

Abstract

1. **Surveyed Area** : 4G1A Subcatchment of Mahanadi Basin, districts Cuttack, Ganjam, Jagatsinghpur, Khorda, Nayagarh and Puri of Odisha State.
2. **Location** : 84°57' 12" to 86° 47' 09" **East Longitude**
19° 26' 15" to 20° 30' 10" **North Latitude**
3. **Total Area** : **9,22,102 ha**
4. **Agroclimatic Region** : VII (Eastern Plateau and hills) as per planning Commission Classification
5. **Type of Survey** : Rapid Reconnaissance Survey for Prioritization of Microwatersheds.
6. **Period of Survey** : December, 2008 to June, 2009
7. **Base Material used** : Survey of India Topographical maps on 1:50,000 scale.
8. **Hydrological Sub-division** :
 - a) Region – ‘4’ All Drainage flowing into Bay of Bengal except those 2 & 3
 - b) Basin - ‘4G’ (Mahanadi Basin)
 - c) Catchment – ‘4G1’
 - d) Sub-Catchment – ‘4G1A
 - e) Watersheds –‘4G1A1 to A9
 - f) Subwatersheds – 4G1A1a, 4G1A1b,..... to
 - g) Microwatersheds – 4G1A1a1, 4G1A1a2.....

9. Extent of Area (ha) under Different Runoff Potential Mapping Units (RPMU):

Sl.No	RPMU	Runoff Potential Value	Area (ha)	Area %
1	A01	57	15709	1.70
2	A02	56	244662	26.53
3	A03	57	110902	12.03
4	A04	55	7844	0.85
5	A05	69	1134	0.12
6	A06	60	3638	0.39
7	A07	57	3205	0.35
8	A08	53	33270	3.61
9	A09	53	3236	0.35
10	A10	56	9758	1.06
11	A11	57	18584	2.02
12	A12	57	89820	9.74
13	L01	69	5233	0.57
14	L02	62	13249	1.44
15	L03	58	10412	1.13
16	L04	57	68038	7.38
17	L05	60	5098	0.55
18	L06	66	17048	1.85
19	L07	65	11423	1.24
20	L08	64	390	0.04
21	SD01	74	35	0.00
22	SD02	76	3584	0.39
23	SD03	78	746	0.08
24	SD04	71	185	0.02
25	SD05	66	227	0.02
26	SD06	57	6851	0.74
27	G01	82	30938	3.36
28	G02	90	26246	2.85
29	G03	62	4120	0.45
30	G04	59	1749	0.19
31	G05	60	1987	0.22
32	G06	60	6760	0.73
33	G07	57	10942	1.19
34	G08	56	24114	2.62
35	G09	66	1984	0.22
36	G11	57	1339	0.15
37	G12	56	4723	0.51
38	G13	58	826	0.09
	Subtotal		800009	86.78
	Misc.		122090	13.24
	Grand Total		922102	100

10. Districtwise Distribution of Area (ha) under Different Runoff Potential Mapping Units (RPMU):

RPMU	Cuttack	Ganjam	Jagatsingh pur	Khorda	Nayagarh	Puri	Total Area	Area (%)
A01	3423	168	3719	4436	972	2991	15709	1.7
A02	36516	1560	100377	25933		80276	244662	26.5
A03	22457	108	43390	7888		37059	110902	12.0
A04	359		3948	621		2916	7844	0.9
A05	342		553	9	211	19	1134	0.1
A06	1175		523	169	40	1731	3638	0.4
A07	109		1279	36		1781	3205	0.4
A08	42	621	873	4757		26977	33270	3.6
A09			2875			361	3236	0.4
A10		51				9707	9758	1.1
A11	96	287				18201	18584	2.0
A12	1585	697		5802		81736	89820	9.7
L01	449			3601	836	347	5233	0.6
L02	1480			11051	203	515	13249	1.4
L03	457			8534	991	430	10412	1.1
L04	3048			56078	4086	4826	68038	7.4
L05				4598	431	69	5098	0.6
L06				11868	5180		17048	1.9
L07	1205	53		9787	45	333	11423	1.2
L08	16			330		44	390	0.0
S01				35			35	0.0
S02	892			2561		131	3584	0.4
S03				695		51	746	0.1
S04				65		120	185	0.0
S05	215					12	227	0.0
S06	2890			3961			6851	0.7
G01		2380		15567	12991		30938	3.4
G02		5066		10518	10662		26246	2.9
G03		2145		551	1424		4120	0.5
G04		10		279	1460		1749	0.2
G05		1122		654	211		1987	0.2
G06		4537		2114	109		6760	0.7
G07		5764		2454	2724		10942	1.2
G08		7538		7628	8948		24114	2.6
G09		795		861	328		1984	0.2
G11		1063		91	185		1339	0.2
G12		827		3896	3		4726	0.5
G13				826			826	0.1
Misc	14012	7777	7149	16225	538	76389	122090	13.2
Total	90768	42569	164686	224479	52578	347022	922102	100

11. Districtwise Distribution of Area (ha) under Different Soil Erosion Hazard:

S. No.	Erosion	Cuttack	Ganjam	Jagat singhpur	Khorda	Nayagarh	Puri	Total Area
1	None to slight erosion	63648	18178	147515	114527	15946	231235	591049
2	Slight to Moderate erosion	3347			17093	1422	499	22361
3	Moderate erosion	3987	8320	8946	9517	4176	35596	70542
4	Moderate to Severe erosion	4540	848	523	38362	6632	3033	53938
5	Severe erosion	892	2380		18193	12991	251	34707
6	Severe to Very severe erosion	342	5066	553	10562	10873	19	27415
7	Miscellaneous	14012	7777	7149	16225	538	76389	122090
	Total	90768	42569	164686	224479	52578	347022	922102

12. Priority Categorization:

S. No.	Priority Category	No. of Microwatersheds	Area (ha)	Area %
1.	Very high (above 70)	53	49861	5.4
2.	High (66 – 70)	35	36229	4.0
3.	Medium (61-65)	95	94938	10.3
4.	Low (56-60)	609	688831	74.7
5.	Very Low (55 & Below)	42	52243	5.7
	Grand Total	834	922102	100

13. Watershedwise Distribution of Area (in ha) under Different Priority Categories:

S. No.	Priority Category	4G1									Total Area	Area %
		A1	A2	A3	A4	A5	A6	A7	A8	A9		
1.	Very high (above 70)	21910	14703	13248							49861	5.4
2.	High (66 – 70)	15261	8155	9770	3043						36229	3.9
3.	Medium (61-65)	17279	21655	26037	17787	12180					94938	10.3
4.	Low (56-60)	28663	13512	34563	62788	115254	207037	96004	54574	76436	688831	74.7
5.	Very Low (55 & Below)	12286	18504	1505	2547	1939		1118	10406	3938	52243	5.7
	TotalArea	95399	76529	85123	86165	129373	207037	97122	64980	80374	922102	100

14. Districtwise Distribution of Area (in ha) under Different Priority Categories:

S. No.	Priority Category	Cuttack	Ganjam	Jagat singhpur	Khorda	Nayagarh	Puri	Total Area	Area (%)
1	Very high (above 70)	-	2593	-	21792	25476	-	49861	5.4
2	High (66 – 70)	38	11913	-	17502	6776	-	36229	3.9
3	Medium (61-65)	7612	8823	-	66659	11810	34	94938	10.3
4	Low (56-60)	78062	18633	154280	113082	8516	316258	688831	74.7
5	Very Low (55 & below)	5056	607	10406	5444	-	30730	52243	5.7
	Total Area	90768	42569	164686	224479	52578	347022	922102	100

15. Salient Features of the Area:

- The survey area consists of 834 microwatersheds covering 922102 ha. The survey area has 53 and 35 microwatersheds under the category of very high and high priority respectively, covering total area of 86090 ha (9.3%). 95 microwatersheds covering 94938 ha are categorized under medium priority category. An area of 688831 ha (74.70%) covered by 609 microwatersheds are coming under low priority category and remaining 42 microwatersheds covering an area of 52243 ha (5.7%) is under very low priority category.
- Severe and severe to very severely eroded lands altogether occupy 62122 ha (6.8%) and it needs proper soil conservation practices. The area under moderate erosion and moderate to severe erosion category occupies 124480 ha (13.50%). Khorda districts have maximum area under this category. The maximum area of 591049 ha (64.1%) does not have problem of soil erosion.
- Under Very high and high priority category comprises 5.4% and 3.9% respectively of total area. Total area of very high and high category are distributed in three watersheds 4G1A1, 4G1A2 and 4G1A3
- Khorda and Nayagarh districts has maximum area of very high and high priority followed by the Ganjam and Cuttack districts.

How to use Soil Survey Report

The report embodies the results of the Priority delineation survey conducted for identification and delineation of priority microwatersheds of 4G1A1-9 watersheds of 4G1A subcatchment of Mahanadi Basin in Odisha. The report explores valuable information about land and soil characteristics of the watersheds. The main objective of the survey is to identify microwatersheds which generate comparatively high runoff towards the lower catchment. Maps showing the demarcation of priority microwatersheds in 4G1A subcatchment in the scale of 1: 50,000 are appended with the report.

The catchments of Centrally Sponsored Scheme are delineated and codified following the codification system of Watershed Atlas of India (WAI) published by Soil & Land Use Survey of India. The surveyed area comprises nine watersheds (4G1A1-9) which are subdivided into 125 Subwatersheds and finally into 834 microwatersheds. Subwatersheds are codified by suffixing small case English alphabets with the watershed code e.g. 4G1A1a, 4G1A1b, 4G1A1c etc. and microwatersheds are codified by affixing Arabic numerals with subwatersheds code, 4G1A1a1, 4G1A1b1, 4G1A1c1 etc. Different Runoff Potential Mapping Units (RPMUs) are identified and denoted by capital English alphabets coined from parent material of this area such as 'A' for alluvium. The mapping unit connotes a set of soil and land attributes namely, physiography, slope, soil characteristics, land use/land cover, erosion hazards and conservation practices. The description of mapping units with their Runoff Potential values is presented in Table 5. The differentiating characteristics of each mapping units are furnished in Table 6.

The details of computation of Runoff Potential Index are given in Annexure - I which list the microwatersheds in systematic order of codification with relative priority. Microwatersheds with their area under different priority categories are summarized in Annexure-II. In the Annexure-II microwatersheds have been arranged in descending order according to their priority rating i.e. very high, high, medium, low and very low categories. Watershedwise and Districtwise grading of microwatersheds under different priority categories are presented in Table 17 & 18. In addition to select priority microwatersheds for soil and water conservation programme, the data contained in mapping legend can also be used for characterization of any part of catchment with respect to slope gradient, broad soil groups, present land use, surface condition, erosion and problems as well. Details of microwatershedwise computation of RPI values and the districtwise priority categorization are furnished in Annexure I & II.

For further clarification and explanation, communication may be made to:

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