



*Newsletter No.-6*

*December 2009*

## *Ganga*

Copenhagen Climate Summit is another important event for the modern civilisation. It has all the ingredients of a modern day best seller with politics, economics, power struggle, lobbying. The posturing of different International power centers, the North and the South, the Developed and developing countries etc. are unimaginable. Common people would always think how a mere Environment Summit to mitigate the problems evolving due to climate change can be so complex. The one liner from

Ben Nelson, the US senator says it all “We don’t have to destroy our economy to save the environment”.

Govt. of India is no exception, it’s stand also confusing within and outside the parliament. More importantly the Govt. Stand on Himalayan Glaciers becoming complicated, in one report it has been stated that the melting of Himalayan glaciers are much less than reported and it is not due to Climate change while ISRO scientist from last 3 decades data are claiming the Glaciers are melting



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much faster than reported. This is not an esoteric research but it has implication on billion people's life better this confusion gets removed at earliest.

**Ganga the Eternal River**  
*Part-3*  
*Bhagirathi*

*“The Ganges, above all is the river of India, which has held India's heart captive and drawn uncounted millions to her banks since the dawn of history. The story of the Ganges, from her source to the sea, from old times to new, is the story of India's civilization and culture, of the rise and fall of empires, of great and proud cities, of adventures of man...” Jawaharlal Nehru in Discovery of India,*

The word Bhagirathi literally means "caused by Bhagiratha", a mythical Sagar Dynasty prince who was instrumental in bringing the river Ganges from the heavens on to the earth, in order to release his 60,000 grand-uncles from a curse of the saint Kapila. The main tributary of Ganga in it's origin got it's name from mythological prince Bhagirath.

The stories and myths are numerous on Ganga it's interwoven with the Indian civilization over millennium. Another legend says that Brahma created Ganga by collecting sweat from Vishnu feet. After being touched by two of the Tridevs (Brahma, Vishnu and Mahesh), Ganga became the holiest River in India. The Bhagirathi is a tumultuous Himalayan river arising at Gomukh from the snout of the Gangotri glacier at a height of 7,756 m (25,446 feet) in Uttarakhand, India. It flows for 700 kilometers until it reaches Deoprayag where it merges with the Alaknanda River.

On the right bank of the Bhagirathi, eighteen kilometers downstream from Gomukh there is the Gangotri Temple dedicated to Goddess Ganga. It was built in the early 18th Century by a Gurkha commander, Amar Singh Thapa.

It passes through Uttarkashi and Tehri Districts of Uttarkhand. The part of Bhagirathi (upstream to Devprayag) falls in the mountainous Lesser and Higher Himalayan regions. Entire terrain presents a picturesque landscape of steep



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to very steep slope intervening into narrow valley.

As per seismic zoning map of India the area falls in the zone IV and V. Due to presence of a number of active faults and thrusts, the area is seismically active and construction of reservoir may also cause reservoir induced seismicity.

A number of Hydropower projects are completed or under construction throughout the Bhagirathi River. The three major projects have been already completed and two are under construction. In addition 3 mega projects are proposed one at Harshil, and 2 on Jad Ganga in Bhairav Ghata area (Table below<sup>1</sup>). On completion of these projects, there will be no more Bhagirathi river running right from Lohari to Koteshwar covering an stretch of more than 125 Km. Besides to this, it would be a potential area of man made disaster in future. Tehri dam lies at the confluence of the Bhagirathi and Bhilangana, near Tehri.

The Tehri project is towering to 260.5 m the main dam at Tehri is the 8th tallest

dam in the world. The dam's projected capabilities include a power generation capacity of 2400MW, irrigation stabilization of an area of 2.7 lakh hectare land and a supply of 270 million gallons of drinking water (per year) to industrialized cities in Delhi, Uttar Pradesh and Uttarakhand.

Tehri hydropower project envisages 3 phase of power generation- Main Tehri Dam and Hydro Power Project (1000MW), Koteshwar Dam and HPP (400MW) and Tehri Pumped Storage Plant (1000MW). Tehri Hydroelectric plant has been in operation from 6th July 2006. While Koteshwar power project is scheduled to be completed up to 2010 and Tehri Pump Storage Plant up to 2015. A sum of Rs. 8298.56 Crore has been spent so far on Tehri dam and HPP project till March 2008. Geo-structural setting of the Tehri Dam area suggests that the risks associated with the Dam is very high. There are several evidences of adverse impacts observed shortly within 1.5 years of completion of the Tehri dam.

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<sup>1</sup> (Reference [www.holyganga.org](http://www.holyganga.org))



### Hydro list - Uttarakhand (Above 25 MW schemes)

S. N.	Name of Project	Capacity (MW)	River (Tributary/ River/ River Basin)	District	Agency	Comment
1.	Maneri Bhali St-I	90	Bhagirathi	Uttarkashi	UHPC	Under operation
2.	Bhariron Ghati	60	Bhagirathi	Uttarkashi	UJVNL	under investigation
3.	Bharon Ghati- I	324	Bhagirathi	Uttarkashi	UJVNL	under investigation
4.	Bharon Ghati- II	240	Bhagirathi	uttarkashi	UJVNL	under investigation
5.	Bhela Tipri	100	Bhagirathi	Uttarkashi		under investigation
6.	Gangotri	70(55)	Bhagirathi	Uttarkashi		under operation
7.	Synachatti gangani	45	Bhagirathi	Uttarkashi	Pvt.	under investigation
8.	Lohari Nag Tharang	520	Bhagirathi	Uttarkashi		under investigation
9.	Loharinag-Pala	520 (600)	Bhagirathi	Uttarkashi	NTPC	Under Construction
10.	Maneri Bhali St- II	304	Bhagirathi	Uttarkashi	UJVNL	under Construction
11.	Pala Bhila Tipri	400	Bhagirathi	Uttarkashi		under investigation
12.	Pala-Maneri	416 (480)	Bhagirathi	Uttarkashi	UJVNL	Under Construction
13.	Hanumanchatti-Synachatti	33	Bhagirathi	Uttarkashi	Pvt.	yet to be developed
14.	Harsil Dam	350(210)	Bhagirathi	Uttarkashi		under investigation
15.	Koteswar	400	Bhagirathi	Tehri Garhwal	THDC	under Construction
16.	Tehri Pump Storage	1000	Bhagirathi	Tehri Garhwal	THDC	under Construction
17.	Tehri St- I	1000	Bhagirathi	Tehri Garhwal	THDC	under Operation
18.	Dhargoan-Jandarwa	29	Bhilangana	Tehri Garhwal		Yet to be developed
19.	Diulong-Sumangaon	26	Bhilangana	Tehri Garhwal		Yet to be developed
20.	Jamolna-Ghanshyali	44	Bhilangana	Tehri Garhwal		Yet to be developed
21.	Jadh Ganga	110(50)	Jadh Ganga	Uttarkashi	THDC	Under development
22.	Karmali	190(140)	Jadh Ganga	Uttarkashi	THDC	under development
23.	Nelang	190	Jadh Ganga	Uttarkashi		yet to be developed



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*(To be continued)*

**Soot Causing Melting of Himalayan glaciers (Planet Earth, October, 2009)**

Glaciers in the Himalayas and the Tibetan plateau are melting rapidly due to the soot from diesel fumes and wood fires. Scientists from India and China have determined that soot, made up of tiny particles of “black carbon” that is emitted from diesel engines and from cooking with wood, crop waste of cow dung is responsible for the melting of glaciers. Once the soot lands on the glaciers, it absorbs sunlight which under normal circumstances, would have been reflected by snow. This leads to melting of glacier. Researches reveal that in areas of the Himalayas considered pristine they have found concentration of black carbon. What is worse is that the problem is being sidelined. To tackle the problem, two sensors have been set up, one on the Kholai glacier and the other which flows through the eastern side reaches in Sikkim.

**Jhelum is melting alarmingly (Planet Earth, October, 2009)**

It is Kashmir’s biggest glacier and feeds the region’s main river. But now, it is

melting faster than other Himalayan glacier, thereby threatening the water supply of thousands. It is believed that rising temperature is causing the Himalayan glacier to shrink rapidly. In Kashmir, the biggest glacier, Kolahoi, spread over just a little above 11 Sq.KM. has shrunk 2.63 Sq.KM in the past 3 decades, a recent study reported.

The main source of water for Kashmir’s biggest river, Jhelum, and its many streams and lakes, is shrinking at the rate of 0.08 Sq.KM a year. The 3-year study was led by Glaciologist, Shakil Ramsoo, Assistant Professor in the department of Geology at the university of Kashmir. As per a UN Environment programme and World Glacier Monitoring Service Study, the average melting rate of the mountain glaciers has doubled since the turn of millennium.

**Bengal Rivers**

**Jaldhaka River**

Jaldhaka river has originated from Bidang lake in Sikkim at an altitude of 4400 m and is passing over vast lands of Sikkim, Bhutan, West Bengal and ultimately joins with Jamuna at Rangpur



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district in Bangladesh. The Jaldhaka River is a trans-boundary river, with a length of 192 Kilo metres. Due to the river`s travel over many international borders, only a small length of the river flows within Bangladesh. The Jaldhaka River is formed by the combination of three streams at Bindu, the descending point of the Jaldhaka Police Station at Darjiling district in West Bengal. The three streams are known as Dudh Pokhri, Bindu Khola, and Jaldhaka, which takes birth in the small glacial lake the Kupukh Pokhri. The merged streams meet at Bindu to form the Jaldhaka River thus forming a riverine periphery with India and Bhutan in the left bank. The main tributaries that join the river in its right bank are the Murti, Naksal Khola and the Sutunga in the last course.

The Diana is the main tributary on the right bank. The river flows across the three North Bengal districts of Jalpaiguri, Darjeeling, and Koch Bihar. The entire watershed is the most fertile agricultural zone along with the Teesta Basin. The Upper course is famous for crops like ginger, medicinal herbs and

fruits like oranges and pomegranate. The middle course comprising of Jalpaiguri district is entirely tea and corn dominated and the lower course is filled with the harvesting of rice, jute and tobacco. The inter river formed lands are cultivated with crops like bamboo and mat sticks. In the lower basin the inter river lands are cultured with banana. The river enters Bangladesh at Ghoksadanga district and meets the Brahmaputra or the Jamuna River, as it is known there.

River gradient has been reduced after it has come down in the plains of Jalpaiguri from the Himalayas. And due to this low gradient, the river is unable to carry huge loads of pebbles and gravels carried down in the plains. The Report says that during monsoon Jaldhaka carries along its course about 3.80 lakhs Cu.Sec. water and approximately 50 lakhs tons of sediments. As such, the river often shifts its course and bifurcates in a number of channels and this dynamicity is a characteristic feature of the river Jaldhaka.

Jaldhaka hydro-electric project station is situated at the right bank of river Jaldhaka near Bindu. The project



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supplies electricity in the surrounding areas including part of Siliguri and Jalpaiguri.

### **Recession of Gangotri glacier**

Gangotri glacier has receded by 1.5 KM in the last 30 years and ISRO data reveal that it is receding far faster than shown in earlier studies. However, the rate (approx. 50 m. annually) has slowed down since 2002. The satellite imagery has captured that Alpine vegetation has now started growing at a higher altitude than it used to a few decades ago. A discussion paper on glaciers, released by Environment Minister, Government of India argued that glaciers were not melting due to climate change. It could be a part of the inter-glacial period and other related phenomenon. However, to understand impacts of climate change, baseline data is important in which India did not have a scientific accurate data base. (*The Times of India, December, 2009*)

### **Government draws criticism for climate surrender to West**

Government's decision to offer carbon emission intensity cuts of 20-25% by 2020 over 2005 levels has sparked a

sharp war of words with politicians and some environment experts accusing it of surrendering India's argument that its per capita emissions were very low. Even if growth averages as high as 8%, better technology and more competition could see reduction up to 37% in emission intensity with 2005 as the base year. The decline in emission intensity since 2000 had been sharp. This trend could mean a fall by 37%, the calculation being based on the elasticity of emission for 2000-2005 period. These studies have been carried out by NCAER, TERI-MOEF, IRADE and McKINSAY.

### **Himalayan glaciers & climate change**

Dr.V.K.Raina, retired Dy. Director General, Geological Survey of India published a paper stating that there was no conclusive evidence to prove that the Himalayan glaciers are melting due to climatic change. Environment Minister, Government of India made it clear that the views expressed by Dr.Raina are not that of the Government and it is meant to stimulate discussion. Ramesh said – the discussion paper presents evidence that most glaciers are in the process of



retreat, while some Himalayan glaciers, such as Siachen glacier, are actually advancing and some others are retreating at a rate slower than before, such as Gangotri glacier. Dr. Raina said “None of our glaciers under monitoring are recording abnormal retreat”. The report states “The Himalayan glaciers although shrinking in volume and constantly showing a retreating front, have not in any way exhibited, an abnormal annual retreat, of the order that some glaciers in Alaska and Greenland have reported. Raina pointed out that melting of Himalayan glacier is taken as a threat to North Indian hydrological cycle and to the region’s economy in case global warming continues unabated. Ramesh said the discussion paper challenged conventional wisdom. Whatsoever, UN’s intergovernmental panel on climate change had, in contrast, warned that “Glaciers in the Himalayas are receding faster than in any other part of the World”.

*(Times of India, November 10, 2009)*

### **Water Institutions In India**

IRBMS is covering brief write up on various institutions associated with water resources in India from newsletter-3.

## **REGISTERED SOCIETIES**

### **11. National Institute Of Hydrology**

The Government of India in December 1978 established the National Institute of Hydrology with its headquarters at Roorkee. It has six Regional Centers. Its objectives are to undertake aid, promote and coordinate systematic and scientific studies in all aspects of Hydrology so as to improve the present practices in planning, design and operation of water resources projects.

### **12. National Water Development Agency**

The National Water Development Agency (NWDA) was established in July, 1982 under the Ministry of Water Resources, to promote scientific development for optimum utilization of water resources in the country and for preparing feasibility reports for interbasin transfer of water from surplus to deficit areas envisaged in the National Perspective for Water Resources Development.

*(Source: Ministry of Water Resources)*

*(To be continued)*

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*Editor- Sujit Choudhury, Published by*

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