and low to medium nutrient status.
3	A	Chaugel, Kanhargaon, Dantewada, Narharpur, Mahanadi	Choice of plants limited because of very rapid permeability, porous in nature, low moisture holding and moisture retentive capacity and medium nutrient status.
4	F	Mero	Choice of plants limited because of poorly drained slow permeability and water logging during rainy season poses problems
5	G	Neghur, Bodeli, Durgkondal	Choice of plants as lateriferous species suitable, lighter in texture, high amount of iron and medium nutrient status.
6	C-D	Korogaon, Bogar, Deori	Choice of plants slow to moderately slow permeability, fine in texture, good moisture holding and retentive capacity and medium nutrient status.
7	B-C	Ghatti, Kheregaoon	Choice of plants limited by low fertility status and present land use (forest).
8	J	Ghota, Pichekatta, Pujarikankar	Choice of plants limited by soil depth, topography and thus shallow rooted plant species.

Soil of high productivity potential for paddy:

Pataud, Kanhargaon, Mahanadi, Mero, Kheregaoon, Korogaon, Chichgaon, Sambalpur series are mainly under paddy cultivation. These series occupy considerable area in the district occurring in lower piedmont, flood plain, intervening basin and valley bottom with slope gradient range from 1 to 3 per cent. They are very deep and non-calcareous soils. These soils have medium to high productivity potential for paddy crops. It is observed in the area even with poor crop management, it is giving good response for crop yields.

The soils of Chichgaon and Sambalpur series are mostly under wheat, gram, vegetables, paddy and a few patches are under irrigated crops.

Soils of high productivity potential for kodo-kutaki (lesser millets):

Chaugel, Durgkondal, Narharpur and Pratappur soils are mostly cultivated to lesser millets. These soils occupy considerable area next to paddy in the district. They occur on piedmont plain with slope gradient ranging from 1 to 3 percent. The crop management practices in these areas are traditional and crop yields were below average. Thus suitable management practices will be useful to increase the per unit yield.

Soils of high productivity potential for mustard, madia crops and sal plantation:

The soil series namely Bodeli, Neghur, Bastar are mostly under lateriferous species (sal) plantation and crops like mustard kodo, kutaki and madia. They are very well responsive to management practices and plantation of

lateriferous species. They are found to occur on gently sloping subdued plateau with slope gradient range from 3 to 5 percent. They have high contents of iron oxide and hence they are suitable for lateriferous plant species.

These soils may be suitable for safflower, sunhemp, mustard, sorghum, groundnut and pulses mainly because they need of less moisture. The plantation of sal is successful in these soils.

Soils of high productivity potential for wheat, gram sugarcane and vegetables:

Khandi, Sambalpur, Chichgaon, Dantewada, Pataud, Basala and Mahanadi soils are good for paddy, wheat, gram and sugarcane. They have high moisture holding and retentive capacity and slow permeability. They are found to occur in flood plain, lower piedmont and intervening basin on 1 to 3% slope. The soils are mostly cultivated to paddy. However, wheat, gram and sugarcane are also grown. They are well responsive to irrigation. Though the use of improved Seed, fertilizers, plant protection measures and irrigation is lacking, these soils are expected to response favorably to these crops.

Soils of high productivity potential for plantation of teak, bamboo, eucalyptus and sahaja:

Ghota and Pichekatta soils are under teak and bamboo plantations. They are found to occur on escarpment with slope gradient ranges from 10 to 25 per cent.

Joba, Baster and Pujarikanker soils are under grassland and very good for construction works like building, roads, canals etc. and other non-agricultural uses.

Soils of high productivity potential for grazing:

Deori, Bogar, Korogaon and Ghatti soils are mostly under thick grass cover. The district is having about 65 percent area under forest and limited herds, so, most of grasses are destroyed by fires. Wherever these soils are giving good response for the growth of grasses plantation of improved species of grasses and forest species may be useful to raise the production per unit area.

Soil of high productivity potential for Sal, Eucalyptus and Sahaja plantation:

It is observed that planted Sal/Sahaja in Neghur, Bodeli, Chaugel soils is well responsive. It implies that Neghur and Bodeli soils are well suited for sal plantation while Chaugel soils are good for Eucalyptus and sal plantation.

The distribution of soils and association units shown on map as well as they are occupied by each series should be helpful in planning to meet the requirement of micro level planning. The maps are also useful for construction of roads, dams and canals and other nonagricultural uses in the area mostly for plantation purposes.

Alternate crops and Recommendations:

Most of the area is under thick mixed dry deciduous forest and: hilly tract. The area is having complex geology and heterogeneous landscape with hilly terrain.

The common problems are lack of communication, lack of extension particularly in crop husbandry, lack of facilities for inputs and people's awareness about development of modern technique and agriculture. The following recommendations are made for proper land use plan so that per unit production can be raised.

- i. The land nearby villages, towns and along the drainage line, rivers, streams can be put under paddy, kodo, kutaki and a few patches cultivated to wheat, gram, sugarcane and vegetables by adopting better crop management practices, such as improved seeds, use of fertilizers, plant protection measures and possibly irrigation for better harvest.
- ii. The most of area is suitable for rain fed crop, even though it is lying fallow so that climatically suitable crops can be grown.

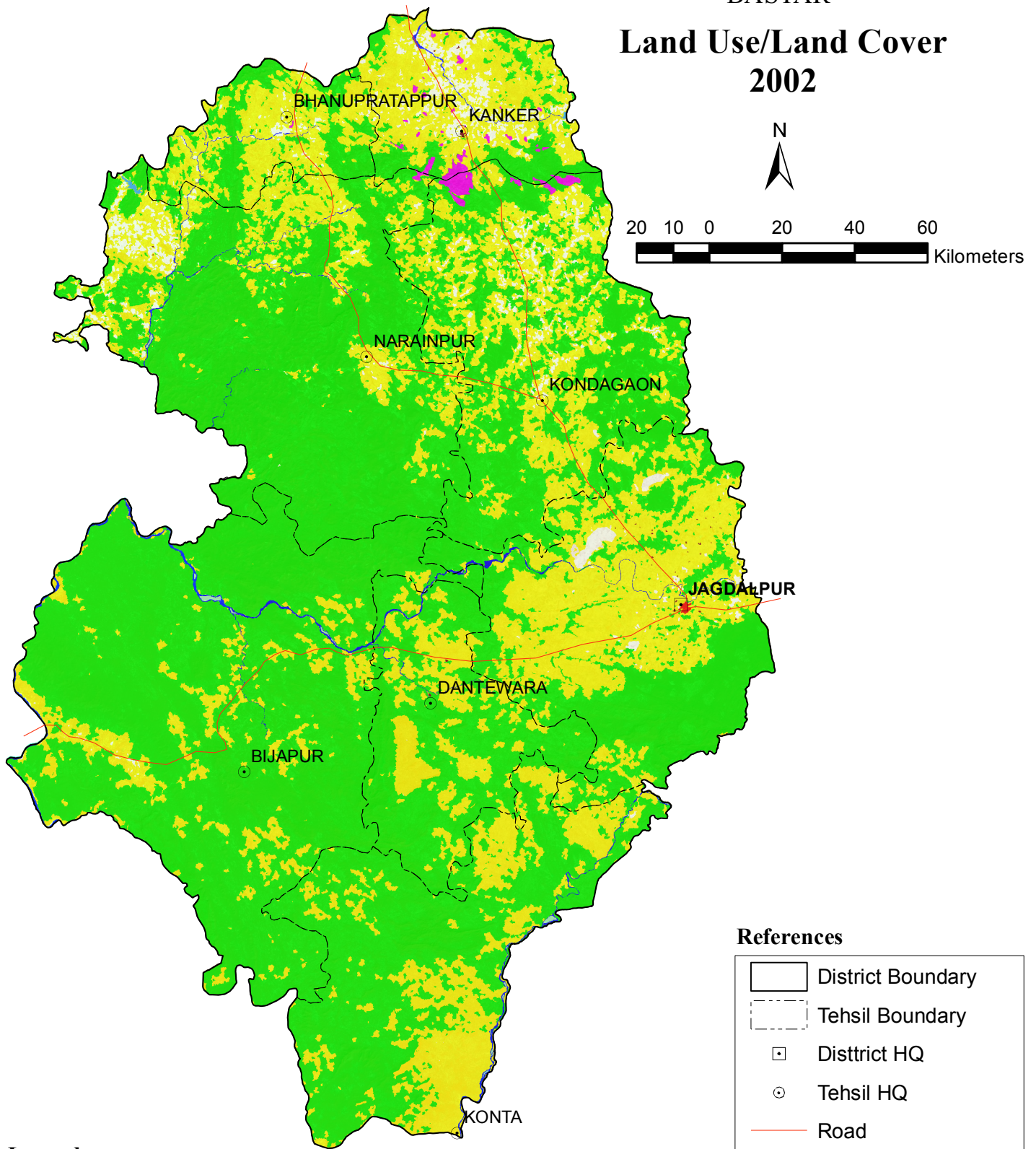
- iii. Have a proper land use plan so that crop cultivation should be followed for maximize the better harvest.
- iv. The lands occurring around hills may be put under teak, bamboo, eucalyptus plantations and grazing.
- v. The soils which are dark red in colour should be useful for sal plantation and cultivation of mustard, medium and minor millets.
- vi. Only a few patches are under wheat, gram, sugar-cane, vegetables and linseed. These areas should be brought extensively under those crops.
- vii. The soils occurring on lower piedmont, flood plain and intervening basin are well suited for multiple and mixed cropping and it should be fallowed.
- viii. The area having single crops should be put under mixed cropping and double cropping (provided irrigation facilities).
- ix. Soils on piedmont plains except few patches are under lesser millets but those are also good for groundnut, sorghum, maize, sesamum crops and these crops should be cultivated.
- x. Flood plain, lower piedmont, intervening basin soils are under *kharif rabi* crops and vegetables and at places chillies. These soils may be brought extensively under rain fed and irrigated crops and vegetables.
- xi. Lateritic soils like Bastar series are good for cashew nut plantation and such soils should be put under cashew nut/eucalyptus plantation.
- xii. The area of Abhujmal and Kutru forest of the district are having hilly (rocky) terrain with thick mixed forest and coarse grass cover. This area may be useful for wild life sanctuaries and should be kept as protected/reserved forest.

Land Use/ Land Cover map of the district derived from Landsat ETM+ satellite images is shown in fig. 15.

BASTAR

Land Use/Land Cover

2002



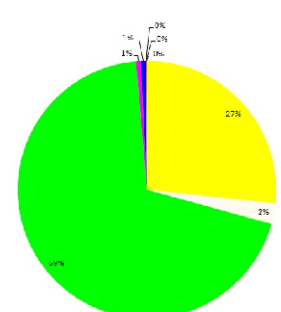
References

- District Boundary
- Tehsil Boundary
- District HQ
- Tehsil HQ
- Road

Legend

Classes	Area [sq.km]	Classes	Area [sq.km]
● Agriculture		● Uncultivable	
● Agriculture, Cropland	10428	● Barren/Uncultivable/Wastelands, Scrub Land	231
○ Agriculture, Single Crop, Fallow	1012	● Water	
● Builtup		● Wetlands/Water Bodies, Reservoir/Lakes/Ponds	15
● Built-up, Rural	26	● Wetlands/Water Bodies, River/Stream/Canals	238
● Built-up, Urban	8		
● Forest			
● Forest, Deciduous	27103		

LULC (2002): Area Statistics for Bastar District
Total Geographic Area: 39061 sq.km



Note: Refer Legend for Category

Data Source: Landsat ETM+ Satellite data of Kharif (2002) and Rabi (2002), SRTM DEM, Existing Soil Maps & Reports (NBSS & LUP), and other Statistical Data

5.

SOIL CLASSIFICATION

The soil classification and mapping are based on morphology which is influenced by various environmental factors. Soil series are the fundamental units of soil classification. The delineated soil series association units are shown on the soil map. The soil series association is a group of soils having about similar horizons, differentiating characteristics and arrangement in the profile, similar elevation and developed from same parent material. The soils within the series are essentially homogenous in all characteristics i.e. texture of the surface horizon, arrangement of horizons, slope, erosion, drainage, physiography, colour, cutans, cracks and structure and sub-group (Soil Taxonomy) too (table 10 and fig. 16).

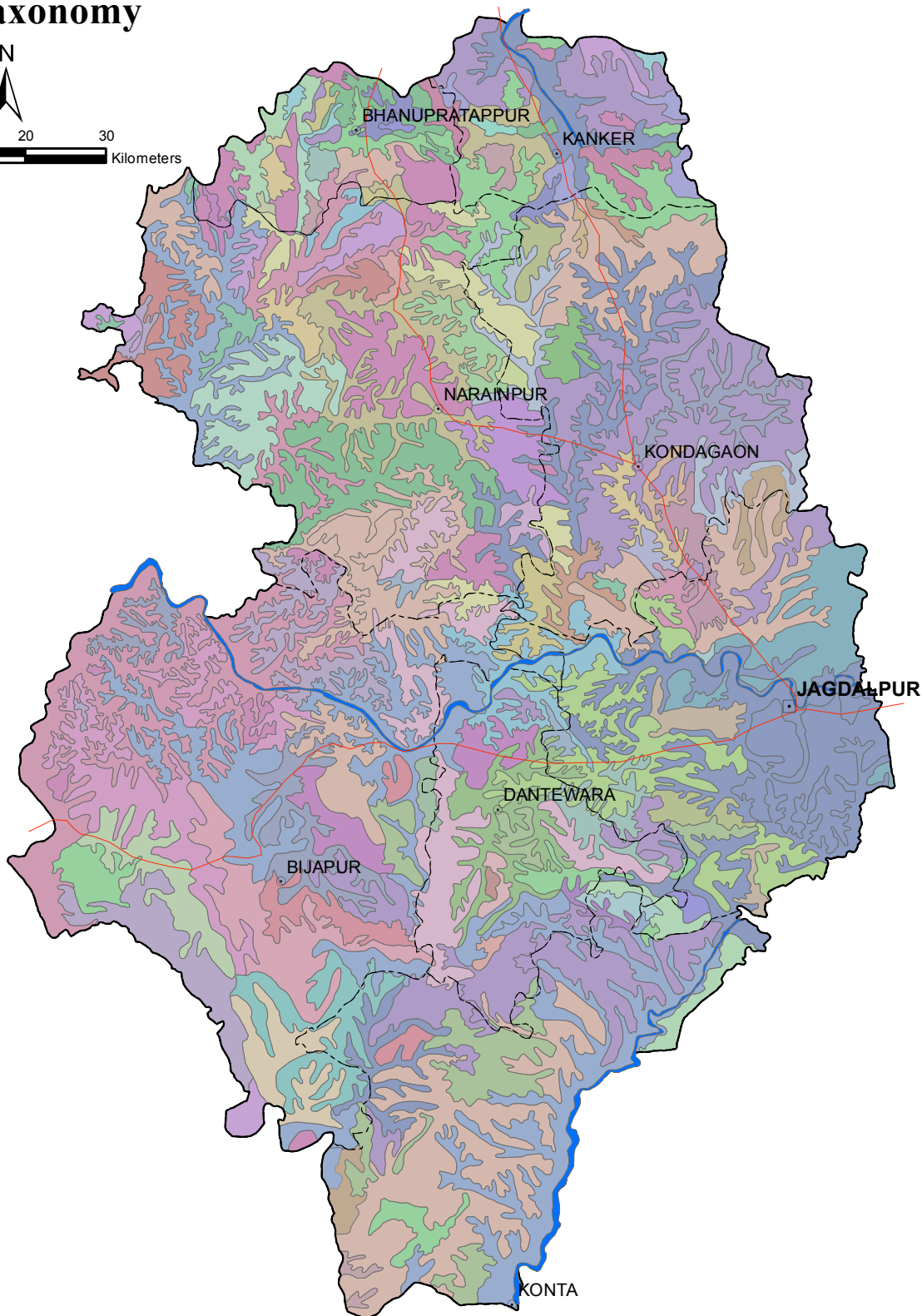
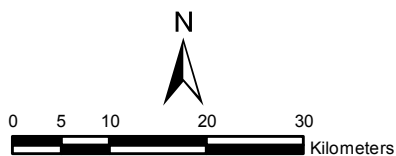
Table 10. Classification of soils of Bastar district, Madhya Pradesh

S. No.	Soil Series	Order	Sub-order	Great-group	Sub-group	Family
1	Joba	Entisol	Orthents	Ustorthent	Lithic Ustorthents	Coarse-loamy, kaol., isohyperthermic, family of Lithic Ustorthents
2	Bastar	Millisol	Ustoll	Haplustolls	Lithic Haplustoll	Fine-loamy, kaol., isohyperthermic, deep family of Lithic Haplustoll
3	Ghota	Entisol	Orthents	Ustorthent	Lithic Ustorthents	Coarse-loamy, kaol., isohyperthermic, shallow, family of Lithic Ustorthent
4	Pichekatta	Entisol	Orthents	Ustorthent	Lithic Ustorthents	Coarse-loamy, kaol., isohyperthermic, shallow family of Lithic Ustorthent
5	Bodeli	Millisol	Ustoll	Paleustoll	Typic Paloustoll	Fine-loamy, isohyperthermic deep, family of Typic Paleustoll
6	Deori	Inceptisol	Tropepts	Ustropepts	Typic Ustropepts	Fine-loamy, kaol., isohyperthermic, deep, family of Typic Ustropepts
7	Neghur	Alfisol	Ustalfs	Rhodustolf	Udic Rhodustolf	Fine-loamy, kaol., isohyperthermic, deep family of Udic Rhodust
8	Pratappur	Inceptisol	Tropepts	Ustropepts	Typic Ustropepts	Fine-loamy, kaol., isohyperthermic, deep, family of Typic Ustropepts
9	Pujarikankar	Millisol	Ustoll	Haplustoll	Lithic Haplustoll	Fine-loamy, kaol., isohyperthermic, deep family of Lithic Haplustoll
10	Bogar	Alfisol	Ustalfs	Haplustalfs	Typic Haplustalfs	Fine, kaol., isohyperthermic, deep, family of Typic Haplustalfs
11	Chaugel	Alfisol	Ustalfs	Plinthustalfs	Plinthustalfs	Fine-loamy, kaol., isohyperthermic deep, family of Plinthustalfs
12	Durgkondal	Millisol	Ustalfs	Haplustoll	Typic Haplustalfs	Fine kaol., isohyperthermic, deep family of Typic Haplustalf
13	Korogaon	Alfisol	Ustalfs	Haplustoll	Udic Haplustalfs	Fine, kaol., isohyperthermic, deep family of Udic Haplustalfs
14	Narharpur	Alfisol	Ustalfs	Haplustalfs	Typic Haplustalfs	Fine, loamy kaol., isohyperthermic, deep, family of Typic Haplustalfs
15	Basala	-do-	-do-	Plinthustalfs	Plinthustalfs	Fine, kaol., isohyperthermic, deep family of Plinthustalfs.

16	Dantewada	-do-	-do-	Haplustalfs	Udic Haplustalfs	Fine-loamy kaol., isohyperthermic, deep, family of Udic Haplustalfs
17	Kanhargaon	-do-	-do-	Plinthustalfs	Plinthustalfs	Fine, kaol., isohyperthermic, deep family of Plinthustalfs
18	Pataud	Alfisol	Ustalfs	Haplustalfs	Vertic Haplustalfs	Fine, kaol., isohyperthermic, deep, family of Vertic Haplustalfs
19	Mero	Alfisol	Aqualfs	Plinthustalfs	Aquic Vertic	Fine, kaol., isohyperthermic, deep family of Plinthustalfs
20	Kharegaon	Millisol	Ustoll	Haplustoll	Udic Haplustoll	Fine, kaol., isohyperthermic, deep family of Udic Haplustalfs
21	Ghatti	Alfisol	Ustalfs	Haplustalfs	Vertic Haplustalfs	Fine, kaol., isohyperthermic, deep, family of Vertic Haplustalfs
22	Chichgaon	Vertisol	Ustert	Chromusterts	Typic Chromustert	Fine, montmorillonitic, isohyperthermic, deep family of Typic Chromusterts
23	Khandi	Inceptisol	Tropepts	Ustropepts	Vertic Ustropepts	Fine, montmorillonitic, isohyperthermic, deep, family of Vertic Ustropept
24	Mahanadi	Entisol	Orthents	Ustorthents	Fluventic Ustorthents	Coarse-loamy, kaol., isohyperthermic, deep, family of Fluventic Ustorthents
25	Sambalpur	Vertisol	Ustert	Chromustert	Typic Chromustert	Very fine, montmorillonitic, isohyperthermic, deep, family of Typic Chromusterts

In view of the importance, of texture, the soil series are identified as a textural families as series differentiation. The other important factor is the climatic parameters i.e. moisture and temperature regimes. This also plays an important role in the soil classification. The meteorological data, soil morphological and laboratory analytical data are used and after proper characterization classified it according to Soil Taxonomy (USDA 1978). Five soil orders viz. Entisol, Inceptisol, Mollisol, Alfisol and Vertisol have been identified. Detailed soil classification is presented in table 8.

BASTAR Soil Taxonomy



Legend

Aquic Vertic Plinthoqualls-Udic Haplustalfs-Typic Haplustalfs	Plinthustalfs-Typic Haplustalfs	Typic Paleustol-Udic Haplustalfs
Fluventic Ustorthents-Plinthustalfs	Plinthustalfs-Typic Haplustalfs-Lithic Ustorthents	Typic Paleustol-Udic Haplustalfs-Plinthustalfs
Lithic Haplustol-Lithic Ustorthents-Plinthustalfs	Plinthustalfs-Typic Haplustalfs-Typic Paleustol	Typic Paleustol-Udic Rhodustalfs-Plinthustalfs
Lithic Haplustol-Lithic Ustorthents-Typic Paleustols	Plinthustalfs-Typic Haplustalfs-Udic Rhodustalfs	Typic Ustropepts-Plinthustalfs
Lithic Ustorthents	Plinthustalfs-Typic Paleustol-Udic Rhodustalfs	Typic Ustropepts-Typic Haplustalfs
Lithic Haplustol-Udic Rhodustalfs	Plinthustalfs-Typic Paleustol-Typic Haplustalfs	Typic Ustropepts-Typic Haplustalfs-Plinthustalfs
Lithic Ustorthents-Lithic Haplustalfs	Plinthustalfs-Udic Haplustalfs	Typic Ustropepts-Typic Paleustol-Plinthustalfs
Lithic Ustorthents-Lithic Haplustol-Typic Haplustalfs	Plinthustalfs-Udic Rhodustalfs-Lithic Ustorthents	Udic Haplustalfs-Vertic Ustropepts-Plinthustalfs
Lithic Ustorthents-Plinthustalfs	Plinthustalfs-Udic Rhodustalfs-Typic Ustropepts	Udic Rhodustalfs-Typic Haplustalfs-Lithic Haplustol
Lithic Ustorthents-Typic Chromusterts	Plinthustalfs-Vertic Ustropepts-Vertic Haplustalfs	Udic Rhodustalfs-Typic Haplustalfs-Typic Paleustol
Lithic Ustorthents-Typic Haplustalfs	Typic Chromusterts-Plinthustalfs-Fluventic Ustorthents	Vertic Ustropepts-Aquic Vertic Plinthoqualls-Plinthustalfs
Lithic Ustorthents-Udic Rhodustalfs	Typic Chromusterts-Plinthustalfs-Udic Rhodustalfs	Vertic Ustropepts-Aquic Vertic Plinthoqualls-Typic Chromusterts
Lithic Ustorthents-Plinthustalfs-Typic Paleustol	Typic Chromusterts-Plinthustalfs-Vertic Haplustalfs	Vertic Ustropepts-Aquic Vertic Plinthoqualls-Typic Haplustalfs
Lithic Ustorthents-Typic Ustropepts-Plinthustalfs	Typic Chromusterts	Vertic Ustropepts-Fluventic Ustorthents-Plinthustalfs
Lithic Ustorthents-Typic Ustropepts-Aquic Vertic Plinthoqualls	Typic Chromusterts-Typic Haplustalfs	Vertic Ustropepts-Fluventic Ustorthents-Typic Chromusterts
Lithic Ustorthents-Udic Rhodustalfs-Typic Haplustalfs	Typic Haplustalf-Aquic Vertic Plinthoqualls-Udic Rhodustalfs	Vertic Ustropepts-Plinthustalfs-Aquic Vertic Plinthoqualls
Plinthustalfs-Fluventic Ustorthents-Aquic Vertic Plinthoqualls	Typic Haplustalfs-Aquic Vertic Plinthoqualls	Vertic Ustropepts-Plinthustalfs-Lithic Haplustalfs
Plinthustalfs-Lithic Ustorthents-Typic Chromusterts	Typic Haplustalfs-Udic Rhodustalfs-Lithic Ustorthents	Vertic Ustropepts-Plinthustalfs-Typic Chromusterts
Plinthustalf-Aquic Vertic Plinthoqualls	Typic Paleustol-Lithic Ustorthents	Vertic Ustropepts-Typic Chromusterts-Plinthustalfs
Plinthustalf-Typic Chromusterts	Typic Paleustol-Typic Haplustalfs	Vertic Ustropepts-Typic Chromusterts-Typic Haplustalfs
Plinthustalfs-Typic Haplustalf-Typic Ustropepts	Typic Paleustol-Typic Haplustalfs-Udic Rhodustalfs	

References

□	District HQ
○	Tehsil HQ
—	District Boundary
—	Road
—	Drainage
—	River



Fig. 16: Soil Taxonomy

6.

SUGGESTED LAND USE

Taking into account the climatic make-up of the area, soil site characteristic, soils physicochemical properties, geology and present land use the suggested land use for each mapping unit have been suggested.

No doubt by adopting improved crop and management practices the yield per unit area can be raised. In the area utmost need is to be to draw the attention on extension work regarding soil based agro technology transfer so that over all development can be possible in the area. Improved crop management practices includes use of recommended doses of manure, fertilizer, improved seed of high yielding varieties, plant protection, measure, irrigation and needed clean cultivation practices etc. The suggested land use unit being in general have been given with mapping unit. Salient features (Table 6) and soil-scape with present and suggested land use as follows (table 11).

Table 11. Soil-scape and Land Use

S. No.	Geomorphologic Unit	Soil characteristics and limitations	Present land use	Suggested land use
1	Plateau (with hills)	Very shallow to shallow, lighter texture well drained, low nutrient status, low moisture holding and storage capacity, low responsive to arable crops, low production potentials, rock outcrops and susceptible to erosion.	Dry deciduous mixed forest (reserved/protected) and plantation of sal, teak, bamboo, sal, teak, bamboo and at places cultivated to lesser millets and cashewnut plantation.	Not suitable for husbandry, suitable for forestry and plantation extensively for teak, bamboo, plantation etc
2	Escarpments (with hills)	Very shallow to shallow, lighter textures moderate to excessively drained, low nutrient status, low moisture holding and storage capacity, low productivity potentials, low response to management practices, severely eroded, rock outcrops excessive. runoff and steeply sloping land	Dry deciduous mixed forest (reserved/protected) and plantation of sal, teak, bamboo etc.	-do-
3	Gently sloping subdued plateau	Deep to very deep, medium texture, well drained, low to medium nutrient status, low to medium moisture holding and storage capacity, low to medium productivity potentials, severe erosion, rock outcrops	Dry deciduous mixed, forest (reserved/protected) and plantation of sal, eucalyptus, teak, bamboo and at places cultivation of lesser millets.	Suitable for plant of sal, teak, bamboo, eucalyptus and pasture, arable land for <i>kharif</i> crops
4	Undulating subdued plateau	Shallow to moderately deep, lighter textured well drained, low nutrient status, shallow effective rooting depth, low moisture holding and storage	Dry deciduous mixed, forest (reserved/protected) and plantation of sal, teak, bamboo and coarse grasses	Suitable for crops as well as forestry and pasture. Well suited for plantation of bamboo & coarse grass etc

		capacity, low productivity potentials of arable crops, low response to management practices, severe erosion & rock out crops		
5	Upper Piedmont	Very deep, medium texture, moderate to moderately well drained, medium nutrient status, medium moisture holding and storage capacity, medium productivity potentials and response to management practices (arable crops) moderate erosion, nearly level to sloping land(3 to 5% slope	Dry deciduous mixed, forest (reserved/protected) and plantation of sal, teak, eucalyptus bamboo and at places cultivation of lesser millets, oilseeds	Best suited for plantation of sal, teak, bamboo, <i>kharif</i> , eucalyptus etc. Less millets and oilseeds can be grown extends.
6	Lower Piedmont	Very deep, medium to heavy textured, moderate to moderately well drained, medium nutrient status, medium to high moisture holding and storage capacity, medium response to management practices and medium productivity potentials	Dry deciduous mixed, forest (reserved/protected) and plantation of sal, teak, eucalyptus bamboo, wild life sanctuaries and at places cultivated to paddy, lesser millets, wheat, vegetables etc.	Best suited for plantation of sal, teak, eucalyptus garadi, land well for paddy, pulses, wheat, sugar, linseed and vegetables.
7	Valley bottom (with hills)	Very deep, moderately well drained, medium nutrient status, medium to high moisture holding and storage capacity, moderate response to management practices (arable crops) and medium productivity potentials	Dry deciduous mixed, forest (reserved/protected) and plantation of sal, teak, bamboo, wild life sanctuaries and at places cultivated to paddy, lesser millets.	Best suited for plantation of sal, teak, eucalyptus, bamboo. Arable land may be for paddy, pulses, wheat, gram, linseed vegetables etc.
8	Intervening basin (with hills)	Very deep, heavy textured, moderately well drained, medium to high nutrient status, medium to high moisture holding and storage capacity, well response to management practices (arable crops) and medium to high productivity potentials	Dry deciduous mixed, forest (reserved/protected) and plantation of sal, teak, eucalyptus bamboo, and cultivated to paddy, wheat, sugarcane, gram, vegetables etc.	Best suited for plantation of sal, garadi, Arable land be suited for paddy, wheat, sugarcane, linseed and vegetables.
9	Flood plain	Very deep, medium to heavy textured, moderate to moderately well drained, medium to high nutrient status, medium moisture holding and storage capacity, response to management practices (arable crops) and medium productivity potentials	Dry deciduous mixed, forest (reserved/protected) and at places cultivated to paddy, wheat, pulses, sugarcane, gram, vegetables etc.	Best suited for plantation of sal, teak, eucalyptus garadi. Arable land may be for paddy, gram, sugar, linseed vegetables etc.

APPENDIX – I

Soil Survey Report of Bastar District (Madhya Pradesh)

Horizon	Depth (cm)	Coarse fragment >2mm of whole soil	Particle size distribution			Org. Carbon (%)	Ext. Iron as Fe (%)	pH		Bulk density Mgm ⁻³	Ratios to clay		Extractable bases					CEC (NH ₄ OAC)	Base saturation on percent NH ₄ OAC
			Sand (2.0-0.05) (%)	Silt (0.05-0.002) (%)	Clay (<0.002)			1:1 Soil:1NKC1	1:2:5 Soil: Water		CEC	Ext. Iron	Ca ⁺⁺	Mg ⁺⁺	Na ⁺	K ⁺	Sum		
JOBA SERIES (LITHIC USTORTHENT)																			
A	0-6	51.1	45	22	32	0.84	1.00	4.8	5.5	1.62	0.40	0.03	3.5	2.50	0.10	0.18	6.28	14.52	43
A12	6-13	51.1	42	24	34	0.80	1.30	4.7	5.5	1.52	0.40	0.04	3.0	2.50	0.10	0.19	5.79	13.9	42
R	13-20+																		
BASTAR SERIES(LITHIC HAPLUSTOLLS)																			
A	0-10	23	36	26	38	0.71	1.60	4.9	5.8	1.58	0.52	0.04	4.32	1.68	0.60	0.36	3.04	19.4	41
B	10-25	44	32	26	41	0.59	1.73	4.9	5.5	1.60	0.40	0.04	4.64	1.68	0.87	0.27	9.47	19.2	49
C	25-60+	69	34	25	41	0.52	1.80	4.6	6.0	-	0.46	0.04	6.60	2.16	0.27	0.31	9.34	19.0	49
GHOTA SERIES (LITHIC USTORTHENT)																			
A	0-8	11	65	9	26	0.91	1.04	5.4	6.4	1.61	0.73	0.04	3.9	0.5	0.6	-	5.6	18.2	31
A12	8-22	11	52	13	35	0.80	1.60	5.0	6.0	1.82	0.57	0.05	3.0	0.3	0.3	-	3.9	16.0	23
R	22+	Rock																	
PICHEKATTA SERIES (LITHIC USTORTHENT)																			
A	0-7	5.2	80	2	10	0.54	1.06	5.1	7.2	1.7	0.68	0.06	6.7	1.7	0.5	0.2	9.1	17.1	58
A12	7-16	8.4	66	3	31	0.40	1.54	5.2	7.5	1.3	0.68	0.05	12.7	1.5	0.4	0.2	14.0	18.8	79
R	16-32+	Rock																	
BODELI SERIES (TYPIC PELEUSTOLL)																			
A	0-14	1.3	53	17	29	0.06	3.27	4.3	5.9	1.6	0.68	0.11	6.6	2.5	0.2	0.2	9.5	19.6	48
B11	14-34	1.2	43	20	37	0.76	3.17	4.5	5.9	1.6	0.62	0.80	7.4	2.2	0.2	0.3	10.1	23.0	44
B12t	34-58	5.6	48	21	39	0.51	2.60	4.5	5.8	1.5	0.64	0.06	8.8	2.7	0.3	0.2	12.0	24.9	50
B2	58-82	71.4	39	17	44	0.48	3.30	5.1	5.8	1.5	0.55	0.08	8.0	2.8	0.3	0.2	12.1	24.1	50
C	82-95	44.4	37	13	50	0.25	4.60	5.3	6.1	1.5	0.54	0.09	9.5	2.6	0.4	0.2	11.7	26.0	48
DEORI SERIES (TYPIC USTOPEPT)																			
A	0-8	-	72	11	17	0.32	0.43	4.8	6.8	1.7	0.30	0.05	3.0	0.5	0.05	0.11	3.66	5.11	71
A12	8-21	-	70	12	18	0.27	1.25	4.7	5.9	1.6	0.30	0.06	3.5	1.0	0.09	0.16	4.75	5.33	90
B	21-50	-	72	8	20	0.22	1.15	4.8	6.0	1.6	0.18	0.04	3.5	1.5	0.06	0.10	5.74	5.36	95
C	50-60+	23	70	10	20	0.14	1.20	5.0	6.7	1.0	0.33	0.06	3.5	1.5	0.09	0.36	5.44	5.44	83
NEGHR SERIES(UDIC RHODUSTALF)																			
A	0-14	1.2	64	17	19	0.70	5.50	4.9	6.8	1.7	0.75	0.26	0.5	4.0	0.35	0.42	13.27	19.4	72
A12	14-26	1.5	64	13	23	0.75	5.12	4.7	5.8	1.5	0.88	0.22	0.8	4.0	0.19	0.18	12.37	19.9	62
B12	26-43	2.6	55	10	26	0.70	6.00	4.7	5.8	1.7	0.78	4.77	0.5	4.0	0.32	0.34	12.04	20.7	62
B22	43-59	69.2	58	20	30	0.69	5.12	4.7	5.9	-	0.55	0.14	0.5	3.5	0.26	0.39	13.65	19.7	64
C	59-91+	1.5	53	19	28	0.56	6.17	4.8	5.9	-	0.61	0.21	0.5	2.0	0.43	0.42	11.3	17.3	66
PRATAPPUR SERIES(TYPIC USTOPEPT)																			
A	0-7	-	76	9	15	0.49	0.65	5.3	6.0	1.5	0.56	0.04	5.64	0.44	0.13	0.34	6.55	0.15	80
B1	7-20	-	67	10	23	0.47	1.09	4.0	5.9	1.6	0.27	0.03	4.64	0.54	0.65	0.36	6.21	0.9	70

Soil Survey Report of Bastar District (Madhya Pradesh)

B2	20-45	-	63	12	25	0.39	1.10	4.0	5.9	-	0.33	0.04	4.64	0.24	0.50	0.28	5.69	0.9	65
R	45-60+	Rock																	
PUJARIKANKER SERIES (LITHIC HAPLUSTOLL)																			
A	0-6	-	65	11	24	0.70	0.93	5.4	6.4	1.6	0.42	0.04	7.6	1.1	0.36	0.42	8.40	10.2	83
A12	6-24	-	50	10	40	0.67	1.36	4.7	5.9	1.6	0.50	0.03	12.0	4.5	0.20	0.5	17.2	20.1	85
B	24-40	-	51	10	39	0.54	1.18	4.7	6.0	1.7	0.53	0.03	10.1	4.0	0.18	0.34	16.4	20.4	76
C	40-55+	-	45	10	45	0.11	1.19	4.9	6.0	1.8	0.43	0.03	10.0	5.6	0.21	0.34	16.9	21.3	70
BOGAR SERIES (TYPIC HAPLUSTALF)																			
Ap	0-19	1.1	57	15	27	0.71	1.30	5.2	6.2	1.6	0.70	0.05	8.0	2.5	0.10	0.12	10.72	18.7	57
A12	19-49	2.4	54	30	33	0.40	1.35	5.0	6.1	1.6	0.57	0.04	7.5	3.0	0.16	0.22	11.72	18.9	62
B1	49-80	2.6	52	11	36	0.38	1.60	5.3	6.1	1.6	0.55	0.04	7.5	3.0	0.23	0.22	11.75	20.1	50
B21t	80-97	3.0	48	23	28	0.29	1.50	5.5	6.1	1.7	0.56	0.04	7.2	4.0	0.14	0.21	11.56	21.2	54
B22t	97-138	3.9	50	12	38	0.25	1.50	5.5	6.6	1.7	0.63	0.04	11.0	7.5	0.22	0.33	19.00	22.7	06
C	139-160+	-	60	14	26	0.13	1.70	5.3	6.7	1.6	0.32	0.06	8.9	3.0	0.10	0.25	12.25	15.9	77
CHAUGEL SERIES (PLINTHUSTALFS)																			
Ap	0-18	-	72	10	10	0.64	2.10	4.0	6.1	1.6	0.60	0.13	5.36	2.16	0.32	0.20	0.12	14.5	56
A12	18-42	1.2	69	12	20	0.60	2.36	4.9	6.2	1.6	0.61	0.08	6.20	2.24	0.45	0.30	9.35	17.2	54
B21	42-79	1.3	60	10	30	0.52	1.90	4.0	6.2	1.5	0.63	0.06	7.80	2.50	0.36	0.25	10.91	20.2	54
B22	79-123	1.2	49	12	39	0.40	2.03	5.0	6.5	1.7	0.56	0.05	8.24	2.92	0.38	0.20	12.74	20.2	61
B23t	123-194	15.6	44	19	37	0.36	2.09	5.3	6.5	1.7	0.54	0.05	0.52	2.46	0.23	0.33	12.34	19.0	61
B24t	194-200+	5.0	55	15	30	0.17	3.40	5.3	6.5	1.7	0.60	0.11	5.00	3.40	0.31	0.30	9.97	10.2	55
BASALA SERIES (PLINTHUSTALF)																			
Ap	0-17	-	57	11	32	0.56	1.65	5.6	6.4	1.7	0.40	0.05	5.5	2.2	0.20	0.20	0.1	13.1	62
B1	17-37	-	47	14	39	0.40	1.67	5.7	6.1	1.7	0.46	0.04	5.5	3.2	0.20	0.20	9.1	18.0	57
B2	37-60	1.3	37	17	46	0.36	1.69	5.3	6.1	1.7	0.57	0.04	8.0	4.5	0.20	0.10	12.0	22.7	56
B22t	60-115	1.8	37	18	55	0.31	1.77	5.5	6.2	1.7	0.49	0.03	13.0	5.0	0.20	0.30	18.5	26.2	71
B23t	115-134	1.9	33	20	47	0.29	1.81	5.6	6.3	1.7	0.44	0.04	14.0	5.0	0.30	0.20	19.5	23.1	84
C	134-147+	1.8	27	16	57	0.26	1.09	5.9	6.5	1.7	0.40	0.02	14.2	5.0	0.40	0.20	20.3	25.2	81
DANTEWADA SERIES (ODIC RAPLUSTALF)																			
A	0-8	-	76	6	18	0.26	1.35	5.0	6.2	1.8	0.64	0.08	5.36	1.48	0.32	0.30	7.46	11.4	65
A12	8-25	-	57	10	33	0.25	1.32	5.4	6.4	1.6	0.40	0.04	9.80	1.20	0.30	0.33	11.61	14.6	50
B21	25-41	-	48	19	35	0.23	1.52	4.5	5.9	1.6	0.55	0.04	9.44	3.12	0.15	0.42	13.13	19.0	69
B22t	41-63	-	47	17	36	0.19	1.31	4.7	6.0	1.9	0.51	0.04	0.84	3.21	0.21	0.49	13.74	18.1	76
B23t	63-89	-	41	17	41	0.13	1.61	4.6	6.1	1.9	0.54	0.03	11.80	3.60	0.22	0.50	13.74	21.9	74
B24t	89-122	-	42	18	41	0.11	1.32	5.1	6.6	1.9	0.57	0.03	13.90	5.10	0.26	0.40	19.66	23.6	83
C	122-145+	-	32	19	49	0.10	1.40	6.0	7.5	1.9	0.53	0.03	16.6	5.50	0.36	0.50	22.96	25.8	90
KANHARGAON SERIES (PLINTRUSTALFS)																			
Ap	0-16	0.6	55	13	32	0.56	1.56	5.2	5.9	1.6	0.43	0.05	10.0	1.0	0.3	0.2	11.5	13.1	88
A12	16-39	1.1	55	14	31	0.39	1.18	5.3	6.3	1.6	0.34	0.04	6.0	1.5	0.2	0.2	7.2	10.4	76
B21t	39-72	0.6	53	13	31	0.27	1.68	5.2	6.5	1.7	0.42	0.05	10.0	3.5	0.3	0.1	13.9	14.3	97

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B22T	72-102	1.2	59	9	32	0.19	1.37	5.4	6.8	1.7	0.48	0.04	11.0	2.5	0.3	0.1	13.9	15.4	90
C	702-150+	3.8	50	9	41	0.16	1.25	5.9	6.5	1.7	0.47	0.03	14.0	4.0	0.2	0.04	18.2	19.4	94
DURGKONDAL SERIES (TYPIC HAPLUSTALF)																			
Ap	0-10	-	68	13	19	0.89	1.87	5.1	5.6	1.6	0.34	0.10	3.9	1.3	0.1	0.10	5.40	10.2	53
B1	10-31	0.6	58	14	28	0.87	2.25	4.8	5.5	1.6	0.35	0.35	3.9	1.3	0.2	0.10	5.50	9.0	56
B2	31-51	-	43	27	30	0.75	2.06	5.0	5.6	1.6	0.32	0.07	4.6	1.7	0.1	0.04	6.44	9.4	67
B22	51-94	-	44	21	35	0.51	3.25	5.1	6.2	1.6	0.30	0.09	4.6	1.7	0.1	0.03	6.43	9.3	67
B23	94-126	1.3	51	14	35	0.47	3.25	5.4	6.2	1.6	0.29	0.09	4.6	1.7	0.2	0.05	6.55	9.9	66
C	126-152+	2.6	40	15	37	0.43	3.00	5.6	6.3	1.6	0.26	0.08	4.8	1.7	0.1	0.05	6.65	9.5	70
KOROGAON SERIES (UDIC HAPLUSTALF)																			
Ap	0-18	-	40	38	22	0.91	1.56	4.3	5.5	1.4	0.50	0.07	2.9	1.0	0.1	0.2	4.10	10.0	38
B2	18-30	-	19	28	51	0.92	1.70	4.5	5.5	1.4	0.34	0.03	4.8	1.5	0.1	0.1	6.07	17.5	39
B22t	30-66	1.3	21	33	45	0.62	1.66	4.5	6.5	1.5	0.37	0.04	7.3	3.0	0.1	0.1	10.49	17.0	62
B23t	66-87	4.9	18	34	48	0.41	1.74	4.4	6.4	1.6	0.33	0.04	7.3	2.5	0.1	0.1	9.90	17.3	56
B24t	87-114	17.8	21	25	55	0.34	1.64	4.4	6.4	1.7	0.33	0.03	7.0	2.5	0.2	0.1	1.60	18.1	59
C	114-150+	-	25	32	42	0.22	1.87	4.5	6.5	1.6	0.47	0.04	7.0	3.3	0.2	0.1	11.09	18.7	59
NARHARPUR SERIES (TYPIC HAPLUSTALF)																			
A	0-16	13.3	66	13	21	0.42	1.55	5.4	6.3	1.6	0.29	0.07	3.50	1.00	0.08	0.25	4.03	6.1	79
A2	16-41	-	64	18	18	0.30	1.66	4.1	5.5	1.5	0.37	0.09	3.50	0.50	0.07	0.08	4.15	6.8	61
A21	41-60	-	54	22	21	0.26	1.74	4.2	5.6	1.5	0.35	0.07	5.50	0.50	0.12	0.25	6.37	8.8	72
A22t	60-80	-	61	9	31	0.14	1.23	4.5	5.9	1.6	0.31	0.04	5.50	0.50	0.10	0.26	6.36	9.7	66
C	80-105+	-	62	12	26	0.11	1.45	4.6	6.1	1.6	0.35	0.06	6.25	0.25	0.10	0.39	7.24	9.1	80
PATAUD SERIES (VERTIC HAPLUSTALS)																			
Ap	0-20	2.0	49	26	25	0.23	0.30	6.0	8.0	1.9	0.62	0.01	11.5	3.5	0.18	0.25	15.43	15.6	99
A12	20-47	9.0	18	18	31	0.12	0.46	6.5	8.5	1.9	0.69	0.01	15.0	4.5	0.43	0.44	20.37	21.4	95
B21	47-81	5.0	21	21	28	0.12	0.43	6.7	8.8	1.9	0.72	0.01	13.5	6.5	0.59	0.36	20.95	21.4	98
B22	81-120	5.0	20	20	25	0.10	0.37	6.9	8.5	1.9	0.72	0.01	12.5	4.0	0.60	0.28	17.38	17.6	99
IIC	120-140+	5.0	19	19	23	0.06	0.35	6.8	8.8	1.9	0.77	0.01	13.0	3.0	0.60	0.31	16.91	17.6	76
MERO SERIES (ACQUIC VERTIC PLINTHAQUALFS)																			
Ap	0-20	8.7	57	21	22	0.57	2.30	5.2	6.0	1.6	0.75	0.10	5.68	2.68	0.71	0.20	9.07	17.5	52
Bt	20-38	4.1	41	28	30	0.56	2.41	5.0	5.7	1.5	0.72	0.08	6.96	2.64	0.86	0.22	10.68	21.6	49
B21t	38-82	2.0	41	23	36	0.52	2.61	5.0	5.9	1.6	0.60	0.07	7.44	3.12	0.55	0.22	11.63	21.9	53
B22t	82-124	3.0	40	24	36	0.44	1.82	5.1	6.5	1.7	0.58	0.04	8.68	4.36	0.97	0.21	14.72	21.8	68
B23t	124-130	7.4	57	17	26	0.38	1.90	5.2	6.4	1.7	0.72	0.07	6.76	3.84	0.89	0.16	11.65	18.3	64
C	130-150+	9.7	61	13	25	0.38	1.90	5.2	6.5	1.8	0.71	0.07	6.28	3.96	0.85	0.18	11.27	18.2	62
KHEROGAON SERIES (UDIC HAPLUSTOLLS)																			
Ap	0-12	2.0	24	35	41	0.98	1.80	5.4	6.4	1.6	0.91	0.04	24.00	8.12	0.91	0.52	33.55	38.0	88
A12	12-29	14.3	23	38	39	0.87	1.60	5.3	6.4	1.6	0.95	0.04	21.60	8.64	0.79	0.29	31.32	37.5	84
B21t	29-46	5.42	23	31	46	0.79	1.35	5.1	6.3	1.6	0.80	0.03	19.68	8364	0.32	0.37	24.01	37.4	78
B22t	46-60	-	26	35	39	0.55	1.66	5.2	6.3	1.5	0.93	0.04	18.72	9.12	0.82	0.47	29.16	36.0	81

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B23t	60-110+	80	27	34	39	0.39	1.67	5.4	6.6	1.6	0.91	0.04	19.68	1.08	0.98	0.58	31.32	35.5	88
GHATTI SERIES (VERTIC HAPLUSTALFS)																			
A	0-15	-	57	12	31	0.58	1.65	5.0	6.2	1.5	0.75	0.05	9.12	3.84	0.34	0.50	13.80	23.1	60
A12	15-39	1	37	21	42	0.56	1.30	5.1	6.6	1.7	0.76	0.03	14.00	6.10	0.85	0.56	21.16	28.2	76
B1	39-85	2	32	23	45	0.54	1.45	5.4	6.8	1.7	0.79	0.03	18.52	11.36	0.67	0.63	31.18	35.2	89
B12t	85-126	-	28	26	45	0.50	1.66	5.6	7.4	1.9	0.84	0.04	22.80	12.72	0.41	0.48	34.41	38.5	89
B22t	126-140+	3	31	25	43	0.44	1.70	5.7	7.3	1.0	0.90	0.04	21.12	12.51	0.77	0.44	34.92	38.5	91
CHICHGAON SERIES (TYPIC CHROMUSTERT)																			
Ap	0-15	-	60	14	26	0.46	1.70	4.0	6.3	1.7	0.84	0.06	9.7	3.5	0.10	0.20	13.05	21.4	63
A12	15-40	12.5	53	15	32	0.25	1.60	5.0	6.7	1.6	0.92	0.06	12.7	6.5	0.20	0.20	19.60	22.8	86
A13	40-71	6.3	46	16	38	0.19	1.30	5.0	6.7	1.8	0.71	0.05	11.8	6.7	0.30	0.40	19.20	27.1	71
AC	71-109	19.2	31	16	53	0.76	1.00	6.0	6.5	1.8	0.65	0.03	13.5	7.5	0.40	0.40	21.80	29.0	75
C	109-150+	15.0	37	14	48	0.13	1.80	5.9	7.0	1.8	0.51	0.04	14.2	7.2	0.30	0.40	22.10	25.1	86
KHANDI SERIES (VERTIC USTROPEPT)																			
Ap	0-14	-	42	19	39	0.42	1.59	4.9	6.2	1.7	0.79	0.04	9.8	8.7	0.4	0.2	19.1	31.1	61
B12	14-39	1.3	28	26	46	0.41	1.40	5.4	6.3	1.6	0.72	0.03	10.8	8.2	0.4	0.4	17.6	33.2	60
B21t	39-72	1.4	37	21	42	0.48	1.60	5.3	6.4	1.7	0.68	0.04	14.8	8.5	0.4	0.4	24.1	35.7	68
B22t	72-110	1.1	29	19	51	0.39	1.69	5.3	6.5	1.7	0.70	0.03	16.5	9.7	0.4	0.5	27.1	33.8	76
C	110-150+	-	29	24	47	0.39	1.75	5.2	6.7	1.7	0.71	0.04	15.0	8.8	0.4	0.5	24.8	33.2	75
MAHANADISERIES (FLUVENTIC USTORTENT)																			
Ap	0-17	-	68	15	17	0.48	0.18	5.6	6.7	1.4	0.89	0.07	11.5	1.5	0.21	0.11	13.31	15.1	86
A12	17-32	-	65	15	20	0.32	0.18	5.4	6.7	1.6	0.90	0.06	13.0	2.5	0.22	0.08	15.03	17.6	97
A13	32-68	-	71	10	19	0.26	0.87	5.4	6.8	1.6	0.72	0.05	10.5	1.5	0.18	0.10	12.28	13.9	89
A14	68-93	-	78	9	13	0.19	0.81	5.4	6.9	1.5	0.88	0.06	7.5	2.0	0.17	0.06	9.73	11.7	83
AC	92-120	-	74	10	16	0.16	0.68	5.4	6.9	1.5	0.73	0.04	7.5	1.5	0.14	0.04	8.98	11.8	76
C	120-155+	-	69	14	17	0.11	0.81	5.2	6.9	1.7	0.69	0.05	8.3	1.0	0.17	0.04	9.81	11.7	84
SAMJALPUR SERIES (TYPIC CHROMUSTERTS)																			
Ap	0-14	0.7	23	32	45	0.66	1.19	4.9	6.5	1.6	1.58	0.03	15.8	6.8	0.3	0.4	23.3	30.5	76
A12	14-47	1.3	15	31	54	0.50	1.17	5.4	7.3	7.6	1.54	0.02	15.8	12.3	0.5	0.4	29.0	30.3	93
A13	47-84	1.6	13	30	57	0.38	1.21	5.1	7.4	1.7	1.54	0.02	14.8	13.6	0.6	0.4	29.4	30.5	96
A14	84-126	1.6	12	25	63	0.36	1.30	5.3	7.6	1.7	1.53	0.02	17.2	13.4	0.8	0.5	31.5	33.0	97
AC	126-145+	-	14	24	62	0.32	1.40	5.6	7.7	1.7	0.54	0.02	18.2	11.5	0.9	0.4	31.0	33.0	94

CONTRIBUTORS

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