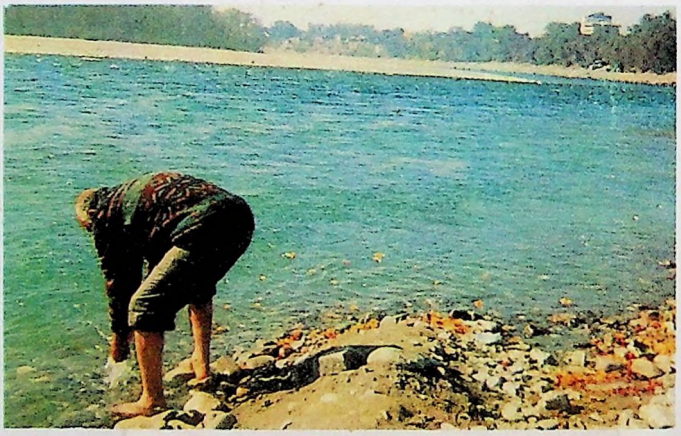
Protecting Ganga River

Linking Reverence To Effective Action

Bharat Dogra



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1998

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This Book Is Dedicated To

Chipko Poet Ghanshyam 'Shailani'

1934-1997

Ghanshyam Shailani wrote, composed and sang songs which went to the heart of the basic problems of Uttarakhand's people, particularly the women. Whether it was the chipko movement for saving forests, the struggle against Tehri dam, the anti-liquor movement or the efforts to end animal sacrifices, Shailani Ji always managed to reach the various places of struggles and Gandhian reform movements. Despite deteriorating health conditions, he travelled to remote villages and forests to take the message of relevant social change to hill-villagers.

People and activists present at several movements have told moving stories of how the arrival of Shailani and his songs used to impart a new life to the movement. His unselfish and dedicated efforts endeared him to common people and other activists. He never sought fame, one reason why he has remained relatively less known despite his tremendous achievements. The people and activists of Uttarakhand will never forget the poet who gave voice to their inner-most feelings and sufferings.

Protecting Ganga River

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The tendency of looking upon nature as something to be dominated and conquered has been responsible to a significant extent for ecological ruin. Of course human beings have to meet their various needs, obtain food, clothing and shelter, and in the process they have to make certain demands on nature, they have to obtain water from rivers and food from land. It is certainly possible to do so while maintaining an attitude of respect and co-existence towards nature, preserving the clean and beautiful flow of rivers and protecting the fertility of land. There is evidence that in some ancient cultures there was an attitude of reverence towards nature, an attitude which survived till much later times among many indigenous groups. For example, according to one summary of Mayan ethics in New Internationalist Journal,

"According to the Guatemalan Mayan vision of the cosmos, every form of life emerges from the same origin or seed. Some seeds become trees, others flowers, others water, others human beings. Thus each creature is inextricably linked to all others and what one does to a tree affects not only the tree but oneself and other creatures. This inter-relatedness calls for profound respect between people and their Creator, between people and nature, and among people themselves. The aim of the Maya is to keep their relationships with the world around them, and also the inner life of each person, in perfect balance according to the rhythms of the cosmos."

This journal goes on to say that Mayan ideas have much in common with those of other indigenous cultures of the Americas, especially in their holism and respect for the environment.

In 1855, the Indian Chief of Seattle responding to pressures from the United States President to sell the land of what in now Washington State, had this to say,

"How can we buy or sell the sky or the warmth of the land? Such thoughts to us are inconceivable. We are not in possession of the freshness of the air, or the water-bubbles. Every corner of this land is holy to my people - They remain holy in the memory of my people - from the sparkling pine leaves, the sandy beaches and the mist of dark brooding forests, to the songs of insects...

We know that white men do not understand our way of life. Land to him is not a brother but an enemy. After conquering a piece he proceeds to the next...

Our God is the same God that you worship. His compassion extends equally to white men and Indians. This land is precious to Him and harming it, therefore, would be an insult to our Creator."

However these views of nature increasingly came in conflict with the tendency which existed even in ancient times, of making excessive demands on nature, inflicting grave damage on land and water sources, and thereby sooner or late also bringing disaster on human beings. As environment historian John Bellany Foster writes,

"The history of precapitalist and preindustrial societies is thus full of examples of social collapse brought on by

environmental depredations. History and archaeological evidence suggests that the Sumerian, Indus Valley, Greek, Phoenician, Roman and Mayan civilizations all collapsed due in part to ecological factors."

Thus while attitude of reverence towards nature certainly existed in ancient and indigenous traditions, they should not be romanticised too much as the conflict with other viewpoints based on excessive expansion and exploitation appeared sooner or later in most places.

In the conflict of these views - one stressing conquest of nature and the other stressing co-existence with nature - the later attitude started asserting itself more and more with the passage of time. The progress of science should have opened our eyes to the dangers of making excessive demands on nature but in reality something entirely different happened. The unraveling of the mysteries of nature appears to have decreased the awe of it, and encouraged the view that as we know its secrets we can conquer and dominate it.

Philosopher of science and one-time Lord-Chancellor of England Sir Francis Bacon observed that the conquest of nature constitutes, "the real business and fortune of the human race." He said nature must be "bound into service" and made a "slave."

Such a viewpoint cleared the way for and provided the justification for very large-scale disruption of environment in the last few centuries. However as rivers were turned into sewer-lines, the rain became acidic, and even the life-giving sunshine was made hazardous by the depletion of the ozone layer, during the last few decades there has

been quite a significant upsurge for protection of environment. A large number of scientists are now involved at various levels in work relating to the protection of environment. The message that saving environment is of crucial importance to humankind has travelled far and wide. In many interesting and diverse ways, the new scientific facts have merged with some of the old-surviving values to create public opinion on environment protection which is strong but at the same time also vague and uncertain of what actually should be the plan of action.

A recent book titled 'Environmental Values in American Culture' by Willett Kempton, James Boster and Jennifer Hartley recently reached the surprising conclusion that a big majority endorsed three cultural models of nature which say,

" ● *Nature is a limited resource, a closed system upon which humans depend both physically and emotionally.*

● *Nature is made up of delicately balanced interdependent parts; disrupting nature produces unpredictable consequences including species extinctions. Human-caused extinctions are morally wrong, both because species have inherent value (a conviction derived in various ways) and for utilitarian, prudential reasons. Consequently, non-intervention in nature is the preferred prescription.*

● *Market processes devalue nature. Modern humans are alienated from it, and indigenous peoples are commonly viewed as the ideal environmentalist.* "

In a review article on this book Bron Taylor says in a recent issue of Ecologist magazine -

"The authors also found widespread affinity with biocentric notions that non-human life has instrinsic value as well as statements expressing "nature spirituality".

"...US historians of religion argue that nature-based religion has been common in US history, while recent scholarship has found that nature mysticism has animated many, if not most, of the most influential US environmental activists during the past one hundred years. Environmental action in the United States cannot be accounted for without understanding how frequently it is grounded in religious, usually pagan, underpinnings, grounded in perceptions and beliefs that the natural world is sacred."

Despite all this we have to reckon with the reality that the life-style of the majority of people is highly destructive to environment. As Bron Taylor explains,

"Perhaps widespread agreement with the above cultural models of nature represents little more than a recitation of empty truisms that bear little relation to environmental action. In the light of other findings - such as only 18 per cent of Americans express a willingness to work, earn and consume less as part of an environmental strategy - such a conclusion seems equally plausible to the authors more encouraging finding of widespread environmental concern."

"Most religions have nominal members who, when surveyed, will express agreement with their own tradition's propositions, but whose behaviour is not congruent with such propositions. Recognizing this common dynamic helps explain why, despite widespread agreement with the posited cultural models of nature, few become actively engaged in voluntary environmental action."

How Polluted Is The Ganga River

In India an attitude of reverence has existed for a long time towards rivers, and nowhere has this been more pronounced and emphatic than in the case of the Ganga river. So many mythological tales and historical stories have flown along its endless waters that this river and its tributaries have become perhaps the most easily recognised symbol of this land and its culture.

In Gita, Lord Krishna identifies his own self with the Ganga river, and the Ganga and the various pilgrimages along its path have always held a special religious significance for Hindus. But the Ganga - Jamuna culture extends beyond the confines of one religion - it includes and represents the contribution of several faiths and philosophies. The most commonly used identity of Ganga is that of Ganga Maa, or Ganga Mother.

Jawaharlal Nehru has written, "The Ganga especially is the river of India, beloved of her people, around which are interwined her racial memories, her hopes and fears, her songs of triumph, her victories and her defeats. She has been a symbol of India's age-long culture and civilization, ever-changing, ever flowing, and yet ever the same Ganga.

"...Smiling and dancing in the morning sunlight, and dark and gloomy and full of mystery as the evening shadows fall, a narrow, slow and graceful stream in the winter, and a vast roaring thing during the monsoon, broadbosomed almost as the sea, and with something of

the sea's power to destroy, the Ganga has been to me a symbol and memory of the past of India, running into the present, and flowing on to the great ocean of the future."

Keeping in view this special cultural significance of river, any sincere effort to 'protect' Ganga river, in particular to check its pollution and keep it clean, should evoke strong emotional feelings leading to large-scale mobilisation of people for this task. Somehow this has not happened and the pollution of Ganga river and most of its tributaries such as the Jamuna has reached alarming levels. Although the Ganga Action Plan (GAP) project has helped to some extent to check this, yet on the whole the pollution as well as other disruptive impacts on Ganga river remain an area of serious concern.

Scientists usually measure river water quality (in mg./ litre) by applying two standards. One is the biochemical oxygen demand (BOD). This is a measure of the degree of pollution - the higher the BOD, the lower the quality of water. The second is dissolved oxygen (DO) - the more the oxygen, the better the quality of water. According to the Best Designated Use criteria of the Central Pollution Control Board for Indian rivers, the desired designated water quality of Ganga is the 'Bathing Class' which stipulates, among other things, BOD of 3 and DO of 5.

In the early and mid-eighties (before launching GAP) the absence of sewage treatment facilities in the over 100 towns and cities which discharged their wastes straight into the Ganga river was identified as the most important source of pollution. In addition heavy industrial pollution in

some selected stretches was particularly responsible for toxic waste. These points included the industrial belt of Kanpur, a fertiliser complex near Phulpur and another industrial complex near Mokameh bridge (in Bihar). In the last zone in particular a large number of fish deaths were reported. Several half burnt and unburned dead bodies were also being thrown in Ganga river.

As a result of all this, the BOD at several places along the Ganga was found to be higher than the standard maximum of 3mg/lt. It was 8.6 in Kanpur, 15.5 in Allahabad and 10.6 is Varanasi. In terms of DO the minimum standard of 5 mg/lt. was met at all these three places in 1986 as the DO level ranged between 6.4 and 8.5.

It was at this stage that the Rs 4.6 billion GAP plan started in 1985 as a fully Central Funded Programme. Under GAP Phase1 pollution abatement works have been taken up in 25 class I towns (population over 100 thousand in 1985). 261 schemes were sanctioned under GAP - 88 schemes of interception and diversion of sewage, 35 of sewage treatment, 43 of low cost toilets, 28 of electric crematoria, 35 of river front development and another 32 of miscellaneous category. Originally planned for just 6 years, GAP was later extended to nearly double this period and targeted for completion in March 1997. However there were further delays and a few schemes have spilled into 1998.

Despite the fact that it was extended to almost double its original time span, the objective of bringing BOD and DO levels to desirable norms has not been fulfilled.

According to official data for 1996 BOD level at Kanpur (4.1) and Allahabad (3.3) was still higher than the desirable maximum norm of 3 mg/lit although the situation had improved significantly compared to the 1986 levels. In Varanasi BOD level in 1996 had been reported to be below 3. The DO level in 1996 was higher than the desired minimum level in all these three places but significantly, the situation had become slightly worse in Kanpur where the DO level had gone from 6.7 to 6.4.

To place the performance of GAP in perspective, however it is important to have an idea of the limitations and costs of treatment plants. The World Resources Report (WRR) 1992-93 says, "Primary (physical) and secondary (biological) treatment of sewage may remove 35 and 85 percent of pollutants in sewage, respectively but they remove only 30 per cent of the phosphorous, 50 per cent of the nitrogen and 70 per cent of the most toxic compounds. Advanced sewage treatment plants that can further reduce specific pollutant levels cost twice as much to build and four times as much to operate as secondary treatment plants. Without regular maintenance and proper operation, primary, secondary and advanced sewage treatment plants will operate well below intended standards."

This is particularly significant in the case of GAP as the state governments have not been able to find the money and the electricity to properly operate and maintain the various facilities created after spending over 4 billion rupees under GAP. An expert, R. P. Sharma, Adviser to the National River Conservation Directorate, recently

wrote, "Operation and maintenance of conveying sewers and intermediate pumping stations, which is cost intensive, is the sole responsibility of the State Governments. This has also badly suffered due to the inability of the States to provide adequate funds. As a result, despite the facilities being available, sewage is still finding its way into the river at several places. ***This has defeated the purpose of the action plan***."

He added that the inconsistent availability of power for pumping stations, STPs and electric crematoria is a bottleneck. In the event of power failure, untreated sewage still finds its way into the river.

To return to the WRR, it says further, "Conventional treatment of sewage does not eliminate the problem of pathogens in sewage. To eliminate human pathogens, the water discharged from sewage treatment plants is sometimes treated with chlorine, which reacts with organic chemicals to form carcinogenic chlorinated hydrocarbons. The sludge produced by sewage treatment can also pollute water, unless it is further treated and incinerated or properly applied to land."

In the case of GAP even official sources have been able to claim only "incidental reduction" in respect of the microbial pollution (which is indicated by the coliform counts). In the first week of December 1997, when the preparations were being made for the Mahakumbh Mela which attracts millions of pilgrims, some scientists of the National Environmental Engineering Research Institute (NEERI) shocked the nation by telling newspersons that

they have found the Ganga water at Hardwar "to be severely contaminated with bacterial and viral pathogens which, alarmingly enough, have become resistant to the normally administered antibiotics. Industrial effluents are suspected to be the reason."

The analysis of water samples taken by NEERI scientists from Rishikesh and Hardwar revealed that the water contained E. Coli (water quality indicator organism), Salmonella (causative agent for typhoid), Shigella (causative agent for bacterial dysentery) and Vibrio (causative agent for cholera) in huge numbers. The resistance of several of these pathogens to routinely administered antibiotics led NEERI director to warn that pilgrims would really be quite defenseless if their doctors had only conventional antibiotics to treat them.

As industrial effluents have been suspected as the villain in this case, this reveals yet another serious weakness of GAP which concentrated mainly on municipal sewage.

However upstream of Hardwar and Rishikesh, even the condition of sewage disposal is far from satisfactory as untreated sewage from several towns and small urban centres, including ironically pilgrim towns and temple towns where the Ganga is worshipped, continues to create serious pollution problems in Ganga river.

Recently, in Patna city after the holy bath of Chhath festival on the bank of the Ganga, several devotees had eruptions, red spots and other skin irritations all over their body.

As late as mid-1997, 11 years after launching GAP, the chairperson of Nagar Nigam working committee of Varanasi, told a leading magazine, "What is the use of the existing schemes? Most of the pumping stations and the equipment in the STP lie idle, and untreated sewage enters the river just as before, because of lack of power supplies."

The city of Kanpur has been a particularly troublesome area for pollution control as the pollution load from municipal as well as industrial sources has been simply too heavy for the dilution capacity of the Ganga river in this stretch. At least some of the effluence of tanneries still continues to flow directly into the river. A major problem has been the use of highly hazardous chromium by these units. A review in September 1997 showed that only a few tanneries have installed chromium recovery units. What is no less disturbing is the increased discharge of pollutants into a tributary of the Ganga where the DO levels are reported to have dipped so low as to endanger the survival of aquatic life.

The role of dams in reducing the flow of river in some critical areas, thereby greatly reducing their ability to absorb and dilute the wastes, should also be stressed, particularly in view of the large number of dam projects that are being planned on the Ganga river and its tributaries. Infact among the sources of selected pollutants the WRR specifically mentions "dams that reduce water flow", "creation of reservoirs" and "reduced discharges from dams". Storage of water in artificial lakes is known to adversely affect water quality, particularly when compared to the water quality of a free flowing river.

Deforestation, indiscriminate mining and quarrying, farming practices which rely heavily on agri-chemicals - all these are known to adversely affect the quality of water, and there is enough evidence that pollution from all these sources has increased in recent decades, particularly from the last source. This is true not only of the Ganga river but also for most of its tributaries.

The pollution of Yamuna in particular is becoming a major concern. In February 1996 two of Delhi's major water treatment plants had to be shut down for several hours, causing a major drinking water shortage, as the water entering the city was too polluted for effective treatment. This year Central Pollution Control Board told the Delhi High Court, "The pollution of the Yamuna river from domestic discharges from Delhi, Ghaziabad, Noida, Faridabad, Mathura and Agra has rendered the river unfit for any beneficial use. Until stringent measures are taken to alleviate these pollution loads, the raw water quality of Agra cannot be improved and there is always a high risk of any epidemic in Agra."

Thus the problem appears even bigger if tributaries are included. It is good that under GAP Phase II some of the major tributaries of the Ganga like Yamuna, Gomati and Damodar are also being covered. In July the Central Government also decided to provide complete funding to all new projects under GAP Phase II. (Earlier states were supposed to provide 50% of the cost of the projects). This is encouraging, but for GAP Phase II to be more effective than its earlier phase, it should move beyond the 'pumps and pipes' stage and genuinely involve the people in the sacred task of protecting 'Ganga Maa'.

People's Movements

The Ganga has always inspired a very special devotion among Indians, so much so that any other river considered sacred by people is also frequently given the name Ganga. It is interesting that several mythological stories have ecological connotations. Some examples - Bhagirath persuading the goddess Ganga to came down form heaven to earth, Lord Shiva capturing the torrential water in his hair so that the earth is not damaged, the Ganga vanishing due to bad actions (Sage Jahnu gulping its water in anger) and reappearing due to good actions.

The faith in Ganga even gets the support of modern science when scientists confirm Ganga's unique self cleansing abilities and the longevity of its water (it does not putrefy even after long periods of storage).

If despite these highly remarkable qualities the Ganga water has become very polluted and is now seen by scientists as a major potential source of spread of infectious diseases, then clearly the destruction wrought by us has been quite massive.

The ancient faith in Ganga, bolstered by recent scientific confirmation of the special qualities of its water should have provided a strong base for a people's movement to protect and clean the Ganga. Instead people have been regularly congregating at the periodic melas to have their holy baths (in the process adding to the pollution of the Ganga, according to a recent statement by a scientist of the Central Pollution Control Board) while the

pollution of the Ganga (and its tributaries and other rivers) has gone on unabated. How the faith of the people can be extended beyond empty (sometimes even harmful) rituals and linked to the protection and cleaning of Ganga is a question that needs to be examined seriously.

The changes taking place in the Ganga and its tributaries are linked to the livelihood of a large number of people living in the Ganga river basin, most of whom are poor. If the protection of Ganga river can be taken up in such a way that it gets linked up with resolving the livelihood crisis faced by people, then this will be perhaps the best way of securing the sustained participation of a large number of people in the protection of Ganga.

There is enough evidence now that dams can adversely affect most types of fish for a wide stretch of the river. Speaking in the Indian context, V. G. Jhingran, former Director of the Central Inland Fisheries Research Institute, has said - "The river valley development programmes adversely affect both the migratory and the non-migratory species of fish. Dams, weirs and barrages act as physical barriers to migration tending to prevent access of the fish to their usual breeding, rearing and feeding grounds. The denial of migration may result in a permanent and irrevocable reduction of fish stocks ranging from lowering the levels of abundance to complete extermination."

Another serious crisis to river fisheries comes from the increasing pollution of rivers. Large-scale fish deaths have been reported from Ganga, its tributaries and several rivers in India; not quite so dramatic but equally serious is

the gradual reduction in fish populations as a result of the decline in water quality due to pollution related factors.

In many places the impact of river valley projects and pollution add to each other. The construction of dams and the subsequent withdrawal of water for irrigation or other purposes greatly reduces the river flow in some places. It is this reduced flow which has to bear the increasing burden of various kinds of pollutants, making it most difficult for fish to survive.

River fisherfolk are also frequently asked to pay several taxes and even illegal extortions which, keeping in view the reduced earnings from their traditional occupation, it is extremely difficult for them to continue paying. The burden of such cash payments can make it very difficult for them to continue their traditional occupation. Although the price of several river fish species has increased significantly in recent years, a significant share of this hike goes to traders and not to the actual fisherfolk.

To protect the livelihood of these fisherfolk, both immediate and long-term measures are required. Some relief can be provided immediately be checking illegal extortions and reducing the burden of taxes. Some significant steps have already been taken in this context in Bihar largely due to the efforts of Ganga Mukti Andolan, a movement of river fisherfolk in this state. This beginning can be followed in other states. Such movements have also helped to protect boatmen from illegal extortions.

Reducing pollution and maintaining good river flow will help the livelihood of fisherfolk and boatmen, and this will

also protect the Ganga. The linking up of these two activities has to be done by people's movements supported by appropriate government policies.

Badly flood affected people constitute another category of people whose livelihood issues can be linked up with the protection of Ganga river. In particular the condition of flood affected people in East U.P. and North Bihar is very bad as the embankment based flood-control effort has turned against them and is responsible to a large extent for the accentuation of the flood problem.

In Bihar nearly 3,500 km embankments have been constructed during the last four to five decades. What is the net result of this? In 1954, when the length of embankment here was negligible, the flood-prone area was 2.5 million hectares. By 1995 embankments had been created for a length of 3,465 km but the flood-prone area had also increased (instead of decreasing) to 7.1 million hectares.

Ironically, this distorted approach to flood-control was adopted despite well known limitations and problems of embankments particularly in areas like east UP and north Bihar where rivers bring huge loads of silt. As accumulation of silt raised the bed of rivers, the protection afforded by embankments diminished. New problems also emerge at the point where tributaries meet the main river. Due to the higher bed of the main river, the tributaries cannot discharge their water and flood new areas. The rising river bed also caused seepage on the other side, leading to waterlogging and spread of diseases like malaria and kala-azar.

Embankments also prevented free flow of rain water, leading to water-logging in areas where it was unknown before. Worse was the plight of several hundred thousand people caught between the river and the embankment. They had to bear more frequent and more destructive floods. There were several promises to rehabilitate them properly at a new place but generally these promises were not fulfilled.

These problems were ignored and the construction of embankments was pursued vigorously because massive corruption in this work led to the enrichment of powerful persons. The same phenomenon was responsible for poor construction, inadequate provision of drainage, culverts and neglect of maintenance. The predictable result was that there were many breaches leading to very destructive floods. The floods caused by embankment breaches are much more intense and hence more destructive compared to ordinary floods.

To cope with this worsening problem of floods, organisations like Barh Mukti Abhiyan (freedom from floods campaign) in Bihar and Sahyog in east UP are demanding a basic change in the approach to flood-control and water-logging. These organisations stress that flood control should be rid of existing vested interests and instead this should be debated openly among ordinary people so that flood-control can benefit from the real-life experiences and knowledge of people. Such efforts can be and should be linked to the broader issue of the protection of Ganga.

A large number of people in the Ganga basin are threatened by displacement due to the construction of large dams on these rivers. These can be replaced by smaller run-of-the-river projects which avoid displacement and the people who have been saved from displacement can be involved in many sided programmes to protect the Ganga river.

Villagers and nomadic herdsmen particularly in hilly catchment areas can be involved in forest protection programmes which protect the forests as well as their livelihood. Their efforts to oppose indiscriminate mining practices particularly in sensitive catchment areas' should be encouraged. Nomads of hill areas can play an important role in giving information about any damage done in remote hill areas of rivers, particularly from landslides or anticipated landslides.

Many more such examples can be given where the efforts to save the livelihood of poor people can be linked to the broader task of protecting the Ganga and its tributaries.

Wherever the Ganga river and its tributaries flow, members of the elected panchayats and zila parishads etc. should be closely involved in the protection of the rivers. The invaluable knowledge of people regarding technology which suits local conditions should be fully tapped while implementing the second phase of GAP. (And more generally the National River Conservation Plan). A board consensus should be created by involving community leaders around the belief that the real 'punya'

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or good deed exists in contributing to the cleaning and proper maintenance of rivers and other water sources, and not in outdated rituals which can sometimes even harm the rivers.

Ganga River System

The Ganga (or the Ganges) river flows for over two and a half thousand kms. in India before merging into the Bay of Bengal. In addition there is another branch of this great river called the Padma, which separates itself 40 kms. above Farakka in West Bengal and flows through Bangladesh towards Bay of Bengal.

At its point of origin in Garhwal Himalaya the Ganga is known as the Bhagirathi. Receiving several hill rivers and streams such as the Bhilanagana, the Bhagirathi reaches Devprayag where it receives an important tributary Alaknanda. From this place onwards the river is called Ganga. The river emerges into plains at Rishikesh. In its further flow in the state of Uttar Pradesh the river is joined by the Ramganga (left bank, near Kannauj), the Yamuna (right bank, near Allahabad), Tons (31 kms. downstream) and Gomti (boundary of Varanasi and Ghazipur districts). The Karamnasa river also joins the Ganga river after forming a border between U.P. and Bihar.

While the Yamuna and Ramganga rise like the Ganga in Garhwal Himalaya region, the Tons and the Karamnasa originate in the Kaimur hills while the Gomti originates near Pilibhit town.

The Sarada river rises north of the great Himalayan range from glaciers of Zaskara. Many tributaries from India and Nepal join this river, which is called by different names of Kali, Mahakali and Sarada.

In its further march in the state of Bihar, the Ganga receives several rivers from Nepal and Bihar. These include the Ghaghra (also known as the Karnali in Nepal) which merges into the Ganga a few kms. downstream of Chapra, the Gandak which joins the Ganga near Patna, the Adhwara system of rivers and the Kosi which joins the Ganga through a number of channels near Manibarighat. The Kosi has seven arms in Nepal, the major ones being the Sun Kosi, the Arun (origin in Nepal) and the Tamur.

Other rivers which join the Ganga in Bihar include the Sone which rises in Maikala hills and which joins the Ganga 16 kms upstream of Danapur, the Pun Pun and the Kiul which arise in the Chotanagpur hills and join the Ganga in Patna and Monghyr districts respectively.

The Burhi Gandak arises in Champaran district and joins the Ganga near Monghyr.

The rivers which merge into the Ganga in West Bengal (fully or partially) include the Mahananda, the Dwarka, the Ajay, the Damodar, the Rupnarayan and the Haldi. In West Bengal the river a little below Farakka is called the Bhagirathi and further downstream after its confluence with Jalangi tributary, it is called the Hooghly. After Diamond Harbour the river flows southwards till it merges into the Bay of Bengal. Here the mouth of the river is about 25 kms wide.

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"The Ganga especially is the river of India, beloved of her people, around which are interwined her racial memories, her hopes and fears, her songs of triumph, her victories and her defeats. She has been a symbol of India's age-long culture and civilization, ever-changing, ever flowing, and yet ever the same Ganga.

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Jawaharlal Nehru