CHALLENGES OF CLEANING RIVERS

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If urgent measures are not undertaken to clean our rivers they will soon become history. Foremost reason of pollution is discharge of all sorts of waste into our rivers. Next come religious practices which demand the leftovers after every ritual to be consigned to flowing waters of a river. Bathing of humans as well as cattle, washing laundry and consigning remains of dead bodies etc. are other contributing factors. If only we stop dumping our waste into rivers they would cleanse themselves.

Pollution in our rivers has grabbed our attention these days like never before. Our rivers have been subjected to the worst kind of pollution during the past decades and any clean up drive is no less than a big challenge. Majority of our rivers have been polluted to the extent that the waters they carry have become unfit even for bathing, let alone drinking. They have dried up to a level that they appear to be carrying only sludge and effluents. Growing industrialisation, urbanisation and construction of dams have robbed our rivers of their natural flow and purity. Ironically though, as long as we had no access to modern techniques for disposal of solid and chemical industrial waste and urban sewage, our rivers were, by and large, clean. But discharge of industrial and urban waste into them has choked them and they appear to be heading towards certain extinction. If no immediate measures are taken, the current situation may snowball into a major crisis for potable water.

As per Central Pollution Control Board (CPCB) estimates, out of 445 rivers flowing through our 29 States and six union territories, 275 have become completely polluted. Today 650 urban settlements located on the banks of 302 rivers are discharging 62,000 million litres per day (MLD) into these rivers as compared to earlier figure of 38,000 MLD while any capacity addition to the existing sewage treatment facilities has only been nominal. Out of these 302 rivers 34, have been accorded the first degree of priority which require immediate attention. During the past five years number of heavily polluted rivers has more than doubled. Their number has increased from 121 in the year 2009 to 275 in the year 2015. During the same period number of polluted river belts increased from 150 to 302. Today 85 per cent rivers of Maharashtra are polluted which also has the dubious distinction of having 45 polluted river basins in the State, which is the maximum in India. In reply to a Parliament question sometime back, it was told that with 28 polluted rivers, Maharashtra tops the list in India while Gujarat and Uttar Pradesh are placed second and third, with 19 and 12 such rivers, respectively. Sensing the urgency of the situation the Government of India has earmarked a sum of around ₹4500 crores for reviving the ailing rivers of the country through National River Conservation Project (NRPC).

Namami Gange

Even as the Central Government's Ministry of Water Resources, River Development and Ganga Rejuvenation is working on the cleanup operation of all rivers in the country, its top priority is on restoring the holiest of our rivers Ganga to its pristine State. The drive has rightfully been named *Namami Gange*. Originating from Gomukh glacier near Gangotri, Ganga travels a distance of 2,525 kilometres before merging with the sea in the Bay of Bengal. The great civilisation of our country has developed on its banks. The Ganga has long been regarded by followers of Hinduism as giver of life and provider of salvation. Continued polluting has done great damage to it. A river that flowed freely

with its sparkling waters has now become tired and sluggish, carrying the burden of sewage and other pollutants of the cities located on its banks. It is a matter of great concern which has prompted the Central Government to create a new Ministry to clean the *Punya-salila* (the holy river). The Government has started the project *Namami Gange* to accomplish the task of cleaning the river Ganga in two years which could not be accomplished in thirty years by various governments. It might sound incredible but the it has been taken up as challenge by the Central Minister of Water Resources, River Development and Ganga Rejuvenation. Minister has stated that the results of the efforts being made in this direction will start being visible by October 2016 itself and by the end of 2016 Ganga will be fully restored to its pristine purity. Her claim is based on the success of 231 projects launched at a cost of ₹1,500 crore on July 7, 2016. Out of these 43 projects costing ₹250 crore will check pollutants from flowing into Ganga at eight places in Uttarakhand alone; rest will go into setting up facilities at 95 predetermined locations in Haryana, Delhi, Uttar Pradesh, Bihar, Jharkhand and West Bengal. These projects will basically concentrate on renewal of ghats, construction and cleaning of drains, construction of sewage treatment plants, disposal of industrial waste, plantation and development of bio diversity zones. For cleaning of river Ganga 118 municipalities located on its banks have been identified where total cleanliness targets would be achieved through latest techniques of waste water treatment and solid waste management.

Organic Farming for Conservation of Ganga Waters

The Central Government has taken one more step forward in its quest for speedy implementation of *Namami Gange* mission. It involves promotion of micro irrigation in the area lying in the vicinity of the river for water conservation. The Central Government's Ministry of Water Resources, River Development and Ganga Rejuvenation has entered into an agreement with the Ministry of Agriculture and Farmers Welfare for this purpose which will iron out the problem areas related to agriculture for accelerated implementation of the *Namami Gange* project. It has been proposed that clusters will be formed at village panchayat level to represent the rural settlements located around Ganga. With the help of self help Groups and mobile applications, awareness programmes regarding cleanliness of Ganga would be launched to promote organic farming at these cluster levels. As per the terms of the agreement, the Ministry of Agriculture and Farmers Welfare will work to create awareness among farmers about balanced use of fertilizers and pesticides so that micro irrigation could be promoted in the Ganga basin for water conservation and farmers could benefit from it.

Agreements with other Ministries

The *Namami Gange* project is likely to cost about ₹12,728 crore in terms of a Unified Ganga Conservation Mission. Under this mission several small projects costing a sum of ₹7,272 crore have already been rolled out. The concerned Ministry has already entered into several agreements with other ministries of Central Government for *Namami Gange* mission. These Ministries are Shipping, Human Resources and Development, Rural Development, Tourism, AYUSH, Youth Affairs and Sports and Drinking Water and Sanitation.

Gangasagar to Gangotri March

The Minister of Water Resources, River Development and Ganga Rejuvenation is to flag off a Gangasagar to Gangotri March in October that will focus on creating awareness regarding cleanliness of Ganga. It will also take stock of the progress being on various components of the mission and speed up the work.

Ensuring the Continuity of Flow

As indicated in the reports of several studies and enquiry committees, it is difficult to ensure cleanliness of Ganga without ensuring its continuous flow. This is matter of great concern. Maximum dams have been erected on Ganga, which also bears the burden of maximum 54 irrigation projects. Certainly, these projects are the biggest impediment to the unbroken flow of Ganga. They are also robbing Ganga of its bacteriophage and special silt that are the part of the river's self-cleaning mechanism. The Environment Minister, considered an expert on rivers, had rightly opined on assuming office that "every river must flow". If he and the Water Resources Minister are able to ensure the flow of rivers, it would be a giant positive step forward.

On the occasion of the 4th River Festival in Madhya Pradesh, the latter had said, "No river would be allowed to dry up. Their continuous flow would be ensured by interlinking them. Rivers cannot be sacrificed for dams. If dams are to be erected, rivers will have to be saved first.

How to check Waste Dumping

Steps have been initiated to clean rivers other than Ganga as well. The National Green Tribunal (NGT) has directed to impose a fine of up to ₹50,000/- on instances of ritual-related, construction -related and other types of waste disposal in Yamuna River. Taking a tough stand on the issue, NGT has directed the CPCB not to allow industrial units to discharge their liquid or solid waste into rivers. Since every river flows at the lowest level in its catchment area, any waste dumped on the ground even far away from its banks will eventually find its way into the river. This phenomenon is contributing heavily to polluting of our rivers. Growing demand for water has led to construction of dams and diversion of rivers' natural course which has further diminished their capacity to carry away waste materials. Such waste material will ultimately pollute the sea where a river empties.

Learning Points from Foreign Lands

Almost every major river in the world has been a victim of pollution at some point of time or the other but awareness among people and perpetual cleanliness drives have turned them into shining examples of what can be achieved on this front. Thames of London and Rhine of Germany had once turned black with pollution but were cleaned that ultimately. Now that these rivers have been cleaned, the locals have come forward to shoulder the responsibility of maintaining their present status. Rhine is only half as long as Ganga but it took Germany 30 years to clean it to the current level.

Rivers are considered a natural drainage for effluents and pollutants all over the world but are not left to themselves and thus, die a painful death. About a decade ago Elbe was considered the most polluted river of the world but today it is amongst the cleanest ones in the world. This turnaround has been possible because the Government in that country considers rivers as a legacy. Not long ago, German rivers were so polluted that fish were dying of ulcer in those waters but today these rivers have been fully cleaned. From the biodiversity angle our rivers have been home to some of the most unique flora and fauna in the world ranging from temperate to tropical, but pollution is steadily destroying this uniqueness.

Yamuna in Delhi

When the Yamuna begins its downward journey from Himalayas, it is just like Ganga-clean and clear. By the time it enters the plains and reaches Delhi, its condition becomes miserable. At Wazirabad in Delhi, Yamuna on one side is clear while on the other it's black. Here all water is diverted to the treatment plant for purification and supply of potable water to Delhi households. The story of the river's misfortune begins here. Oxygen levels in Yamuna has reached zero in Delhi. Yamuna begins its journey from Yamunotri in Uttarkashi district of Uttarakhand and meets Ganga at Prayag (Allahabad) in Uttar Pradesh. The Water Resources Minister says it is not possible to even imagine a clean Ganga without cleaning Yamuna first. Regarding Yamuna, she claims that the Central Government would clean up the stretch of Yamuna between Delhi and Agra by 2018. Drains of Delhi emptying into Yamuna will be diverted to treatment plants. Japan and Netherlands are providing technology and soft loans for the project. Clean-up operation of Yamuna will be carried out in three phases. Work on first two phases involving the stretch between Delhi and Mathura has already begun. The third phase is likely to be launched in Agra next year. Out of the total distance of 1,029 kilometers that Yamuna travels, 700 kilometers lie between Delhi and Allahabad. Delhi, Mathura and Agra are the major contributors of pollutants to the river therein.

Hindan and the Rivers of North India

While talking about Yamuna one must not forget about the Hindan that merges with Yamuna near Delhi. Hindan is an important river of West UP. It originates from upper Shivalik hills in Saharanpur and covers a distance of about 400 kilometers through Saharanpur, Muzaffarnagar, Ghaziabad, Noida and Greater Noida before meeting Yamuna. Its catchment area is about 7,083 square kilometers that lies between Ganga and Yamuna. Once it meets Yamuna, it ultimately affects the water quality of Ganga as well. It provides drainage to several densely populated industrial townships located in its catchment area. This river has been in news

for quite some time due to heavy pollution. Waste from stone crushers legal as well as illegal located in upper parts of Ghaziabad has changed the colour of its waters to red. Besides this, countless paper mills, sugar mills, abattoirs, distilleries and chemical mills located in West UP directly discharge their untreated effluents in this river.

Oxygen levels in Hindan have fallen so low that no fish can survive in it. The U.P. Government has been working with 'Water Resource Group' of the USA to clean it and might enlist the help of Belgium as well for the purpose.

Gomti is another prominent river of North India which has now been converted into a gutter. Originating from Gomad Tal near Madho Tanda in Pilibhit district of Uttar Pradesh, it journeys through Sitapur, Hardoi, Lucknow, Bahraich and Jaunpur before merging with Ganga at Kaithidhar near Varanasi. At no point during this journey it is clean. Gomti Riverfront Development Project has been launched to clean it. UP Government has been making claims to start work on cleaning two other major rivers of the State-Varuna and Saryu.

Plight of Narmada

Narmada is the second holiest river in India after Ganga. It is also worshipped like Ganga. It begins its 1,289 kilometers long journey from Amarkantak in Madhya Pradesh and passes through Vindhya and Satpura hills before merging with the Arabian Sea, meeting with endless exploitation en route. Same treatment has been accorded to *Suryaputri* (daughter of Sun) Tapti, which originates from Multai in Betul district of Madhya Pradesh and meets Arabian Sea near Surat. River Tamsa has already ceased to exist.

Findings of a survey conducted by the Government agencies suggest that about 100 drains from the urban and rural settlements located near its banks discharge their effluents and sewage in Narmada. It appears quite polluted at the place of its origin, Amarkantak, itself. At several places, level of pollution in the river is dangerously high. The State Government has declared that it will launch a special drive to clean Narmada with a budgetary allocation of ₹4,000 crore.

Environmentalist Anupam Mishra says that every river in India, howsoever polluted, cleanses itself once a year during monsoon when it gets flooded with rain waters. This unique phenomenon may be attributed to our weather cycle. But once cleaned we start polluting it again. So the need is not to clean up but to stop polluting our rivers.

Pamba River of South India

Young Indian scientist Shilly David has been conducting research on the river Pamba of Kerala at the Centre for Marine Tropical Ecology in Germany since 2009. She wants to revive ailing rivers of India.

After finishing her research at the Centre for Earth Science Studies, Thiruvananthpuram, Shilly went to Germany for further research. The professors at ZMT University were impressed by her synopses and she was admitted with scholarship. At ZMT, she is doing research on the third largest river of South India. The river is sick with pollution. Working with support from ZMT, Shilly as a guest scientist wants to save the river along with its fragile ecosystem. She visits India every 6 to 8 months and takes samples of river water and the fertilizers being used in the catchment area. The river is dying due to human intervention.

Ever deteriorating water quality is an indicator that our rivers are slowly dying. Ecosystem of a river is dependent on the oxygen dissolved in its waters for its survival and starts dying with dwindling supply of oxygen. When the oxygen level falls below a certain point, the river is scientifically declared dead. It takes a minimum of 30 to 40 years to revive a dead river. Onset of massive industrialisation in Europe killed several rivers and some of them have not been revived till date. Polluted rivers ultimately affect our seas and are responsible for climate change as well.

The Way Ahead

If urgent measures are not undertaken to clean our rivers they will soon become history. Foremost reason of pollution is discharge of waste into our rivers. Next come religious practices which demand the leftovers after every ritual to be consigned to flowing waters of a river. Bathing of humans as well as cattle, washing laundry and consigning remains of dead bodies etc., are other contributing factors. If we stop dumping our waste into rivers, they can cleanse themselves. As per findings of a report, a bacterium found in rivers does multiple jobs, such

as joining stones, to filtering water, which is part of a natural mechanism for rivers to cleanse themselves. But their falling numbers over the past decades has worsened the situation.

Significance of River Basins

Various small streams, small ponds, flora and rain-fed and other tributaries found in a river basin contribute to the flow of a river. Any plans to revive or rejuvenate a river must concentrate on enriching these contributors. Every river basin has a unique physical structure and biodiversity. Basically these two factors determine the quality of water of a river at its place of origin. Gradient of the river, structure of riverbed, erosion of its banks, structure of underlying rocks and sand and aquatic plants and animals also contribute to the quality of water a river carries. To what extent a river is capable of cleansing itself also depends on these factors. Environmentalists are against the tendency of destroying natural flora and fauna, small river bed ponds created on the bends of a river by its natural flow through extensive use of heavy earthmoving machinery in the name of desilting. This practice may adversely affect the natural flow and quality of water of a river. Rather employment generation through cottage industries using eco-friendly technology should be promoted in the catchment area.

Points to Ponder

In 1932, the then Commissioner of Banaras passed an order regarding linking of the main gutter of the city with the Ganga. There are no known instances of linking a drain to a river prior to this. Should we not decide that no waste is poured in our rivers and all waste disposals would be done where it is being generated? Ironically, today, polluted water carrying waste is flowing in our rivers while fresh water is flowing in irrigation canals. There are basic flaws with this practice which need to be reversed. Rivers should carry fresh water while treated water should flow in canals for irrigation and industrial purposes. This is not too difficult to achieve. Sewage treatment systems linked to community and private septic tanks are freely available in India. Today, the residents of Lucknow are passing on their sewage to Sultanpur and Jaunpur while Delhites are handing over their filth to Mathura and Agra. Surprisingly exceptions are coming up. Residents of Kolkata recycle their sewage and do not discharge it into rivers. Honeysuckers of Bengaluru are extracting compost from septic tanks. On the one hand, they are saving our rivers by checking discharge of sewage and on the other, providing organic manure for agricultural purpose. If we take a close look at the technology for organic disposal of human excreta as developed by the Defense Research & Development Organisation (DRDO), we find that there is no need to link our new settlements, apartment buildings and commercial complexes with sewage pipelines.

SBM (G) in *Namami Gange* Villages

Swachh Bharat Mission (Gramin) endeavours to achieve Swachh Bharat by October 2, 2019. Swachh Bharat includes freedom from Open Defecation and appropriate Solid and Liquid Waste Management (SLWM). Namami Gange is the umbrella programme coordinated by the Ministry of Water Resources, River Development & Ganga Rejuvenation.

The programme involves multiple Ministries mainly Ministry of Urban Development and Ministry of Environment, Forests and Climate Change (since checking of source pollution and checking industrial pollution are the major components). A major role of Ministry of Drinking Water and Sanitation is to prioritize the villages on Ganga bank and work with States for making them free from Open Defecation as part of SBM (G).

In the 5 riparian States of the Ganga i.e., Bihar, Jharkhand, Uttar Pradesh, Uttarakhand and West Bengal, 1,651 Gram Panchayats in 251 Block of 52 districts have been identified as being adjoining the river Ganga. These Gram Panchayats comprise of 5,169 villages in all, of which 4,279 villages are directly adjoining the Ganga, which have been prioritized to achieve ODF status.

As per Baseline Survey (2012-13) conducted by States 15,18,649 households in these GPs did not have toilets. Of these, a total of 5,58,608 (36.78 per cent) individual toilets have been constructed so far. As far as achievement of ODF is concerned, of the 4,279 villages, 1,523 (35.59 per cent) villages are ODF. States are taking efforts to make these villages ODF within this year.

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