



**The purpose of this quarterly digest brought out by the Centre for Ganga River Basin Management and Studies (cGanga) led by the Indian Institute of Technology Kanpur is to disseminate valuable traditional and scientific knowledge assimilated from national and international sources on various aspects of management of water and river restoration and conservation among concerned institutions and citizens.**

## SMALL RIVERS, GREAT HOPES

Rivers are a priceless gift of nature to humanity. Civilizations arose on the banks of rivers across the world. Today the same rivers expect civilized conduct from man for their very existence. Rivers and humans are symbiotically interdependent. If we make a concerted effort today, only then will healthy rivers survive; and if rivers survive, only then will human existence be secure.

This issue of Pragyambu is dedicated to those small rivers even whose names we have begun to forget. But these small rivers are an important part of our water resources system. Let us learn what efforts can be made by the administration and citizens together to revive these small rivers.

As per ancient Indian knowledge, one should live near a river. Following this edict, many cities and towns came up on riverbanks. Each such settlement has its own history – the forts, palaces and other buildings stand testimony to that history; if anything has been lost it is the rivers on whose banks the cities came up.

Some of our rivers have already disappeared and some have become wastewater drains. Nag river of Nagpur, Jojri river of Jodhpur, Mithi river of Mumbai, Oshiwada river and many such rivers are now struggling for their existence. Bundelkhand's life-giving Bagei river has almost dried up. Ujjain's Kshipra river is also facing a water crisis. The Punpun river of Bihar, described in the Puranas as a sin-cleansing river, is also plagued by pollutants.

Man aspired to establish his dominion over rivers for his own benefit. On the one hand, he tried to control their natural flow and on the other hand industrial and domestic wastes were discharged into the rivers. Thus many

big rivers got polluted and small rivers became wastewater drains. Many perennial rivers became ephemeral – flowing only in the rainy season, while some seasonal rivers, due to continuous discharge of wastewater, started flowing throughout the year.

The Central Pollution Control Board examined the water quality of 323 rivers. It was found that the water of 351 river stretches is polluted including in geographically important rivers like Chambal, Sone, Kshipra, Punpun, Kaveri and Sutlej.

Large rivers and their tributaries are like the blood circulation system of the human body. If a single vein or artery malfunctions, then it affects one organ first and later on the whole body. Similarly, if small tributaries are polluted and unhealthy, then the adverse consequences will gradually spread to the entire river system and later on to the land, groundwater, weather, agriculture, and economy of the basin.

There are two main sources of water in the rivers of India: the first is glaciers. The major source of water in the rivers originating from the glaciers of the Himalayas is the melting ice from the glaciers. When these rivers descend from the mountains and move into the plains, then rainfall, tributaries, natural drains, and streams emerging from springs join them. The rivers grow in size and finally complete their journey merging with the ocean.

Other rivers originate from hills and plateaus, from verdant mountains. From there they descend and reach the plains, where their waters recharge groundwater and groundwater wells; these rivers are also a source of subsoil water; and they also provide irrigation water; eventually they merge with large rivers. An example of the origin and

importance of small rivers is the Janapav hill of Madhya Pradesh. Seven rivers originate from this hill including the Chambal River. After covering a route of 1024 km the Chambal merges with the Yamuna.

The mutually interactive system of these small hilly rivers is a kind of natural pipe network, in which the water flows and refines itself. And wherever it passes through, it shares many gifts with its surroundings including fertile silt, sand, artistic pebbles, biodiversity, etc.

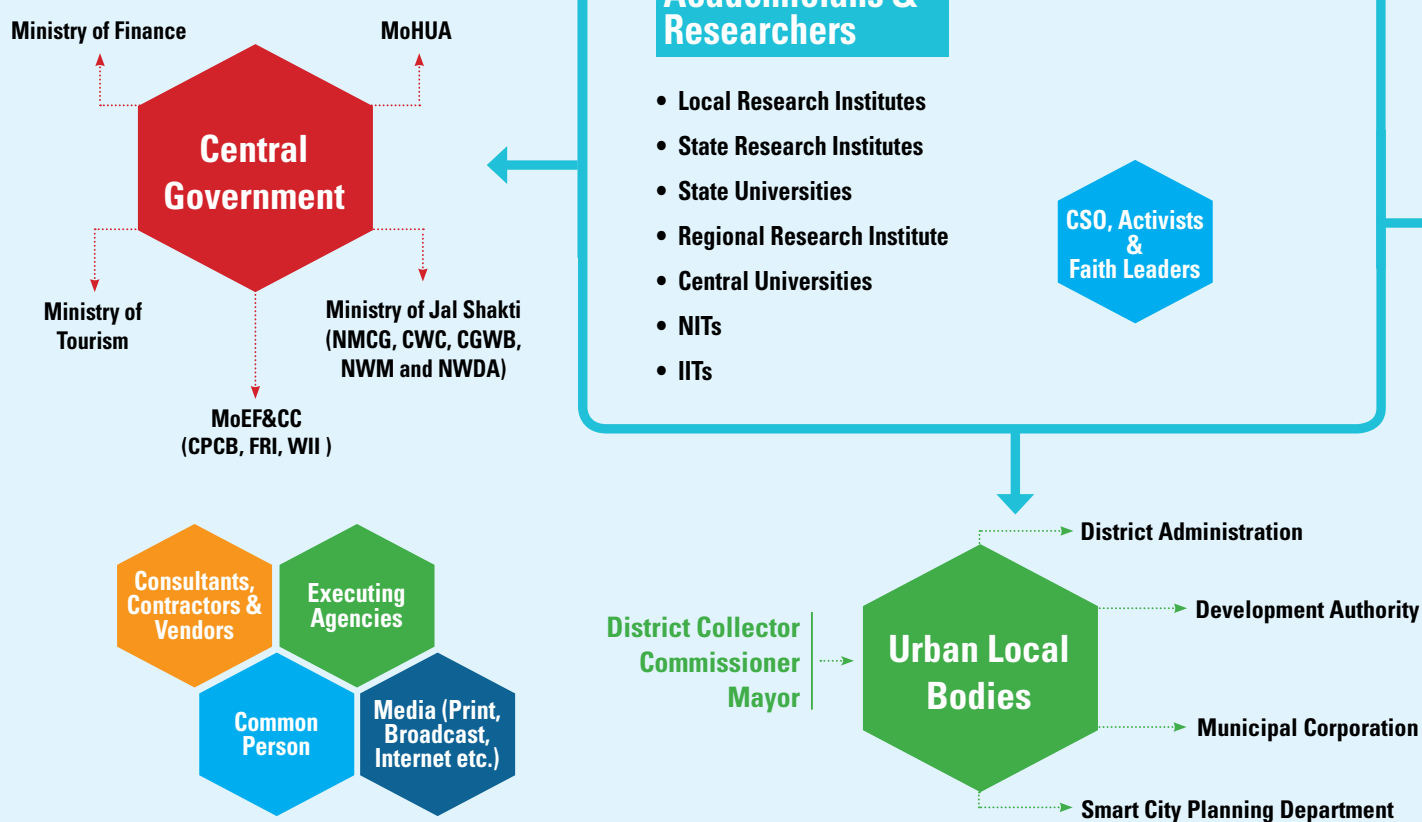
### HOW RIVERS BECOME PERENNIAL

In folk languages, these small rivers are called "sadneera" meaning always watery. The creation of these rivers is a beautiful amalgamation of physics, geography, botany, and geosciences. Based on this combination, these rivers not only keep themselves alive but also keep alive the big rivers (higher order rivers) that they join. Many deciduous trees grow on the banks of such rivers, their roots absorb thousands of liters of water from the rivers during the rainy season; later gradually the roots of the trees release this water into the river. This is the reason that water remains in these rivers after the monsoon has passed. There is thus a symbiotic relationship between these giant trees and the small rivers. If the existence of one is threatened, the existence of the other will also be in danger in the future.

Just as everyone has a right over the river, similarly everyone has some duty towards the river. Let us know what role we can play at different levels in preserving and keeping these rivers safe. How and what role can the government, administration, social workers,

## IMPLEMENTATION CHALLENGE: DE-ALIGNED INTERESTS COORDINATION

THE MAJOR IMPLEMENTATION CHALLENGE OF RIVER BASIN PLANS IS THE DIVERGENCE OF INTERESTS AND OUTLOOK OF DIFFERENT ACTORS AND THE SHORT AND VARIABLE RESIDENCE TIME OF THE AGENTS OF IMPLEMENTATION. HOW CAN THIS PROBLEM BE OVERCOME? APPROACH RIVER BASIN MANAGEMENT AS AN EMBEDDED CYCLIC PROCESS (FIG 03A, PRAGYAMBU VOLUME 1, ISSUE1).



social institutions, academic institutions, religious leaders play in the direction of conservation of these rivers?

### CENTRAL AND STATE GOVERNMENT

The first responsibility for the management of natural resources rests with the government. The Government of India has made and is making many efforts towards the conservation of rivers. For the conservation of big and small rivers, the government is working with the bottom-up approach, which is appreciable.

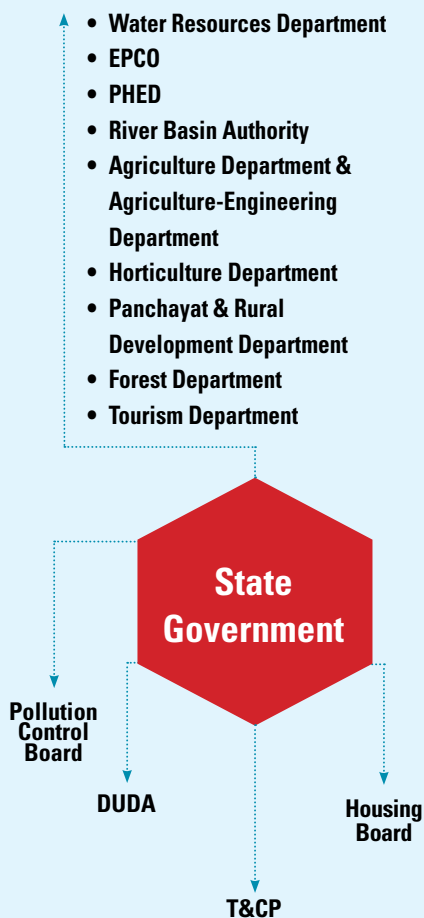
### ROLE OF LOCAL ADMINISTRATION

There is a paucity of information about small rivers, with very few administrative documents describing their origin and natural course. The district administration or municipal body can of course easily demarcate the origin and basin boundary of a river. After this task is completed, the second step can be to identify the problem and develop a strategy to solve it. The work of collecting data such as the amount of incoming and outgoing water in the river can also be done by local governance

bodies. This will help prepare a water budget in future. The Local Body can collect and compile the available information such as from which sources and how much-polluted water reaches the river, and what kind of chemicals are contaminating the water. Thereafter, with the help of experts, a plan can be prepared to treat the water or to prevent the untreated water from getting into the river.

### FORMATION OF RIVER BASIN ORGANIZATION

Based on the recommendations of the Central



**Stakeholders for Restoration and Conservation**

Government, the district administration should constitute a River Basin Organization, which should act as a custodian of the river and the river basin. The philosophy behind the concept of RBO is that the direct involvement of stakeholders and beneficiaries related to the river can result in better implementation of river conservation plans.

### FORMATION OF RIVER BASIN MANAGEMENT COMMITTEE

The District Level River basin Management Committee should be constituted for the

river flowing in a district or passing through the district. This committee, along with the representatives of the district administration, representatives of the Irrigation Department, Pollution Control Board, Horticulture Department, City development Authority should also be there. Non-Governmental Sectors such as Farmer Organizations, Real State Organizations, Art World, Education Sector, Citizens Organizations, College Posted and Retired Professors (especially experts in Botany, Zoology, Chemistry, Geology subjects) Senior Citizens Clubs & other active organizations should also be included.

### ROLE AND RESPONSIBILITIES OF THE COMMITTEE

#### Establishment of River Knowledge Bank:

The River Basin Management Committee (RBMC) can assist the RBO (River Basin Organization) in setting up a River Knowledge Bank related to the local river.

#### BOTANICAL STUDIES

The RBMC members can conduct a botanical study of the river basin, in which they can meet senior citizens of the city to gather information about the city's botanical diversity fifty or sixty

years ago. For example, which trees were in abundance in the river basin sixty years ago? Which species of shrubs, plants, and other vegetation were in abundance, can be studied and compared with the present situation.

In conducting such a study during the implementation of the Kanh River Rejuvenation Plan in Indore, Madhya Pradesh, it was revealed that there were nine lakh trees in an area falling in the basin of Kanh. Because of these trees, the area was named "Naulakha" meaning the land of 9 lakh (9,00,000) trees. Today there are instead many multi-story buildings in that area. History cannot be repeated, but based on this study, plans for future plantations can be made.

#### HYDROLOGICAL STUDIES

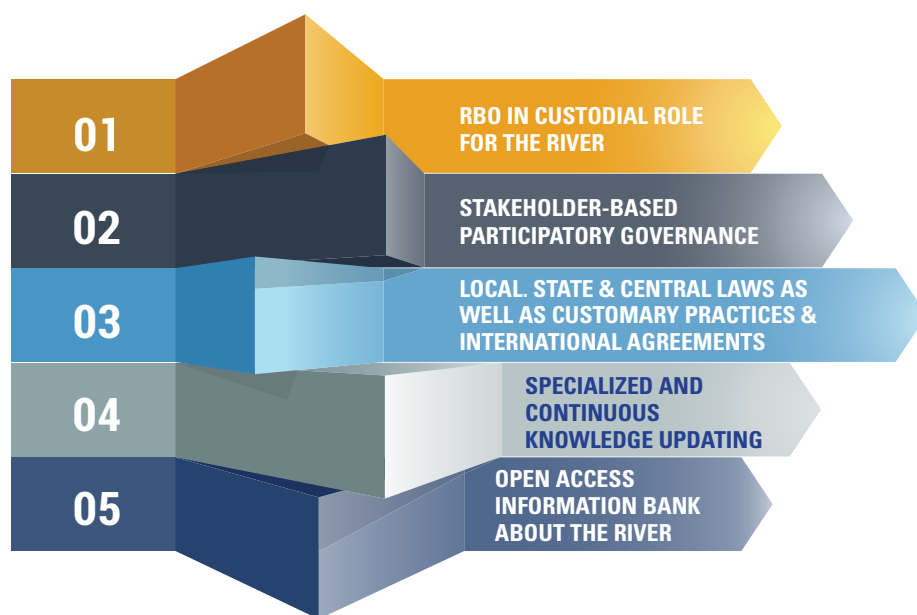
The identification of other water sources like small and big ponds, wells, and step wells, etc., in the basin area of the river and their condition should also be studied.

#### CULTURAL STUDIES

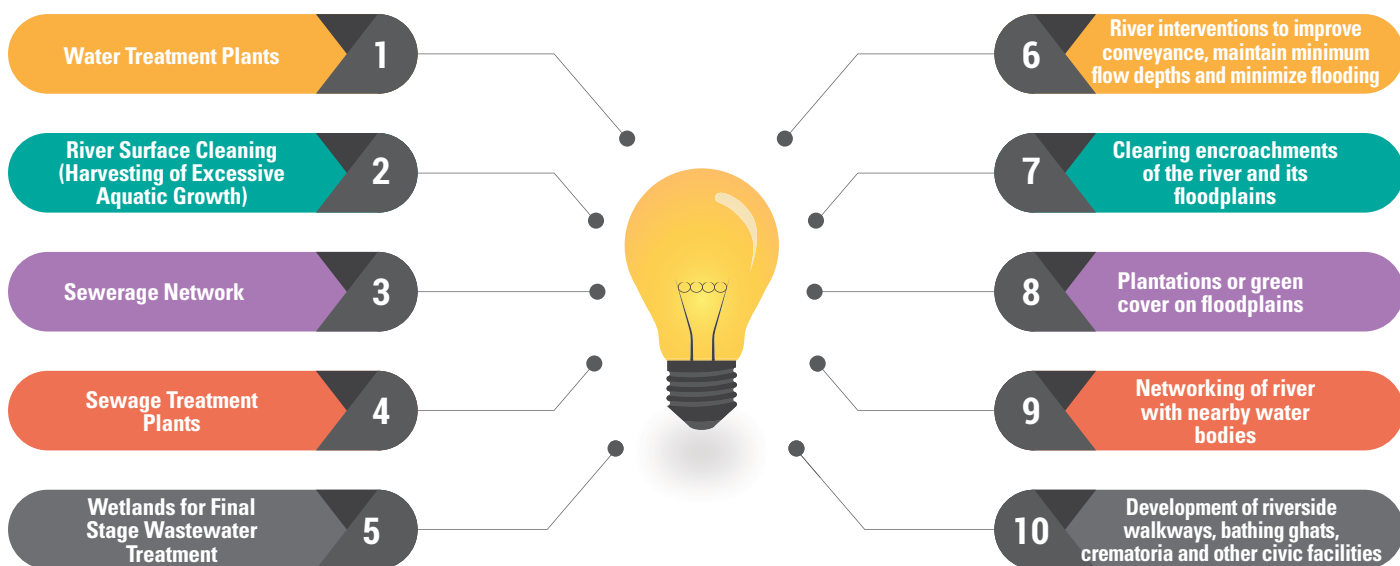
There are legends, songs and or folktales about every river in every region. By collecting information about these, it should be used to spread public awareness about the river.

### GOVERNANCE

THE BASIC GOVERNANCE PRINCIPLES THAT SHOULD BE ADOPTED BY RBOs:



HENCE THE RBO ITSELF SHOULD COMPRISE LARGELY OF PROMINENT LOCAL PERSONS AND STAKEHOLDERS BESIDES GOVERNMENT REPRESENTATIVES AND SUBJECT EXPERTS.



## PEOPLE'S PARTICIPATION AND SOCIAL EVENTS

The RBMC can play a catalytic role in bringing public awareness about the river and in increasing public participation in its revival. With involvement of mass media, activities like cleaning of river ghats, tree plantations along the river and other such activities can be organized. To increase public participation, information related to river conservation can be disseminated in these programs. The more people who join the campaign, the faster the campaign will accelerate and the efforts will get stronger. New suggestions and increased cooperation will also be achieved.

## COORDINATION OF COMMITTEE AND NATIONAL AGENCIES

The Local River Basin Management Committee and the National Agencies will have to work together as a unified entity. This reconciliation can be achieved through modern communication techniques. After the constitution of the Committee, the first meeting of the members of the committee can be held with the national agency in which setting future targets and timelines should be done. From time to time, the members of the committee can hold online and offline meetings with representatives of the national agencies

as per requirements. National agencies can also organize training sessions for enhancing the knowledge of the committee members.

## RIVER CONSERVATION AND ECONOMIC ASPECTS

There are three economic aspects associated with river conservation. The first is the treatment of wastewater so that wastewater coming from various sources in the river does not reach the river without treatment. Hence treatment plants will have to be set up in a planned manner for which a financial budget will be required. It is a one-time investment for proper planning and implementation to save the river from pollution in the long run.

## RIVER BEAUTIFICATION

The cost of beautification of the river can be done through public participation and innovations. The city's social organizations or big industries and corporations can adopt specific ghats and stretches of the river, taking responsibility to keep them clean and beautiful. Besides, walls near bridges and ghats can be beautified by organising painting competitions or local folk art competitions (such as Mandana, Madhubani, etc.)

## REVENUE AND INVESTMENT

Along with making the river clean and healthy,

economic up-gradation of its beneficiaries is also necessary. If this does not happen, then after some time there will be a repetition of past mistakes due to which the river had degraded. For this, a location-specific strategy will have to be made. For example, open theatres, parks, botanical gardens, spice gardens, bonsai gardens, etc. can be developed on the banks of the river.

## IMPACT OF RIVER REJUVENATION ON LOCAL ECONOMY

River restoration will help revive the city's culture and prosperity. Rivers enhance the cities' aesthetics, enrich its biodiversity and bring prosperity in its wake. In 1940, the Chung-Gi-Chun River in Seoul, South Korea was polluted due to several reasons. The river was revived through relentless efforts of the government. This had a remarkable result not only on the culture and beauty of the city but on the entire economy. The rejuvenation of rivers saves the invaluable natural heritages of a city like its water resources, the positive effects of which are visible everywhere. As land prices rise near natural waterbodies, real estate booms in the city, and hence so do other businesses. Activities like eco-tourism and natural healing can also develop.

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