

# An Overview of Ratey Chu Watershed, East Sikkim

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Sikkim has 449 glaciers, 534 high altitude wetlands and 104 rivers (Sangewar and Shukla, 2009; FEWMD, 2012-13; FEWMD, 2008; Dahal, 2014). The 534 high altitude wetlands cover an area of 3225 ha. While, the watershed of Ratey Chu (Chu = river) covers an area of 51.79 km<sup>2</sup> with a relative relief of around 1700m. Additionally, it hosts around 15 wetlands fed by precipitation, snow melt and *niche glaciers*.<sup>i</sup> The prominent lake in the valley is Hans Pokhari<sup>ii</sup>, W. Lake, Pemthang Chho<sup>ii</sup> and Biren Jheel<sup>ii</sup> lying across North (SE) and East districts (NE) of Sikkim. The lithology of the watershed is represented by Rayong formation and Darjeeling gneiss and

Gneiss (Chola Range). The largest lake in the valley is Tamze/Hans Pokhari at an altitude of 4066m.

These wetlands provide several types of intangible (amenity, recreation, aesthetics) ecosystem services (Photo 1 & 2). Functions, goods and services provided by natural and semi-natural ecosystem, Ratey Chu watershed/Tamze Wetland Complex are in (Table 1). The shallow and elongated Hans Pokhari (4066m) is one of the major sources of Ratey Chu River which pumps in millions of gallons of water daily to meet the requirements of 1.5 lakhs Gangtokian. Similarly, presence of several snow covered mountain peaks, Chola Range (E), big and small water bodies in the

valley forms a distinct wetland complex (Fig.1). The typical soils of the watershed are Fine thermic, typic dystrochrepts, loamy-skeletal, thermic lithic haplumbrepts and loamy skeletal, mesic typic udorthents etc., (Das et al. 1996). Additionally, it is also a permanent halting place of the Brahmminy ducks. Owing to high rainfall intensity in its catchment these water sources have been disturbed by rock and debris slide in the monsoon seasons. The attribute of the wetlands, Ratey Chu watershed are in (Table 2). Furthermore, the important rivers of East Sikkim and their length characteristics are in (Table 3).

**Table 1: Functions, goods and services provided by natural and semi-natural ecosystem (Tamzey Wetland Complex/Ratey Chu)**

Functions	Ecosystem processes and components	Goods and services (examples)
Water regulation	Role of land cover in regulating runoff & river discharge	Drainage of natural irrigation, medium for transport
Water supply	Filtering, retention and storage of fresh water in the lakes	Provision of water for consumptive use (e.g. drinking, irrigation and industrial use)
Aesthetic information	Attractive landscape features	Enjoyment of scenery
Recreation	Variety in landscapes with (potential recreational uses)	Travel to natural ecosystems for eco-tourism etc.
Cultural and artistic information	Variety in natural features with cultural and artistic value	Use of nature as motive in books, film, pointing, folklore, national symbols, architect, advertising etc.
Spiritual and historic information	Variety in natural features with spiritual and historic value	Use of nature for religious or historic purposes (i.e. heritage value of natural ecosystems and features)
Science and education	Variety in nature with scientific and educational value	Use of natural systems for school excursions, etc. Use of nature for scientific research

Source: Adopted from Goods et al. 2002

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Table 2: Attributes of the wetlands, Ratey Chu

Name of lake	Area (m <sup>2</sup> )	Length (km)	Breadth (km)	Altitude (m)	Ecosystem Services
Hans Pokhari	50302.66	0.36	0.19	4066	PRCRS
W. Lake	37914.53	0.25	0.17	4551	PRCRS
Pemthang Chho	51787.00	0.43	0.14	4224	PRCRS
Biren Jheel	9983.406	0.17	0.10	4273	PRCRS

(P = Provisioning, R = Regulatory, CR = Cultural & Religious, S= Supporting)

Source: Lake attributes -Topographical map of 1962-63

Table 3: Length of the rivers, East Sikkim

Name of Rivers	Length (km)	Stream length (km)	Source/Authors
Ratey Chu	18	5	Sharma and Usha , 1998
Byu Chu	13.5	2	<i>Ibid</i>
Langzo Chu	12	1	<i>Ibid</i>
Rangpu Chu	172	7	<i>Ibid</i>
Taksom Chu	13	2	<i>Topographical map, 1962</i>

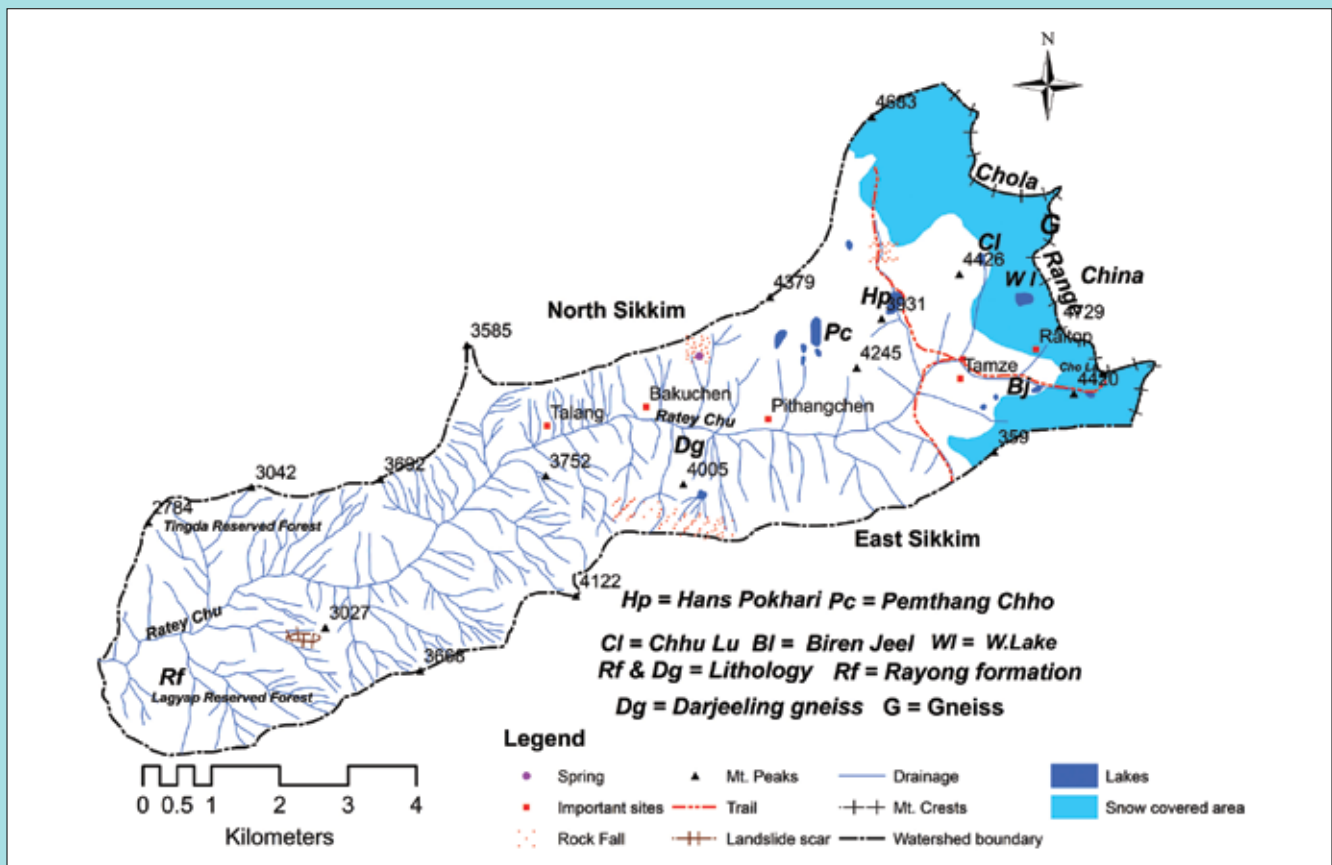


Fig 1: Wetlands of Ratey Chu Watershed, East Sikkim. The map is based on the Survey of India Topographical map on 1:50,00 Scale, surveyed in 1962-63. The lithology has been adopted from geological map prepared by GSI, Richard Temple article on: *Lake Reions of Sikkim on the Frontier of Tibet*; and author own observation.



## HANS POKHARI AND ITS SIGNIFICANCE

As per Shrestha et al. towards the northern side of the Tsomgo Lake, this wetland is situated in the Tamzey valley below the Chola Pass lying at the foot of Chola Range. We attribute formation of the lake to the scooping and scouring action of ice and glacier in the past. As the wetlands lies in a depression at the base of Chumapu, and Chomnaga valley which form the main catchment area. It is however argued that the presence of a large number of migratory ducks at the lake in the past gave it the name '*Hans Pokhari*' though it is also referred to as Tamzey Lake.

Additionally, Shrestha et al. have reported Hans Pokhari Wetland Complex is inaccessible by road, and an easy uphill walk of around an hour through beautiful alpine forests of rhododendron, juniper and birch leads to the lake. Two smaller water bodies located on a ledge above, feed into *Hans Pokhari*. The outlet flows into a small stream that heads southwest towards Gangtok and eventually joins the Teesta river after entering North Sikkim. Owing to the presence of military in the valley; the wetlands are restricted for the visitors.



Photo 1. Environmental flow - Ratey Chu

## HUMAN INSECURITY

Ratey Chu is the only water source providing water to 150,000 populace of Gangtok and its milieu. The expansion of towns, growing population, in-migration of people from the adjoining states, and inflow of foreign and domestic tourists in an around Gangtok as well natural hazards are posing enormous pressure to the water source. Water from Rathey chu is pumped into the water pressure brake tank located near 2<sup>nd</sup> Mile and then ferried to Selep Water Treatment Plant (SWTP) near Ganesh Tok (Tok = hill top) through six main supply pipes. As per Nirmal (2010) from SWTP, around 36 million gallons of water has been distributed to the residents of Gangtok. The landslides have already strike and disturbed the pipeline system several times in 2008, 2009 and 2010 causing prolonged water scarcity and human insecurity in an around Gangtok as the restoration of the pipelines take a long time during monsoon seasons and in times of disaster.

## THREATS AND CONSERVATION MEASURES

As per Shrestha et al. it is the only source of drinking water for most of the population of Gangtok, as well as the residents in the catchment area, there is an urgent need to work towards safeguarding these wetlands for future. This wetland in particular is the main source of water to Gangtok through the Ratey Chu Reserve Forest. Massive felling of trees for defence purposes in the past have contributed to increased erosion and siltation in these parts as well. The Forest Environment and Wildlife Management Department, (FEWMD) Government of Sikkim has taken measures to check erosion and excessive silting through the construction of silt retention structure made by dry stone walls at the various locations. Soil moisture conservation through construction of check dams is carried out every year at the main inlet points.

## ENDNOTES

- i. As per Dhobal [Cf. Singh et al. 2011] *Niche* glaciers are very small in size. Such glaciers occupy gullies and hollow on the slopes and appear as little more than large snow fields. They do not make image of a typical glacier. A niche glacier may develop into a corrie/cirque glacier if conditions are favourable, and it is common in glaciated areas to finds small niche glaciers between larger corrie/cirque glaciers.
- ii. Term *Pokhari*, *Chho* and *Jheel* are interchangeable used for the lake by our ancestors and ancestress.





Photo 2. Prayer flags quivering on the Rately Chu bridge

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Hans Pokhari

Picture by: Nagendra Rizal, Range Officer