

सारांश / ABSTRACT

1.	सर्वेक्षण क्षेत्र / Survey area	:	जिला- भावनगर, गुजरात / Bhavnagar District, Gujarat
2.	भौगोलिक सीमा / Geographical Extent	:	पूर्व देशांतर: 72°23'24'' to 72°28'51'' पूर्व उत्तर अक्षांश : 20° 59'33'' to 22° 21'26'' उत्तर/ Longitude: 72°23'24'' to 72°28'51'' East Latitude: 20° 59'33'' to 22° 21'26'' North
3.	कृषि जलवायु क्षेत्र / Agro- climatic Zone	:	गुजरात मैदानी और पहाड़ी क्षेत्र (ज़ोन-XIII) / Gujarat Plains and Hills region (Zone-XIII)
4.	कुल क्षेत्रफल / Total area mapped	:	१०,६५,३०७ हेक्टेयर / 10,65,307 ha
5.	सर्वेक्षण की प्रकार / Kind of Survey	:	मृदा संसाधन मानचित्रण (एस.आर.एम.), सुदूर संवेदन और भौगोलिक सूचना प्रणाली तकनीक के उपयोग से / Soil Resource Mapping (SRM) using Remote Sensing & GIS Techniques
6.	आधार नक्शा / Base Map	:	a) आईआरएस-१डी जिओ-कोडेड उपग्रह चित्रण (१:५०००० स्केल) / IRS-1D Geo-Coded Satellite Imagery (1:50,000 Scale) b) सर्वे ऑफ इंडिया टोपोशीट (१:५०००० पैमानेपर) / SOI Toposheets (1: 50,000 Scale)
7.	मानचित्रण के स्केल / Scale of Mapping	:	१:५०,००० पैमाना / 1:50,000 Scale
8.	सर्वेक्षण की अवधि / Period of Survey	:	अप्रैल, २०११ / April, 2011

A. मृदा श्रृंखला एसोसिएशन के तहत मैप किया क्षेत्र का वर्गीकरण / Distribution of Area under Different Soil Series Association Mapped

क्र.सं./ S. No.	मानचित्रण प्रतीक/ Mapping Symbol	मानचित्रण इकाई/ Mapping Unit	श्रृंखला संघ / Series Association	क्षेत्रफल(हे.)/ Area (ha)	क्षेत्रफल(%)/ Area (%)
1.	A10	ALi5d1	Malitha(ML5)-Mulad(MU5)	178	0.02
2.	A11	ALb2a1	Latipura(LT5)-Thasra(TS5)	113	0.01
3.	A16	ALb2a2	Varnol(VR5)-Thasra(TS5)	22514	2.11
4.	A17	ALb2a3	Sajod(SJ5)-Varnol(VR5)	9577	0.90
5.	A18	ALb3a1	Kawa(KW5)-Varnol(VR5)	7570	0.71
6.	A19	ALg3d1	Derol(DR5)-Varnol(VR5)	7373	0.69
7.	A20	ALg3d2	Varnol(VR5)-Sajod(SJ5)	6493	0.61
8.	A21	ALb2a4	Varnol(VR5)-Sajod(SJ5)	4274	0.40
9.	A25	ALh4d1	Mulad(MU5)-Rumalpura(RP5)	299	0.03
10.	A27	ALi5d2	Mulad(MU5)-Derol(DR5)	622	0.06
11.	B11	BAw2a1	Sagbara(SG4)-Chandeliya(CN5)	527	0.05
12.	B15	BAu5a1	Jambar(JB2)-Shenthali(SH3)	55	0.01
13.	B16	BAn7c1	Kuri(KU2)	21295	2.00
14.	B19	BAn6c1	Dungra(DG2)-Kuri(KU2)	28722	2.70
15.	B22	BAu5d1	Jambar(JB2)-Dungra(DG2)	8238	0.77
16.	B25	BAu4d1	Jambar(JB2)-Shenthali(SH3)	75589	7.10
17.	B26	BAu4c1	Chandravan(CD3)-Kuri(KU2)	1219	0.11
18.	B28	BAu4a1	Kadaba(KD3)-Shenthali(SH3)	13246	1.24
19.	B32	BAv3a1	Chandravan(CD3)-Songarh(SN2)	46798	4.39
20.	B33	BAv3a2	Chandravan(CD3)-Shenthali(SH3)-Songarh(SN2)	55952	5.25
21.	B34	BAv3a3	Jambar(JB2)-Chandravan(CD3)	55480	5.21
22.	B35	BAw2a2	Chandeliya(CN5)-Kadaba(KD3)	66	0.01
23.	B38	BAw2a3	Shapur(SP4)-Shenthali(SH3)	275	0.03
24.	B39	BAw2a4	Shenthali(SH3)-Chandravan(CD3)-Kadaba(KD3)	16120	1.51
25.	B40	BAw2a5	Chandravan(CD3)-Shapur(SP4)	137416	12.90
26.	B41	BAw2a6	Shenthali(SH3)-Shapur(SP4)-Kadaba(KD3)	32580	3.06
27.	B42	BAw2a7	Shapur(SP4)-Shenthali(SH3)	57988	5.44
28.	B43	BAG3d1	Jambar(JB2)-Shenthali(SH3)	35079	3.29
29.	B44	BAG3d2	Shenthali(SH3)-Jambar(JB2)	22691	2.13
30.	B45	BAG3a1	Shenthali(SH3)-Kadaba(KD3)	8218	0.77
31.	CA04	CA12e1	Mava Madhia(MV5)	244	0.02
32.	CA07	CA12d2	Lakhigaon(LK5)-Nadiyad(ND5)	232	0.02
33.	CA09	CA12c1	Sarod(SR5)-Mava Madhia(MV5)	30013	2.82
34.	CA10	CA12d1	Mava Madhia(MV5)-Nadiyad(ND5)	32767	3.08

35.	CA11	CA12d3	Nadiyad(ND5)-Mava Madhia(MV5)-Sarod(SR5)	15319	1.44
36.	CA12	CA12d4	Mava Madhia(MV5)-Sarod(SR5)	9343	0.88
37.	CA13	CA12a1	Nadiyad(ND5)-Mava Madhia(MV5)	34082	3.20
38.	CA14	CA12a2	Sarod(SR5)-Nadiyad(ND5)	4853	0.46
39.	CA15	CA14d1	Nadiyad(ND5)-Sarod(SR5)	20522	1.93
40.	CA18	CA12a3	Vansali(VS5)-Sarod(SR5)	20114	1.89
41.	CA19	CA11c2	Hebatpur(HP5)-Sarod(SR5)	365	0.03
42.	LS06	LSu4c2	Minakayar(MK2)-Prachi(PR4)	3933	0.37
43.	LS07	LSu3c1	Prachi(PR4)-Minakayar(MK2)	5816	0.55
44.	LS11	LSw2a1	Kolikheda(KL5)-Barwara(BW4)	2508	0.24
45.	LS14	LSw2a2	Barwara(BW4)-Kuri(KU2)	26429	2.48
46.	LS15	LSw2a3	Barwara(BW4)-Prachi(PR4)	9355	0.88
47.	LS16	LSw2a4	Kolikheda(KL5)-Prachi(PR4)	3145	0.30
48.	Misc.	e		14526	1.36
49.	Misc.	f		15215	1.43
50.	Misc.	g		139959	13.14
कुल योग/ GRAND TOTAL				1065307	100.00

B. विभिन्न प्राकृतिक भूगोल वर्गों के अन्तर्गत क्षेत्र का वर्गीकरण / Distribution of Area under Different Physiography Classes

क्र.सं./ S. No.	भू-दृश्य / Landscape	प्राकृतिक भौगोलिक वर्ग/ Physiography Class	क्षेत्रफल (हे.) / Area (ha)	क्षेत्रफल (%)/ Area (%)
1.	Alluvium	Alluvial plains	44048	4.13
		Dissected stream banks	299	0.03
		Ravinous lands	800	0.08
		Stream banks	13866	1.30
2.	Basalt	Lower pediplains	244972	23.00
		Narrow mountain valleys	65988	6.19
		Pediments	98347	9.23
		Undifferentiated hills side slope	50017	4.70
		Upper pediplains	158230	14.85
3.	Coastal alluvial	Coastal alluvial plains	167854	15.76
4.	Limestone	Lower pediplains	41437	3.89
		Pediments	9749	0.92
Misc. (Habitation, Unculturable waste land/Salt Pan, Waterbodies etc.)			169700	15.93
कुल योग/ GRAND TOTAL			1065307	100.00

C. विभिन्न मृदा गहराई वर्ग के अन्तर्गत क्षेत्र का वर्गीकरण / Distribution of Area under Different Soil Depth Class

क्र.सं./ S. No.	मृदा गहराई वर्ग/ Soil Depth Class		क्षेत्रफल (हे.) / Area (ha)	क्षेत्रफल (%) / Area (%)
1.	Shallow(d2)		191973	18.02
2.	Moderately deep(d3)		418408	39.28
3.	Deep(d4)		28895	2.71
4.	Deep to Very deep(d4-d5)		527	0.05
5.	Very deep(d5)		255804	24.01
6.	Misc.	Unculturable waste land/Salt Pan (e)	14526	1.36
		Build-up area (f)	15215	1.43
		Water bodies (g)	139959	13.14
कुल योग/ GRAND TOTAL			1065307	100.00

D. विभिन्न मृदा अपरदन वर्गों के अन्तर्गत क्षेत्र का वर्गीकरण / Distribution of Area under Different Erosion Classes

क्र.सं./ S. No.	अपरदन वर्ग/ Erosion Class		क्षेत्रफल (हे.) / Area (ha)	क्षेत्रफल (%) / Area (%)
1.	None to Slight water erosion (e0-e1)		208155	19.54
2.	Slight to Moderate erosion (e1-e2)		285882	26.84
3.	Moderate to Severe erosion (e2-e3)		254100	23.85
4.	Severe water erosion (e3)		67139	6.30
5.	Severe to Very severe erosion (e3-e4)		80331	7.54
6.	Misc.	Unculturable waste land/Salt Pan (e)	14526	1.36
		Build-up area (f)	15215	1.43
		Water bodies (g)	139959	13.14
कुल योग/ GRAND TOTAL			1065307	100.00

E. विभिन्न प्रबंधन वर्गों के अन्तर्गत क्षेत्र का वर्गीकरण / Distribution of Area under Different Management Classes

क्र.सं./ S. No.	प्रबंधन वर्ग/ Management Class	क्षेत्रफल (हे.) / Area (ha)	क्षेत्रफल (%) / Area (%)	
1.	Unmanaged (UB)	35482	3.33	
2.	Unmanaged (UB) to Poorly managed (PB)	77937	7.32	
3.	Poorly managed (PB)	4610	0.43	
4.	Poorly managed (PB) to Moderately managed (MB)	356658	33.48	
5.	Moderately managed (MB)	527	0.05	
6.	Moderately managed (MB) to Well managed (WB)	400166	37.56	
7.	Well managed (WB)	20227	1.90	
8.	Misc.	Unculturable waste land/ Salt Pan (e)	14526	1.36
		Build-up area (f)	15215	1.43
		Water bodies (g)	139959	13.14
कुल योग/ GRAND TOTAL		1065307	100.00	

F. विभिन्न ढलान वर्गों के अन्तर्गत क्षेत्र का वर्गीकरण / Distribution of Area under Different Slope Classes

क्र.सं./ S. No.	ढलान वर्ग / Slope Class	क्षेत्रफल (हे.) / Area (ha)	क्षेत्रफल (%) / Area (%)	
1.	Nearly level (0-1%)	365	0.03	
2.	Nearly level to Very gently sloping (0-3%)	469854	44.11	
3.	Very gently sloping to Gently sloping (1-5%)	251470	23.61	
4.	Gently sloping to Moderately sloping (3-10%)	114808	10.78	
5.	Moderately sloping to Strongly sloping (5-15%)	9093	0.85	
6.	Strongly sloping to Moderately steep (10-25%)	28722	2.70	
7.	Moderately steep to Steep (15-33%)	21295	2.00	
8.	Misc.	Unculturable waste land/ Salt Pan (e)	14526	1.36
		Build-up area (f)	15215	1.43
		Water bodies (g)	139959	13.14
कुल योग/ GRAND TOTAL		1065307	100.00	

G. विभिन्न भूमि उपयोग अन्तर्गत क्षेत्र का वर्गीकरण / Distribution of Area under Different Landuse Classes

क्र.सं./ S. No.	भूमि उपयोग / Landuse	क्षेत्रफल (हे.) / Area (ha)	क्षेत्रफल (%) / Area (%)	
1.	Agriculture	569255	53.44	
2.	Barren Land	244	0.02	
3.	Forest	91363	8.58	
4.	Open scrub	234745	22.04	
5.	Misc.	Unculturable waste land/ Salt Pan (e)	14526	1.36
		Build-up area (f)	15215	1.43
		Water bodies (g)	139959	13.14
कुल योग/ GRAND TOTAL		1065307	100.00	

H. विभिन्न भूमि क्षमता वर्ग के अन्तर्गत क्षेत्र का वर्गीकरण / Distribution of Area under different Land Capability Classes

क्र.सं./ S. No.	वर्ग के विवरण / Description of classes	भूमि क्षमता वर्ग / Land Capability Classes	क्षेत्रफल (हे.) / Area (ha)	क्षेत्रफल (%) / Area (%)
1.	Land suitable for cultivation, good land with minor limitations	II	22627	2.12
2.	Land suitable for cultivation, moderately good land with limitations.	II-III	97207	9.12
3.	Land suitable for cultivation, moderately good land with major limitations	III	38356	3.60
4.	Land suitable for cultivation moderately to fairly good land occasional cultivation with major limitations.	III-IV	371511	34.87
5.	Land suitable for cultivation, fairly good land with occasional cultivation and land suitable for pasture and forestry with no limitations	IV	186120	17.47
6.	Land suitable for cultivation, moderately to fairly good land with occasional cultivation and major limitations to land suitable for pasture and forestry with minor limitations	IV-VI	97372	9.14
7.	Land suitable for pasture and forestry with minor limitations	VI	800	0.08
8.	Forest		81614	7.66
9.	Misc.	Unculturable waste land/ Salt Pan (e)	14526	1.36
		Build-up area (f)	15215	1.43
		Water bodies (g)	139959	13.14
कुल योग/ GRAND TOTAL			1065307	100.00

I. विभिन्न मृदा सिंचाई वर्गों के अन्तर्गत आने वाले क्षेत्र का विस्तार / Distribution of Area under Different Soil Irrigability Classes

क्र.सं./ S. No.	SIC	मृदा सिंचाई वर्ग / Soil Irrigability Class	क्षेत्रफल (हे.)/ Area (ha)	क्षेत्रफल (%)/ Area (%)
1.	B	Moderate soil limitation for sustained use under irrigation	22627	2.12
2.	B-C	Moderate to severe soil limitation for sustained use under irrigation	93567	8.78
3.	C	Severe soil limitation for sustained use under irrigation	8218	0.77
4.	C-D	Severe to very severe soil limitation for sustained use under irrigation	450079	42.25
5.	D	Very severe soil limitation for sustained use under irrigation	239502	22.48
6.	Forest		81614	7.66
7.	Misc.	Unculturable waste land/ Salt Pan (e)	14526	1.36
		Build-up area (f)	15215	1.43
		Water bodies (g)	139959	13.14
कुल योग/ GRAND TOTAL			1065307	100

J. विभिन्न जलविज्ञान मृदा समूह वर्गों के अंतर्गत आने वाले क्षेत्र का विस्तार / Distribution of Area under Different Soil Irrigability Classes

क्र.सं./ S. No.	HSG	जलविज्ञान मृदा समूह / Hydrological Soil Grouping	क्षेत्रफल (हे.)/ Area (ha)	क्षेत्रफल (%)/ Area (%)
1.	B	Soils with moderate infiltration rate, moderately run-off potential	14034	1.32
2.	B-C	Soils with moderate infiltration rate, moderately low to low run-off potential	70089	6.58
3.	C	Soils with slow infiltration rate, moderately high run-off potential	15008	1.41
4.	C-D	Soils with slow to moderate infiltration rate, moderately run-off potential	200357	18.81
5.	D	Soils with very low infiltration rate, high run-off potential	514505	48.30
6.	Forest		81614	7.66
7.	Misc.	Unculturable waste land/ Salt Pan (e)	14526	1.36
		Build-up area (f)	15215	1.43
		Water bodies (g)	139959	13.14
कुल योग/ GRAND TOTAL			1065307	100

K. मुख्य विशेषताएं/ Salient Features:

- There are twenty-nine soil series have been mapped in Bhavnagar district of Gujarat.
- Majority of the soils of Bhavnagar district are moderately deep comprising of 418408 ha (39.28 %) area, followed by very deep 255804 ha (24.01 %), shallow 191973 ha (18.02 %), deep 28895 ha (2.71 %) and deep to very deep 527 ha (0.05 %).
- Miscellaneous land of 169700 ha (15.93 %) area comprising of Unculturable waste land/ Salt Pan of 14526 ha. (1.36 %), Build-up area 15215 ha. (1.43%) and Water bodies 139959 ha (13.14 %).
- Physiographically, Bhavnagar district covered by Alluvial plains 44048 ha (4.13%), Dissected stream banks 299 ha (0.03%), Ravinous lands 800 ha (0.08%) and Stream banks 13866 ha (1.30%) under Alluvium landscape. In Basaltic landscape, Lower pediplains 244972 ha (23.00%), Upper pediplains 158230 ha (14.85%), Pediments 98347 ha (9.23%), Narrow mountain valleys 65988 ha (6.19%) and Undifferentiated hills side slope 50017 ha (4.70%). Coastal alluvium plains 167854 ha (15.76%) under coastal alluvium landscape while in Limestone landscape majority of area covered under lower pediplains 41437 ha (3.89%) followed by pediments 9749 ha (0.92%).
- Soils of Bhavnagar district having seven slope classes such as nearly level 365 ha (0.03%), nearly level to very gently sloping 469854 ha. (44.11%), very gently sloping to gently sloping 251470 ha (23.61%), gently sloping to moderately sloping as 114808 ha. of (10.78%), Moderately sloping to Strongly sloping 9093 ha (0.85 %), Strongly sloping to Moderately steep 28722 ha. of (2.70%), Moderately steep to Steep 21295 ha (2.00%).
- In the Landuse classes of Bhavnagar district, area under agriculture is 569255 ha (53.44%) followed by forest land 91363 ha (8.58%), open scrub 234745 ha (22.04%) and barren land 244 ha (0.02%).
- Soils of Bhavnagar district exhibits different soil erosion classes such as slight to moderate erosion 285882 ha (26.84%), moderate to Severe erosion 254100 ha (23.85%), None to Slight water erosion 208155 ha (19.54%), severe to very severe erosion 80331 ha (7.54%), severe water erosion 67139 ha (6.30%).
- Soils of Bhavnagar district are categorized under different land capability classes such as Class-II covered 22627 ha (2.12%) area, Class- II to III 97207 ha (9.12%), Class- III 38356 ha (3.60%), Class- III to IV 371511 ha (34.87%), Class-IV 186120 ha (17.47%), Class- IV to VI covered 97372 ha (9.14%) and Class-VI covered 800 ha (0.08%) area.
- Soil of the area are taxonomically classified into five orders are Alfisols, Aridisols, Entisols, Inceptisols and Vertisols. All the soil series identified in the area are further classified in to 6 suborders, 7 great groups, 12 sub-groups and 8 families.

HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the soil resource mapping of Bhavnagar 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-6.

Bhavnagar district of Gujarat is spread over an area 1065307 ha. The district is covered by 25 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 landuse; soil series Association, describing Latipura - as dominant series in association with Thasra 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, correspondation or personal contact may be established, with the

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