

prioritisation of Micro-watersheds of 3D1A, 3D1B and 3C3B Subcatchment of Brahmaputra Basin, District Aizawl, Champhai ,Lawngtlai, Lunglei, Mamit ,Saiha and Serchhip of Mizoram using Remote Sensing and GIS Techniques

Abstract

1. Survey area	:	.3D1A1-7, 3D1B1-2&4, and 3C3B1-5 Watersheds of 3D1A, 3D1B and 3C3B Subcatchment of Brahmaputra Basin, districts Aizawl, Champhai ,Lawngtlai, Lunglei, Mamit ,Saiha and Serchhip of Mizoram.
2. Kind of Survey		Rapid Reconnaissance Survey for priority delineation
3. Total area Surveyed and mapped	:	971150 ha
4. Location	:	21 ⁰ 56' 24" to 23 ⁰ 51' 00" N Latitude 92 ⁰ 15' 54"to 93 ⁰ 12' 18" E Longitude
5. Agroclimatic Region	:	Eastern Himalayan Region (II) as per Planning Commission(1989)
6. Period of Survey	:	December 2011 to January 2011
7. Base material used	:	Survey of India Toposheets (1:50,000) and IRS-P6 LISS-III Precision Geo-coded FCC(3, 2, & 1) Satellite Imagery (1:50,000)

8. Areal Extent of different Runoff Potential Mapping Units

Sl.No.	RIMU	Runoff Potential Value	Area in ha.	
			Area (ha.)	Area (%)
1.	AL01	58	6594	0.68
2.	AL02	63	1145	0.12
3.	AL03	58	1247	0.13
4.	SD01	68	482	0.05
5.	SD02	60	3551	0.37
6.	SD03	69	1419	0.15
7.	SD04	90	39037	4.02
8.	SD05	82	96539	9.94
9.	SD06	71	134139	13.81
10.	SD07	69	283163	29.16
11.	SD08	91	24044	2.48
12.	SD09	90	119618	12.32
13.	SD10	76	11263	1.16
14.	SD11	74	32053	3.30
15.	SD12	67	45340	4.67
16.	SD13	60	44651	4.60
17.	SD14	81	6958	0.72
18.	SD15	78	31305	3.22
19.	SD16	72	3800	0.39
20.	SD17	69	16365	1.69
21.	SD18	61	12194	1.26
22.	SD19	59	9634	0.99
23.	SD20	75	3608	0.37
24.	SD21	75	22927	2.36
25.	SD22	70	1354	0.14
26.	SD23	66	4842	0.50
27.	SD24	70	3338	0.34
28.	SD25	71	5338	0.55
29.	Home Stead (HS)	0	2621	0.27
30.	River(RI)	0	2581	0.27
Grand Total			971150	100.00

9. Hydrological Divisions:

Water Resource Region (3)

Basin (3D)

Catchment (3D1)

Subcatchment (3D1A)

Watersheds (3D1A1, 2,3

Subwatersheds (3D1A1a, b, .c.....,)

Microwatersheds (3D1A1a 1,3D1A1a 2,)

10. Area under different erosion classes

Erosion Class	Aizawl	Champhai	Lawngtlai	Lunglei	Mamit	Saiha	Serchhip	Area in ha.	
								Total Area	Area (%)
Slight to Moderate erosion	544	98	65086	156237	21531	79102	21444	344042	35.43
Moderate erosion	5032	0	20424	53891	10527	37096	24161	151131	15.56
Moderate to Severe erosion	2034	5	42219	55000	16302	28430	20241	164231	16.91
Severe erosion	7495	0	72847	122450	30970	50869	21913	306544	31.57
Misc.	46	0	946	1783	239	1247	941	5202	0.54
Total	15151	103	201522	389361	79569	196744	88700	971150	100.00

11. Priority Categorisation

Sl. No.	Priority Category & Range	No. of Microwatersheds	Area in ha.	
			Total Area	Area (%)
1.	Very High (above 80)	208	158435	16.31
2.	High (76-80)	259	222380	22.9
3.	Medium (71-75)	425	360564	37.13
4.	Low (66-70)	266	207320	21.35
5.	Very Low (65 & below)	35	22451	2.31
Total		1193	971150	100.00

12. State and District wise Priority Categorisation

Priority Category	Aizawl	Champhai	Lawngtlai	Lunglei	Mamit	Saiha	Serchhip	Total Area	Area (%)
Very High	2209		24543	59197	17017	35417	20052	158435	16.31
High	6882	93	36911	91798	9360	55116	22220	222380	22.90
Medium	5866	10	73579	137242	41299	75804	26764	360564	37.13
Low	194		59579	92753	8480	27966	18348	207320	21.35
Very Low			6910	8371	3413	2441	1316	22451	2.31
Total	15151	103	201522	389361	79569	196744	88700	971150	100

13. Salient features :

- Total area of the 3D1A, 3D1B and 3C3B Subcatchments is 971150 ha distributed over 1193 micro-watersheds.
- An area of 158435 ha (16.31%) is under very high priority distributed over 208 micro-watersheds and that under high priority is 2, 22,380 ha (22.9%) in 259 micro watersheds.
- Total 467 micro watersheds are under very high & high priority, constituting 380815 ha (39.21%) which need immediate attention for suitable Soil-water conservation programme.
- Among the districts, Lunglei is the most affected by runoff water and also come under very high priority category which occupies 59197 ha. area followed by Saiha 35417 ha. area, Lawngtlai 24543 ha. area , Serchhip 20052 ha. area, Mamit 17017ha. area and Aizawl 2209 ha. Area.
- 3C3B5 watershed is the worst affected by runoff water followed by 3D1B2, 3C3B4, 3C3B1 and 3D1B1 watersheds which needs immediate attention for proper soil water conservation vis-à-vis runoff control measures.
- An area of about 180607 ha (18.60%) is under Jhum/ shifting cultivation which needs immediate attention for alternative to shifting cultivation practices. About 683718 ha. (70.4%) lands of the surveyed area are covered by evergreen forest (single and double story veg.), 55936 ha. (5.76%) area under degraded forest while about 39093 ha. (4.03%) area under open scrub land and about 6594 ha (0.68%) area is under cultivation.
- Almost 552878 ha (56.93%) of the total surveyed area are Gravelly fine loamy soil textured.
- About 52.91% of the total come under moderately deep to deep soil followed by 24.42% or under depth very deep soil.
- Moderate to Severely eroded land occupies 164231 ha. (16.91%) and severely eroded land occupies 306544 ha (31.57%) which needs immediate attention for proper soil-water conservation practices.
- Out of total 971150 ha. survey area is about 2740094 ha. (28.21%) and 196766 ha. (20.26%) area of the sub-catchment are come under unmanaged and poorly managed respectively, while 151131 ha (15.56%) area comes under moderately well managed.
- To check the high run-off as well high and very high priority area .an Integrated watershed management programme (IWMP) may be taken up.
- Plantation crop can be ground on abandoned jhum land area to mitigate high run-off from this vulnerable land.

How to Use Soil Survey Report

The report embodies the results of the rapid reconnaissance Survey conducted for identification and delineation of priority micro-watersheds in 3D1A, 3D1B, 3C3B, Sub-catchment of Brahmaputra basin in Mizoram. The report explores valuable information about catchment characteristics as well as soil characteristics of the watersheds. The main out come of this survey is the priority grading of 1193 micro-watersheds delineated in the 3D1A, 3D1B, 3C3B sub-catchment falling in Mizoram state on the basis of run-off potential index. Higher value of run-off potential index suggests higher priority and vice-versa. Maps showing the demarcation of priority micro-watersheds in 3D1A, 3D1B, 3C3B sub-catchment in the scale of 1:50,000 are appended in the report

In the maps, each micro-watershed is marked by an abbreviated code, like **3D1A1a1** where ‘3’ stands for water resource region, ‘D’ stand for basin, ‘1’ for catchment, ‘A’ denotes sub-catchment, ‘1’ stands for watershed, and ‘a’ designated sub-watershed and ultimately ‘1’ denotes micro-watershed.

The run off potential “mapping units (RPMUs) are symbolized by capital English alphabets based on geological origin of the land i.e. ‘S’ stands for sandstone, shale, ‘C’ stands for complex geology, ‘A’ denotes alluvium and their further subdivision are made on the basis of land and soil characteristics. The mapping units are defined on the basis of landscape, physiography, slope, land use, soil characteristics surface features, erosion hazards, and existing management practices. Mapping units are assigned with runoff potential weightage values and different micro – watersheds have been categorized as very high, high, medium and low priority areas according to RPI value.

The mapping legend is furnished in **Table 5.** and the differentiating characteristics of each mapping unit are represented in **Table 6.** The details of computation of run off potential index are given in **Table 7.** and corresponding state and district-wise information of priority is shown in **Table 11.** To select priority micro-watershed for soil and water conservation programme, the mapping legend description can also be used for characterisation of any part of the catchment with respect to slope gradient, broad soil groups, present land use, surface cover, erosion and other problems.

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

The Chief Soil Survey Officer
Soil and Land Use Survey of India
I.A.R.I. Building, New Delhi 110012
Telefax-011-258-43811/1263
E-mail: csso-slusi@nic.in

OR

The Soil Survey Officer
Soil and Land Use Survey of India
E-Block, B. P. Township,
Kolkata-700094
Telefax-033-24301425/1581
E-mail: ssokolkata-slusi@nic.in

Website : [http:// slusi.dacnet.nic.in](http://slusi.dacnet.nic.in)