Prioritisation of Micro-watersheds of 3B1A1-6 Watersheds of Brahmaputra Basin Districts Goalpara, Dhubri, Bongaigaon districts of Assam and West Garo Hills and East Garo Hills district of Meghalaya using Remote Sensing and GIS Techniques

ABSTRACT

1.	**Survey Area**	:	*Goalpara, Dhubri, Bongaigaon districts of Assam and West Garo Hills and East Garo Hills district of Meghalaya*
2.	**Geographical Extent**	:	*89^0 49' to 90^0 38' E Longitude and $25^0$20' to 26^0 13' N Latitude*
3.	**Agro Climatic Region**	:	*Eastern Himalayan Region II (as per planning commission 1989)*
4.	**Total area of the district**	:	***393887 ha.***
5.	**Type of Survey**	:	*Rapid Reconnaissance Survey using Remote Sensing & 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 : 50000*
8.	**Period of Survey**	:	*April to May, 2010* *Nov to Dec,2010*

9. Areal Extent of different Runoff Potential Mapping Units

Sl. No.	RPMU	Runoff Potential Value	Area (ha.)	(%)
1	**AC01**	56	2938	0.75
2	**AC02**	59	1127	0.29
3	**AC03**	60	559	0.14
4	**AC04**	67	359	0.09
5	**AL01**	58	8548	2.17
6	**AL02**	63	5931	1.51
8	**AL04**	56	1766	0.45
9	**AL05**	57	7028	1.78
10	**AL06**	56	14276	3.62
11	**AL07**	56	12119	3.08
12	**AL08**	56	25272	6.42
13	**AL09**	56	3571	0.91
14	**AL10**	58	2282	0.58
15	**AL11**	61	4937	1.25
16	**AL12**	56	7846	1.99
17	**AL13**	56	10425	2.65
18	**AL14**	64	4283	1.09
19	**AL15**	57	7209	1.83
20	**AL16**	56	6207	1.58
21	**AL17**	61	2411	0.61
22	**AL18**	55	2205	0.56
23	**AL19**	59	9865	2.50
24	**GN01**	62	72	0.02
25	**GN02**	71	3965	1.01
26	**GN03**	58	1001	0.25
27	**GN04**	61	7881	2.00
28	**GN05**	94	4591	1.17
29	**GN06**	86	411	0.11
30	**GN08**	81	15567	3.95
31	**GN09**	73	186	0.05
32	**GN10**	70	2120	0.54
33	**GN11**	98	4685	1.19

34	**GN12**	78	7870	2.00
35	**GN13**	75	454	0.12
36	**GN15**	73	663	0.17
37	**GN16**	69	2993	0.76
38	**GN17**	65	25616	6.50
39	**GN18**	74	14140	3.59
40	**GN19**	81	18024	4.58
41	**GN20**	79	1214	0.31
42	**GN21**	65	10227	2.60
43	**GN22**	61	21052	5.34
44	**GN23**	79	4473	1.14
45	**GN24**	75	15634	3.97
46	**GN25**	69	15309	3.89
47	**GN26**	62	8771	2.23%
48	**GN27**	64	3503	0.89%
49	**GN28**	79	234	0.06%
50	**GN29**	71	5079	1.29%
51	**GN30**	64	2058	0.52%
52	**GN31**	64	2743	0.70%
53	**GN32**	70	1244	0.32%
54	**GN33**	55	329	0.08%
55	**GN34**	59	1400	0.36%
56	**GN35**	55	71	0.02%
57	**HOMESTEAD**	0	6720	1.71%
58	**SAND_BAR**	0	14123	3.59%
59	**RIVER**	0	25732	6.53%
60	**WATERBODY**	0	2568	0.65%
	Grand Total		**393887**	**100**

10. Hydrological Divisions

Water Resource Region (3)
Basin (3B)
Catchment (3B1)
Subcatchment (3B1A)
Watersheds (3B1A1, 2, ...)
Subwatersheds (3B1A 1a,.b, .c.....,)
Microwatersheds (3B1A1a1..., 3B1A2a1, ...)

11. Area Under Different soil erosion Classes

Erosion Classes	Bongaigaon	Dhubri	Goalpara	East Garo Hills	West Garo Hills	Area (ha)	%
None to slight erosion		21045	22906	3388	38928	86267	21.9
Slight erosion		59	646	585	20763	22053	5.6
Slight to Moderate erosion		7724	9285	26	3553	20588	5.23
Moderate erosion		6136	14475	2114	59951	82676	20.99
Moderate to Severe erosion		2050	12245	7667	57830	79792	20.26
Severe erosion		369	894	3797	43623	48683	12.36
Severe to Very severe erosion					4685	4685	1.18
Misc.	416	26849	17886	135	3857	49143	12.48
Total	**416**	**64232**	**78337**	**17712**	**233190**	**393887**	**100**

12. Area under different Priority Categories

Sl. No.	Priority Category	No. of Microwatersheds	Area (ha)	%
1	Very High (above 70)	172	93588	23.76
2	High (66-70)	137	74275	18.86
3	Medium (61-65)	132	81750	20.75
4	Low (56-60)	173	144274	36.63
	Grand Total	**614**	**393887**	**100**

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

Watershed	Very High	High	Medium	Low	Area (ha)
3B1A1	368	6949	3791	23961	35069
3B1A2	26217	15327	19403	19850	80797
3B1A3	14613	13069	16937	21238	65857
3B1A4	19342	16078	11950	33303	80673
3B1A5	23371	11849	8392	3117	46729
3B1A6	9677	11003	21277	42805	84762
Total	**93588**	**74275**	**81750**	**144274**	**393887**

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

Priority Category	Assam			Meghalaya		Area (ha)	%
	Goalpara	Bongaigaon	Dhubri	East Garo Hills	West Garo Hills		
Very High (above 70)	3041		15	6634	83898	93588	23.76
High (66-70)	7143		525	4074	62533	74275	18.86
Medium (61-65)	19588	151	7595	5412	49004	81750	20.75
Low (56-60)	48565	265	56097	1592	37755	144274	36.63
Total	**78337**	**416**	**64232**	**17712**	**233190**	**393887**	**100.00**

Salient Features:

- *3B1A1-6 sub catchment has been subdivided into 614 microwatersheds following the delineation and codification method outlined in Watershed Atlas of India (1:1 M scale), 2012.*
- *Out of 614 micro-watersheds comprising an area of 393887 ha, 172 micro-watersheds covering an area of 93588 ha, which accounting for 23.76 % of the total area, belong to the "very high" and 74275ha (18.86%) is under "high" priority that needs immediate attention for soil-water conservation treatment in order to check the soil detachment in the upper sub-catchment area and to control the devastating flood in lower sub-catchment for overall development of the area. 3B1A2 watershed is the worst affected by runoff water as well as flooding as compared to 3B1A5 and 3B1A4 watersheds which needs immediate attention for proper Soil Water Conservation and flood control measures under Integrated watershed Management Programme.*
- *About 16045 ha (2.99%) area of the survey area is unmanaged, 16028 ha (3.02%) area is unmanaged to poorly managed and 111414ha. (20.77%) area is poorly managed. Severely eroded lands occupy 48683 ha. (12.36%) while moderately to severely eroded land cover 79792 ha (20.26%) and moderate eroded land 82676 (20.99%) 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 3B1A1-6 Watersheds of Brahmaputra Basin Goalpara, Dhubri, Bongaigaon districts of Assam and West Garo Hills and East Garo Hills district of Meghalaya 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 6 watersheds 3B1A1-6 of WAI which are subdivided into 86 subwatersheds and finally into 614 microwatersheds. Subwatersheds are codified by suffixing small case English alphabets with the watershed code e.g. 3B1A1a, 3B1A1b etc and microwatersheds are codified by affixing Arabic numerical with the subwatershed code, e.g., 3B1A1a1, 3B1A1b1 etc. Within a microwatershed, Runoff Potential Mapping Units (RPMUs) are demarcated and symbolized with alphanumeric codes viz. AL01, AL02, AC01, AC02, GN01, GN02 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 microwatrshed, 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:

Chief Soil Survey Officer
Soil and Land Use Survey of India
I.A.R.I. Buildings, New Delhi 110012
Telefax-011-25843811
E-mail:csso-slusi@nic.in

Or

Soil Survey Officer
Soil and Land Use Survey of India
E-Block, B. P. Township,
Kolkata-700094
Telefax-033-24301425
E-mail: ssokolkata-slusi@nic.in

Website: http://slusi.dacnet.nic.in