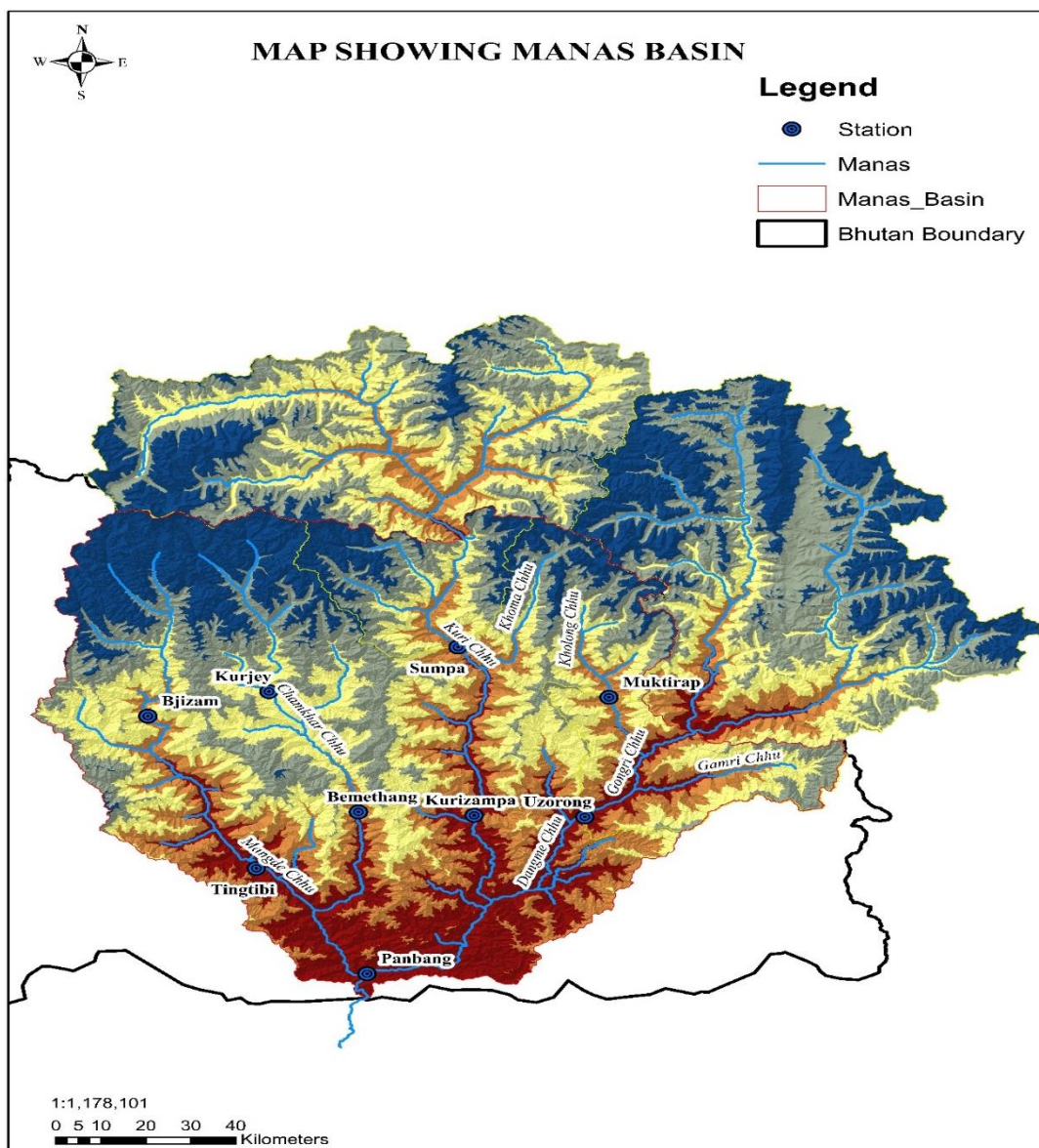


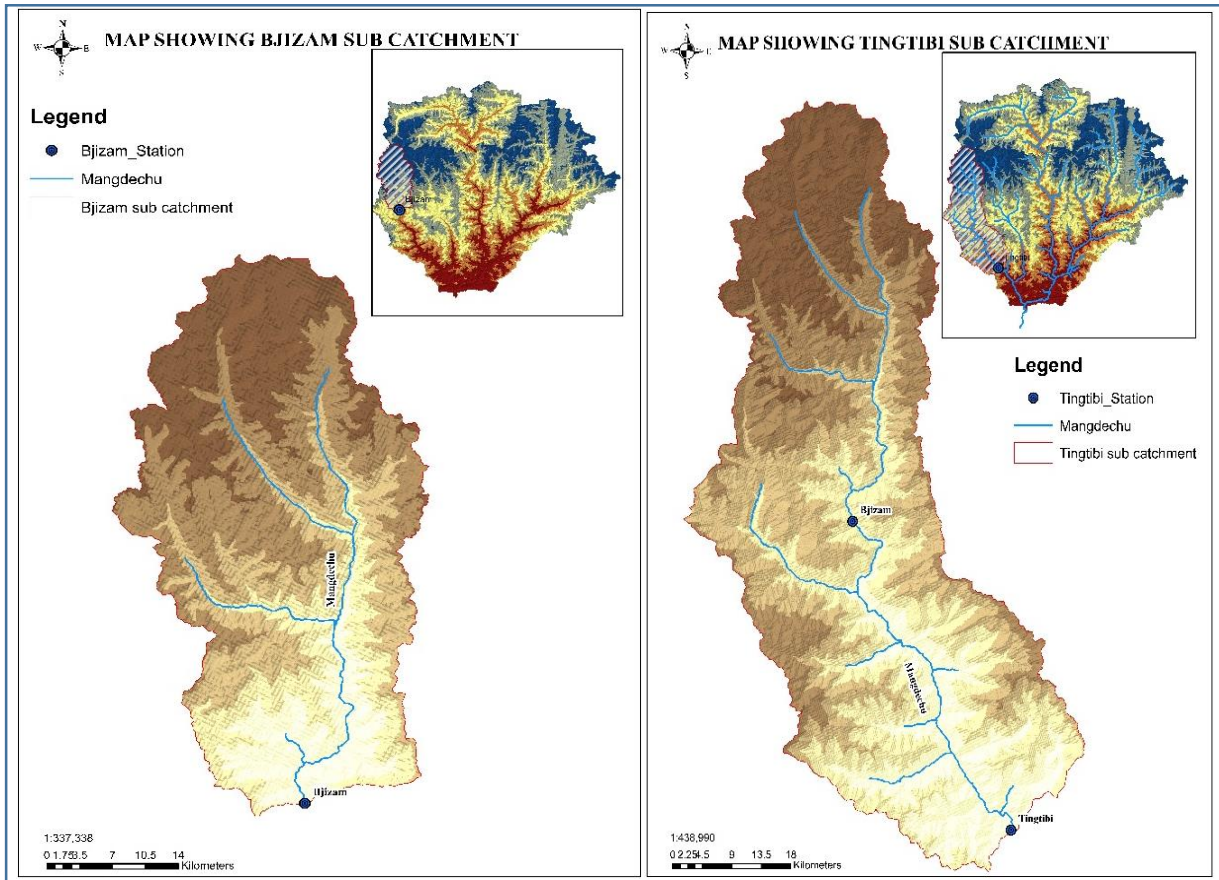
3 Manas Basin

The Manas is the biggest river basin, which drains almost all the catchments of Central and Eastern Bhutan. It comprises of four major sub-basins, namely: Mangde Chhu and Chamkhar Chhu (which both originate close to Gangkhar Puensum), Kuri Chhu (which originates from China), and Dangmechhu (formed by joining two main tributaries-Kholongchhu that originates from the northern-eastern part of Trashi Yangtse and Gongri that originates from China and flows from Aurunacha Pradesh in India to Bhutan). Kurichhu and Gongri are transboundray Rivers that originates from Autonomous region of Tibet, China. The three minor rivers that drains through the southeastern corner of the country are Nyera Ama Ri, Nonori Chhu, and Jomo Chhu (Dhansari).

There are fourteen manual stations (Nine principle and five secondary) in the Manas basin. The catchment delineation is based on the nine principle stations located at Bjizam and Tingtibi on Mangdechu, Kurjey and Bemethang on Chamkharchu, Sumpa and Kurizampa on Kurichu, Muktirap on Kholongchu, Uzorong on Gomgri and Panbang on Drangmechu.



3.1.1 Sub-Catchment – Mangdechu Sub Basin



Bjizam Sub Catchment:

Station Location: Bjizam on Mangdechu

Coordinates: Longitude : 90:27:17

Latitude : 27:31:28

Elevation : 1848

Catchment Area: 1390.33sq.km

Major Streams and River Lengths:

Sl.No	Rivers	Length (km)
1	Mangdechu till Bjizam	58.43
2	Mangdechu till Tingtibi	122.87
3	Bjizam to Tingtibi	64.44

Tingtibi Sub catchment

Station Location: Tingtibi on Mangdechu

Coordinates: Longitude : 90:41:59

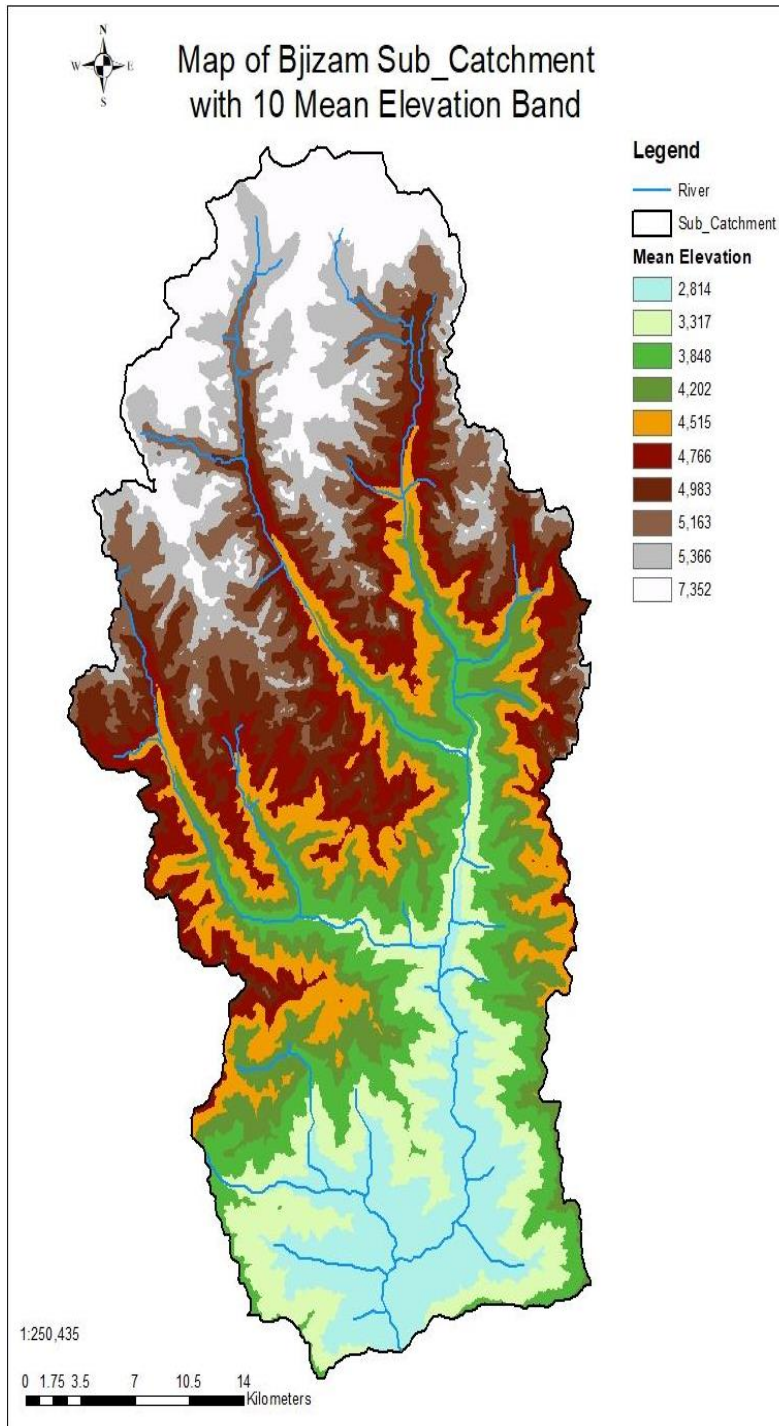
Latitude : 27:08:50

Elevation : 530

Catchment Area: 3339.26sq.km

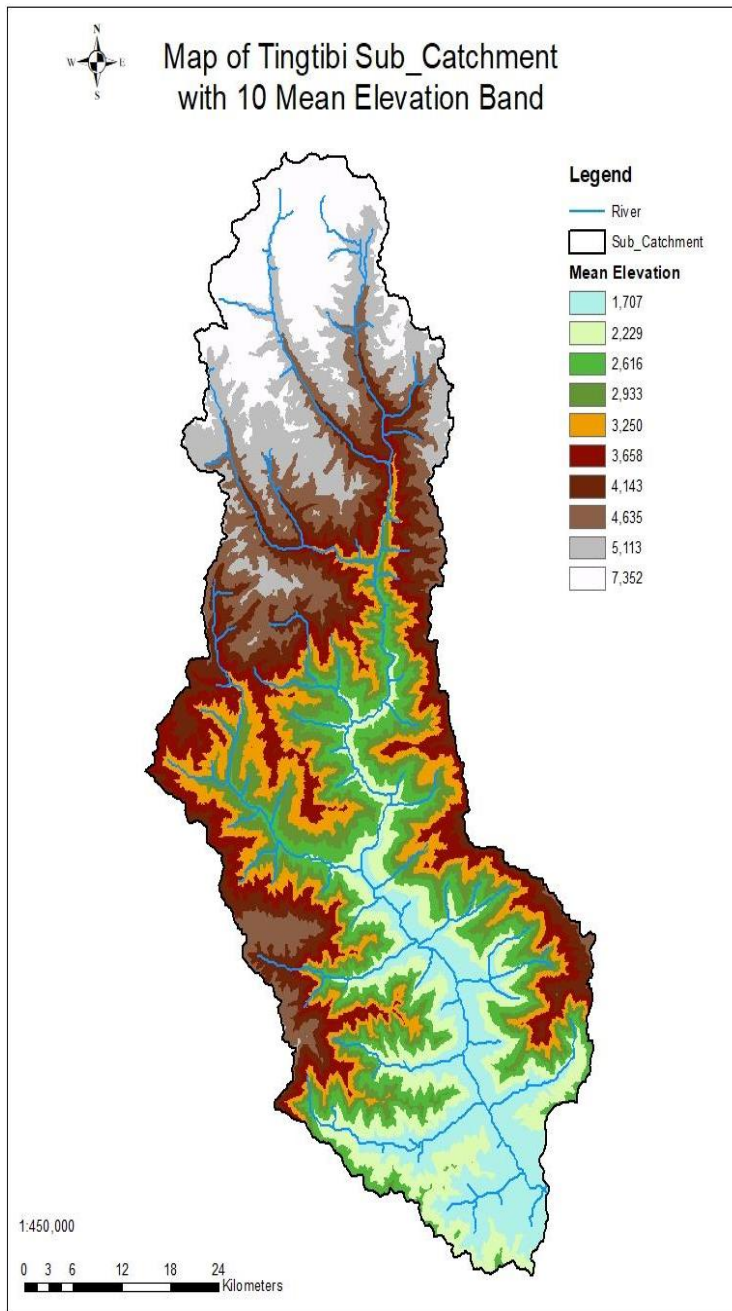
3.1.2 Land Use Area

Bjizam Sub Catchment:



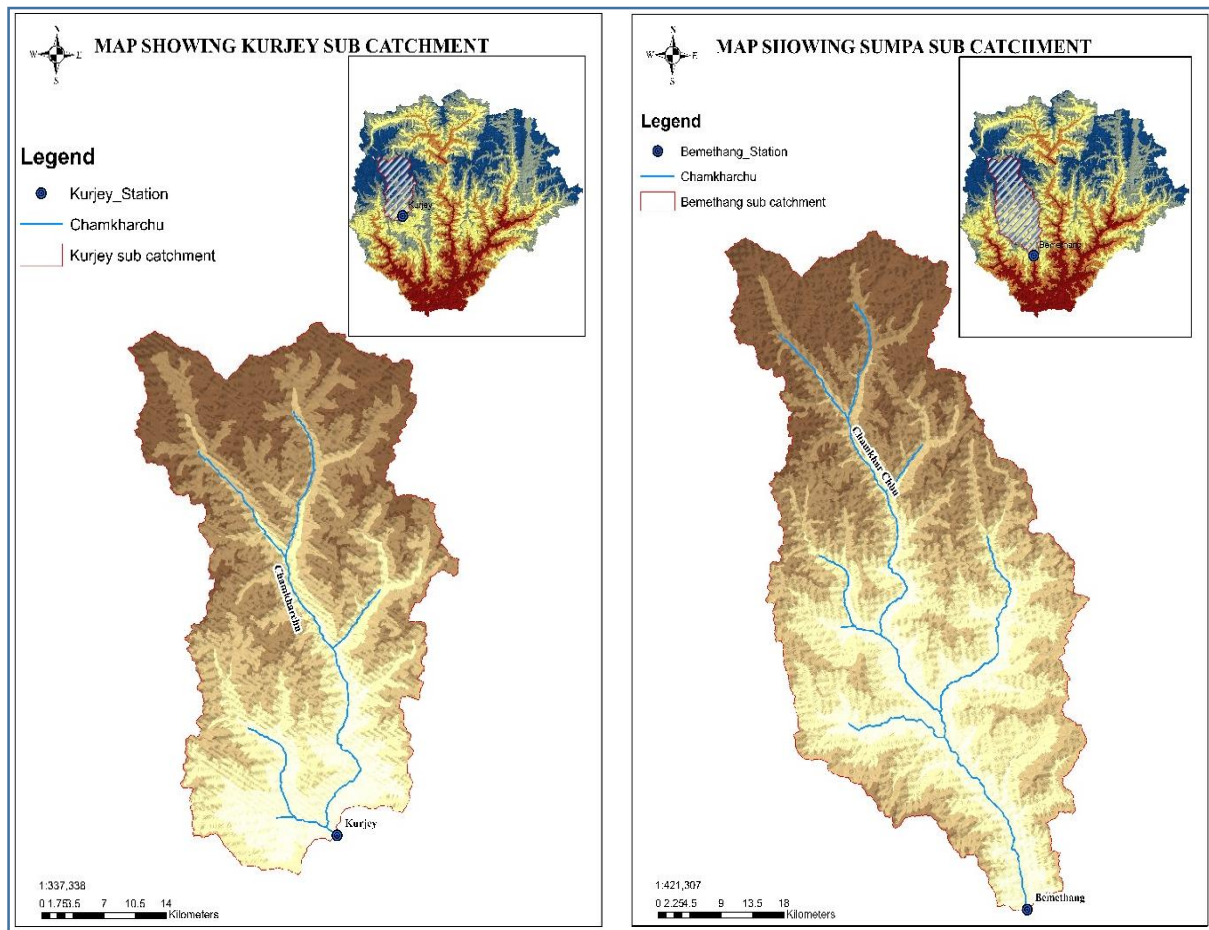
Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	2814	field	16.668
		forest	122.232
2	3317	field	2.778
		forest	136.122
3	3848	field	4.167
		forest	134.733
4	4202	field	25.002
		forest	111.12
		glacier	2.778
5	4515	field	36.114
		forest	80.562
		glacier	22.224
6	4766	field	37.503
		forest	43.059
		glacier	58.338
7	4983	field	44.448
		forest	19.446
		glacier	75.006
8	5163	field	50.004
		forest	12.501
		glacier	76.395
9	5366	field	44.448
		forest	5.556
		glacier	88.896
10	7352	field	59.727
		glacier	79.173

Tingtibi Sub catchment



Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	1707	field	70.466
		forest	249.834
2	2229	field	38.436
		forest	281.864
3	2616	field	28.827
		forest	291.473
4	2933	field	35.233
		forest	285.067
5	3250	field	28.827
		forest	291.473
6	3658	field	12.812
		forest	307.488
7	4143	field	28.827
		forest	288.27
		glacier	3.203
8	4635	field	76.872
		forest	185.774
		glacier	57.654
9	5113	field	99.293
		forest	51.248
		glacier	169.759
10	7352	field	118.511
		forest	9.609
		glacier	192.18

3.2.1 Sub-Catchment – Chamkharchu Sub Basin



Kurje Sub Catchment:

Station Location: Kurjey on Chamkharchu

Coordinates: 90:44:13E,27:35:13N,2600H

Coordinates: Longitude : 90:44:13

Latitude : 27:35:13

Elevation : 2600

Catchment Area: 1354.97sq.km

Major Streams and River Lengths:

Sl.No	Rivers	Length (km)
1	Chamkharchu till Kurjey	54.47
2	Chamkharchu till Bemethang	99.36
3	Kurjey till Bemethang	44.89

Bemethang Sub catchment

Station Location: Bemethang on Chamkharchu

Coordinates: 90:56:15E,27:16:50N,1300H

Coordinates: Longitude : 90:56:15

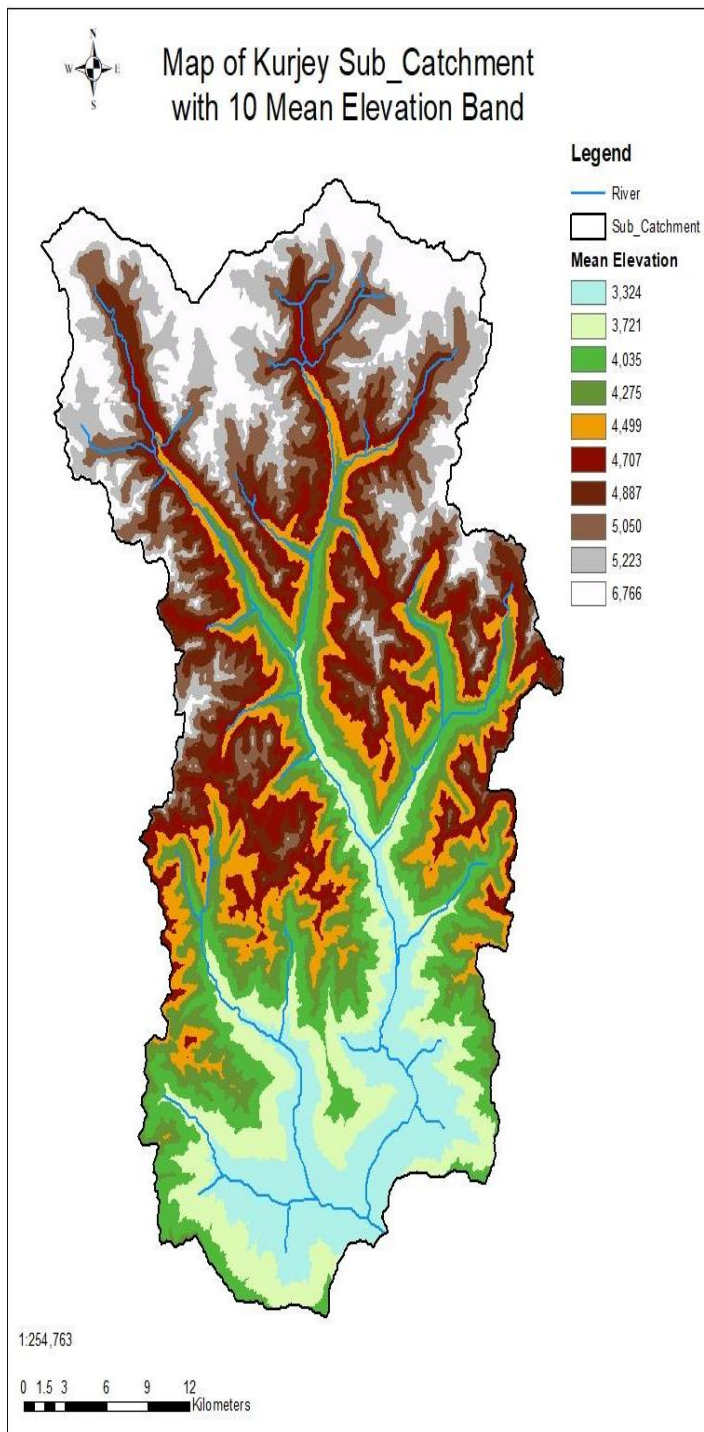
Latitude : 27:16:50

Elevation : 1300

Catchment Area: 2717.72sq.km

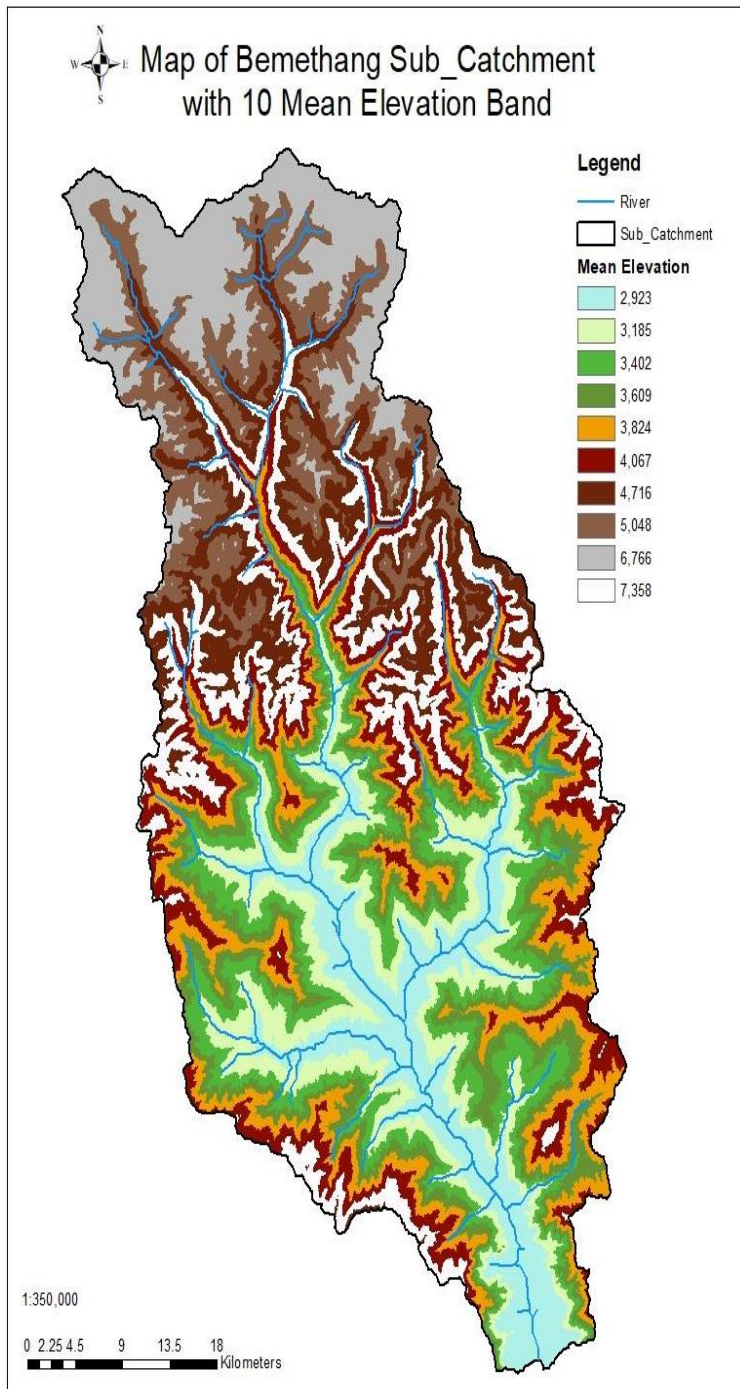
3.2.2 Land Use Area

Kurjey Sub Catchment:



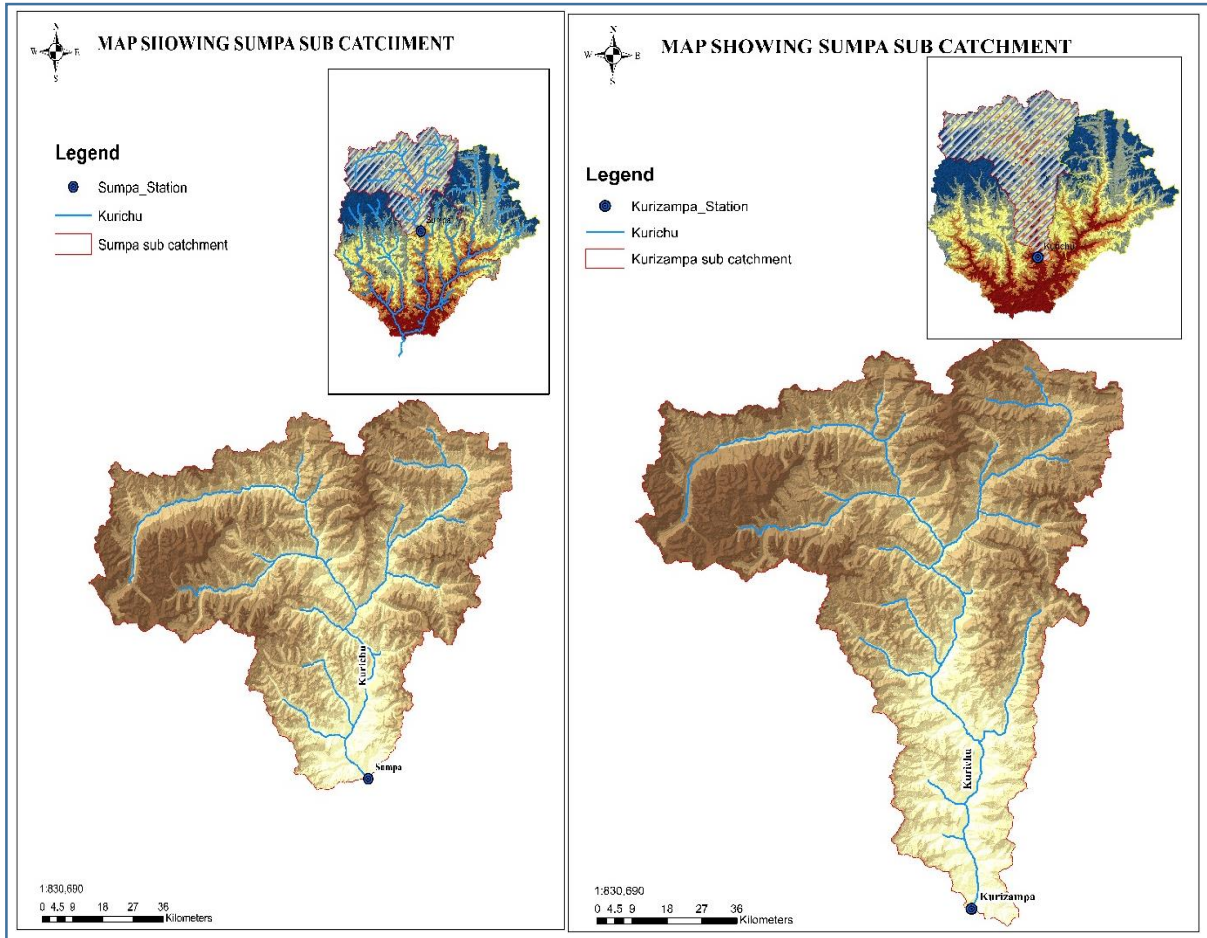
Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	3324	field	27.02
		forest	108.08
2	3721	field	17.563
		forest	117.537
3	4035	field	18.914
		forest	116.186
4	4275	field	33.775
		forest	101.325
5	4499	field	56.742
		forest	75.656
		glacier	2.702
6	4707	field	58.093
		forest	67.55
		glacier	9.457
7	4887	field	55.391
		forest	54.04
		glacier	25.669
8	5050	field	54.04
		forest	44.583
		glacier	36.477
9	5223	field	55.391
		forest	28.371
		glacier	51.338
10	6766	field	54.04
		forest	8.106
		glacier	72.954

Bemethang Sub catchment:



Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	2923	field	65.16
		forest	206.34
2	3185	field	48.87
		forest	222.63
3	3402	field	40.725
		forest	230.775
4	3609	field	29.865
		forest	241.635
5	3824	field	29.865
		forest	241.635
6	4067	field	35.295
		forest	236.205
7	4358	field	67.875
		forest	203.625
8	4716	field	108.6
		forest	149.325
		glacier	13.575
9	5048	field	108.6
		forest	100.455
		glacier	62.445
10	6766	field	111.315
		forest	38.01
		glacier	122.175

3.3.1 Sub Catchment-Kurichu Sub Basin



Sumpa Sub Catchment:

Station Location: Sumpa on Kurichu

Coordinates: Longitude : 91:12:54

Latitude : 27:39:50

Elevation : 1170

Catchment Area: 7101.15sq.km

Major Streams and River Lengths:

Sl.No	Rivers	Length (km)
1	Kurichu till Sumpa	169.35
2	Kurichu till Kurizampa	227.1
3	Sumpa to Kurizampa	57.75

Kurizampa Sub catchment

Station Location: Kurizampa on Kurichu

Coordinates: Longitude : 91:11:37

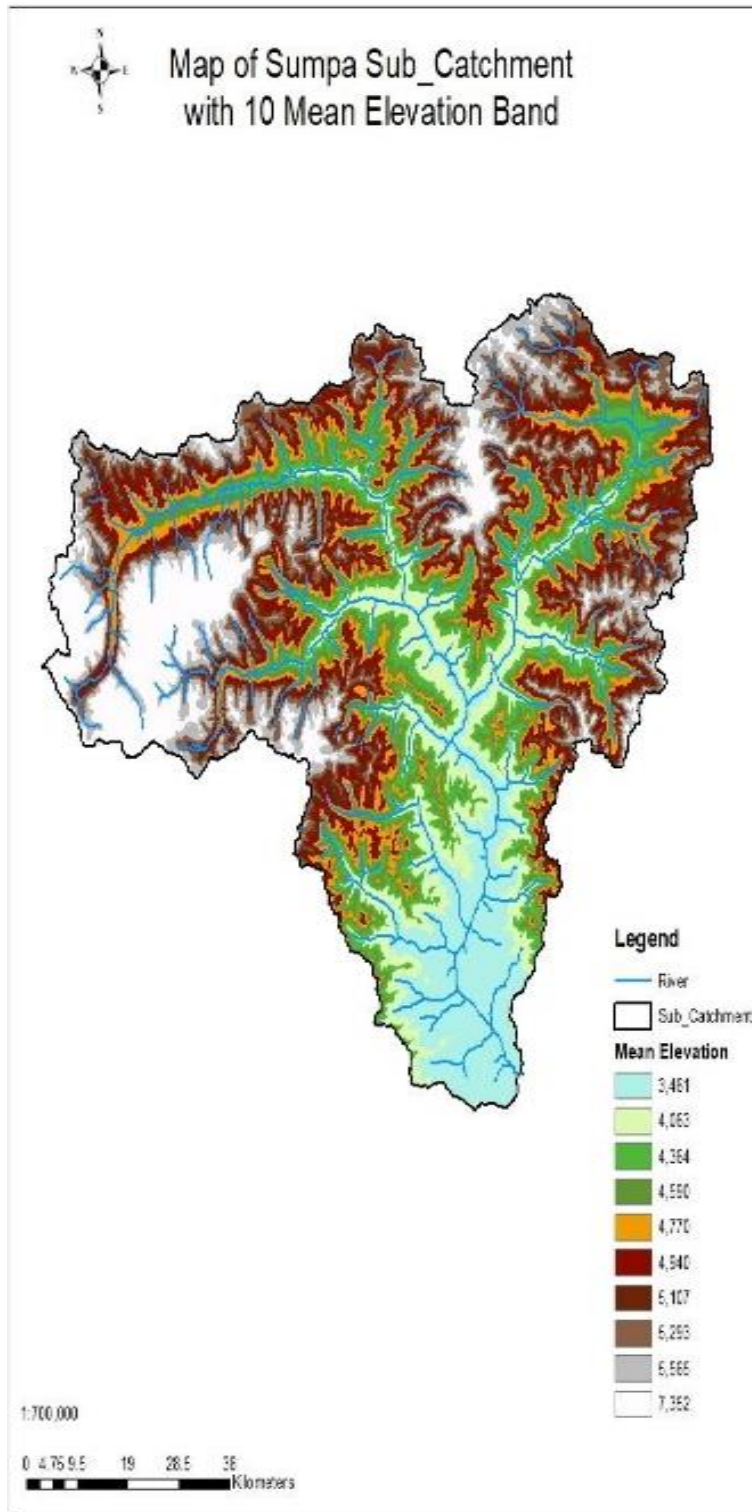
Latitude : 27:16:26

Elevation : 519

Catchment Area: 8997.7sq.km

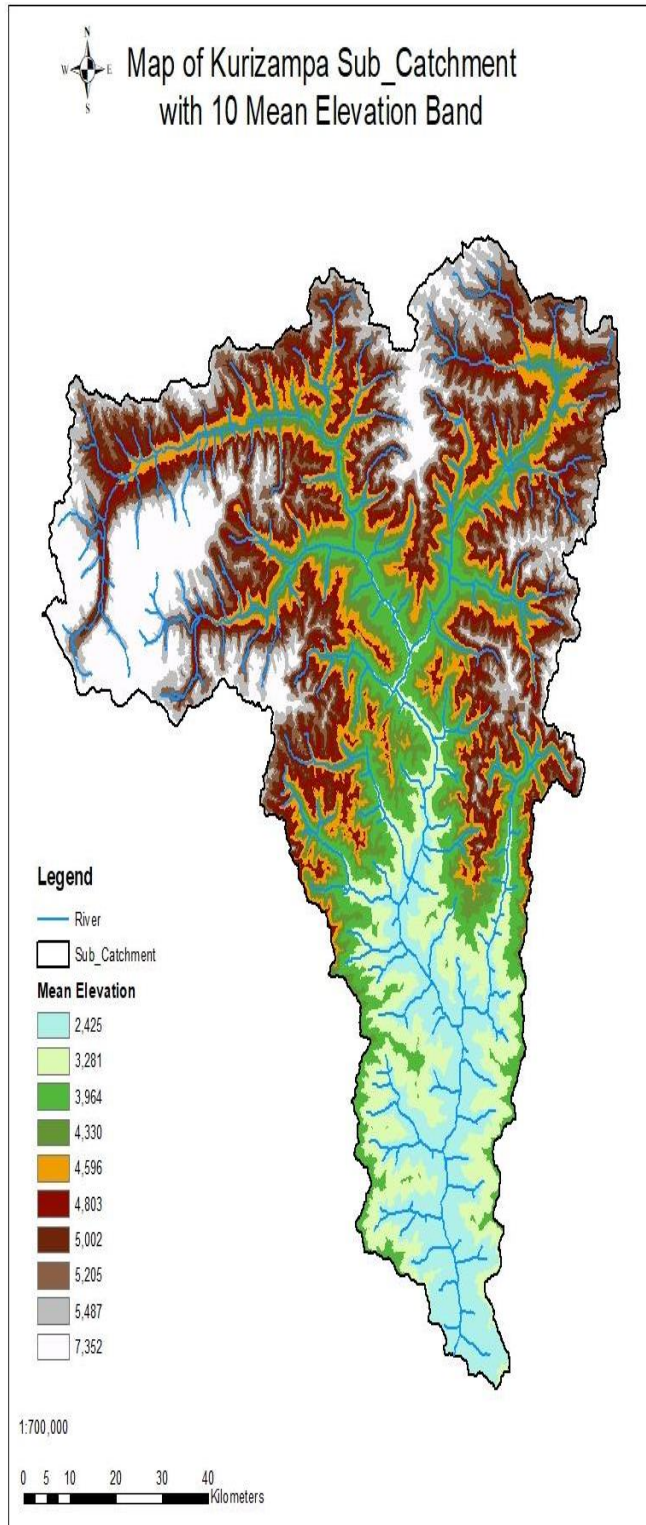
3.3.2 Sub Catchment-Kurichu Sub Basin

Sumpa Sub Catchment:



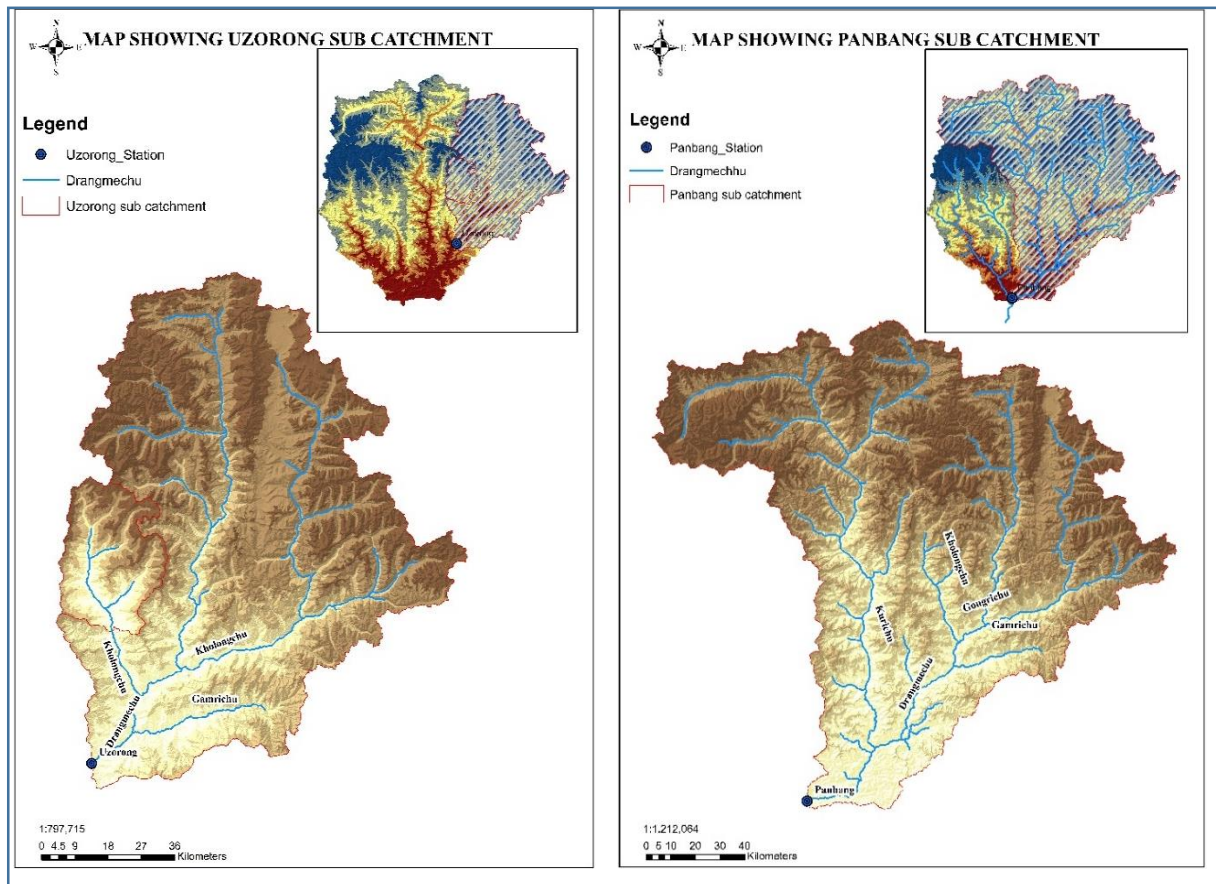
Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	3461	field	145.22
		forest	580.88
2	4063	field	435.66
		forest	254.135
		glacier	36.305
3	4364	field	544.575
		forest	137.959
		glacier	43.566
4	4590	field	573.619
		forest	123.437
		glacier	29.044
5	4770	field	566.358
		forest	137.959
		glacier	21.783
6	4940	field	559.097
		forest	137.959
		glacier	29.044
7	5107	field	544.575
		forest	145.22
		glacier	36.305
8	5293	field	522.792
		forest	152.481
		glacier	50.827
9	5565	field	501.009
		forest	130.698
		glacier	94.393
10	7352	field	334.006
		forest	50.827
		glacier	341.267

Kurizampa Sub catchment:



Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	2425	field	179.94
		forest	719.76
2	3281	field	89.97
		forest	809.73
3	3964	field	368.877
		forest	503.832
		glacier	26.991
4	4330	field	602.799
		forest	242.919
		glacier	53.982
5	4596	field	665.778
		forest	161.946
		glacier	71.976
6	4803	field	656.781
		forest	179.94
		glacier	62.979
7	5002	field	656.781
		forest	170.943
8	5205	field	638.787
		forest	179.94
		glacier	80.973
9	5487	field	611.796
		forest	170.943
		glacier	116.961
10	7352	field	440.853
		forest	80.973
		glacier	377.874

3.4.1 Sub Catchment-Drangmechu Sub Basin



Uzorong Sub Catchment:

Station Location: Uzorong on Drangmechu

Coordinates: Longitude : 91:24:30

Latitude : 27:15:38

Elevation : 554

Catchment Area: 8260.73sq.km

Panbang Sub catchment:

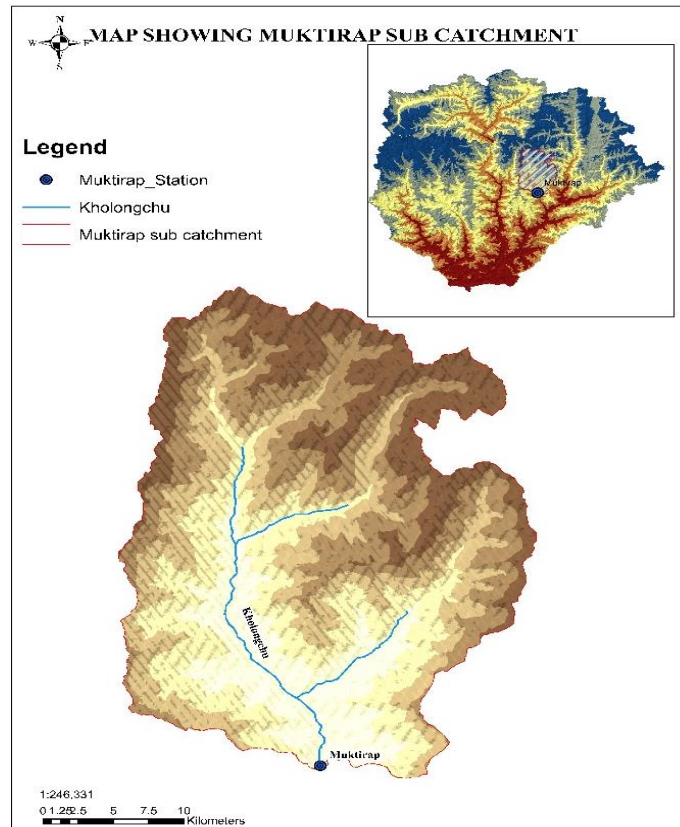
Station Location: Panbang on Drangmechu

Coordinates: Longitude : 90:50:30

Latitude : 26:50:30

Elevation : 136

Catchment Area: 21006.1sq.km



Muktirap Sub Catchment:

Station Location: Muktirap on Kholongchu

Coordinates: Longitude : 91:29:40

Latitude : 27:35:16

Elevation : 1640

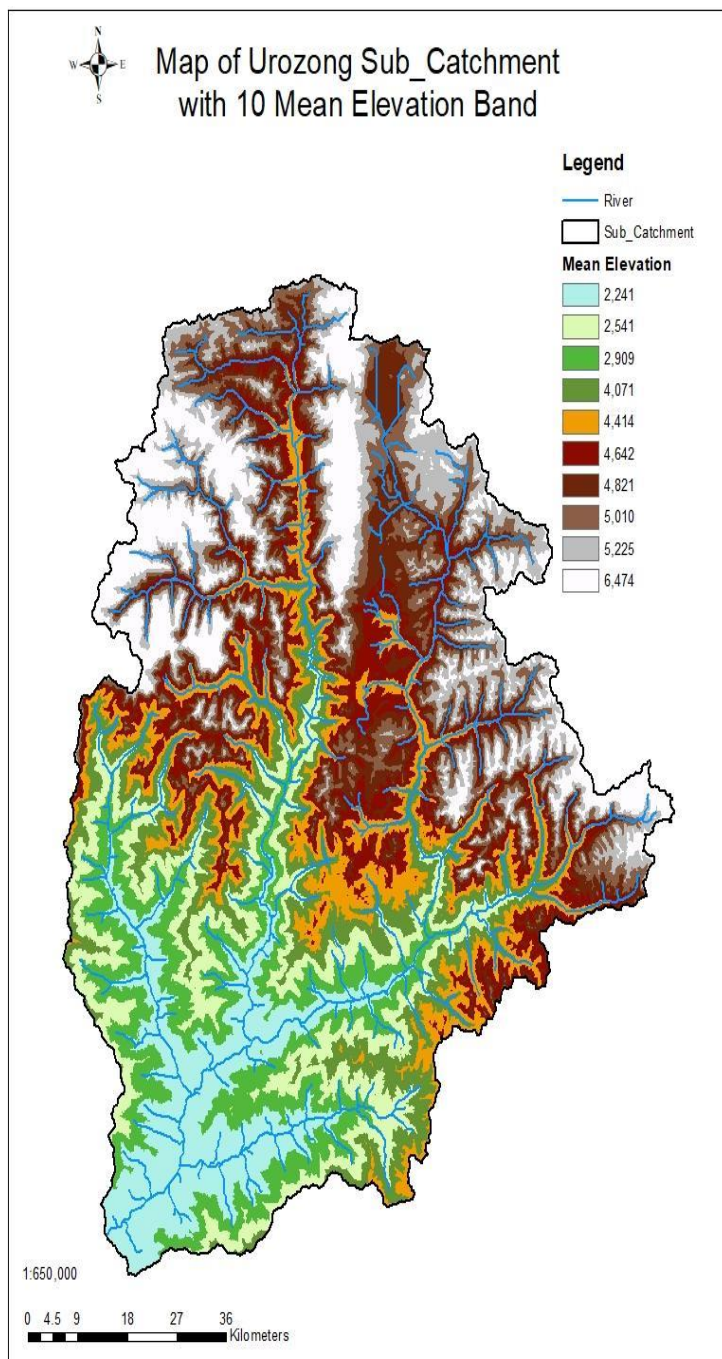
Catchment Area: 876.36sq.km

Major Streams and River Lengths:

Sl.No	Rivers	Length (km)
1	Kholongchu till Uzorong	172.24
2	Kholongchu till Panbang	258.69
3	Kurichu till Panbang	306.51
4	Panbang till end	31.05
4	Kholongchu (small) till Muktirap	20.57

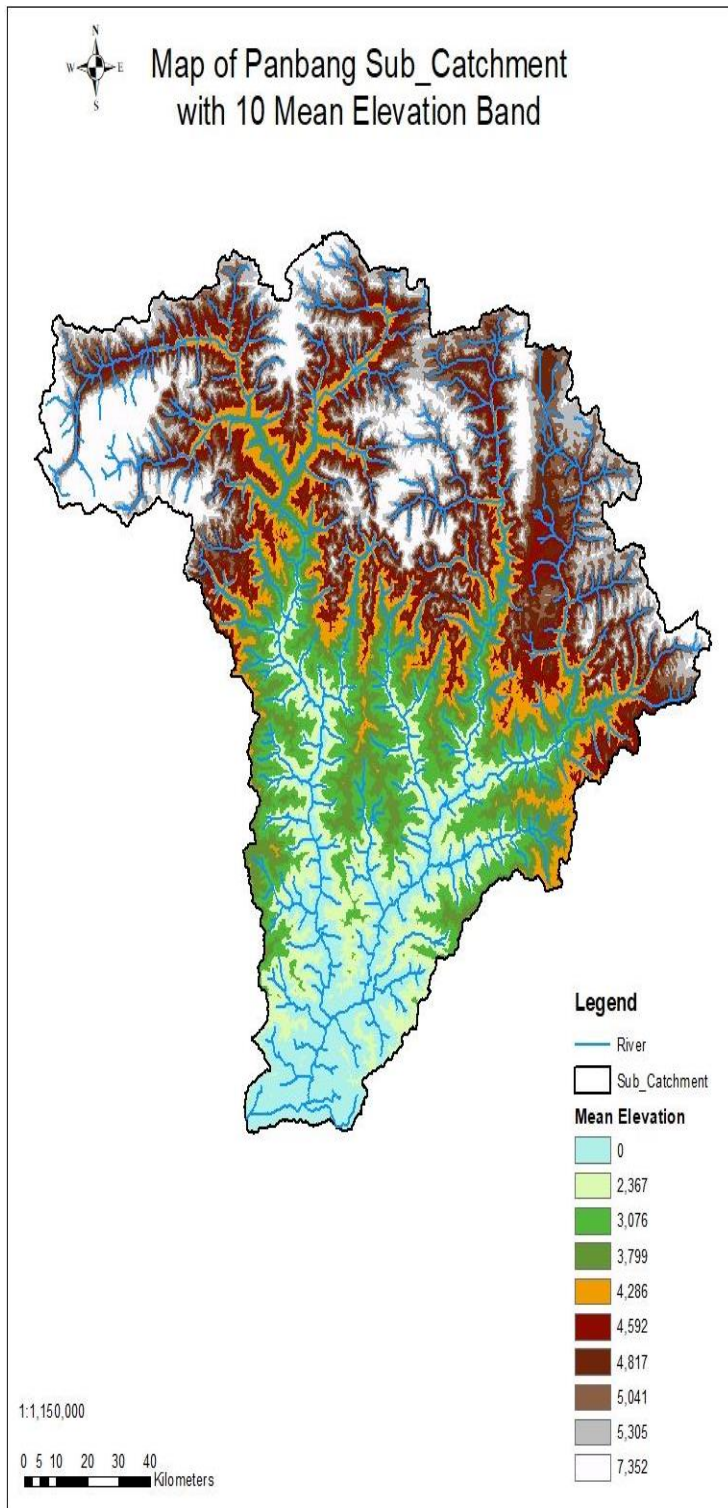
3.4.2 Land Use Area

Uzorong Sub Catchment:



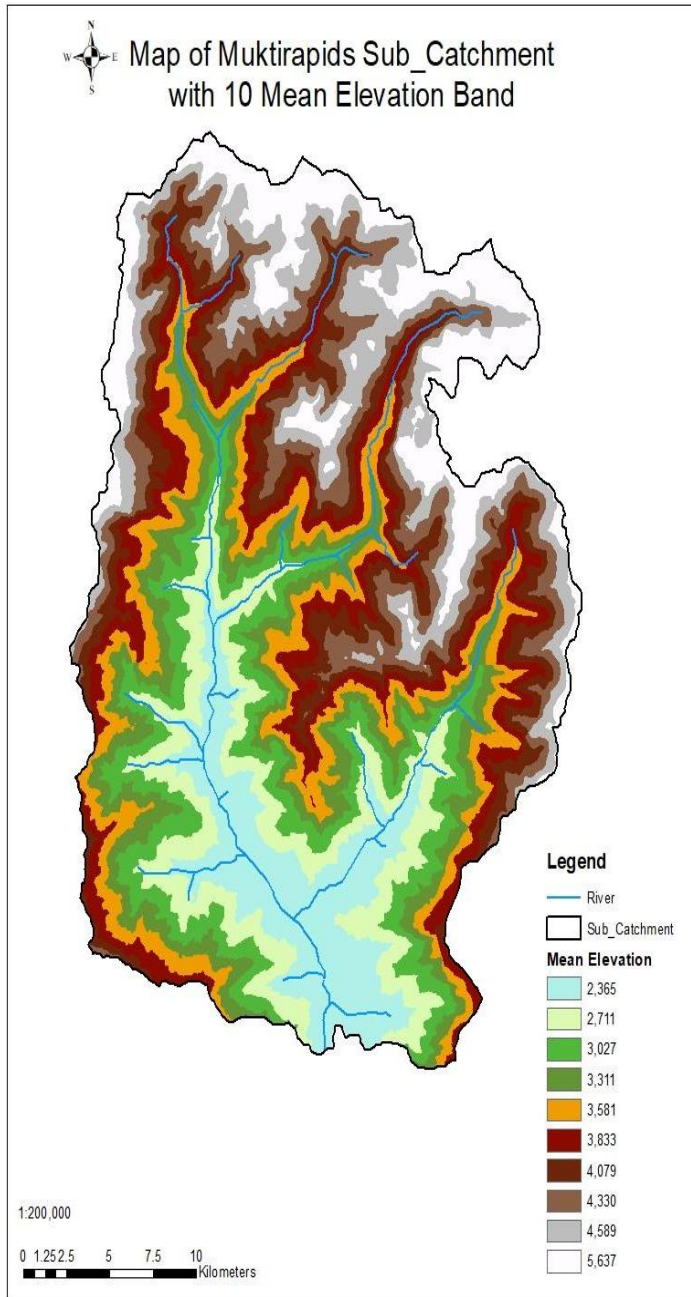
Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	2241	field	412.74
		forest	504.46
2	2909	field	238.472
		forest	678.728
3	3541	field	265.988
		forest	651.212
4	4071	field	486.116
		forest	431.084
5	4414	field	678.728
		forest	201.784
		glacier	36.688
6	4642	field	724.588
		forest	128.408
		glacier	64.204
7	4821	field	706.244
		forest	174.268
		glacier	36.688
8	5010	field	669.556
		forest	220.128
		glacier	27.516
9	5225	field	651.212
		forest	238.472
		glacier	27.516
10	6474	field	642.04
		forest	146.752
		glacier	128.408

Panbang Sub catchment:



Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	1592	field	609.551
		forest	1492.349
2	2367	field	609.551
		forest	1492.349
3	3076	field	315.285
		forest	1786.615
4	3799	field	630.57
		forest	1450.311
		glacier	21.019
5	4286	field	1324.197
		forest	693.627
		glacier	84.076
6	4592	field	1618.463
		forest	336.304
		glacier	147.133
7	4817	field	1576.425
		forest	399.361
		glacier	126.114
8	5041	field	1534.387
		forest	462.418
		glacier	105.095
9	5305	field	1492.349
		forest	462.418
		glacier	147.133
10	7352	field	1282.159
		forest	273.247
		glacier	-3657.31

Muktirap Sub Catchment:



Sl. No	Mean Elevation Band	Type	Area (sq.km)
1	2365	field	32.449
		forest	55.251
2	2711	field	6.139
		forest	81.561
3	3027	field	4.385
		forest	83.315
4	3311	field	2.631
		forest	85.069
5	3581	field	0.877
		forest	86.823
6	3833	field	1.754
		forest	85.946
7	4079	field	4.385
		forest	80.684
		galcier	2.631
8	4330	field	2.631
		forest	67.529
		galcier	17.54
9	4589	field	0.877
		forest	34.203
		galcier	52.62
10	5637	field	2.631
		forest	13.155
		galcier	71.914

MAP SHOWING RIVER LENGTHS OF MANAS BASIN

