

**Prioritisation of Micro-watersheds of 3A2A1-8, 3A2C1-5 and 3A2D1-8 Watersheds of Brahmaputra Basin Districts Goalpara, Bongaigaon, Barpeta, Sonitpur, Nalbari, Marigaon, Kokrajhar, Kamrup, Darrang districts of Assam and West Kameng district of Arunachal Pradesh using Remote Sensing and GIS Techniques**

**ABSTRACT**

1.	<b>Survey Area</b>	:	<i>Goalpara, Bongaigaon, Barpeta, Sonitpur, Nalbari, Marigaon, Kokrajhar, Kamrup, Darrang districts of Assam and West Kameng district of Arunachal Pradesh</i>
2.	<b>Geographical Extent</b>	:	<i>90<sup>0</sup> 25' to 92<sup>0</sup> 50' E Longitude and 26<sup>0</sup>08' to 27<sup>0</sup> 15' N</i>
3.	<b>Agro Climatic Region</b>	:	<i>Eastern Himalayan Region II (as per planning commission 1989)</i>
4.	<b>Total area of the district</b>	:	<i>1467140 ha.</i>
5.	<b>Type of Survey</b>	:	<i>Rapid Reconnaissance Survey using Remote Sensing &amp; GIS Techniques</i>
6.	<b>Base map</b>	:	<i>a) IRS – ID Geocoded Satellite Imagery (1: 50,000 scale) b) SOI –toposheet (1:50,000 scale)</i>
7.	<b>Scale of Mapping</b>	:	<i>1 : 50000</i>
8.	<b>Period of Survey</b>	:	<i>December 2009 to March 2010</i>

### 9. Areal Extent of different Runoff Potential Mapping Units

Sl.No.	RPMU	Runoff Potential Value	Area ( ha)	(%)
1	AC01	56	19831	1.35
2	AC02	57	4467	0.30
3	AC03	58	10981	0.75
4	AC04	57	28499	1.94
5	AC05	56	10481	0.71
6	AC06	58	2204	0.15
7	AC07	56	34314	2.34
8	AC08	58	19230	1.31
9	AC09	57	18627	1.27
10	AC10	59	5706	0.39
11	AC11	55	10217	0.70
12	AC12	63	1323	0.09
16	AL01	58	21259	1.45
17	AL02	55	45329	3.09
18	AL03	55	43023	2.93
19	AL04	56	102560	6.99
20	AL05	56	19549	1.33
21	AL06	55	258170	17.60
22	AL07	57	4015	0.27
23	AL08	57	6611	0.45
24	AL09	56	12142	0.83
25	AL10	56	1744	0.12
26	AL11	58	2103	0.14
27	AL12	56	332178	22.64
28	AL13	54	17303	1.18
29	AL14	56	4747	0.32
30	AL15	61	5210	0.36
31	AL16	61	2074	0.14
32	AL17	55	20369	1.39
33	AL18	58	25801	1.76
34	AL19	56	17887	1.22
35	AL20	57	6056	0.41
36	AL21	59	2067	0.14
37	AL22	57	20108	1.37
38	AL23	58	12292	0.84
39	AL24	57	9661	0.66
40	AL25	57	22474	1.53
41	AL26	57	5922	0.40
42	GN01	70	1353	0.09
43	GN02	75	2753	0.19

44	GN03	84	2050	0.14
45	GN04	92	1003	0.07
46	GN05	72	3974	0.27
47	GN06	80	1656	0.11
48	GN07	76	2650	0.18
49	GN08	82	2426	0.17
50	SD01	59	755	0.05
51	SD02	65	4518	0.31
52	SD03	67	11780	0.80
53	SD04	69	11871	0.81
54	SD05	80	7998	0.55
55	SD06	89	4776	0.33
56	SD07	86	8407	0.57
57	SD08	81	2514	0.17
58	SD09	62	15378	1.05
59	SD10	65	9787	0.67
60	SD11	72	13269	0.90
61	SD12	80	794	0.05
62	SD13	61	864	0.06
63	SD14	63	6565	0.45
64	SD15	67	11968	0.82
65	SD16	74	6413	0.44
66	SD17	59	1653	0.11
67	SD18	60	2219	0.15
68	SD19	66	5841	0.40
69	SD20	73	911	0.06
70	SD21	71	2978	0.20
71	SD22	68	3655	0.25
73	HOMESTEAD	0	6343	0.43
74	LANDSLIDE	0	418	0.03
75	RIVER	0	98254	6.70
76	TANK	0	329	0.02
77	WATERBODY	0	22483	1.53
	<b>Grand Total</b>		<b>1467140</b>	<b>100</b>

**10. Hydrological Divisions**

*Water Resource Region (3)*

*Basin (3A)*

*Catchment (3A2)*

*Subcatchment (3A2A)*

*Watersheds (3A2A1, 2, .....)*

*Subwatersheds (3A2A 1a,.b, .c.....)*

*Microwatersheds (3A2A1a1..., 3A2C2a1, ...)*

### 11. Area Under Different soil erosion Classes

Erosion Classes	Area (ha)	%	Barpeta	Bongaigaon	Darrang	Goalpara	Kamrup	Kokrajhar	Marigaon	Nalbari	Sonitpur	West Kameng
None to slight erosion	559116	38.11	137676	18814	123852		50089	70205		107757	50642	81
Slight erosion	71312	4.86	7326	507	1262			10716		5061	6298	40142
Slight to Moderate erosion	471067	32.11	94465	16623	117826		43615	47934		79088	51988	19528
Moderate erosion	182393	12.43	19307	1941	66337		6947	15521	331	18343	26046	27620
Moderate to Severe erosion	43589	2.97	3788	6804	2340		1508	2444		3491	4929	18285
Severe erosion	11836	0.81	41	3388							25	8382
Misc	127827	8.71	21407	3360	36272	825	9276	23962		17922	14110	693
<b>Total</b>	<b>1467140</b>	<b>100</b>	<b>284010</b>	<b>51437</b>	<b>347889</b>	<b>825</b>	<b>111435</b>	<b>170782</b>	<b>331</b>	<b>231662</b>	<b>154038</b>	<b>114731</b>

### 12. Area under different Priority Categories

Sl. No.	Priority Category	No. of Microwatersheds	Area (ha.)	Percentage
1	Very High (above 70)	65	50241	3.42
2	High (66-70)	73	63191	4.31
3	Medium (61-65)	81	73420	5.00
4	Low (56-60)	1271	974393	66.42
5	Very Low (55 & below)	463	305895	20.85
	<b>Grand Total</b>	<b>1953</b>	<b>1467140</b>	<b>100</b>

### 13. Watershedwise distribution of Area (ha.) under different Priority Categories

Watershed	Very High	High	Medium	Low	Very Low	Area (ha)
3A2A1	6432	4628	7957	25705	1052	45774
3A2A2				27486	9651	37137
3A2A3				56054	28102	84156
3A2A4				95967	16195	112162
3A2A5			2025	31146	10086	43257
3A2A6			3402	84616	27580	115598
3A2A7		816	6868	32413	18246	58343
3A2A8				54989	31761	86750
3A2C1				36163	5374	41537

<b>Watershed</b>	<b>Very High</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Very Low</b>	<b>Area (ha)</b>
3A2C2		460	1400	38462	18999	59321
3A2C3			48	55612	12381	68041
3A2C4		373	2888	82365	9079	94705
3A2C5	2554	2605	2364	31165	16317	55005
3A2D1		1184	3730	59834	14259	79007
3A2D2		479	659	66279	21090	88507
3A2D3				26996	9181	36177
3A2D4	24128	22943	20815	36091	12149	116126
3A2D5	5321	13119	4277	37286	16390	76393
3A2D6	1407	6085	9928	50723	19461	87604
3A2D7	10399	10499	7059	45041	8542	81540
<b>Total</b>	<b>50241</b>	<b>63191</b>	<b>73420</b>	<b>974393</b>	<b>305895</b>	<b>1467140</b>

**Table 14 Districtwise distribution of area (ha.) Microwatershed under different Priority Categories**

PriorityCategory	Area (ha)	%	Barpeta	Bongaigaon	Darrang	Goalpara	Kamrup	Kokrajhar	Marigaon	Nalbari	Sonitpur	West Kameng
Very High	50241	3.42		6432	578		2554				3255	37422
High	63191	4.31	816	4628	6942		2526			460	7186	40633
Medium	73420	5.00	5880	7166	10832	695	4140	484		7379	4913	31931
Low	974393	66.41	202378	28985	250326	130	86081	131179	331	165647	104591	4745
Very Low	305895	20.85	74936	4226	79211		16134	39119		58176	34093	
<b>Total</b>	<b>1467140</b>	<b>100.00</b>	<b>284010</b>	<b>51437</b>	<b>347889</b>	<b>825</b>	<b>111435</b>	<b>170782</b>	<b>331</b>	<b>231662</b>	<b>154038</b>	<b>114731</b>

**Salient Features:**

- ❖ *3A2A1-8, 3A2C1-5 & 3A2D1-8 watersheds have been subdivided into 1953 microwatersheds following the delineation and codification method outlined in Watershed Atlas of India (1:1 M scale), 2012.*
- ❖ *Out of 1467140 hectares of surveyed area, 50241 ha. (3.42%) covered by 65 microwatersheds have been categorized under very high priority and 63191 ha. (4.31%) covered by 73 microwatersheds have been categorized under high priority area which needs immediate attention for suitable soil-water conservation measures under Integrated Watershed Development Programme.*
- ❖ *In Arunachal Pradesh, about 37422 ha. area of West Kameng district is under very high and 40633ha area is under high priority and in Assam about 6432 ha. of Bongaigaon district, 3255 ha of Sonitpur district, 2554ha of Kamrup district and 578 ha of Darang comes under very high priority which needs immediate attention for soil and water conservation measures.*
- ❖ *Among the watersheds, 3A2D4 watershed is more vulnerable followed by 3A2D7, 3A2D5 and 3A2D6 watershed which needs immediate attention for soil water conservation measures.*
- ❖ *About 46602 ha (3.18%) area of the survey area is unmanaged, 4776 ha (0.33%) area is unmanaged to poorly managed and 80635ha. (5.5%) area is poorly managed.*
- ❖ *Severely eroded lands occupy 11836 ha. (0.81%) while moderately to severely eroded land cover 43589 ha (2.97%) and moderate eroded land 182393 (12.43%) that also needs proper soil-water conservation practices under Integrated Watershed Development Planning.*

## **HOW TO USE SOIL SURVEY REPORT**

*This report on Prioritisation of Micro-watersheds of 3A2A1-8, 3A2C1-5 and 3A2D1-8 Watersheds of Brahmaputra Basin Districts Goalpara, Bongaigaon, Barpeta, Sonitpur, Nalbari, Marigaon, Kokrajhar, Kamrup, Darrang districts of Assam and West Kameng district of Arunachal Pradesh using Remote Sensing and GIS Techniques aims at identifying the microwatersheds which are relatively more prone to flooding and seasonal water logging and need the flood control measures. Further, it furnishes information on general characteristics of the catchments with particular reference to their location and extent, physiography, relief and drainage, geology, climate, land use and soils of the area also.*

*The subcatchment is delineated and codified following the codification system of Watershed Atlas of India (WAI) published by Soil & Land Use Survey of India in September, 1990. The surveyed area comprises 21 watersheds 3A2A1-8, 3A2C1-5 and 3A2D1-8 of WAI which are subdivided into 285 subwatersheds and finally into 1953 microwatersheds. Subwatersheds are codified by suffixing small case English alphabets with the watershed code e.g. 3A1F1a, 3A1F1b etc and microwatersheds are codified by affixing Arabic numerical with the subwatershed code, e.g., 3A1A1a1, 3A1A1b1 etc. Within a microwatershed, Runoff Potential Mapping Units (RPMUs) are demarcated and symbolized with alphanumeric codes viz. AL01, AL02, AC01, AC02, GN01, GN02, SD01 and SD02 etc. The Runoff Potential Mapping Units (RPMU) is established by visual interpretation of False Color Composites (FCC) of IRS-P6 LISS-III followed by field verification. The RPMUs represent the landscape, physiography, slope, soil characteristics, existing soil conservation status, land use and severity of erosion of each mapping unit. These Runoff Potential mapping units are described in the **Table 6** on 'Legend to Runoff Potential Mapping Units'. Each of these units is assigned its runoff potential (RP) value which indicates the potential runoff from the microwatershed. Differentiating morphological characteristics of the Run-off Potential Mapping Units have been depicted in the **Table 7**.*

*Based on Run-off Potential (RP) value and the extent of RPMU in a microwatershed, the Runoff Potential Index (RPI) values of all microwatersheds are computed which is given in the **ANNEXURE-I**. The relative priorities are assigned based upon the Runoff Potential Index (RPI) of the microwatersheds. Higher the value of Runoff Potential Index (RPI) indicates higher priority whereas the lower value indicates lower priority. The list of microwatersheds under different priority categories are given in **ANNEXURE-II**.*

*Microwatersheds categorized under very high and high priority are to be selected for management of flood prone area under FPR Scheme. Both treatable and non-treatable lands are occupied by each priority (very high or high category) microwatershed. The ratio of treatable and non-treatable lands in a priority microwatershed varies with the kind, degree and extent of the degraded lands occupied by the same microwatershed.*

*Each map sheets on 1:50,000 scale depicting the drainage network, hydrological units, runoff potential mapping units and administrative boundaries are appended with this report.*

*For any further clarification, information or comments contact may be made to:*

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