

# Gangotri Glacier: Unveiling the Ground Reality

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## Introduction

The melting of Himalayan glaciers has been a subject of ongoing controversy. Unfortunately, reliable data is not available with any Government department. There has been a total lack of genuine effort to get down to practical ground study of the state of Himalayan glaciers instead of depending only on satellite images. All these controversies could have been avoided if a ground check had been done and taken into account the “International Geophysical Year 1956-57” programme during which a number of Himalayan glaciers were studied and their snout position fixed. In 1955, Geological Survey of India organised an expedition to the Bara Shigri glacier as India’s part in this programme – but unfortunately no record of the same is available.<sup>1</sup>

There has been no effort on the ground to end this controversy as can be seen from a recent statement made by Mr Jairam Ramesh, Environment Minister, in his talk with the Editor- in- Chief of Tribune dated 5 June 2010, while acknowledging that most glaciers were in retreat, he stated, *“Siachen glacier and Gangotri Glaciers are still advancing but at a decelerating rate”*.<sup>2</sup> Not wanting to contradict the Minister, the Government and aided department/institutions, tasked to monitor the Himalayas kept silent.

It is now left to non-government institution/organisations/individuals to unveil the ground reality.

## Adventure cum Study Trek: A USI Environment Initiative

Considering the above, the ‘United Service Institution of India (USI)’ – the country’s oldest Institution (Established in 1870) which has encouraged military reconnaissances in remote areas since 18883 – has taken upon itself to study through ‘Adventure-cum-Study’ treks the Himalayan Glaciers and thus make a contribution to the knowledge base for the study of environmental degradation. The USI plans, in cooperation with other interested institutions, to ‘fix the snout positions, record the state of the ablation zones and study the degradation of catchment areas. For this, to begin with, the Gangotri Glacier has been selected. This article covers the Gangotri Glacier and the strangled Bhagirathi River.

## A Day to Remember

We, a group of four (Neeraj, Vikas, Brajesh from the IMA and self) left Dehra Dun on 20 Oct 2010, had a night halt at Nehru Institute of Mountaineering (NIM), picked up their representative Vishal and an associated guide Raju<sup>4</sup> for our venture and reached Gangotri, the road head. From Gangotri the initial plan was to trek up to Gaumukh, record/carry out observations, spend the night at Bhojbasa and the next day trek down to Gangotri and from there by vehicle to Uttarkashi. However, seeing the deteriorating weather conditions it was decided to go up and return the same day. Doing 40 km in a day at heights ranging from 10,000 to over 13,000 ft is tough going, but just as well we did this, for half an hour after our return to Gangotri it starting snowing – a heavenly blessing. We had left at 0600 hours and returned at 1900 hours.

## On the Heavenly Trail

*Walking to the source of the Ganga from Gangotri is not only a trek-cum-pilgrimage but a unique educational experience on Himalayan ecology. Sketch ‘P’ refers.*

**Gaumukh** (Height 3996 m). The snout of the Gangotri glacier was discovered in 1818 by two British officers. With this discovery and publicity, it became a pilgrimage destination – at that time an extremely tough journey in the absence of a regular track. In ancient times rishis went to the upper reaches of the Ganga, looking for peace and solitude in the silence of the snow-capped mountains – braving hardships that enhanced their rewards and prayers.

**Gangotri** (Height 3140 m). Located 250 km from Rishikesh, Gangotri marks the mythological descent of the celestial Ganga. A Gurkha commander, Amar Singh Thapa, in the beginning of the 18th century built a temple here in dedication to goddess Ganga. Later, the temple was rebuilt to its present granite sculptured form. It is the road head for the foot / pony trail to Gaumukh and beyond. The path takes off from just above the temple through a forest affording marvelous views of Sudarshan peak through gaps in the deodar trees lining the trail. The track passes through Chirbasa (meaning ‘place of pines’) and Bhojbasa (meaning ‘place of *Bhojpatra* tree’) over an easy gradient with stunning scenic views of the Bhagirathi Valley and the mountain overlooking it. The path throughout is on the right bank of the river. At places it is cut into the rock side with iron railing on the open side. The treeline formed by the bluepines ends at Chirbasa. Just short of Chirbasa, one gets a wonderful view of the trio Bhagirathi peaks with the tree line in the foreground.

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**Chirbasa** (Height 3600 m). At a distance of 9 km from Gangotri, Chirbasa is the usual first halt for most travellers. On the Bhojbasa side of Chirbasa there is a beautiful site on the river for pitching tents. Looking to the east, through the trees, one gets a splendid view of Mand peak (6510 m). From Chirbasa onwards it is tundra like terrain. The birch trees that formed the tree line here have all disappeared—victims of the axe for fuel. It is on the fine layer of ‘*Bhojpatra*’ under the bark of the birch tree on which the ancient sages wrote their manuscripts. Along the trail from Chirbasa, the Bhagirathi peaks are the beacons throughout.

**Bhojbasa** (Height 3800 m). Six km from Chirbasa, is a settlement for pilgrims and trekkers. It now has only a rest house - camp sites are also available. From here, 5 km walk over a gradual gradient (the last km over rocks) takes one to Gaumukh. On this walk, Shivling adds to the panorama of other peaks. Short of the snout of the glacier are makeshift temples set-up by sadhus.

Gaumukh is a moving site. A feeling of contentment takes hold of one, when you stand in front of the ‘cave like’ opening (now there are two) in a 200 ft high solid wall of ice through which the water gushes out. To reflect on the thought that you are at the source of India’s holiest river, in the waters of which millions of people in its course take a dip to purify themselves, is a fulfilling experience - always cherished throughout one’s lifetime. The source of the Ganga is considered the most sacred with maximum purifying power, followed by its confluence with other rivers. Many trekkers and pilgrims sip the sacred waters and fill bottles to carry home for distribution by teaspoon fills.

Looking from a point in level with top of the snout one sees the Gangotri glacier as one vast amphitheatre enclosed by 6500 to 7000 m high snowy mountains that feed it. The peaks Mana Parbat, Satopanth, Vasuki, Bhagirathi, Kedar Dome & Shivling stand out against the dazzling blue sky.

*The river valley from Gangotri (temple) to the source, with its scenic splendour and spiritual serenity, gives one a unique feeling of absolute peace - it was the meditational abode of many saints and sages. All peaks, big boulders, waterfalls and streams joining it are linked to deities, saints and gods with their own legends and myths.* This stretch of the valley is best described in the words of our sages :

***Sheetal Mathe Ri, Sheetal Batayo Ri***

***Lau Lau Lau, Bhatku Chamaya Li***

*(It is cold above me and cold all around,*

*In such inhospitable surroundings,*

*I am roaming around with my desires.)*

### **Startling Revelations**

We succeeded in recording some striking ground observations. Having been here during the same period in October 2000, it was possible to note the changes in the state of the Gangotri Glacier, Bhagirathi river and its catchment area. What was then and now, is all recorded on film and in the form of a power point slide show, which leaves no doubt as to what is stated below :-

(a) The ‘Water outlet Ice face’ of the snout called *Gaumukh* (cow’s mouth) is shearing and crumbling with big blocks of ice lying near the water outlet The same is the state of the moraine covered ice shelves but receding at a slower rate.

(b) In all records to date, which I also noted ten years ago, there was only one water outlet (called Gaumukh) from which the melted water of the glacier gushes out but now there are two. The volume of water as compared to what I observed ten years ago in October 2000 is ‘more than double’ - a clear indicator of the increase in melting of the glacier from top and within. *From my observations, I have no doubt that the glacier is fast shrinking and its water outlet ice face (Gaumukh) receding more than 50 m a year.*

(c) GPS and GPS data recorder were used to fix the ice face outlet of the glacier and the slowly receding edges of

the snout area. The water outlet ice face and the edges were also photographed. The close-up pictures showing clearly the two water outlets (Gaumukhs), give a clear idea of shearing and crumbling of the glacier face and the volume of water flow. The snout position was recorded 250 m (Longitude 79 04 34.57 E. Latitude 30 55 47.12 N) from the ice face water outlets. Clear reading on the GPS could not be taken at the water outlets.

(d) The ablation zone of the glacier top is not snow or ice but covered by debris, boulders and rocks brought down for ages by the glacier from mountain slopes..

(e) The GPS data recorder showed the distance from the Gangotri temple to the snout to be 19.9 km, which is 1.9 km more than what has been stated for years.

(f) To stop the degradation of the stretch from Gangotri to Gaumukh the Government has limited the number of visitors to 150 per day, removed all *dhabas* (over 60 eating places) and ponies are not allowed to stop overnight on this stretch. However, it is seen that all this is still not sufficient to restore the environmental damage already done. Closing the area, as was done to save the Nanda Devi Sanctuary, appears to be under consideration.

(g) An NGO led by Dr (Miss) Harshvanti Bisht and Mr Ratan S Chauhan (NIM) have put in commendable effort in Bhojpatra (Birch) plantation and Eco-awareness campaign in the Gangotri-Gaumukh region. They have set-up a nursery at Chirbasa of plants/trees suitable for the region and are also cultivating medicinal plants. Considering that the period conducive to growth is only from May to September they have managed to maintain 50-60 per cent survival rate.<sup>5</sup>

**Likely Future Scenerio.** *Increase in temperatures will lead to accelerated discharge of glacial melt water in the next two decades, after this the discharge will come down to its original level and then start receding and finally dry up. With no healthy forests to cover the loss it is a disaster in the making – not in the distant future, but in our life time.*

## The Strangled Bhagirathi

According to mythology, 60,000 warrior sons of King Sagari were reduced to ashes for having disturbed Kapil Muni during meditation. *Bhagirath* the King's great grandson decided to atone for the sins of his ancestors by undertaking severe penance. He prayed to goddess Ganga asking her to come down to the Earth and flow over the ashes of his ancestors so that they could rest in peace. His prayer was granted and Ganga descended to the Earth. To break the fall, Lord Shiva took the descent on his matted locks. The water gushing out of Gaumukh is believed to be the heavenly Ganga. In its course from Gaumukh to Devprayag it is named Bhagirathi after King Bhagirath – a name, even today, taken to epitomise unmatched grit and determination.

The Bhagirathi emerges from the snout of the Gangotri Glacier with the backdrop of the sacred Bhagirath Range and Shivling. Initially it is a stream flowing through glacial moraines. As it flows, it is joined by other snow fed streams. On the rocky mountain slopes can be spotted herds of Bharals (Blue Sheep) – one of the unique Himalayan wild animals. After a descent of about nine kilometers, at Chirbasa, the barren mountain slopes give way to forests of birch, blue pine, deodar and colourful bushes of different varieties. Towering snow-capped peaks are visible from number of spots in the valley.

A little below Gangotri, the Bhagirathi is joined by one of its main tributary the *Jad Ganga*. At Harsil, beautiful streams with crystal clear waters merge with it. In its stretch from Gangotri to Harsil, the Bhagirathi flows through forests of blue pine and *deodar*, rich in flora and fauna. From Harsil to Tehri, the river flows through scenic valleys with villages surrounded by cultivated fields and fruit trees. At Tehri the *Bhila Ganga*, a major tributary, joins the Bhagirathi. The stretch from Tehri to Devprayag is through a gorge. The road – following the river so far – takes off into the hills to bypass the gorge and links up with the river, now called Ganga, at Rishikesh.

*The river stretch from Tehri to Devprayag through the gorge is one of the finest for river rafting.* In the words of Ajeet Bajaj, Managing Director, Snow Leopard, a top river rafting organisation : “It is one of the most difficult and interesting white water stretch of the world, made more challenging as once you launch into it, without a road near by, you are totally on your own”. Unfortunately, *with damming of the river and run-of- river projects this stretch will never be the same again. Hydro-power projects are also affecting migratory path of fish like the mahseer, trout and other species.*

On 5 December 2001, lowering of the panels of the controversial 2400 MW Hydro - Electric Tehri Dam Project finally stopped the natural flow of the Bhagirathi River. 18 dams (four downstream from Tehri dam) along the Bhagirathi River are either in operation, under construction or planned. If these dams/run-of-the river hydel projects are allowed to go through, it would be the end of the holiest stretch of the river. The riverbed is left dry with the water running from one diversion dam to the other through one tunnel to another. The Centre after much vacillation, considering environment and religious concerns, has put a total ban on planned and under-construction dams on the 130 km stretch of the Bhagirathi from Gaumukh to Uttarkashi.<sup>6</sup>

*The catchment area of the Bhagirathi – the most sacred stretch of the Holiest Ganga – is the most degraded stretches in the entire Himalayas. Before the Tehri dam came up the extent could best be judged from the muddy nature of the Bhagirathi water when it merged with the clear greenish blue waters of the Alaknanda at Devprayag.*

Declaring the area between Gaumukh to Uttarkashi a ‘no-project area’ is not enough. There is an urgent need for an all out effort on reforestation and protection of existing forests and pastures; otherwise soil erosion in the catchment area will lead to fast silting of the controversial Tehri Dam, reducing not only the storage capacity but the minimum water level depth required to run hydro-power units. If this happens, the hydro- electric generating units – which is the main purpose of the dam – will have to be shut down. The ‘run of the river’ hydel projects will face the problem of shortage of water and excessive silt.

## Author's Note

This article is mainly based on ground observations of the group recorded during the recent 'Adventure-cum-Study' trek from 20-25 October 2010 and my earlier trip to this area ten years ago in the first week of October 2000.

## End Notes

1. News report in Times of India 11 November 2009 and other papers/ media reports. before and after the Copenhagen meet on Climate Change.
2. The Tribune, Chandigarh, Saturday, dated 05 June 2010.
3. USI Journals: Centenary Number, Oct-Dec 1970, page 530 and Vol CXL, No. 580, Apr-Jun 2010 Issue, page 156.
4. The Group consisted of : Col (Retd ) KS Dhami, Capt Neeraj Mehta (27 Punjab, IMA), GC Vikas Sheoran (IMA), GC Barjesh Beniwal (IMA), Mr Vishal Ranian (NIM) and Mr RS Rawat (Local NIM associated guide).
5. Save Gangotri Glacier Campaign. Website <http://saveganga.org>
6. News Report: The Tribune, Chandigarh, Tuesday, 02 November 2010.

**\*Colonel KS Dhami (Retd)** was commissioned into the Scinde Horse on 12 Jun 1960 and volunteered for transfer to The Parachute Regiment in 1963. He took premature retirement from the Army in 1983. During his service as Bursar with The Lawrence School Sanawar from 1994-98, he organised many adventure activities in the Himalayas, river rafting and treks through the desert.

Recently, he proposed an adventure-cum-study tour of the Gangotri Glacier to study the effects of environment degradation. This trek, sponsored by USI in conjunction with the IMA Dehradun, was led by Colonel Dhami and undertaken from 20-25 Oct 2010. The study of Himalayan glaciers is a passion with Colonel Dhami who is a member of USI.

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