

River pollution with special reference to the pollution of the River *Ganga and its impact on our society*:

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Abstract: River is one of the most important parts of our natural society. Like other natural resources river also helps to keep the balance of the bio-diversity of our society in many ways. Importance of rivers in human life is immense. From the very dawn of the society human civilization is depended on rivers. But now the most serious problem that is facing by the rivers is pollution. In Indian society most of the rivers are regarded as sacred as goddess. But the most sacred river of India river Ganga is also not free from pollution. The national and the holiest river of India now become one of the most polluted rivers in the country and one of the ten most threatened river basin in the world. Water condition of the river has now become dangerous and harmful to the people not only for drinking or bathing but also for agricultural use. Presence of Biochemical Oxygen Demand (BOD), nitrite, nitrate, Total Coliform (TC) and Faecal Coliform (FC) which are the core parameter of pollution and responsible for many diseases, has been studied by the 57 water quality monitoring centre of Central Pollution Control Board is very high in Ganga. Domestic, industrial and religious factors are mainly responsible for the pollution in river Ganga. Many steps like GAP-I, GAP-II have been taken by the Government to make Ganga pollution free. Besides governmental efforts many NGOs, environmentalists and social workers are working for River Ganga. But still pollution of river Ganga is one of the most serious problems and a matter of concern.

Keywords: River, Pollution, BOD, OD, Faecal Coliform, CPCB,

Introduction:

River is one of the most important parts of our natural society. Like other natural resources river also helps to keep the balance of the bio-diversity of our society in many ways. Since the advent of civilization, river is regarded one of the important sources of water to the urban and rural centres. From ancient times most of the urban cities were established on the bank of the river. In India one of the most ancient civilizations 'Sindhu' was first developed on the bank of river Sindh. After that from the end of the later Vedic period most of the urban cities started to develop on the bank of rivers. Importance of river in the life of the people of India is uncountable. Rivers has also its religious importance in Indian society. Most of the rivers are regarded as 'goddess' in Indian culture. But the condition of rivers in India is worsening day by day. Pollution has become a great threat to the rivers. Even the most holiest and prestigious rivers of India have been facing the curse of pollution for a long time. In this article we mainly focus on the pollution of India's most sacred river Ganga and its impact on our society.

Jawaharlal Nehru ,the first Prime Minister of India wrote " The Ganges , above all, is the river of India which has held India's heart captive and drawn uncounted millions to her bank 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....."

The river Ganga has originated from Gaumukh, the southern Himalayas on the Indian side of the Tibetan Border. River Bhagirathi and river Alaknanda join at Devprayag and form river Ganga. Ganga flows through five states of India namely Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal and then enters Bangladesh. River Yamuna, Ramganga, Gomti, Ghaghara, Gandok, Damodar, Kosi and Kali East are the main tributaries of Ganga. It is the longest river in India and by means of water discharge it is the second greatest river of the world. Ganga river basin is the world's most densely populated river basin and more than 400 million people live in its basin. On 20th February, 2009, the Indian government gave the river the status of our National River. But the national and the holiest river of India now become one of the most polluted rivers in the country and one of the ten most threatened river basin in the world. Water condition of the river has now become dangerous and harmful to the people not only for drinking or bathing but also for agricultural use.

Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), P^H, Suspended solids (SS) and Coliform etc. are the indicators of Organic pollution of water. All these indicate whether water can sustain

aquatic life and also indicates the presence of harmful, faecal-related bacteria, Viruses and Protozoa which cause illness respectively.

The Central Pollution Control Board (CPCB) has set up 57 water quality monitoring stations on the main stem of river Ganga in association with State Pollution Control Boards of Uttarakhand, Uttarpradesh, Bihar, Jharkhand and West Bengal in order to assess water quality of river Ganga. Temperature, p^H , conductivity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), nitrite, nitrate, total Coliform (TC) and Faecal Coliform (FC) are the core water quality parameters which are studied by the above mentioned water quality monitoring stations.

PRIMARY WATER QUALITY CRITERIA FOR BATHING REACHES IN RIVERS IS NOTIFIED BY MINISTRY OF ENVIRONMENT & FORESTS (MOEF):

CRITERIA	RATIONALE
1. Faecal Coliform: 500 (desirable) MPN/100ml 2500 (Maximum Permissible)	To ensure low sewage contamination. Faecal coliform and faecal streptococci are considered as they reflect the bacterial pathogenicity. The desirable and permissible limits are suggested to allow for fluctuation in environmental conditions such as seasonal changes, changes in flow conditions etc.
2. Faecal Streptococci: 100(desirable) MPN/100ml 500 (Maximum Permissible)	
3. pH: Between 6.5-8.5	The range provides protection of the skin and delicate organs like eyes, nose, and ears etc. which are directly exposed during outdoor bathing.
4. Dissolved Oxygen: 5 mg/l or more	The minimum dissolved oxygen concentration of 5 mg/l ensures reasonable freedom from oxygen consuming organic pollution immediately U/s which is necessary for preventing production of anaerobic gases (obnoxious gases) from sediments
5. Biochemical Oxygen Demand 3 day, 27oC: 3 mg/l or less	The Biochemical Oxygen Demand of 3 mg/l or less of the water ensures reasonable freedom from oxygen demanding pollutants and prevent production of obnoxious gases

Source: CPCB 2013, Pollution Assessment: River Ganga, Central Pollution Control Board, MoEF, July, 2013

PRIMARY WATER CRITERIA BASED ON DESIGNATED BEST USE

DESIGNATED-BEST-USE	CLASS OF WATER	CRITERIA
Drinking Water Source without conventional treatment but after disinfection	A	<ol style="list-style-type: none"> 1. Total Coliforms Organism MPN/100ml shall be 50 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 6mg/l or more 4. Biochemical Oxygen Demand 5 days 20oC 2mg/l or less
Outdoor bathing (Organised)	B	<ol style="list-style-type: none"> 1. Total Coliforms Organism MPN/100ml shall be 500 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 5mg/l or more 4. Biochemical Oxygen Demand 5 days 20oC 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	<ol style="list-style-type: none"> 1. Total Coliforms Organism MPN/100ml shall be 5000 or less 2. pH between 6 to 9 3. Dissolved Oxygen 4mg/l or more 4. Biochemical Oxygen Demand 5 days 20oC 3mg/l or less
Propagation of Wild life and Fisheries	D	<ol style="list-style-type: none"> 1. pH between 6.5 to 8.5 2. Dissolved Oxygen 4mg/l or more 3. Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	<ol style="list-style-type: none"> 1. pH between 6.0 to 8.5 2. Electrical Conductivity at 25oC micro mhos/cm Max. 2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2mg/

Source: CPCB 2013, Pollution Assessment: River Ganga, Central Pollution Control Board, MoEF, July, 2013

After a long term assessment of mean value of water quality data it is observed by CPCB that the stretch of the river Ganga from its origin to Rishikesh and in the segment of Bihar is found to be largely within the prescribed limits with respect to BOD. While the stretch of Rishikesh Downstream to Garmukteshwar and Kaunaj Upstream to Trighat and few locations at West Bengal (Dakshineshwar, Uluberia and Diamond Harbour) exceeds the criteria in terms BOD. DO and P^H is meeting the criteria at almost all the monitoring locations while Faecal Coliform is not meeting the criteria at most of the monitoring locations onwards up to Diamond Harbour.

Causes of Pollution:

Domestic cause:

Domestic, industrial and religious factors are mainly responsible for pollution of rivers. According to CPCB untreated or partially treated sewage discharge through open drains from urban centres, Industrial waste water and untreated/ partially treated waste water carries by the major tributaries is the major point of pollution in river Ganga. Domestic sewage is the major cause of contamination in the river. According to CPCB 2,723 million litre a day (MLD) of sewage is generated by 36 class-I and 14 class-II cities located along the river , which adds up to cover 85 percent of the river's pollution.

Status of waste water generation and treatment capacity in the urban centres along river Ganga is mentioned below:

Category	Waste water- generation (MLD)	Treatment Capacity (MLD)
Class - I (36)	2601.1	1192.4
Class-II (14)	122	16.4
Total	2723.3	1208.8

Source: CPCB 2013, *Pollution Assessment: River Ganga*, Central Pollution Control Board, MoEF, July, 2013

According to CPCB reports sewage generation from class-I cities is highest in West Bengal followed by Uttarpadesh, Bihar and Uttarakhand and in class-II towns, sewage generation is highest in Uttar Pradesh followed by Bihar, Uttarakhand and West Bengal. It is also matter of concern that the sewage generation in Ganga from urban cities is much higher than its treatment capacity.

Industrial cause:

Industrial waste water is one of the major causes of pollution of Ganga. According to CPCB there are 764 grossly polluting industries like Chemical, Distillery, Dairy, Food & Beverage, pulp & paper, sugar, tannery, textile, bleaching & dyeing, Hospitals and others lies on the bank of the Ganga and its main two tributaries Kali East and Ramganga from Uttarakhand to West Bengal. Total water consumption in these industries is 1123 MLD and the waste water generation is 501 MLD i.e. waste water generation is nearly in terms of total water consumption. State wise status of industrial unit, water consumption and waste water generation is given below:

State	Number of Industry	Water consumption (MLD)	Waste water generation (MLD)
Uttarakhand	42	224	127
Uttar Pradesh	687	693	269
Bihar	13	91	17
Jharkhand	0	0.0	0.0
West Bengal	22	116	87
TOTAL	764	1123	501

Source: CPCB 2013, *Pollution Assessment: River Ganga*, Central Pollution Control Board, MoEF, July, 2013

Religious cause:

Festivals have occupied an important place in Indian culture. In Hindu religion importance of river is immense. Ganga is regarded as 'Goddess' in Indian culture. During festivals seasons million of people come for Ganga Snans (bathe) with a belief that it will clean themselves from all sins. Maha kumbh mela, celebrated once in every 12 years, is one of the biggest festivals of India during which millions of people assemble on the bank of Ganga at Allahabad and Haridwar. For spiritualistic reasons some materials like food, waste or leaves left in the Ganga which led to the pollution of river.

Effects of pollution:

Parameter of pollution in Ganga is increasing day by day and if pollution increase in this way then the marine life will be destroy in near future. Eco- system of the river is very much disturbed by pollution. Human and animal life is also affected by pollution. Water related disease like amoebic dysentery; gastro-enteritis, tape-worm infestations, typhoid, cholera, and viral hepatitis are extremely common in the Gangetic region. The National

Cancer Registry Programme (NCRP) conducted under Indian Council of Medical Research revealed that Ganga

is thick with heavy metals and lethal chemicals. According to the reports of NCRP, cancer of gallbladder, kidneys, food pipe, prostate, liver, urinary bladder and skin are common in the worst hit stretches of Uttar Pradesh, the flood plains of West Bengal and Bihar.

Steps to control the pollution:

Major initiatives have been taken by the Government to control the pollution level in Ganga. In 1986, the Government of India launched the Ganga Action Plan (GAP) to check the levels of pollution. 25 class-I cities located along the river in Uttar Pradesh, Bihar and West Bengal had been selected under GAP-I. In stages between 1993 and 1996 GAP-II was launched with same objective. 59 towns along the main stem river Ganga in five States are covered under the plan and also included work on four tributaries of the river- Yamuna, Gomti, Damodar and Mahanadi. In 2009, the Union Government re-launched the Ganga Action Plan with a reconstituted National Ganga River Basin Authority (NGRBA). The objective of NGRBA is to ensure abatement of pollution and conservation of the river Ganga. Under NGRBA some action has been taken by CPCB. As on 30/06/2013 Total 441 industries of Uttar Pradesh, Uttrakhand, Bihar and West Bengal has been inspected by CPCB to check the compliance and inventory provided by the State Pollution Control Board and to check the adequacy of industries in terms of waste water pollution. Out of 441 industries CPCB issued direction to 141 industries under section 5 of Environmental (protection Act, 1986), issued direction to 13 industries under section 18(1)(b) of water Act, 1974, issued letter to 34 industries for ensuring compliance.

Beside Government's efforts many NGOs such as Ganga seva Abhiyanam, Ganga Mukti Sangram, Ganga Mahasabha etc and social activists and also environmentalists are working and conducting movement to save Ganga. Here we can mention the name of Swami Nigamananda who protested by fasted unto death against the illegal mining which creating pollution in Ganga. All these movements have its single goal to prevent anti nature, anti human, anti environmental activities against Ganga and maintain the cultural importance, holiness and age-old heritage of the river.

Conclusion:

We are proud ourselves being a member of the 21st century or in the age of modernity. Lots of invention, a lot of progress is going on in our everyday life. Our society, economy has noticed the dramatic change in our life. We change our life style according to the demand of the society. This type of change can also found in our food habits. This is an irony of fate that being a part and parcel of the modern society, now we cannot imagine to drink

water without purifies it. Our forefathers had never been so. So the problem is that we are compelled to buy drinking water. Is it we want? Urbanizations have also made the situation very alarming. We see that ponds, dams, tanks etc. are filling up unnecessarily to meet the demand of modern urbanization. The unholy promoters are taking benefit from it. They never think the ill-fate of the society. As a result all the wastes, what is may be are dumping into the river. Thanks to God that we are unable to fill up the rivers. The river changes its course own way. We cannot make any hindrance for the benefit of our society. Jal or water is regarded 'Jiban' or life. So the question is that why we are playing a dangerous game to make water become 'Bis' or poison. Are we alive without a single drop of water? We never imagine a civilization that there is no need of water. The necessity of water or the importance of water is beyond expectations in our civilised society. So for the sake of our society we must conserve water as well as rivers. We have a lot of rivers in our country and they are spread up like our nerves. But most important thing is that an illiterate do not know very well the importance of nerves, in case of river he/she shows total ignorance. This is the mentality not only the illiterates but also the educated persons. So the time has come to do something to come out this mentality and understand the significance of water as well as river. It is our duty to create consciousness to everybody about the necessity of water and should start awareness campaign for not to waste or pollute water from top to bottom class of the society. So to make our future safe, we must aware for water and river conservation. Many initiatives have been taken from time to time, such as Basundhara Summit, Narmoda Bachao Andolan and so on. Presently the Central Government takes special initiative to conserve our natural resources. It gives key importance to make the Ganga, our national pride, clean. For this reason a separate department has formed to look after the campaign. The Government urge all people to join this cleanness programme to save our civilization as well as our riverine system. So we can not overlook or shut our eyes in this serious matter of the society and make promise to each other that we must not pollute water and conserve our National Pride.

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