

SIKKIM

The state of Sikkim is located in the northeastern part of the country and lies between 27⁰04' – 28⁰08' N latitudes and 88⁰00' – 88⁰54' E longitudes covering an area of 7098 sq. km. The state has international borders with China in the North, Nepal in the west and Bhutan in the East and to the south lies the state of West Bengal. For administrative convenience the state has been divided into four districts namely North, East, West and South districts.

Physiographically, two-third of the state consists of largely snow-covered high hills with deep ravines/gorges. About 30 percent of the state is forest covered. The state has cool humid temperatures ranging from 3 - 30⁰ C. However, the mercury dips below freezing temperatures during the winter.

The average annual rainfall is 3000 mm mainly contributed by the southwest monsoon during June-October and intermittent rains during December-February months. Main rivers draining the state are the Teesta and the Rangit rivers. Other tributaries joining the Teesta river are the Yumthang Chhu, the Sebozung Chhu. The

Teesta and its tributaries are perennial in nature and are fed by both snow-melt water and rain water. Due to its high altitude, dense forest, extreme cold climate conditions and rugged topography the area is not easily approachable and renders conventional surveys almost impossible. Thus the role of remote sensing technique for mapping becomes all the more essential for this area.

Distribution of Wetland in Sikkim

Mapping for the state of Sikkim was done on 1:50 000 scale using IRS LISS II data of 1992/93. SOI maps on 1:50 000 scale were used for preparing base maps.

Sikkim has only natural inland wetlands belonging to the category lakes/ponds. In all 160 wetlands greater than the minimum mapping unit (2.25 ha) were delineated which occupy an area of 1985 ha. 69 wetlands got frozen during the winter as manifested on the pre-monsoon season imagery. The water spread of the wetlands decreased from 1985 ha to 1749.50 ha during the pre-monsoon season. In addition, there are 67 wetlands smaller than the minimum mapping unit.

Table : Distribution of Wetlands in Sikkim

Wetland Category	Wetland Class	No. of Wetlands	Wetland Area (ha)	Water Spread (ha)	
				Post-M	Pre-M
Natural	Lake/Pond	160	1985.00	1985.00	1749.50
<2.25 ha	-	67	-	-	-
Total		227	1985.00	1985.00	1749.50

Note : Number of Wetlands frozen in Pre-monsoon 69
M = Monsoon



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District-wise Distribution of Wetlands

There are four districts in the state, viz, North, East, West and South districts.

As mentioned earlier the state has only lakes/ponds type of wetlands. The detailed information about wetland distribution is given in the table below.

Table : District-wise status of wetlands

District	Wetland Class	No. of Wetlands	Wetland Area (ha)	Water Spread (ha)	
				Post-M	Pre-M
1. East Sikkim					
	Lakes/Ponds	14	120.75	120.75	100.75
	< 2.25 ha	3	-	-	-
2. West Sikkim					
	Lakes/Ponds	11	56.50	56.50	56.50
3. North Sikkim					
	Lakes/Ponds	135	1807.75	807.75	1592.25
	< 2.25 ha	64	-	-	-
4. South Sikkim					
		-	-	-	-
Total		227	1985.00	1985.00	1749.50

Note : M = Monsoon

North Sikkim has the highest number of wetlands in the state (135 in number) occupying an area of 1807.50 ha. However, during pre-monsoon season the area estimated is 1592.25 ha. the reduction is due to freezing of many of the lakes. East and West districts have 14 and 11 wetlands respectively occupying an area of 120.75 ha and 56.25 ha. There is no reduction in the area during pre-monsoon seasons. In South district no wetlands could be delineated.

Turbidity

Majority of the wetlands in Sikkim have low turbidity (107 in post-monsoon and 60 in pre-monsoon). This is primarily due to the fact that most of these wetlands (lakes) are located in the high Himalayas and are of glaciatic origin. During the post-monsoon season 29 wetlands exhibited moderate and 24 high turbidity. (refer table below)

Table : Turbidity status in wetlands of Sikkim

Wetland Class	Turbidity					
	Low		Moderate		High	
	Pre-M	Post-M	Pre-M	Post-M	Pre-M	Post-M
Lakes/ponds	60	107	3	29	14	24

M = Monsoon



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CONCLUSIONS

- Sikkim has only natural inland wetlands belonging to the category lakes/ponds. In all 160 wetlands greater than the minimum mapping unit (2.25 ha) were delineated which occupy an area of 1985 ha.
- 69 wetlands got frozen during the pre-monsoon season as manifested on the imagery.
- The water spread of the wetlands decreased from 1985 ha to 1749.50 ha during the pre-monsoon season. In addition, there are wetlands smaller than the minimum mapping unit.
- Majority of the wetlands in Sikkim have low turbidity (107 in post-monsoon and 60 in pre-monsoon). This is primarily due to the fact that most of these wetlands (lakes) are located in the high Himalayas and are of glaciatic origin. During the post-monsoon season 29 wetlands exhibited moderate and 24 high turbidity.
- North Sikkim has the highest number of wetlands in the state (135 in number). The area occupied is 1807.50 ha. However, during the pre-monsoon season the area estimated is 1590.25 ha. The reduction is due to freezing of many of the lakes. East and West districts have 14 and 11 wetlands respectively occupying an area of 120.75 ha and 56.25 ha. There is no reduction in the area during pre-monsoon seasons. In South district no wetlands could be delineated.

*Source : - Wetlands of India
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