

Detailed Soil Survey and Land Use Plan in 4D5B2m4, m5, m6, m7 and 4D5B3d2, d3, d4, d5, d6, d7, d8, g1, g2, g3, g4, g5, h1, h2, h3, h4, h5, j1, j2, j3, j4, j5, j6 microwatersheds of 4D5B2 & 4D5B3 watersheds in 4D5B Subcatchment of Nagarjunsagar Catchment (RVP) in Taluka - Bailhongal & Saundatti, District-Belgaum; and Taluka-Dharwad and Navalgund, District-Dharwad, Karnataka Using Remote Sensing Techniques

ABSTRACT

1. Surveyed area	Detailed Soil Survey and Land Use Plan in 4D5B2m4, m5, m6, m7 and 4D5B3d2, d3, d4, d5, d6, d7, d8, g1, g2, g3, g4, g5, h1, h2, h3, h4, h5, j1, j2, j3, j4, j5, j6 microwatersheds of 4D5B2 & 4D5B3 watersheds in 4D5B Subcatchment of Nagarjunsagar Catchment (RVP) in Taluka - Bailhongal & Saundatti, District-Belgaum; and Taluka-Dharwad and Navalgund, District-Dharwad, Karnataka Using Remote Sensing Techniques
2. Geographical extent	150 28' 40" to 150 45' 44" N Latitude and 74 08' 52" to 75 08' 03" E longitude.
3. Total area surveyed	35,379 ha
4. Kind of survey	Detailed Soil Survey using Remote Sensing Techniques.
5. Period of survey	January, 2013 to February, 2013
6. Base map used	High resolution Satellite Imageries and Enlarged Toposheets on 1:10,000 scale.
7. Toposheet used	48M/3,48M/4,48M/7 and 48M/8.
8. Agro-climatic zone	10 (Southern Plateau and Hill region)

9. Microwatershed wise distribution of area (ha) under different Soil Series

S.No	Micro watersheds	Betsur	Dharwad	Dodvad	Dyampur	Gudikatti	Ron	Kotbagi	Mainahalli	Nangundikop	Siddasamudra	Timmapur	Yadravi	Misc	Total Area	Area (%)
1	4D5B2m4	154	565	0	0	0	117	0	0	0	0	322	154	67	1379	3.9
2	4D5B2m5	37	463	0	0	0	109	0	0	0	0	729	0	0	1338	3.8
3	4D5B2m6	0	8	0	0	0	20	0	0	0	0	889	0	0	917	2.6
4	4D5B2m7	33	595	0	0	0	67	0	0	0	0	361	0	0	1056	3.0
5	4D5B3d2	0	0	0	116	0	101	0	88	0	0	919	0	19	1243	3.5
6	4D5B3d3	0	453	0	0	0	116	0	0	0	0	677	0	28	1274	3.6
7	4D5B3d4	0	332	0	0	0	44	0	0	0	0	1055	0	54	1485	4.2
8	4D5B3d5	0	763	0	0	0	237	0	0	0	0	320	0	0	1320	3.7
9	4D5B3d6	0	414	0	0	0	16	0	0	0	0	908	0	3	1341	3.8
10	4D5B3d7	0	73	0	0	0	159	0	0	0	0	899	0	4	1135	3.2
11	4D5B3d8	0	367	0	0	0	118	0	0	0	0	851	0	40	1376	3.9
12	4D5B3g1	0	430	0	0	0	108	0	41	0	0	739	0	78	1396	3.9
13	4D5B3g2	0	413	0	56	0	8	0	121	0	0	544	0	33	1175	3.3
14	4D5B3g3	0	282	23	0	58	0	0	26	122	97	212	0	33	853	2.4
15	4D5B3g4	0	402	42	0	44	0	0	28	54	6	654	0	79	1309	3.7
16	4D5B3g5	0	302	29	81	132	50	0	0	23	0	404	0	15	1036	2.9
17	4D5B3h1	0	585	0	0	0	146	0	128	0	0	490	0	59	1408	4.0
18	4D5B3h2	0	741	1	82	0	294	105	54	0	55	707	0	0	2039	5.8
19	4D5B3h3	0	222	21	0	52	55	0	0	269	391	331	0	75	1416	4.0
20	4D5B3h4	0	302	11	93	55	183	0	1	207	357	290	0	8	1507	4.3
21	4D5B3h5	0	566	0	0	0	208	0	38	47	0	569	0	17	1445	4.1
22	4D5B3j1	0	598	0	0	0	63	0	116	43	157	93	0	46	1116	3.2
23	4D5B3j2	0	667	0	0	54	132	107	109	39	0	296	0	18	1422	4.0
24	4D5B3j3	0	360	87	0	293	113	24	0	297	56	432	0	40	1702	4.8
25	4D5B3j4	0	527	0	76	0	23	0	87	162	38	396	0	12	1321	3.7
26	4D5B3j5	0	326	0	0	0	136	65	0	13	0	584	0	50	1174	3.3
27	4D5B3j6	0	593	28	0	70	192	1	0	31	1	280	0	0	1196	3.4
	Total Area	224	11349	242	504	758	2815	302	837	1307	1158	14951	154	778	35379	100.0
	Area (%)	0.60	32.08	0.70	1.40	2.10	7.96	0.90	2.50	3.69	3.27	42.26	0.40	2.20	100.00	

10. Microwatershed wise distribution of area (ha) under different Land capability units

S.No.	Microwatershed	Iles-1	IIles-1	IIles-2	IIles-3	IIles-4	IIles-5	IIs-1	IVes-1	IVes-2	IVes-3	Vles-1	Misc.	Area (ha)	Area (%)
1	4D5B2m4	-	836	-	-	-	-	-	-	322	-	154	67	1379	3.90
2	4D5B2m5	255	577	-	-	-	-	-	-	506	-	-	-	1338	3.78
3	4D5B2m6	293	28	-	-	-	221	-	-	375	-	-	-	917	2.59
4	4D5B2m7	295	484	-	-	-	-	-	-	277	-	-	-	1056	2.98
5	4D5B3d2	362	101	-	-	-	-	-	-	557	204	-	19	1243	3.51
6	4D5B3d3	147	517	-	-	-	-	-	-	582	-	-	28	1274	3.60
7	4D5B3d4	303	349	-	-	-	-	-	-	779	-	-	54	1485	4.20
8	4D5B3d5	68	628	-	-	-	-	-	-	624	-	-	-	1320	3.73
9	4D5B3d6	493	414	-	-	-	57	-	-	374	-	-	3	1341	3.79
10	4D5B3d7	459	101	-	-	-	-	-	-	571	-	-	4	1135	3.21
11	4D5B3d8	538	367	-	-	-	-	-	-	431	-	-	40	1376	3.89
12	4D5B3g1	406	371	-	-	-	-	20	-	480	41	-	78	1396	3.95
13	4D5B3g2	61	304	55	-	-	-	23	-	577	122	-	33	1175	3.32
14	4D5B3g3	7	379	29	43	122	-	-	23	205	12	-	33	853	2.41
15	4D5B3g4	138	408	44	-	54	-	-	42	516	28	-	79	1309	3.70
16	4D5B3g5	161	294	83	49	23	-	-	29	301	81	-	15	1036	2.93
17	4D5B3h1	316	541	72	-	-	-	-	-	364	56	-	59	1408	3.98
18	4D5B3h2	262	789	105	-	82	-	-	1	746	54	-	-	2039	5.76
19	4D5B3h3	628	273	-	52	269	-	-	21	98	-	-	75	1416	4.00
20	4D5B3h4	456	440	-	55	300	80	-	11	156	1	-	8	1507	4.26
21	4D5B3h5	351	666	-	-	47	-	-	-	326	38	-	17	1445	4.08
22	4D5B3j1	174	661	1	-	43	-	-	-	76	115	-	46	1116	3.15
23	4D5B3j2	215	799	157	28	14	25	-	-	81	85	-	18	1422	4.02
24	4D5B3j3	437	523	132	185	124	173	-	87	1	-	-	40	1702	4.81
25	4D5B3j4	258	550	87	-	238	-	-	-	176	-	-	12	1321	3.73
26	4D5B3j5	316	462	65	-	13	-	-	-	268	-	-	50	1174	3.32
27	4D5B3j6	148	785	71	-	31	-	-	28	133	-	-	-	1196	3.38
	Total Area (ha)	7547	12647	901	412	1360	556	43	242	9902	837	154	778	35379	100.00
	Total Area (%)	21.33	35.75	2.55	1.16	3.84	1.57	0.12	0.68	27.99	2.37	0.44	2.20	100.00	

11. Micro-watershedwise distribution of area (ha) under different soil depth, slope and erosion classes of surveyed area

S.No	Microwatershed	d2	d3	d4	d5	B	C	D	E	e1	e2	e3	Misc	Total area
1	4D5B2m4	154	0	0	1158	1158	0	0	154	0	894	418	67	1379
2	4D5B2m5	0	0	0	1338	1338	0	0	0	0	832	506	0	1338
3	4D5B2m6	0	0	0	917	696	221	0	0	0	542	375	0	917
4	4D5B2m7	0	0	0	1056	1056	0	0	0	0	779	277	0	1056
5	4D5B3d2	0	88	116	1020	1224	0	0	0	0	463	761	19	1243
6	4D5B3d3	0	0	0	1246	1246	0	0	0	0	664	582	28	1274
7	4D5B3d4	0	0	0	1431	1431	0	0	0	0	652	779	54	1485
8	4D5B3d5	0	0	0	1320	1320	0	0	0	0	696	624	0	1320
9	4D5B3d6	0	0	0	1338	1281	57	0	0	0	964	374	3	1341
10	4D5B3d7	0	0	0	1131	1131	0	0	0	0	560	571	4	1135
11	4D5B3d8	0	0	0	1336	1336	0	0	0	0	905	431	40	1376
12	4D5B3g1	0	41	0	1277	1318	0	0	0	20	777	521	78	1396
13	4D5B3g2	0	121	56	965	1142	0	0	0	23	420	699	33	1175
14	4D5B3g3	23	84	219	494	675	122	23	0	0	603	217	33	853
15	4D5B3g4	42	72	60	1056	1138	50	42	0	0	686	544	79	1309
16	4D5B3g5	29	132	104	756	943	49	29	0	0	639	382	15	1036
17	4D5B3h1	0	128	0	1221	1349	0	0	0	0	929	420	59	1408
18	4D5B3h2	1	159	137	1742	2038	0	1	0	0	1239	800	0	2039
19	4D5B3h3	21	52	660	608	1268	52	21	0	0	1243	98	75	1416
20	4D5B3h4	11	56	657	775	1353	135	11	0	0	1342	157	8	1507
21	4D5B3h5	0	38	47	1343	1428	0	0	0	0	1064	364	17	1445
22	4D5B3j1	0	116	200	754	1070	0	0	0	0	879	191	46	1116
23	4D5B3j2	0	270	39	1095	1351	53	0	0	0	1238	166	18	1422
24	4D5B3j3	87	317	353	905	1203	372	87	0	0	1661	1	40	1702
25	4D5B3j4	0	87	276	946	1309	0	0	0	0	1133	176	12	1321
26	4D5B3j5	0	65	13	1046	1124	0	0	0	0	856	268	50	1174
27	4D5B3j6	28	71	32	1065	1132	36	28	0	0	1063	133	0	1196
	Total area (ha)	396.0	1897	2969	29339.0	33058.0	1147.0	242.0	154.0	43.0	23723.0	10835.0	778.0	35379.0
	Area (%)	1.1	5.4	8.4	82.9	93.4	3.2	0.7	0.4	0.1	67.1	30.6	2.2	100.0

11. Salient features:-

- a. Major geology of the surveyed area is Granite Gneiss (78.19%) followed by Shale (10.63%), Alluvium (7.96%) and Sandstone (1.07%) .
- b. An area of 29339 hectares (82.9%) of the total surveyed area is covered by very deep soils of Betsur, Dharwad, Ron and Timmapur series. An area of 2969 ha (8.4%) of the surveyed area is under deep soils like Dyampur, Nanugundikop and Siddasamudra. Moderately deep soils representing 1897 hectares (5.4%) of the total surveyed area is covered by soil series namely Gudikatti , Mainahalli and Kotbagi . Remaining area of 396 hectares representing 1.1 % of the surveyed area is covered by shallow soils of Dodvad and Yadravi series. An area of 778 hectares is covered by miscellaneous lands.
- c. Out of total surveyed area of 35379 hectares, an area of 33058 hectares (93.4%) is having 1-3% slope, an area of 1147 hectares (3.2%) having 3-5% slope, 242 hectares (0.7%) having 5-10% slope and remaining 154 hectares (0.4%) having 10-15% slope
- d. An area of 43 hectares representing 0.1 % of the total surveyed area is prone for slight or no erosion and 23723 hectares representing 67.1% is susceptible to moderate erosion. The remaining area of 10835 hectares representing 30.6% is susceptible to severe erosion.
- e. Majority of the area is equally shared by Land Capability Class IIIes-1 (12647 ha, 35.75%), IVes-2 (9902 ha, 27.99%) and IIes-1 (7547 ha 21.33%).
- f. Majority of the area occupied 27439 ha (77.55%) under Soil Irrigability Class ‘C’, i.e., soils having severe limitation for sustained use under irrigation

HOW TO USE SOIL SURVEY REPORT

This report on Detailed Soil Survey and Land Use Plan in 4D5B2m4, m5, m6, m7 and 4D5B3d2, d3, d4, d5, d6, d7, d8, g1, g2, g3, g4, g5, h1, h2, h3, h4, h5, j1, j2, j3, j4, j5, j6 microwatersheds of 4D5B2 & 4D5B3 watersheds in 4D5B Subcatchment of Nagarjunsagar Catchment (RVP) in Taluka - Bailhongal & Saundatti, District-Belgaum; and Taluka-Dharwad and Navalgund, District-Dharwad, Karnataka Using Remote Sensing Techniques contains detailed information about the soils of the area. This information is for various purposes including development of strategies for sustainable agro-production system development for the area. This report provide information on soil for planning cropping schedules, soil and water management programmes including soil conservation practices. The requisite information for desired locality could be obtained from the report as follows:

First, the user needs to locate the area of interest on soil map appended with this report and note the soil-mapping units enclosed by the soil boundary. This identification is done with the help of permanent features like roads, ponds, streams, village site, revenue survey number of the field, etc.

On the soil map, area covered by a soil-mapping unit is marked by a mapping symbol. Each of the soil-mapping unit refers to a particular kind of soil type and its related properties eg. soil depth, surface texture, slope, erosion, gravelliness, stoniness, rockiness. A soil mapping unit having mapping symbol, R5rB3 indicates:

- a) Abbreviated name of soil series 'R' for Ron
- b) Soil depth '5' for deep soil depth (more than 100 cm.)
- c) Soil texture 'r' for clayey texture
- d) Slope class 'B' for 1-3% slope and
- e) Erosion class '3' for severe erosion

Detailed information on soil series, profile description and other related soil characteristics is given in **Chapter 4** entitled "Soils of the Area" and in "Description of representative pedons" in **Appendix II**. Soil classification of the soils of the area is done according to the "Soil Taxonomy" (USDA) 2014 and has been provided in **Table 11**.

In **Appendix III** entitled "**Village mapping units list different microwatersheds**" information on the soil mapping units mapped in the area vis a vis , physiographic position, predominant slope, present land use, soil conservation measures adopted and land capability is given.

In **Appendix I**, entitled as "Guide to soil mapping units" multipurpose interpretation of each soil mapping unit is presented. Mapping units mapped in the surveyed area have been listed

along with respective description. Furthermore this provides information on area of mapping unit in each microwatershed followed by the interpretation with respect of land capability units, soil and land irrigability classification, paddy soil grouping and hydrological soil groupings. This table readily provides information on soil and land characteristics and their use potential at a glance thus can be very helpful.

In Chapter 7 section 7.1 on land capability classification, two types of problems viz. 1) Inherent problem and 2) improvable problem /correctable problems have been listed for each of the land capability unit mapped along with the recommendations for soil conservation, treatment needs and crop production. These recommendations are brief and suggestive but are adequate for broad level watershed management planning. For specific planning and potential for a particular land use of any site or area of interest the user agencies can use their local experiences and knowledge about the area and may make necessary modifications as warranted. General recommendations for the soil and water conservation have been given in **Chapter.8** “Specific problems and Recommendations”.

For any suggestion, comment, or clarification further correspondence/personal contact may be established with

<p>The Chief Soil Survey Officer Soil & Land Use Survey of India IARI Buildings, New Delhi 110 012. Ph: 011-25841263 Fax 011-25843811 E-mail: csso-slusi@nic.in, slusi-agri@nic.in Visit us at http://slusi.dacnet.nic.in</p>	<p>The Soil Survey Officer Soil & Land Use Survey of India Survey No.207, Kodigehalli Vidyaranyaपुरa post, Bangalore 560097. 080- 23640761, 23641119 Fax -080-23640751 E. mail: soilkar@nic.in Visit us at http://slusi.dacnet.nic.in</p>
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