

# Inventory of Soil Resources of Narmada District, Gujarat Using Remote Sensing and GIS Techniques

## ABSTRACT

1.	Survey Area	Narmada district, Gujarat
2.	Geographical Extent	73°17' and 73°59'-East Longitude and 21°23' and 22°05'- North Latitude
3.	Agro Climate Region	XIII- Gujarat plain and hills
4.	Total area of the district	3,09,541 ha.
5.	Kind of Survey	Soil Resource Mapping using remote sensing techniques and GIS techniques
6.	Base map	(a)IRS-ID Geocoded Satellite Imagery (1:50,000 Scale) (b) SOI –Toposheet ( 1:50,000 scale )
7.	Scale of mapping	1: 50,000
8.	Period of survey	Dec,2008 to Feb,2009

### 9. Soil Series association mapped and their respective area.

Sl. No	Mapping Unit	Series Association	Area (%)	Area (%)
A01	ALb2a1	Sajod-Thasra	13846	4.47
A02	ALb2a2	Varnol-Sajod	5759	1.86
A03	ALb2a3	Sajod-Varnol	5824	1.88
A04	ALb2a4	Thasra-Sajod-Varnol	9275	3.00
A05	ALb2d1	Thasra-Kawa-Sajod	659	0.21
A06	ALb2d2	Kawa-Sajod	2663	0.86
A07	ALg3d1	Malitha-Rumalpura	1284	0.41
A08	ALb2a5	Thasra-Sajod	683	0.22
A09	ALh4d1	Rumalpura-Mulad	3562	1.15
A10	ALi5a6	Derol-Rumalpura	19108	6.17
A11	ALb2a6	Rumalpura-Thasra	4098	1.32
A12	ALb3a1	Bariya-Borsad-Rumalpura	757	0.24
A13	ALb3a2	Borsad-Bariya	137	0.04
A14	ALb3d1	Rumalpura-Borsad	187	0.06
A15	ALb2a7	Varnol-Thasra	1254	0.41
B01	BAn8c1	Kavachiya-Dungra	29779	9.62
B02	BAn8c2	Dungra-Kavachiya	48156	15.56
B03	BAn8d1	Kavachiya-Dungra	9621	3.11
B04	BAn6c1	Kavachiya-Dungra	14547	4.70
B05	BAn6c2	Dungra-Kavachiya	13596	4.39
B06	BAn6a1	Kavachiya-Dungra	4287	1.38
B07	BAu5a1	Jambar	1839	0.59
B08	BAu4a1	Jambar	44967	14.53
B09	BAu4d1	Jambar	3715	1.20
B10	BAv3a1	Chandravan-Kadaba	13219	4.27
B11	BAw2a1	Sagbara-Chandeliya	12616	4.08
B12	BAw2a2	Chandeliya-Sagbara	4502	1.45

Sl. No	Mapping Unit	Series Association	Area (%)	Area (%)
B13	BAG4d1	Kadaba-Chandeliya	1669	0.54
B14	BAu4a2	Chandeliya-Kadaba	10541	3.41
B15	BAu5a2	Jambar	901	0.29
B16	BAn8c2	Kavachiya-Dungra	136	0.04
S01	SDo6c1	Naswadi-Kothiya	426	0.14
S02	SDu4d1	Chametha-Godham	1161	0.38
S04	SDu4d2	Nanakothiya	46	0.01
H			4599	1.49
R			7399	2.39
T			12723	4.11
<b>Total</b>			<b>309541</b>	<b>100.00</b>

#### 10. Physiography wise Distribution of area and their percentage.

Landscape	Physiography	Area (ha)	Area (%)
Alluvium	Alluvial plains	45142	14.58
	Dissected stream banks	3562	1.15
	Ravinous lands	19108	6.17
	Stream banks	1284	0.41
Basalt	Lower pediplains	17118	5.53
	Narrow mountain valleys	1669	0.54
	Pediments	61963	20.02
	Undifferentiated hills side slope	120122	38.81
	Upper pediplains	13219	4.27
Sandstone	Foot hill slopes	426	0.14
	Pediments	1207	0.39
	Misc	24721	7.99
<b>Total</b>		<b>309541</b>	<b>100.00</b>

#### 11. Slope wise Distribution of area and their percentage.

Slope Classes	Area(ha)	Area (%)
Nearly level to very gently sloping	61179	19.76
Very gently sloping to gently sloping	15584	5.03
Gently sloping to moderately sloping	65661	21.21
Moderately sloping to strongly sloping	21848	7.06
Strongly sloping to moderately steep	32856	10.61
Steep to very steep	87692	28.33
Misc.	24721	7.99
<b>Total</b>	<b>309541</b>	<b>100.00</b>

**12. Depth wise Distribution of area and their percentage.**

Depth	Area (ha)	Area (%)
Shallow	171970	55.56
Shallow to moderately deep	1161	0.38
Moderately deep to deep	13219	4.27
Deep to very deep	29328	9.47
Very deep	69142	22.34
Misc.	24721	7.99
<b>Total</b>	<b>309541</b>	<b>100.00</b>

**13. Various land use / Land cover wise Distribution of area and their percentage.**

Land use	Area (ha)	Area (%)
Agriculture	153613	49.63
Forest	106640	34.45
Open scrub	24567	7.94
Misc.	24721	7.99
<b>Total</b>	<b>309541</b>	<b>100.00</b>

**14. Soil under Different Erosion Classes.**

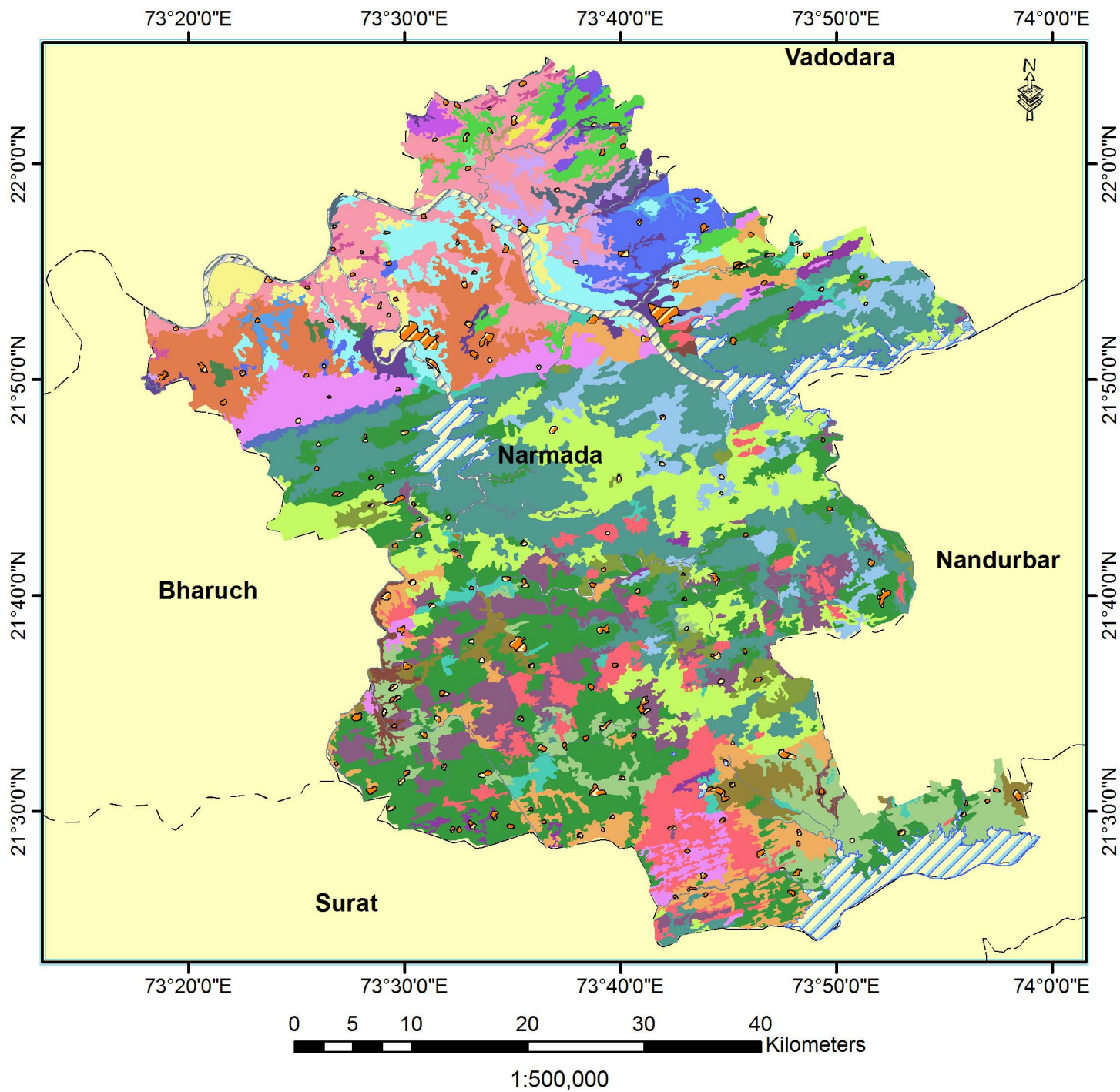
Erosion	Area (ha)	Area (%)
None to slight erosion	61179	19.76
Slight to moderate erosion	14300	4.62
Moderate to severe erosion	63170	20.41
Severe water erosion	120548	38.94
Severe to very severe erosion	25623	8.28
Misc.	24721	7.99
<b>Total</b>	<b>309541</b>	<b>100.00</b>

**15. Soil under Different Land Capability Classes.**

Land Capability Class	Area (ha)	Area (%)
II	19857	6.41
III	13406	4.33
II-III	42216	13.64
III-IV	3562	1.15
IV	2953	0.95
IV-VI	63170	20.41
VI	23395	7.56
VII-VIII	9621	3.11
Forest	106640	34.45
Misc.	24721	7.99
<b>Total</b>	<b>309541</b>	<b>100.00%</b>

## 10. Salient Features:

- Total 24 soil series have been mapped in Narmada district of Gujarat.
- Out of total area of 3,09,541 ha shallow soils have maximum coverage occupying 1,71,970 ha (55.56%) followed by very deep soils with area of 6, 9142 ha (22.34%), deep to very deep soils 29,328 ha (9.47%), moderately deep to deep 13,219 ha (4.27) %, shallow to moderately deep 1161 ha (0.38%) , miscellaneous land occupy 24,721 ha (7.99%).
- Agricultural land covers an area of 1,53,613 ha (49.63%), followed by forest land 1,06,640 ha (34.45%) and open scrub 24, 567 (7.94%).
- Physiography of Narmada district is having mainly ten physiographic units.



Legend									
Soil Mapping Units									
	ALb2a1		ALh4d1		BAn8c2		BAv3a1		Tank
	ALb2a2		ALb2d1		ALi5a6		BAn8d1		BAw2a1
	ALb2a3		ALb2d2		BAG4d1		BAu4a1		BAw2a2
	ALb2a4		ALb3a1		BAn6a1		BAu4a2		SDo6c1
	ALb2a5		ALb3a2		BAn6c1		BAu4d1		SDu4d1
	ALb2a6		ALb3d1		BAn6c2		BAu5a1		SDu4d2
			ALg3d1		BAn8c1		BAu5a2		Habitation
									District Boundary

Fig No1.-Soil Map



# HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the soil resource mapping of Narmada district of Gujarat providing information on the geographical setting of the district, such as location, extent, physiography, relief, drainage, climate, geology, natural vegetation, agriculture, land use & soils.

The report contains other information on interpretative grouping of soils such as land capability classes; land irritability classes, soil suitability grouping and hydrological grouping and also recommendation for crops ; horticulture development, forest, forage and grasslands development; water harvesting, water storage and water management that are essential for soil land resource management. The genesis and classification of the soils are also discussed in **chapter-5**.

Narmada district of Gujarat is spread over an area of 3,09,541.46 ha. The district is covered by - SOI topographical sheets on the scale of 1:50,000 which are used as base material along with satellite imageries.

Each soil mapping unit is marked by mapping unit i.e. Alb2a1 (Alluvium, alluvial plain; 0-3% slope; agriculture land use; soil series Association, describing Sajod – as dominant series in association with Varnol, Thasra & Kawa series). Each soil association is restricted to maximum of three soil series.

For the use of the soil resource mapping report, first locate the area of your interest on the map. For the detailed information on soil mapping unit in respect of soil series of the area of interest, its extent, present and proposed land uses, and reference may be made to **chapter-4**, appendix I and II.

The mapping unit used in soil mapping represents the five levels of mapping i.e. Alb2a1 may be referred as follow:

- |    |   |   |              |
|----|---|---|--------------|
| AL | - Alluvium  | - | Landscape    |
| b  | - Alluvium plain  | - | Physiography |
| 2  | - 0-3 %   | - | Slope class  |
| a  | - Agriculture land  | - | Land use     |
| 1  | - Association of soil series with erosion and management soil unit. |   |              |

Any comment and suggestion on the report would be welcome. For any further enquiry/or clarification, correspondence or personal contact may be established, with the

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