

Ganga River Basin Management Plan Extended Summary

by

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1. Introduction

- **River Ganga in Indian Consciousness:** River Ganga, along with her many tributaries, has been the source of physical and spiritual sustenance of Indian civilization for millennia. And all through the ages, Indians held the munificent River Ganga as a Divine Body. To the Indian mind, River Ganga is not only the holiest of rivers and purifier of mortal beings, but also a living Goddess – MOTHER GANGA! Her vaulted status in Indian consciousness has been aptly encapsulated in the following words of Sri Krishna in Bhagavad Gita:

पवनः पवतामस्मि रामः शस्त्रमृतामहम् ।
झषाणां मकरश्चास्मि स्रोतसामस्मि जाह्नवी ॥

I am the wind among things of purification, and among warriors I am Rama, the hero supreme. Of the fishes in the sea I am Makara, the wonderful, and among all rivers the holy Ganges.

-Bhagavad Gita; Verse 31, Chapter 10

- **Recent Deterioration:** Despite being nationally revered, River Ganga has been deteriorating noticeably over a long time, at least since large scale water abstractions through canal systems began in the mid-nineteenth century. But her degradation gradually became multi-faceted and accelerated in recent decades, while attempts to keep the river clean through conventional pollution control methods have proved ineffective.
- **GRBMP's Goal:** River Ganga was declared as India's National River by the Government in 2008, thereby implying her well-being to be of prime national concern. Hence the main goal of GRBMP is to restore the wholesomeness of National River Ganga and her basin.
- **Functional Unity of the Ganga Basin:** A river basin is the area of land from which the river provides the only exit route for surface flows. For understanding its dynamics, a basin may be viewed as a closely-connected hydrological-ecological system. Hydrological connections include surface runoff, areal flooding, local evapotranspiration-precipitation cycles and groundwater flow, while ecological links are many and varied. These linkages provide for extensive material transport and communication between the river and her basin.

- **National River Ganga as Key to NRGB:** On account of the manifold hydrological-ecological connectivity in her basin, National River Ganga is the key indicator of the health of her basin (besides being a prime source of material and spiritual resources on her own.) Hence, GRBMP adopts the Ganga River Network as the primary environmental indicator of NRGB (National River Ganga Basin).
- **Himalayas' Importance:** The Himalayan glacier-fed head-streams of National River Ganga, as also her downstream Himalayan tributaries, bring in considerable water, sediment and nutrients into the river almost round-the-year, thus ensuring perennial life-giving flow in the river and fertility to her floodplains. The Himalayan connection thus plays a significant role in the basin dynamics.
- **Resource Management in GRBMP:** The natural resources of NRGB are its abiotic or physical resources (mainly soil/silt, water, and the nutrients and compounds bound up with them) and its biotic resources (plants, animals and microbes). The biota, even as they depend on abiotic resources, modify the latter significantly through various ecological processes. Proper understanding of the basin's resource dynamics is, therefore, pivotal in managing NRGB well. Hence, unlike conventional Indian basin management that consider only water resource management, GRBMP attempts to focus on comprehensive natural resource management in NRGB.
- **Philosophy:** The philosophical basis of this Plan is that NRGB is a common heritage which we must preserve in order to ensure its life-enhancing value. Hence, if the basin has been degrading due to unrestrained anthropogenic activities, then we must curtail or regulate such activities as well as introduce specific measures for environmental restoration and strengthening of the basin.
- **Degradation Processes in NRGB:** With proliferation and diversification of human activities having harmful environmental effects, National River Ganga and her Basin have been degrading rapidly. The degradations are due to five main causes, viz.: (i) *over-withdrawal of fresh water from the basin*; (ii) *discharge of pollutants into terrestrial and aquatic environments*; (iii) *reduction in water-holding capacities and replenishment rates of water bodies*; (iv) *mutilation of rivers by piecemeal engineering operations*; and (v) *changes in geological factors governing the basin*.

- **Anthropogenic Factors:** The major human activities causing the above damages may be clubbed under five main heads, viz.: (i) *Industrialization*, (ii) *Urbanization*, (iii) *Lifestyle Changes*, (iv) *Agriculture & Other Rural Activities*, and (v) *Deforestation/ Denudation*, as depicted in Figure1. This broad grouping indicates the key factors underlying the degradations; however, devising appropriate remedial interventions requires in-depth analysis of the problems.

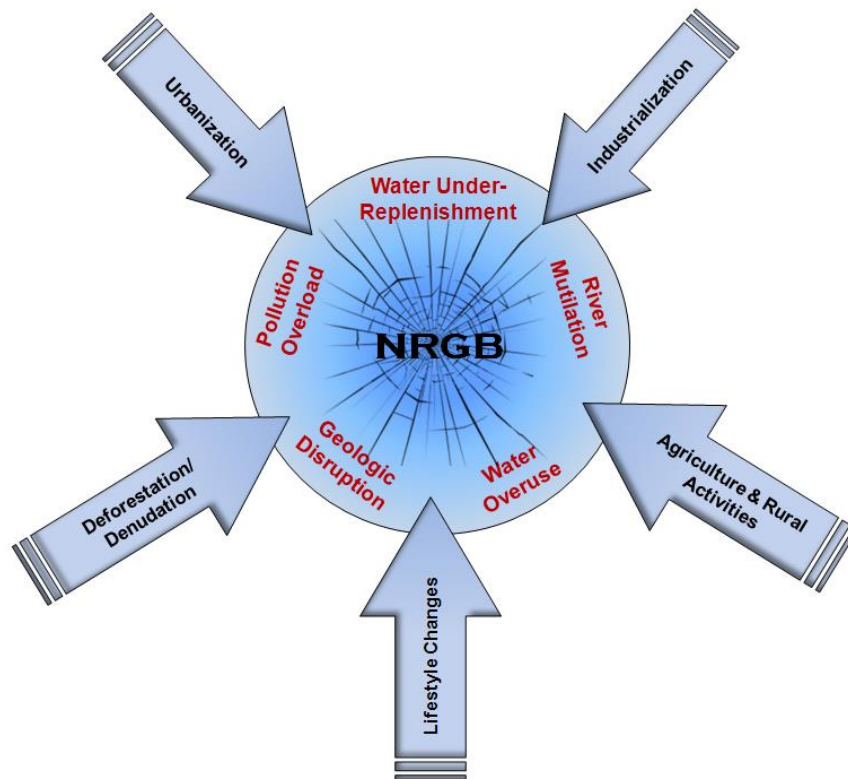


Figure 1: Major Adverse Impacts of Modern Anthropogenic Activities on NRGB

- **Impact on Humans:** The direct impact of NRGB's damage on human beings are in terms of the losses of "ecosystem services" namely, *provisioning services* (e.g. food, freshwater, fibres, energy), *regulating services* (e.g. flood attenuation, groundwater recharge, prevention of salt water intrusion), *supporting services* (e.g. nutrient recycling, soil formation, biodiversity maintenance), and *cultural services* (e.g. recreation, spiritual fulfilment). Even without quantitative valuation, it is certain that these losses are significant in NRGB.
- **Scope for Interventions:** Among the five main types of environmentally significant human activities stated above, the first three concern profit-making activities or activities

of relatively affluent sections of society. Hence, it must be feasible to review these activities and modify them at some cost in order to minimize their adverse environmental impacts. Other activities – such as rural and agricultural activities – often concern basic needs and livelihoods of relatively poor or marginal sections of society, who may not be able to bear the cost of such interventions. But, in such cases too, suitable means must be devised to abate the negative impacts and ensure a wholesome environment in the NRGB.

2. Key Features of National River Ganga Basin

- **Hydrology:** The Ganga Basin, spread over four nations (India, Nepal, China and Bangladesh) covers an area of about 1,080,000 km², of which about 80% area lies within India (see Figure 2). The NRGB is the largest river basin of India, covering more than 26% of her geographical area. And out of the total water availability of 1,869 km³/yr in India, NRGB's share is 525 km³/yr. Thus, it is a large water-rich basin that supports about 43% of India's population.

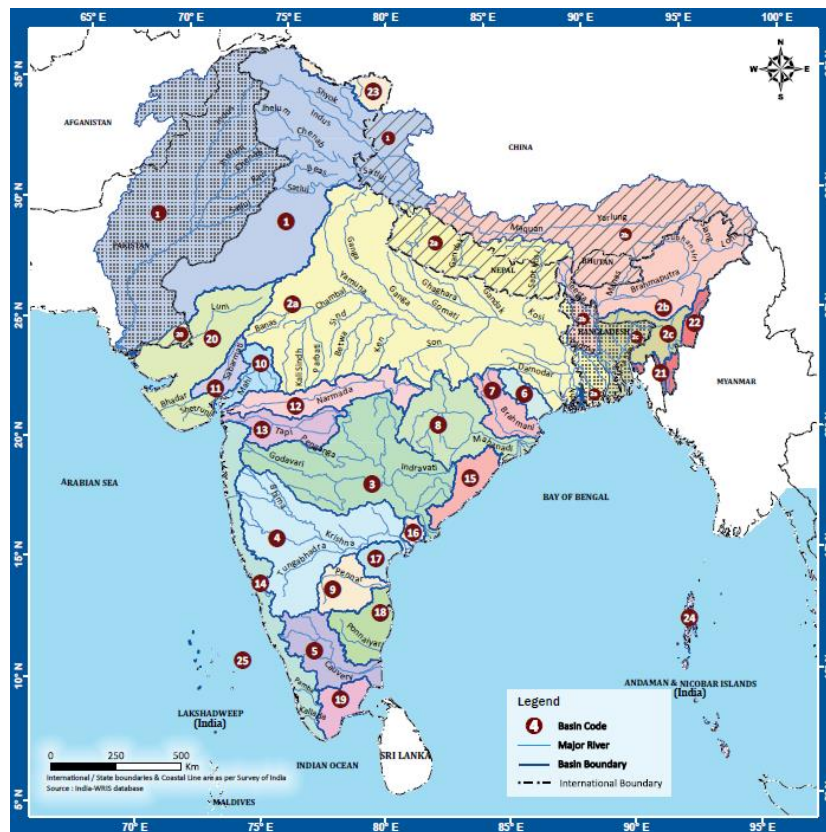


Figure 2: Main River Basins of India (*The Ganga Basin is the Yellow Region Marked as 2a*).

- **Geology:** NRGB is part of the tectonically active foreland basin of the Himalayan mountain range formed by collision of the Indian tectonic plate with the Eurasian plate more than fifty million years ago. Thus much of the NRGB consist of alluvial plains formed during the Tertiary and Quaternary periods by flood deposits of Himalayan rivers. These alluvial deposits also constitute large and highly productive multi-aquifer systems in NRGB, which are a major storehouse of ground water. The soils of the basin are also largely alluvial, with mountain soils, terai soils and black soils towards the mountain ranges in the north and west of the basin.
- **Fluvial Geomorphology:** The geological evolution of NRGB also affected the fluvial pattern. Near the Himalayan front, valley formation and incision were affected by both tectonic and climatic factors; strongly incised valley formation in the western and southern plains were controlled mainly by climatic factors; and fluvial morphologies in the lower Ganga plains and the delta region were much influenced by sea level fluctuations, besides climate and tectonics. Significantly, the Ganga River Network not only conveys voluminous water, but also act as conduits for large amounts of sediment transfer from the Himalayas to the river basin (by flooding) and to the Gangetic delta and the sea.
- **Wetlands:** There are many lakes, tanks and marshes in NRGB. Figure 3 shows some major fresh water and saline lakes of NRGB. But, besides big lakes, NRGB has a large number and variety of wetlands spread across the basin – in the mountainous Himalayan region, the Himalayan terai region, the Gangetic plains, and the coastal deltaic region – which together support a large and diverse ecological system in different geo-climatic settings. Several of NRGB's wetlands are home to specialized flora and fauna as well as migratory species, which fulfil crucial ecological and social functions.

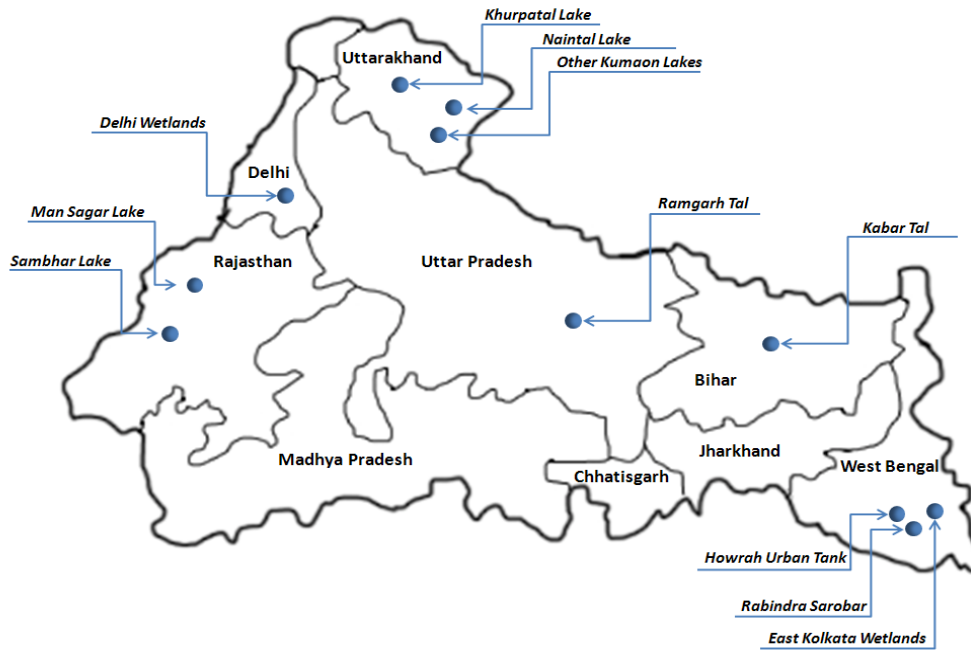


Figure 3: Major Lakes and Wetlands of NRGB [Adapted from *Rainwater harvesting*, 2013]

- Defining River Ganga:** River Ganga is defined herein as comprising of six main headstreams originating in the Himalayas, namely the Alaknanda, Dhaul Ganga, Nandakini, Pinder, Mandakini and Bhagirathi rivers starting from their feeding glaciers up to their respective confluences (together comprising the Upper Ganga segment), the subsequent main stem of the river downstream from Rishikesh to Varanasi (the Middle Ganga segment), and the final stretch from Varanasi to Ganga Sagar (the Lower Ganga segment). The headstreams are fast-flowing mountainous rivers cutting through deep gorges and narrow valleys, whereas the Middle Ganga stretch meanders through relatively flat plains, and the Lower Ganga segment tends to be braided in the delta region near the sea.
- The Ganga River Valley:** The entire river valley (including active floodplains) is a sensitive geomorphic-ecological river space which needs to be demarcated. Based on remote sensing data and other inputs, the active floodplain and valley margins of the Middle and Lower Ganga stretches from Rishikesh to Farakka were mapped. Figure 4, showing the valley map, indicates significant diversity of valley widths and geomorphic features along the river.

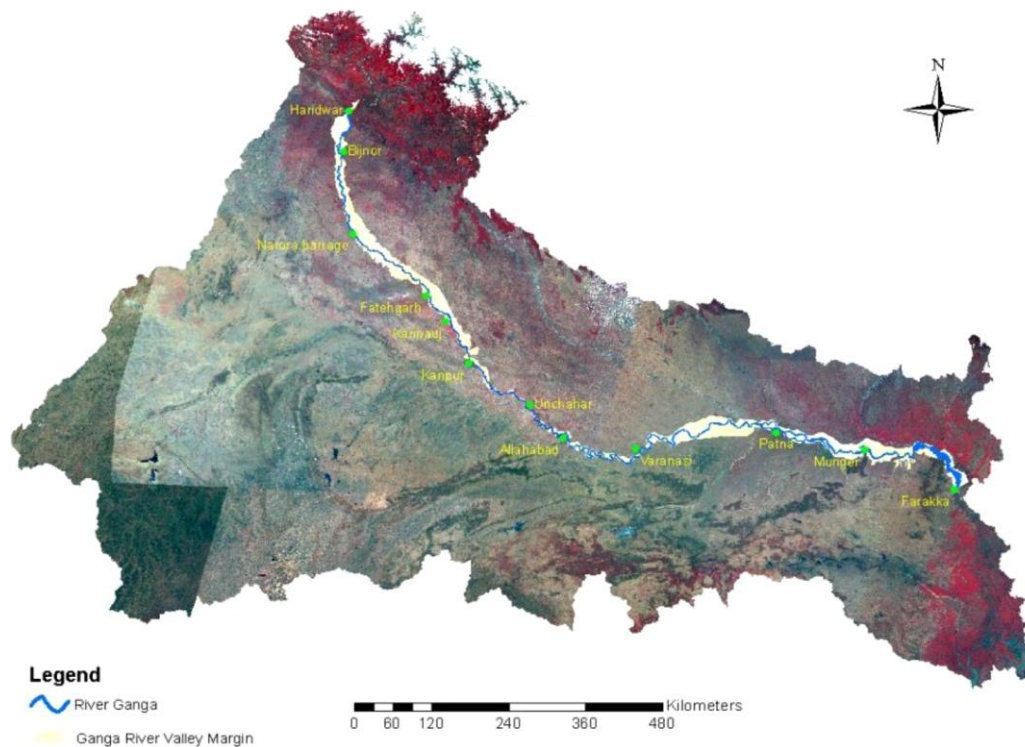


Figure 4: Geomorphic Map of Ganga River Valley

- **Biodiversity:** The biodiversity of National River Ganga is unique as it synthesizes three very different eco-regions of India situated along climatic gradients, namely the Himalayas, the Gangetic plains and the Deltaic regions. The distribution of flora and fauna in each stretch are largely dependent on the substrate, habitat and trophic status. Hence, the presence or absence of a particular family, genus or species is indicative of the conditions prevailing in the eco-region.

3. Vision, Mission, and Conceptual Framework

- **Vision of Ganga River:** In order to preserve and invigorate National River Ganga, her essential character needs to be grasped in a holistic manner. After extensive research and consultations, the “wholesomeness of National River Ganga”, viewed from a dynamic perspective, was determined to be the sanctity of the river system imbibed in the four points stated below:

1. **“Aviral Dhara”** (i.e. **“Continuous Flow”**): The flow of water, sediments and other natural constituents of River Ganga are continuous and adequate over the entire length of the river throughout the year.
 2. **“Nirmal Dhara”** (i.e. **“Unpolluted Flow”**): The flow in the Ganga River Network is bereft of manmade pollution; hence the river water quality should not be affected by human activities.
 3. **Geologic Entity**: The Ganga River System is the earth’s creations of ancient times, which may not be reparable if damaged.
 4. **Ecological Entity**: The Ganga River System is a delicately structured balance between various living species and the physical environment, achieved by nature over thousands of years and vulnerable to irreversible changes.
- **Objectives of GRBMP**: Based on the above vision and the awareness of social needs, the main objectives of GRBMP are identified as the following:
 - a) Environmental Flows shall be maintained in all rivers and tributaries of Ganga River System to fulfill their geological, ecological, socio-economic and cultural functions.
 - b) Water quality in all rivers and tributaries of Ganga River System shall be consistent with their governing geological, ecological, socio-economic and cultural functions.
 - c) Water and other aquatic resources of the Ganga River System shall be used judiciously to enable sustainable development in the entire NRGB.
 - d) All existing, ongoing and planned anthropogenic activities in NRGB shall be reviewed or scrutinized in a transparent, inclusive manner (with consensus of all affected people and stakeholders) for the overall health of NRGB.
 - **Formulation of Missions**: Given the escalating impacts of human activities on NRGB, the above objectives guided the formulation of eight important areas where restorative actions need to be carried out in Mission mode, viz.: *“Aviral Dhara”, “Nirmal Dhara”, “Ecological Restoration”, “Geological Safeguarding”, “River Hazard Management” “Basin Strengthening Against Natural Disasters”, “Sustainable Agriculture”, and “Environmental Knowledge-Building and Sensitization”*. The Vision and Missions of GRBMP are depicted in Figure 5.

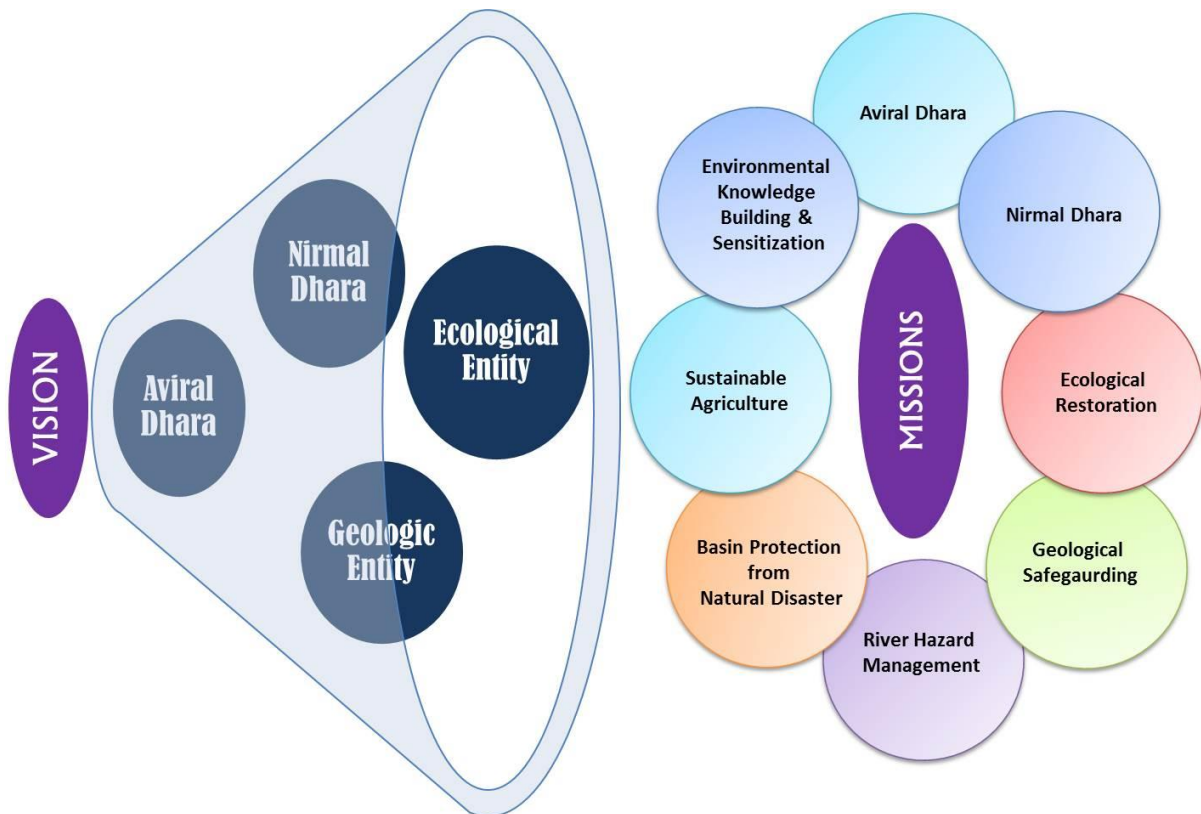


Figure 5: Target Missions to achieve the Vision of a wholesome National River Ganga

- **Conceptual Framework:** Based on the above Vision and the awareness of social needs, the main objective of GRBMP were identified as the formulation of policy frameworks (or “Action Plans”) for given anthropogenic activities in NRGB. The basic approach in this framework action plan is *“Apply modern science and technology in conjunction with traditional wisdom”*, viz. :

पारंपरिक ज्ञान के साथ आधुनिक विज्ञान और नई
 प्रौद्योगिकी को प्रयोग में लाना
 ज्ञान धारा + जन ज्ञान

- **Work Structure:** The task of analysing and preparing the GRBMP was broken up from the whole to the parts into several thematic groups as follows: Environmental Quality and Pollution (EQP), Water Resources Management (WRM), Fluvial Geomorphology (FGM), Ecology and Biodiversity (ENB), Socio-economic and Socio-Cultural (SEC), Policy, Law and Governance (PLG), Geo-Spatial Database Management (GDM), and Communication (COM), plus a cross-thematic group on Environmental Flows (or *E-flows*), vide Figure 6.

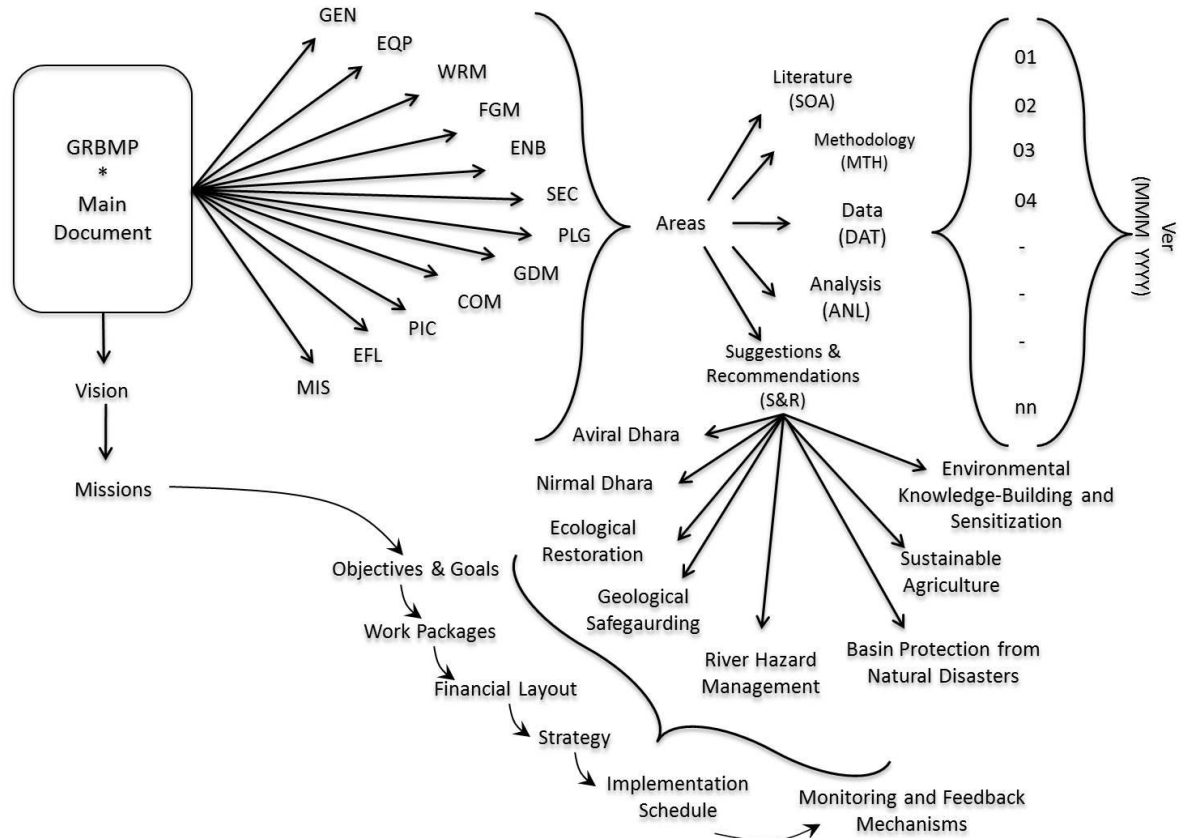


Figure 6: Flow Diagram of GRBMP Work Structure

4. Mission Summaries

Mission 1 – “Aviral Dhara”:

- 1. Ensuring Aviral Dhara:** The continuous flow of water, sediments and other natural constituents of River Ganga have been achieved through long-term balance between various dynamic parameters such as water flow rates and sediment loads (including seasonal and inter-year variations), terrain gradient, and influent/ effluent seepage rates. Anthropogenic activities have violated this integrity in several ways – especially by (a) erecting dams and barrages that snap her *longitudinal connectivity*, and (b) by significant water withdrawals, increased disposal of debris, and altered water recharge/extraction rates (directly from the river or indirectly through the basin), thereby crippling *river functioning*. Thus, while longitudinal connectivity in the river network is an essential first

step to maintain “Aviral Dhara”, having adequate river flows depends much on the basin’s overall water status.

- 2. Water Storage and Demand Control:** Available data indicate that anthropogenic water use has been increasing rapidly in the basin, and probably increasing beyond its renewal capacity. Hence, *either* (i) water availability in the basin must be increased through increased storage, (preferably by “distributed storage” in locally manageable and eco-friendly water bodies and aquifers) *and/or* (ii) water demands must be reduced through more efficient water use. These issues call for technical interventions as well as change in policies on NRGB’s aquatic resources.
- 3. Criteria for Dams and Barrages:** For dams and barrages, a precondition is essential that they cannot violate the longitudinal connectivity in River Ganga and her major tributaries. Besides they must allow E-Flows (Environmental Flows) all along the river. A potential method for ensuring river connectivity through dams/ barrages has been suggested. Furthermore, such projects have been divided into 4 categories of environmental safety (clearance) based on the irreversibility and tenure of their damage potentials.
- 4. E-Flows Requirements:** For dams, barrages, canal outlets, weirs and other structures that alter the flow regime in the River Network, the maintenance of E-flows (with commensurate sediment loads) is essential. A reliable method for estimating E-Flows for specific river stretches was developed and demonstrated for select locations (see Figure 7) in Upper Ganga where undisturbed flows before the construction of dams, etc.) are known for use in comparative analysis of flows. The method is yet to be applied in the Middle and Lower Ganga Segments where only hydrological simulations of the basin can indicate the undisturbed river flows.
- 5. Surface Flow Modeling:** Dynamic modeling of surface flows using SWAT model is in progress.
- 6. Groundwater Flow Modeling:** Dynamic modeling of groundwater flow in the basin using MODFLOW model is in progress.

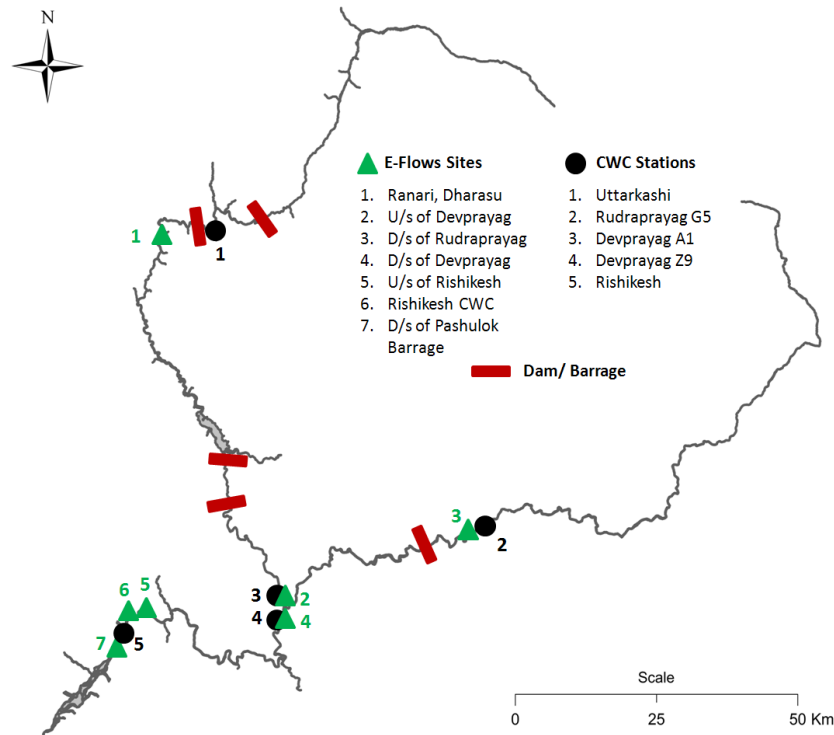


Figure 7: Location Map of Flow Monitoring Stations and E-Flows Sites

7. Recommended Actions: The main recommendations are:

- Water availability in the basin must be increased through increased storage, preferably by “distributed storage” in locally manageable and eco-friendly water bodies and aquifers.
- Water demands must be reduced through more efficient water use.
- Major policy changes needed are: (a) integration of water resource management in NRGB within the ambit of natural resource management; and (ii) granting local natural resource management rights to user groups or local governance bodies, with appropriate co-ordination and regulatory mechanisms in place for regional balance.
- Dams and barrages in the Ganga river network must ensure longitudinal connectivity along with E-Flows (including sediment flows) in respective river stretches.
- At each river site of interest, E-Flows must be realistically estimated adopting scientific holistic methods, as demonstrated under this Mission.

[Note: Some further recommendations may be added on completion of the GRBMP.]

Mission 2 – Nirmal Dhara:

- 1. Nirmal Dhara in River Ganga:** Ganga river's water quality had been acclaimed in ancient times. Its life-giving and healing qualities are evident from the following description in Rajanirghanta (~300 AD) meaning *"The qualities of Ganga water are: Coolness, sweetness, transparency, high tonic property, wholesomeness, potability, ability to remove evils, ability to resuscitate from swoon caused by dehydration, digestive property and ability to retain wisdom"*:

अस्या जलस्य गुणाः शीतत्वम्, स्वादुत्वम्, स्वच्छत्वम्, अत्यन्तरुच्यत्वम्, पथ्यत्वम्, पावनत्वम्, पापहारित्वम्, तृष्णामोहध्वंसत्वम्, दीपनत्वम्, प्रज्ञाधारित्वंच, इति राजनिर्घण्टः

The properties of Ganga river's waters of earlier times quoted above are remarkable, to say the least. But, at present, the river water quality is abysmal, posing a grave threat to life in the region.

The change in water quality may have been occurring over many centuries. Ancient scriptures had cautioned against misusing the Ganga river. For instance, the following edict in Sanskrit prohibited thirteen types of human actions, viz.: defecation; ablutions; discharge of wastewater; throwing of used floral offerings; rubbing of filth; body shampooing; frolicking; acceptance of donations; obscenity; offering of inappropriate praises or even hymns in a incorrect way; discharging of garments; bathing and, in particular, swimming across.

गंगां पुण्यजलां प्राप्य त्रयोदश विवर्जयेत् । शौचमाचमनं सेकं निर्मल्यं मलघर्षणम् ।
गात्रसंवाहनं क्रीडां प्रतिग्रहमथोरतिम् । अन्यतीर्थरतिचैवः अन्यतीर्थप्रशंसनम् ।
वस्त्रत्यागमथायातं सन्तारंच विशेषतः ॥

ब्रह्माण्डपुराण (८०० ई०)

It is possible that such strictures got diluted over time. But, the environmental significance of many of these precautions is obvious to the modern mind. And, what is equally significant, they convey a sense of deep respect for National River Ganga.

- 2. Ensuring Nirmal Dhara in Ganga:** Anthropogenic wastes have been polluting the river network in various ways. The main approach in GRBMP has been to identify the types of pollutants, their sources of generation, and the feasibility of collecting and treating them adequately for reuse (and/or safe environmental disposal), vide Figure 8. Urban

and industrial wastewaters are the major point sources of water pollution that need immediate remediation, while agricultural pollution is the major non-point sources.

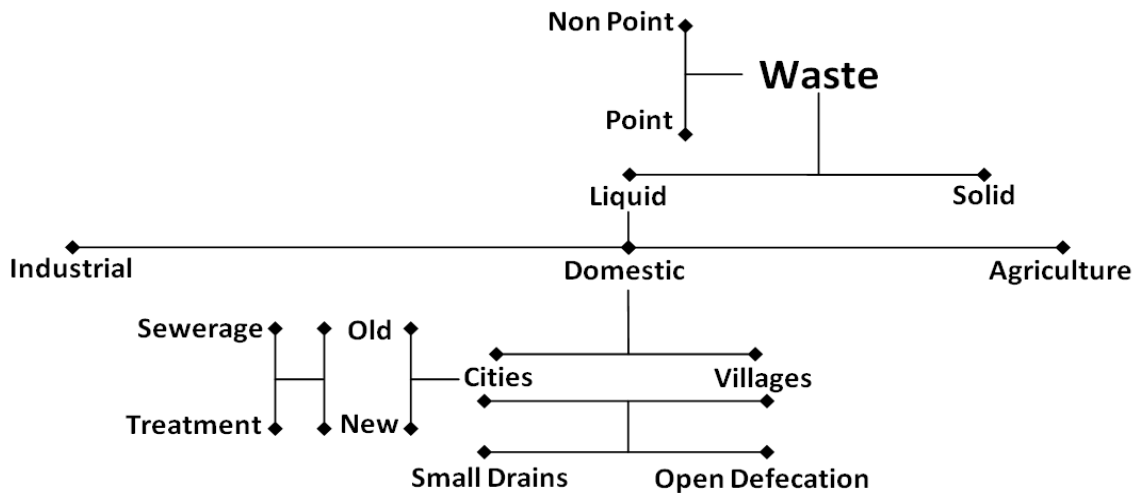


Figure 8: Anthropogenic Waste Generation in NRGB

3. Municipal Wastewater Reuse: For municipal wastewaters it was found economically feasible to treat them to the point where they can be re-used for non-contact purposes, the cost of such additional treatment being only about 1 paisa per litre (Rs.10/- per m³) at 2010 price levels. Treated water reuse is shown to reduce water withdrawals by about 70%, and hence significantly augment dry weather river flows in the Ganga River. Hence, it is recommended that all Class 1 Towns of NRGB immediately prepare Urban River Management Plans (URMPs) and embark on such treatment through competent service providers under the Design-Build-Finance-Operate model, whereby the service provider may receive remuneration for providing reusable-quality water over a sufficiently long contract period. Further, fresh water withdrawals from the basin for all urban and commercial purposes should be valued at least 50% higher than the cost of treating and recycling the wastewater, considering the minimum cost incurred by nature for full treatment of such wastewaters in the basin.

4. Sanitation Cost Estimates: Ballpark estimates of complete Sewerage Provisioning for Class I and Class II Towns of NRGB have been computed and presented. They include not only the Capex and Opex costs, but also Footprint areas, energy consumptions and expenditures, vide Tables 1 and 2. As evident from the tables, barring regional

variations, the overall cost of comprehensive urban sanitation on per capita basis is of the order of about Rs.10/day, which may be viewed as the per capita cost of hygienic civic life in urban settings.

- 5. Wastewater Treatment Plant Sizes:** The overall sanitation costs are shown to be comparable for small on-site STPs (Sewage Treatment Plants) and combined large STPs despite the economy of scale for the latter, since the sewerage system and transportation costs of the former are less. Since small STPs also facilitate easier local re-use, they are generally recommended.
- 6. Industrial Wastewater Management:** For major polluting industries (*such as tanneries, pulp and paper units, distilleries and dyeing units*) in NRGB, the cost of treatment for reuse purposes are significantly higher due to their higher pollutant levels and salinity – about 10 to 50 paisa per litre. But even these costs are much less than the damage caused to NRGB otherwise, thereby justifying the expenditure on such treatment. Hence, it is recommended that all water-polluting industries in NRGB must adopt complete water recycling.
- 7. Wastewater Salt Management:** Available technologies (e.g. reverse osmosis) do not permit 100% recycling of wastewater. Some reject effluent having high salinity would be generated, but these must not be discharged in the basin as they severely damage both land and water bodies. Instead, they can be stored during the dry season, and allowed to flow down the river network to the sea during high flows (i.e., in the monsoon season).
- 8. Agricultural Pollution:** Agricultural pollution is distributed unevenly over the basin. The exact quantum of pollution generated is difficult to assess, but available data show that they are significantly high in water bodies. The main strategy, therefore, will have to focus on their gradual reduction.
- 9. Hindu Cremation Rites:** Hindu cremation rites permit disposal of the dead or their cremated remains in rivers in extreme cases, but this has become a source of increasing river pollution. The cremation practices and facilities in NRGB have been reviewed, and it is recommended that ULBs – in partnership with business and civil society organizations – need to provide much better facilities and ambience at cremation grounds, taking account of socio-religious, institutional, infrastructural, and technological aspects of cremation.

Table 1: Estimated Footprint, Energy Consumption and Expenditure on Sewerage Infrastructure in Class I Towns of NRGB

S No	State	Number of Class I Towns	Population in Millions	Estimated STP Land Required Per Capita in m ²	Estimated Energy Demand in MW	Estimated Annual		Estimated Per Capita Per Day	
						Energy Consumption in GWH	Expenditure on Sewerage System in Millions of INR	Energy Consumption in KWH (Unit of Electricity)	Expenditure in INR
01	Uttarakhand	8	2.121	0.1	51.0	0.087	2257.3	0.03-0.05	2.2-4.4
02	Uttar Pradesh	62	29.613	0.1	755.0	1.735	36074.9	0.03-0.09	2.3-5.5
03	Himachal Pradesh	No Class I town							
04	Haryana	16	5.317	0.1	133.3	0.284	7630.2	0.03-0.08	2.5-5.8
05	Delhi	15	13.482	0.1	376.5	1.183	13541.0	0.03-0.10	1.8-6.2
06	Rajasthan	19	7.689	0.1	209.0	0.606	13388.3	0.04-0.11	3.2-8.0
07	Madhya Pradesh	27	11.934	0.1	305.9	0.719	16829.5	0.03-0.09	1.8-10.8
08	Bihar	28	6.929	0.1	168.8	0.312	8473.0	0.03-0.06	2.5-5.5
09	Chhattisgarh	9	3.138	0.1	80.0	0.184	5252.7	0.03-0.08	3.3-7.3
10	Jharkhand	15	4.801	0.1	119.4	0.246	6474.8	0.03-0.07	2.0-6.5
11	West Bengal	62	17.124	0.1	422.4	0.834	20184.6	0.03-0.07	1.3-7.2
Total/Range		261	102.148		2621.3	6.190	130106.3	0.03-0.11	1.3-10.8

Table 2: Estimated Footprint, Energy Consumption and Expenditure on Sewerage Infrastructure in Class II Towns of NRGB

S No	State	Number of Class II Towns	Population in Millions	Estimated STP Land Required Per Capita in m ²	Estimated Energy Demand in MW	Estimated Annual		Estimated Per Capita Per Day	
						Energy Consumption in GWH	Expenditure on Sewerage System in Millions of INR	Energy Consumption in KWH (Unit of Electricity)	Expenditure in INR
01	Uttarakhand	4	0.212	0.1	5.0	0.007	294.2	0.03-0.04	2.2-6.6
02	Uttar Pradesh	43	3.109	0.1	72.7	0.104	3944.7	0.03-0.05	1.8-8.6
03	Himachal Pradesh	No Class II town							
04	Haryana	3	0.164	0.1	3.8	0.005	213.6	0.03-0.03	3.3-3.9
05	Delhi	14	0.862	0.1	19.8	0.024	755.9	0.03-0.04	1.8-4.5
06	Rajasthan	4	0.287	0.1	6.9	0.011	534.3	0.04-0.04	4.2-5.9
07	Madhya Pradesh	10	0.654	0.1	15.4	0.023	960.6	0.03-0.04	2.9-5.2
08	Bihar	23	1.462	0.1	34.3	0.051	2115.5	0.03-0.04	2.6-6.6
09	Chhattisgarh	6	0.448	0.1	11.1	0.022	1173.1	0.04-0.07	4.8-10.7
10	Jharkhand	17	1.236	0.1	29.3	0.046	1986.3	0.03-0.05	2.8-7.0
11	West Bengal	15	1.000	0.1	23.6	0.036	1580.2	0.03-0.04	2.7-6.4
Total/Range		139	9.433		221.9	0.329	13558.4	0.03-0.07	1.8-10.7

10. Recommended Actions: The main recommendations are:

- i) All Class 1 Towns of NRGB should immediately prepare Urban River Management Plans (URMPs) and embark on full treatment of their wastewater for reuse/ recycling through competent service providers under the Design-Build-Finance-Operate model.
- ii) Fresh water withdrawals from the basin for all urban and commercial purposes should be valued at least 50% higher than the above cost of treating and recycling the wastewater, considering the minimum cost incurred by nature for full treatment of these wastewaters.
- iii) Complete sewerage provisioning should be implemented in all Class I and Class II towns of NRGB. The overall cost on an annualized basis would be on the order of Rs.10/head/day, which may be considered as the cost of hygienic urban life in the Ganga basin.
- iv) All water-polluting industries must adopt complete water recycling, and high-salinity effluents must be barred from discharge in the basin except in the Ganga River Network during monsoons.
- v) To overcome the problem of disposal of human dead bodies in River Ganga, Hindu cremation facilities must be improved and better operated by civic bodies in partnership with civic society and business.

Mission 3 – Ecological Restoration:

- 1. Eco-restoration of River Ganga:** The ecological balance in the Ganga river network has been critically affected in recent times, with major keystone/flagship species (including many fishes, dolphins and turtles) having dwindled or disappeared from many river stretches. Eco-restoration attempts to provide adequate space and stress-free environment to endemic flora and fauna for their survival, eliminate invasive species and conserve biodiversity, restrict over-exploitation, and rejuvenate endemic biota.
 - 2. The Ganga River Ecosystem:** The overall biological profile of River Ganga is depicted in Figure 9. It may be also noted that the ecosystem dynamics of River Ganga is remarkably complex due to her close and frequent biotic and abiotic interactions with her riparian zones, flood plains, and the saturated sub-surface zone under the river
-

bed, as well as the natural variation of flora and fauna along the climatic gradient from Upper to Lower Ganga.

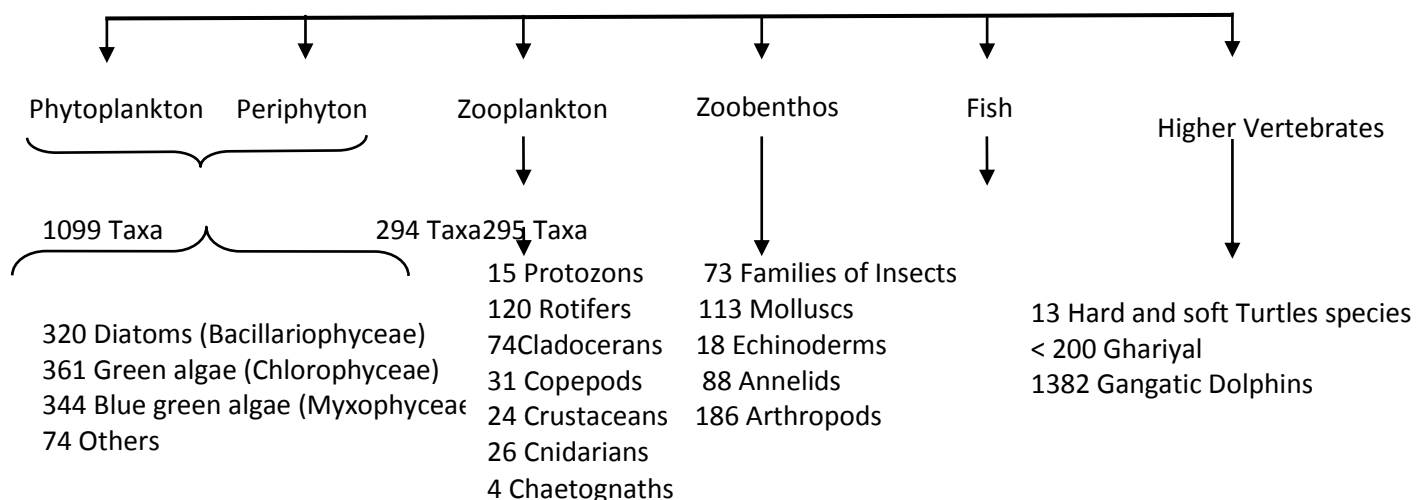


Figure 9: Biological Profile of in River Ganga at a Glance

3. Major Threats to Ganga River's Biodiversity: The most important factors adversely affecting the riverine ecology are:

- i) Habitat fragmentation due to dams and barrages breaking river continuity repeatedly from the Upper Ganga region at least up to Farakka in Lower Ganga; this especially affects migratory and/or highly mobile species.
- ii) Habitat shrinkage due to extensive water abstractions through canals and urban water intakes from Hardwar downward all the way to the Lower Ganga, drastically reducing dry season river flows.
- iii) Habitat alterations by extensive river bed mining, dumping of construction wastes, river constrictions through embankments, etc., at many places, directly affecting benthic flora and fauna and the spawning and breeding sites of aquatic animals.
- iv) Habitat degradation due to increased levels of chemical and biological pollutants, especially in the Middle and Lower Ganga stretches, due to excessive municipal, industrial and agricultural wastewater discharges.
- v) Habitat invasion by alien aquatic species, such as the Common Carp and Tilapia fishes invading the river downstream of Allahabad, which tend to drive out indigenous species, propagate new diseases and parasitic organisms, and destroy the river's ecological balance.

- vi) Habitat encroachment by humans through river bed farming, disturbing the breeding sites of higher aquatic animals and affecting subsurface biota.
- vii) Habitat disturbance, especially in the Lower Ganga, by dredging and plying of noisy ships, affecting aquatic animals (such as the Gangetic dolphin).

4. Recommended Actions: The main recommendations are:

- i) Restoration of river continuity and maintenance of environmental flows throughout the river network as envisaged under Mission Aviral Dhara.
- ii) Restoration of unpolluted flow in the river and control of anthropogenic river degradation as envisaged under Mission Nirmal Dhara.
- iii) Control of anthropogenic habitat alterations as identified above.
- iv) Elimination of alien invasive species from the Ganga river network.
- v) Control of habitat encroachment by humans as identified above.
- vi) Control of anthropogenic habitat disturbance as identified above.
- vii) Control of overfishing and fishing during spawning seasons, ban on commercial fishing, and protection of spawning and breeding grounds.
- viii) Continuous bio-monitoring of the entire Ganga river and its important tributaries, and dissemination of information in public domain.
- ix) Synergising the proposed eco-restoration measures with the Dolphin Conservation Action Plan initiated by MOEF in 2010.
- x) Detailed research on the dynamics of the Ganga River Ecosystem.

Mission 4 – Geological Safeguarding:

- 1. Geological Vulnerabilities of Ganga Basin:** Modern anthropogenic ventures that threaten the earth's crustal formations supporting the Ganga river basin include underground activities such as excavations, explosions, tunneling, mining and fracking (i.e. hydraulic fracturing of rocks), over-withdrawal of ground-water from confined and semi-confined aquifers, and creation of large reservoirs and their operation. These activities can cause partial collapse of the aquifer matrix, land subsidence, and enhanced seismicity in a region.
- 2. Geomorphological Vulnerabilities of Ganga Basin:** Various modern land-use practices that affect the geomorphological performance of the basin need to be controlled.

They include land-uses that significantly affect the physical stability of catchments such as denudation/ deforestation, construction activities on fragile slopes and in floodplains, agricultural tillage causing large-scale soil erosion, sand mining from river beds, and river bank modifications for local flood control and other purposes.

3. Recommended Actions:

- i) Adopting safety measures against the geological vulnerabilities identified above to maintain the integrity of the basin.
- ii) Region-specific land-use restrictions identified above to protect the geomorphological features of rivers, wetlands, floodplains and drainage routes;
- iii) Continuous geological monitoring of the basin to forecast impending geological and geomorphological events.

Mission 5 – River Hazard Management:

- 1. Ganga River Hazards:** The Ganga river network poses some innate hazards to human settlements near rivers. The two main hazards in the Middle and Lower Ganga Plains are river course shifting and floods, which are very pronounced in the Lower Ganga plains of Bihar and West Bengal. It is important to realize that river dynamics is a natural behavior of the river and it is crucial to accurately map the extent of migration and reaches prone to migration, defined as the 'space' for the river, and the concept of floodplain zoning must be seriously pursued to save a large population from the misery of river dynamics and floods and for improving river health.

2. Recommended Actions:

- i) Adopting Integrated Flood Management approach built upon a strong but flexible legal framework and supporting institutional arrangements.
- ii) Research on: (a) spatial and temporal sediment dynamics in the river basins and (b) the relationship of sediment dynamics with several fluvial hazards resulting from river dynamics and floods.

Mission 6 – Basin Protection from Natural Disasters:

- 1. Significance of Natural Disasters:** Natural disasters can have significant adverse impacts on the health of a river basin and its ecosystems (including the river), with consequent long-term impacts on humans in terms of the basin's ecosystem services. Thus protecting the river basin and building its resistance to natural disasters is extremely important. But many common disasters play a vital role in periodically rejuvenating ecosystems, except when the events are so extreme as to inflict long-term damage or debilitate large parts of ecosystems. Hence the impact of disasters must be viewed from an ecosystem perspective.

- 2. Important Disasters:** Out of about 31 important disasters covered by the National Disaster Management Authority, 4 natural disasters may be considered as frequent and significant threats to the well-being and performance of NRGB viz.: *Extreme Floods, Extreme Droughts, Large-scale Forest Fires, and Landslides*. *Cyclones* are also of significance in the coastal regions of Lower Ganga, especially in the Sundarban forests. Besides these, *biological invasions and epidemics* among natural flora and fauna may also be a significant threat, though major biological invasions in NRGB's ecosystems have rarely been reported.

- 3. Geographic Extent:** Hydrological and meteorological disasters like floods, droughts and forest fires affect ecosystems irreparably only when they are extreme. But landslides/ landslips being geological disturbances, they harm rather than help ecosystems. Moreover, when occurring near rivers, they can overload the river with boulders and silt, and even result in damming rivers in extreme cases. Since natural ecosystems are limited in NRGB, the above impacts are also of concern in such ecologically prime areas, especially in the Himalayan Upper Ganga region and in the hilly tracts of the Vindhyas, Aravalli and Chhota Nagpur plateau.

- 4. Recommended Actions:**
 - i) Protection and increase in natural forest cover and wetlands.
 - ii) Propagation of mixed indigenous species to enhance the adaptability and resilience of ecosystems against extreme hydrological and meteorological events, as also against potential biological threats.

- iii) Monitoring of the functioning of ecosystems with regard to damages caused by natural disasters and their recovery process.
- iv) Control on anthropogenic activities that promote landslides and geological instabilities as envisaged under Mission Geological Safeguarding.

[Note: Some further recommendations may be added on completion of this GRBMP.]

Mission 7 – Sustainable Agriculture:

- 1. Why Sustainable Agriculture:** Water and soil are the two main physical resources of a basin that support agriculture. Sustainable agriculture integrates environmental viability, economic profitability and social equity; but, among these, environmental sustainability is most crucial since the latter two goals are contingent upon it. Now, while India's per capita (renewable) water availability is only about 22% of the world average, its per capita land availability is just 13% of the world average. In NRGB, the corresponding figures are more telling – only 15% for water and 8-9% for land. Thus, not only is water a meagre resource, but land – and, by implication, soil – is an even more critical resource. This twin constraint underlies the urgent need for agricultural sustainability in NRGB.
- 2. Soil Productivity:** Agricultural productivity depends primarily on soil composition (which helps in water and air retention) and fertility (in terms of nutrients). While a large number of macro- and micro-elements are known to be essential for crops, there are many other micro-nutrients that are essential for animals (including humans), who get them from plants. Thus, a host of micro-nutrients are essential for soil fertility and human health. And soil microbes (bacteria, actinomycetes, protozoa, fungi, algae and nematodes) play a central role in nutrient recycling to make them available for plant uptake.
- 3. Agricultural Growth and Consequences in NRGB:** Despite natural resource constraints, NRGB has witnessed significant agricultural growth in the past 4-5 decades since Green Revolution – through intensive cultivation, high-yield crops, tube-well irrigation and high fertilizer and pesticide applications – to meet increasing need for national food production and income growth of farmers. An inevitable result was rapid soil and water degradations in many parts of the basin. Notably, while water

depletion is rapid, soil degradation is a relatively slow process. But, water being a renewable resource, the damage can be redeemed soon after the degradation process is checked; whereas, soil formation, nutrient generation and microbial regeneration being slow processes, the impacts are of much longer import. Thus, the observed impacts of present agricultural practices on NRGB's soil (topsoil erosion, nutrient loss, salinity, acidity, alkalinity, microbial depletion/ imbalance, etc.) and on water bodies (water depletion, pollution, salinity, etc.) are in actuality a long-term problem.

4. Recommended Actions: The main actions recommended are:

- i) Promotion of conservation agricultural practices such as organic farming, zero tillage technology, micro-irrigation, and laser land-leveling.
- ii) Policy interventions like water credit system for farmers, rationalization of agricultural subsidies, and market access.
- iii) Providing advanced knowledge, training and capacity building infrastructure for soil health indexing, improved cropping practices, balanced fertilizer use, integrated pest management, and farm irrigation systems.
- iv) Reorient agriculture R&D, extension and training system for development and transfer of technology suited to sustainable agriculture.

[Note: Some further recommendations may be added on completion of this GRBMP.]

Mission 8 – Environmental Knowledge-Building and Sensitization:

- 1. Rationale:** Basin planning and management combine diverse fields such as water resources, land resources, biological resources, river dynamics, geological phenomena and atmospheric processes as well as traditional wisdom and grassroots knowledge. Hence, it is necessary to build a comprehensive Knowledge Bank to enable meaningful analyses and obtain quantitative indicators of NRGB's status. Moreover, NRGB's welfare needs the co-operation and help of both formal and informal sectors of society, the Knowledge Bank should also be accessible to citizens to inform and sensitize them about NRGB's environment and to enable people's participation in the overall upkeep of NRGB. The data bank, therefore, needs to be complemented with community-specific educational material and programmes on NRGB's environment.

2. Recommended Actions: The main actions recommended are:

- i) Establishment of a comprehensive Data Bank by continuous collection, processing and storage of information on natural resources, anthropogenic activities, and environmental monitoring data of the basin.
- ii) Preparation of secondary results (charts, tables, etc.) based on primary data.
- iii) Preparation of documents and materials based on the above data for easy understanding by non-specialized people.
- iv) Keeping all the above information in open domain for easy access by all interested individuals and institutions.
- v) Conducting workshops and educational campaigns with various stakeholders and interested citizens to enable their comprehensive understanding of basin processes and take meaningful action.

Envisaged Consequences of Missions:

The most direct and immediate result of the above measures would be on the health of the Ganga River System (in terms of *Quantity, Quality & Biodiversity of the river's waters*). On issues of national and socio-economic importance, the changes (*positives and negatives*) are likely to reflect immediately on various sectors, especially *Water & Sanitation, Health & Disease, Flood Impacts, Agriculture & Food Security, Energy Generation, and Ecosystem Services* (such as *aquatic foods and fish catches, cultural, religious & recreational activities*), vide Fig. 4. While implementation of the proposed measures will incur costs, it is believed that they will have significant net positive gains for the region.

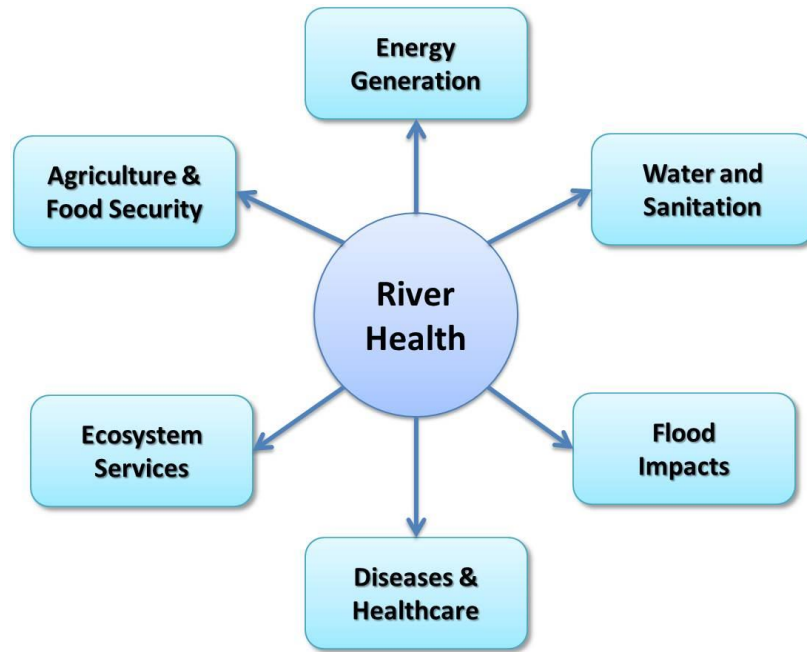


Figure 10: Major Sectors Likely to be Influenced by Improved River Health

5. Composite Recommendations for Implementation

- Specific Actions:** On assessing the significant impacts on NRGB under different Missions, specific anthropogenic activities that should be immediately *Prohibited*, *Restricted* or *Promoted* have been identified and listed. Their implementation and future development would require the coordinated efforts and co-operation of government and non-government institutions, key stakeholders and civil society. It is envisaged that only a dedicated, knowledge-based, empowered and stakeholder-involving agency would be able to pool in the collective knowledge and resources for environmental rejuvenation of NRGB.
- Implementation Mechanism:** The implementation, monitoring, review and evaluation of environmental problems and interventions on a long-term basis are therefore recommended through an independent Commission. Moreover, since rivers are *prima facie* inter-state subjects as per the Constitution, the said Commission would need adequate resources and authority (*under relevant provisions of the Constitution*) to co-ordinate and oversee the activities of multiple sectoral organizations and informal sectors of society insofar as they affect River Ganga. GRBMP, therefore, includes the functional requirements of a Commission that needs to be established by an Act of

Parliament, to enable an enduring mechanism for sustainable growth in the National River Ganga Basin.

6. GRBMP Documentation

GRBMP documentation is planned as 3-tier documents as depicted in Figure 11. The three tiers would comprise of: (i) Thematic Reports providing the necessary inputs for different Missions, (ii) Mission Reports documenting the requirements and actions for specific missions, and (iii) the main GRBMP Report synthesizing background information with the main conclusions and recommendations emanating from the Thematic and Mission Reports. It is hoped that this modular structure will make the Plan easier to comprehend and implement in a systematic manner.

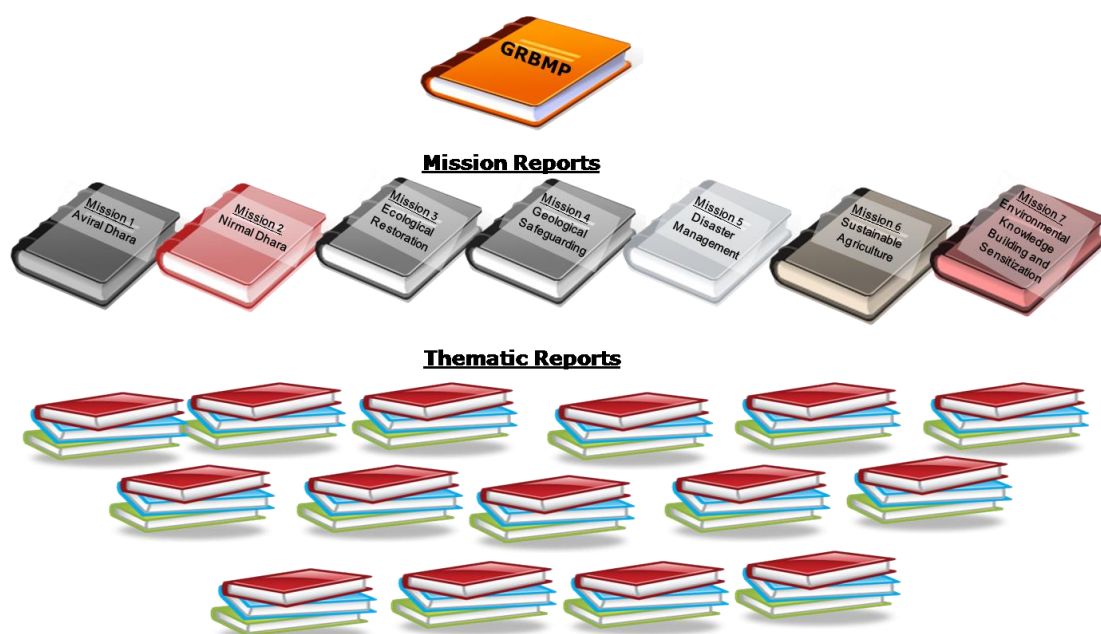


Figure 11: Final GRBMP Documentation (proposed)

Appendices

1. Appendix I: Environmental Valuation: Examples from Australia.
2. Appendix II: Summaries of IIT_GRBMP Thematic Reports.
3. Appendix III: The National River Ganga Basin Management Bill, 2013.
4. Genesis and Growth of GRBMP: A Chronological History.

Note: The aforementioned appendices are part of the Full GRBMP Document and are not appended to this Extended Summary of the GRBMP.

Appendix III

The National River Ganga Basin Management Bill, 2013

(An ACT to provide for Regulation, Conservation and Development of the National River Ganga Basin, and for the establishment of National River Ganga Basin Management Commission and National River Ganga Basin Tribunal for effective and expeditious disposal of matters affecting the River Basin with a view to restore and conserve the river basin and for matters connected therewith or incidental thereto)

WHEREAS, the river Ganga is declared as the National River of India on November 5, 2008 by the Government of India considering its unique position in Indian society and world's natural heritage.

AND WHEREAS, it shall be desirable to adopt an integrated river basin management approach that focuses on maintenance and restoration of wholesomeness of rivers of the Ganga Basin in public interest.

AND WHEREAS 'Wholesomeness' in this context shall mean sanctity of the river system as imbibed in the following points:

- a. Continuous Flow ("Aviral Dhara") in time and space including maintenance of connectivity of flow in the river systems.
- b. Un-polluted Flow ("Nirmal Dhara") meaning that quality of river waters is not significantly affected by human activities.
- c. Rivers as Geologic Entities that is, rivers as the earth's creations of ancient times (over geological ages), which may not be recoverable if damaged.
- d. Rivers as Ecological Entities that is, rivers as delicately structured ecological balance between various living species and the physical environment achieved over thousands of years and vulnerable to irreversible change.

AND WHEREAS 'Public Interest' in this context shall mean welfare or wellbeing of all beings including the future generations.

AND WHEREAS, to attain the wholesomeness, it is mandated to adopt preventive and corrective approach, the Act shall prohibit, restrict and promote activities that directly or indirectly affect the wholesomeness of all rivers in the National River Ganga Basin.

AND WHEREAS, the Act shall establish appropriate authorities to achieve the objectives of the Act and matters related thereto.

AND WHEREAS the Act shall be enacted to realize fundamental right guaranteed under Article 21 and to give effect to provisions of the Directive Principles of State Policy under Articles 39(b), 48 A, 49 and the Fundamental Duties enshrine under Article 51A (f) and(g) of the Constitution of India.

AND WHEREAS, the Act shall be enacted by Parliament by invoking legislative power under Article 246 read with Entry 56 of the Union List of the Constitution of India.

Chapter I

Preliminary

1. Short Title, Extent and Commencement

- 1) The Act may be called The National River Ganga Basin Management Act, 2012.
- 2) It shall extend to the whole National River Ganga Basin.
- 3) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint and different dates may be appointed for different States.

2. Definitions

In this Act, unless the context otherwise requires –

- 1) “Active Flood Plain” is the area on the two sides of a river that gets inundated by a flood having a mean recurrence interval of 2.33 years;
- 2) Afforestation means plantation of trees to restore or re-establish the forest cover;
- 3) Authority means any authority, board, corporation, council, department, institute, university or any other body corporate, established by or under any Central, State or Provincial Act in force in the territory of India and includes,
 - a. The Central Government,
 - b. The State Governments,
 - c. A Department of the Government,
 - d. Local authorities;
- 4) “AviralDhara” (in a river or stream) means continuity of flow in both time and space, including connectivity of flow throughout the river;
- 5) Basin includes land, water, vegetation and other natural resources on a catchment basis;
- 6) “Basin” means the entire catchment (of a water body or water course) including the soil, water, vegetation and other natural resources in the area;
- 7) “Catchment” (or “Catchment Area”, or “Watershed”, or “Drainage Basin”) is the entire land area whose runoff from rain, snow or ice drains into a water body or a water course (before the water course joins another river or discharges into a water body);
- 8) Class I town means a town whose population is greater than 100,000;
- 9) Class II town means a town whose population is greater than 50,000 and less than 100,000;

- 10) "Commercial fishing" means large-scale fishing for commercial purposes by nets, cyanide poisoning, or other modern fishing gear or methods.
- 11) Commission means National River Ganga Basin Management Commission;
- 12) "Connectivity" (of a river) means continuity of flow in the three directions, viz. longitudinal connectivity (along the length of the river), lateral connectivity (across the width of river), and vertical connectivity (below the water surface in vertical direction).
- 13) "Deforestation" means removal or reduction of forest cover, especially when caused by anthropogenic activities;
- 14) "Degraded Forest" means a forest having loss or reduction of native forest cover and/ or vegetation density;
- 15) "Direct Injection" (of water) means injection or introduction (of water) directly into subsurface waters through natural or artificial crevices, faults, channels or conduits without the natural passage through porous soil strata;
- 16) "Ecological Park" is a protected area for conservation of native and endangered species;
- 17) "Ecology" is the totality of relations between organisms and their environment. It includes the composition, distribution, amount, number and changing states of organisms within and among ecosystems;
- 18) "Ecosystem" is a community of organisms and their physical environment, considered to function together as a unit, and characterized by a flow of energy that leads to trophic (or nutritional) structure and material cycling;
- 19) "E-Flows" means Environmental Flows;
- 20) "Embankment" is a raised wall of earth, stone or other material to hold back water within a water body or water course; it includes levees constructed on either side of a river as a flood protection measure;
- 21) "Engineered Diversion" means a structure or device constructed or installed to transfer the river water into a canal or other engineering structure;
- 22) "Environmental Flows" are the regime of flows including sediments and other natural constituents required to maintain the ecological integrity of a river and the goods and services provided by it, computed by Building (Bigger) Block Method;
- 23) "Flood" means the overflowing of water from a water course or water body that inundates normally dry land;
- 24) "Flood Plain" is the land area susceptible to inundation by flood waters;
- 25) "Flood Routing Channel" is a channel designed to carry the excess water of a water course during high flows;

- 26) "Geologic Entity" is an entity formed by ancient earth processes over geologic ages;
- 27) "Ghat" is a sloping or cliffed part of a riverbank, often with artificially constructed steps, used for providing easy human access to river water;
- 28) "Ground Water Recharge" is replenishment (in part or wholly) of water depleted from ground water reservoirs;
- 29) Hazardous Solid Waste (HSW) includes as provided in the Act;
- 30) "Hydrological Cycle" is the natural cycle of change through which water moves on earth;
- 31) Industrial Effluents includes as it is mentioned in the Act;
- 32) Kharif Canals means Irrigation canals used for crops grown in rainy season;
- 33) Landfills means a place used for disposal of solid waste on land;
- 34) Large Scale Industries provided in the Act;
- 35) Medium Scale Industries provided in the Act;
- 36) Municipal Solid Waste provided in the Act;
- 37) "National River Ganga" is the entire length of six head-streams in the state of Uttarakhand namely, Rivers Alaknanda, Dhauli Ganga, Nandakini, Pinder, Mandakani and Bhagirathi starting from their originating glaciers up to their respective confluences at Vishnu Prayag, Nand Prayag, Karn Prayag, Rudra Prayag and Dev Prayag as also the main stem of the river thereafter up to Ganga Sagar including Prayag Raj;
- 38) "NirmalDhara" or "Un-polluted Flow" means flow in a river or stream that is not significantly polluted by anthropogenic activities;
- 39) "Paleo-Channel" is the remnant of an extinct river or stream that got filled with sediments deposited in later periods;
- 40) "person" includes—
 - a. an individual;
 - b. a Hindu undivided family;
 - c. a company;
 - d. a firm;
 - e. an enterprise;
 - f. an association of persons or a body of individuals, whether incorporated or not, in India or outside India;
 - g. any corporation established by or under any Central, State or Provincial Act or a Government company as defined in section 617 of the Companies Act, 1956 (1 of 1956);
 - h. any body corporate incorporated by or under the laws of a country outside India;

- i. a co-operative society registered under any law relating to cooperative societies;
 - j. a local authority;
 - k. every artificial juridical person, not falling within any of the preceding sub-clauses;
- 41) Ritual Bathing means taking dip in the water for religious or spiritual purposes;
 - 42) River Bed Farming includes seasonal agriculture/farming on the river bed during low flows when the bed is exposed;
 - 43) Rivers in National River Ganga Basin include, but is not restricted to, all major and minor tributaries of the National River Ganga within the basin;
 - 44) River Bank means the land at the side of a river which retains the river in its natural channel, when there is the greatest flow of water;
 - 45) River Bed means dried portion of the river, the place where the river run its course; when it fills with water.
 - 46) River Port means a place on a waterway with facilities for loading and unloading ships;
 - 47) River System means network of rivers rather than a single river;
 - 48) Rivulets includes very small tributaries of a major river;
 - 49) Sand Mining means large scale removal of river sand from the dried channel belt or a part of it;
 - 50) Sewage means as provided in the Act;
 - 51) Small Scale Industries as provided in the Act;
 - 52) Solid Waste as provided in the Act;
 - 53) Sludge as provided in the Act;
 - 54) Tribunal means the National River Ganga Basin Management Tribunal;
 - 55) "Water Body" (or "Surface Water Body") is a depression on land or a lowland area that usually holds water or remains saturated through most of the year, such as a lake, tank, pond, marsh or swamp;
 - 56) "Water Course" (or "Surface Water Course") is an overland channel (natural or manmade) through which water flows, such as a river, stream, rivulet (or "nala") or canal;
 - 57) Water Recharge Structures includes arrangements made for enhancement of sub surface flow and storages of water;

Chapter II

Duty to Ensure Respect and Dignity of National River Ganga

3. Respect and Dignity

Every person shall ensure utmost respect and dignity for the National River Ganga and desist from activities prejudicial to her interests.

4. Duty of State and Citizen

It shall be the duty of the State and every other person to ensure the protection, preservation, conservation and maintenance of wholesomeness of National River Ganga.

Chapter III

Usage of Water in National River Ganga Basin

5. Usage of water shall be determined in accordance with the following

- 1) The usage of water shall be posterior to nature and ecology.
- 2) The usage shall have sequential priority from 'water for life' to 'livelihoods' to 'developmental activities'.
- 3) There shall be institutional arrangements for usage of water based on principles of equity, resource-conservation, protection of water resources, and harmonization of water use.

Chapter IV

Prohibition and Restriction of Activities

6. Prohibition of Activities relating to the National River Ganga Basin

Notwithstanding anything contained in any law whatsoever, no person or authority shall indulge in any activity relating to any of the following:

- 1) engineered diversion and/or storage of water in any river unless E-Flows are maintained in the immediate downstream of the diversion/storage; or

- 2) discontinuity in the flow due to engineered diversion/storage in any river; or
- 3) discharge of sewage (either treated or untreated) from Class I towns, either directly or indirectly, into any river; or
- 4) discharge of industrial effluents (either treated or untreated) from any large, medium or cluster of small industries, either directly or indirectly, into any river; or
- 5) direct injection of sewage and industrial effluents (either treated or untreated) into the subsurface; or
- 6) disposal of un-burnt and partially burnt corpses and animal carcasses in any river or riverbank; or
- 7) open defecation and dumping of municipal/industrial solid wastes or sludge in any river or its active flood plain; or
- 8) setting up of or continuation in dwellings or other encroachments in the river banks or its active river flood plains; or
- 9) construction of new permanent structures for residential, commercial and industrial purposes in the active flood plain of any river;
Provided that construction of bridges and associated roads, jetties/ghats/ports and hydraulic structures for storage/ diversion/ control/ channelization of river waters shall not be thereby prohibited.
- 10) any other like activities as may be prescribed by the commission.

7. Restriction of Activities relating to the National River Ganga Basin

No person shall indulge in any of the following activities except in accordance with the rules and regulations as may be laid down in this regard from time to time.

- 1) discharge of sewage (either treated or untreated) from Class II town and smaller towns and villages, either directly or indirectly, into any river; or
- 2) disposal of sludge derived through treatment of sewage and industrial effluents except in secure landfills/hazardous waste sites; or
- 3) discharge of industrial effluents (either treated or untreated) from small scale industry into any river; or
- 4) disposal and/or discharge of mining and construction debris in any river's flood plain, river bank or the river itself; or
- 5) construction of bridges and associated roads, jetties, ghats, ports and permanent hydraulic structures for storage/diversion/control/ channelization of waters in any rivers; or

- 6) withdrawal of ground water by electric/diesel operated shallow and deep tube wells; or
- 7) sand mining, stone crushing, sediment removal and mining of other minerals from the river bed of any river; or
- 8) dredging or any other excavation activity on river bed for any purposes threatening the balance of the natural environment; or
- 9) river bed farming and agricultural activities in the active flood plain of any river; or
- 10) commercial fishing or aqua culture in any river; or
- 11) ritual immersion of idols, and floral and other offerings in any river; or
- 12) wallowing of animals, washing of clothes, vehicles, etc., in any river; or
- 13) deforestation of hill slopes and notified forest and other sensitive areas; or
- 14) hazardous or harmful emissions into the atmosphere that can affect terrestrial waters directly or indirectly in any river; or
- 15) use of chemical fertilizers and pesticides in agriculture, horticulture, aquaculture, animal husbandry, forestry, etc. in any river; or
- 16) any activity that may lead to geologically disruptive phenomena such as heightened seismic activity, ground subsidence, and leaching or erosion of contaminants into water bodies; or
- 17) cattle grazing on erodible hill slopes and in over-grazed areas; or
- 18) any other like activities as may be prescribed by the commission.

Chapter V

Conservation, Development of National River Ganga Basin

8. Conservation and Development

- 1) The appropriate authority shall take all measures necessary for the conservation and development of the National River Ganga Basin.
- 2) Such conservation shall include measures relating to the following:
 - a. ensuring that E-Flows are maintained in all rivers at different locations and in different seasons;
 - b. protecting both geology and ecology in the river basin;
 - c. using of floodplains in environmentally safe manner, and after ensuring Environmental Impact Assessment for approval of flood plains projects;
 - d. ensuring both short-term and long-term measures for conservation and improvement of natural resources in National River Ganga Basin;

Explanation - The term “appropriate authority” in this section and the subsequent one shall be taken to include the Central Government or State Government or such Local authorities responsible for implementation as the context indicates;

- e. monitoring, review and dissemination of the National River Ganga Basin’s environmental status in the public domain.

9. Promotion of Activities relating to the National River Ganga Basin

The appropriate authority shall adopt special measures to promote the following activities in the National River Ganga Basin:

- 1) reuse and recycle of treated domestic and industrial sewage and use of products derived from sewage sludge, with mechanism for commercial use/reuse where feasible;
- 2) measures including construction of sewer lines, provision of sanitation services, construction of wastewater treatment plants for municipal and industrial effluents, construction of secure solid waste landfills, hazardous waste landfills and other related facilities in the River Basin;
- 3) facilities for environmentally safe cremation/burial of corpses and measures for disposal of animal carcasses;
- 4) ground water recharge with unpolluted water (including use of kharif canals, paleo-channels, nalas, check dams, unlined ponds and lagoons, etc.) to increase ground water levels and enhance river base flows;
- 5) higher efficiencies in irrigation water use (through appropriate irrigation techniques, rationalization of cropping patterns, recycling of return flows, etc.) for agriculture, horticulture, fodder cultivation, etc;
- 6) higher efficiencies in institutional, commercial, industrial, domestic, municipal and community water uses through minimization of losses, wastage control and provision of adequate water treatment facilities;
- 7) afforestation and/or grassland development in degraded forest lands, wastelands and denuded hill slopes (for control of surface runoff and erosion, and for enhancing groundwater recharge);
- 8) activities related to flood control, including development of flood routing channels, embankments and other methods for controlling sediment flows and distribution;
- 9) protection of breeding areas and natural habitats of indigenous and migratory species of fishes, birds, reptiles, amphibians and mammals, and the prevention of the spread of exotic species;

- 10) eco-friendly tourism, pilgrimage, recreational and sporting activities in all rivers and riverbanks;
- 11) use of the riverbank and active flood plains of rivers for development of water-recharge structures and ecological parks;
- 12) use of bio-fertilizers and bio-pesticides (in place of chemical fertilizers and pesticides) in agriculture, horticulture, aquaculture, forestry, etc., to protect groundwater from agricultural pollutants;
- 13) any other like activities as may be prescribed by the commission.

Chapter VI

Duties of Central and State Governments

10. Duties of Central and State Governments

- 1) It shall be the duty of the Central Government to constitute the National River Ganga Basin Management Commission to carry out the provisions of the Act.
- 2) The Central and State Governments shall render all assistance and cooperation necessary for the effective implementation of the provisions of the Act.
- 3) The Central Government shall, in consultation with and concurrence of the Commission, make rules and regulations necessary for the effective implementation of the provisions of the Act.
- 4) In accordance with the directions of the Commission, the Central and the State governments, as the case may be, shall take necessary measures towards prohibition and restriction of activities in any river of the National River Ganga Basin as well as conservation and development of the basin.

Chapter VII

National River Ganga Basin Management Commission

Constitution, Power and Functions

11. Establishment of Commission

- 1) With effect from such date as the Central Government may by notification decide, there shall be established for the purposes of this Act, a Commission to be called the “National River Ganga Basin Management Commission” hereinafter referred to as the Commission.
- 2) The Commission shall be a body corporate by the name aforesaid having perpetual succession and a common seal with power, subject to the provisions of

this Act, to acquire, hold and dispose of property, both movable and immovable and to contract and shall, by the same name, sue or be sued.

- 3) The Head Office of the Commission shall be at such place as the Central Government may decide from time to time.
- 4) The Commission may establish offices at other places in India.

12. Composition of Commission

- 1) The Commission shall consist of the following Members, namely:
 - a. A Chairperson,
 - b. A Retired or Sitting Judge of the High Court,
 - c. Five Independent Members of Civil Society/Academia/Experts having expertise in requisite areas of river basin management.
- 2) The Chairperson shall be the Chief executive of the Commission and shall exercise such powers and perform such duties, as may be prescribed and he shall be responsible for the business of the Commission.
- 3) The Chairperson and other members of the Commission shall be persons of ability, integrity and standing and who have special knowledge of and such professional experience of not less than 15 years in scientific, technical, socio-economic, legal or other pertinent areas of river basin management.

13. Selection of Chairperson and other members of the Commission

- 1) The Chairperson and Independent Members shall be appointed by the Central Government from a panel of names recommended by a selection committee consisting of
 - a. The Prime Minister of India : Chairperson
 - b. Leader of Opposition : Member
 - c. Cabinet Secretary, Central Government : Member Secretary
- 2) The Retired or Sitting Judge of the High Court shall be selected by the Chief Justice of India.
- 3) The term of the Selection Committee and the manner of selection of panel of names shall be such as may be prescribed by the Central Government by way of notification.
- 4) The Chairperson and every other member shall, before entering upon his office, make and subscribe to an oath of office for secrecy and maintain integrity in such form and manner as may be prescribed.

14. Term of Office of Chairpersons and Other Members

The term of office of the members shall be as follows:

- 1) The Chairperson and every other member shall hold office as such for a term of five years from the date on which he enters upon his office but shall not be eligible for reappointment.
Provided that the Chairperson and other members shall not hold office as such after he has attained the age of 70 years.
- 2) A vacancy caused by the resignation or the removal of the Chairperson or any other member or by death or otherwise shall be filled by fresh appointment in accordance with the previous provisions.
- 3) The Chairperson and every other member shall, before entering upon his Office, make and subscribe to an oath of office and of secrecy in such form, manner and before such Commission as may be prescribed. In the event of the occurrence of a vacancy in the Office of the Chairperson by reason of his death, resignation or otherwise, the senior-most member shall act as the Chairperson till the new Chairperson enters upon his Office.
- 4) When the Chairperson is unable to discharge his function owing to absence, illness or any other cause, the senior-most member shall discharge the routine functions of the Chairperson till the date on which the Chairperson resumes his Office.
- 5) No person shall be appointed as Chairperson or member of the Commission who shall have direct or indirect interest in any business or commercial activity related to the River Basin.

15. Resignation, Removal and Suspension of Chairperson and other members

- 1) The Chairperson or any other member may, by notice in writing, address to the Central Government resign from Office.
Provided that the Chairperson or any other member shall, unless he is permitted by the Central Government to relinquish his Office sooner, continue to hold Office until the expiry or three months from the date of receipt of such notice or until a person duly appointed as his successor enters upon his Office or until the expiry of his term of Office, whichever is the earliest.
- 2) Notwithstanding anything contained above, the Central Government may, by order, remove the Chairperson or any other member from his Office if such Chairperson or Members, as the case may be:
 - a. Is or at any time has been, adjudged as an insolvent; or

- b. Has engaged at any time, during his term of office, in any paid employment; or
 - c. Has been convicted of an offence which, in the opinion of the Central Government involved moral turpitude; or
 - d. Has acquired such financial or other interest as his likely to affect prejudicially his functions of a member; or so abused his position as to render his continuance in office prejudicial to public interest; or
 - e. Has become physically or mentally incapable as such.
- 3) Notwithstanding anything contained herein before, no member shall be removed from his office unless the Supreme Court, on a reference being made to it in this behalf by the Central Government, has on an enquiry, held by it in accordance with such procedure as may be prescribed in this behalf by the Supreme Court, reported that the Chairperson or the members, ought on such ground or grounds to be removed.

16. Restrictions on Employment of Members in certain cases

The Chairperson and every other member shall not, for a period of two years from the date which he ceases to hold Office, accept any employment in, or be connected with the Management or Administration of, any enterprise which has been a party to a proceeding under the Act or associate in any capacity or establish any NGO in related field;

Provided that nothing in the section shall apply to any employment under the Central Government or a State Government or Local Commission or in any statutory Commission or any corporation established by or under any Central, State or Provincial Act or a Government company as define in Section 617 of the Companies Act 1956(1 of 1956).

17. Salary and Allowances and other terms and conditions of service of Chairperson and other members

- 1) The salary and other terms and conditions of service, of the Chairperson and other members including travelling expenses, house rent allowance and conveyance facilities, sumptuary allowance and medical facilities shall be such as may be prescribed.
- 2) The salary allowances and other terms and condition of service of the Chairperson or any member shall not vary to his disadvantage after appointment.

18. Procedure for Transaction of Business

- 1) The Commission shall meet regularly at its Office at such time as the Chairperson thinks fit, but four months shall not intervene between its last and next meeting.

- 2) All decisions shall be taken by majority;
Provided that in the case of equality of votes, the Chairperson or in his absence the person presiding, shall have to exercise casting vote;
- 3) The Commission shall observe such rules of procedure in the transaction of its business at a meeting, including the quorum at such meeting, as may be prescribed by the Central Government under the Act;
- 4) All decisions of the Commission shall be authenticated by the Chairperson or any other officer duly authorised in this behalf.

19. Duties, Powers and Functions of the Commission

- 1) The powers and function of the Commission shall relate to the following:
 - a. To formulate strategies, plans, programmes, policies and guidelines for the due discharge of functions in furtherance of the object of the Act;
 - b. To review the working of the Commission and prepare Annual Report;
 - c. To review and monitor the working of the Wings under the Act;
 - d. To coordinate and strengthen the efforts of the Central and State Governments for conservation and development of the National River Ganga Basin, and prohibition, restriction and promotion of activities in National River Ganga Basin in consonance with the object of the Act;
 - e. Issue Directions to the Central and State government;
 - f. To inquire and investigate into alleged contraventions of provisions of the Act;
 - g. To direct such investigations and inquiries as may be necessary from time to time;
 - h. To pass such orders or issue such directions as it may deem fit.
- 2) It shall be the duty of the Commission to take necessary steps for the elimination of all practices prejudicial to the interests of the National River Ganga Basin and promote the conservation and development of the Basin in consonance with the object of the Act.

20. Power of Superintendence

The Chairperson of Commission shall have the powers of general superintendence direction and control in respect of all matters of the Commission.

Provided that the Chairperson may, for the internal conduct of business of the Commission, delegate such powers relating to administrative matters to any member of the Commission, including the power to monitor the working of the Wings, established under the Act, and such member shall coordinate with the Director, appointed hereinafter, with regard to implementation of the policies of the Commission.

Provided that the Investigation Wing shall, at all times be monitored by the Retired or Sitting Judge of the High Court as specified under Section 12 of the Act.

21. General Administration and Finance Division

- 1) There shall be a General Administration and Finance Division under the control of the Chairperson of the Commission.
- 2) Such division shall
 - a) Undertake all activities pertaining to the internal management of the Commission;
 - b) Create and maintain the National River Ganga Basin Management Fund to be generated from the deposit of damages awarded by the Commission and Tribunal from time to time;
 - c) Maintain proper accounts and relevant records;
 - d) Prepare annual reports and statement of accounts;
 - e) Audit Accounts as may be required by the Central Government.

22. Constitution of Wings

- 1) The Commission shall constitute the following Wings for the efficient discharge of its duties and functions under the Act:
 - a. Information and Communication wing;
 - b. Environmental Monitoring and Impact Assessment Wing;
 - c. Investigation Wing;
 - d. Research and Development Wing;
 - e. Policy, Planning and Advocacy Wing.
- 2) The Commission may constitute such other regional or specialised units under each of the wings, and at such places, as may be necessary from time to time.

23. Composition of Wings

- 1) Each wing shall consist of the following:
 - a. The Director;
 - b. Such other Officers and Employees as may be necessary for the efficient performance of the functions under the Act;
- 2) The Wing shall be headed by the Director who shall be assisted by Additional, Joint, Deputy and Assistant Directors and such other officers or employees as may be decided by the Commission;
- 3) The Director shall be of the level of Joint Secretary or equivalent of the Central Government;

- 4) Regional units/branches shall be headed by the Joint Director and he shall report to the Director on all matters relating to the unit/branch.
- 5) The Director and other officials shall be whole time members.

24. Powers and Functions of Wings

The wings shall discharge the necessary powers, functions and responsibilities in furtherance of its specific subject matter.

- 1) The Investigation Wing shall investigate matters relating to:
 - a) Non-implementation of appropriate measures relating to prohibition, restriction, conservation and promotion activities;
 - b) Non-compliance of policy decisions and guidelines in furtherance of integrated River Basin Management;
 - c) Continuance of existing practices in contravention of the provisions of the Act; and
 - d) Such other matters as the Commission may direct from time to time.
- 2) The Research and Development Wing shall
 - a) Identify research needs of National River Ganga Basin;
 - b) Undertake and/or outsource need based specific research;
 - c) Conduct economic, social and cultural analysis on National River Ganga Basin;
 - d) Prescribe scientific details on measures relating to prohibition, restriction, conservation and promotion activities on National River Ganga Basin, as may be necessary from time to time;
 - e) Provide technical know-how related to building of infrastructure on National River Ganga Basin;
 - f) Such other matters as the Commission may direct from time to time.
- 3) The Environmental Monitoring and Impact Assessment Wing shall
 - a) Conduct regular and random field measurement of environment related data on river basin;
 - b) Monitor developmental and infrastructure projects on the river basin approved by the Government;
 - c) Coordinate developmental projects and anthropogenic activities on National River Ganga Basin;
 - d) Conduct impact assessment of existing practices, activities and infrastructure on National River Ganga Basin;
 - e) Such other matters as the Commission may direct from time to time.

- 4) The Information and Communication wing
 - a) Procure all types of data relating to scientific, technological, economic, social, cultural and such other forms as the commission may determine time to time on river basin;
 - b) Preprocess all data collected referred to in clause (a);
 - c) Compile data and reports referred to in clause (a);
 - d) Store the data and reports in easily retrievable system;
 - e) Provide public access to all such data;
 - f) Such other matters as the Commission may deem fit.
- 5) The Policy, Planning and Advocacy Wing shall
 - a) Periodically review and frame the environmental strategies, plans, programmes, policies and guidelines on National River Ganga Basin;
 - b) Formulate good governance guidelines;
 - c) Promote awareness of issues pertaining to National River Ganga Basin;
 - d) Conduct advanced interactive Programmes, including Seminars, Workshops and Training of stakeholders;
 - e) Conduct special campaigns to sensitize and motivate people;
 - f) Prepare educational material; and
 - g) Such other matters as the Commission may deem fit.

25. Appointment and service conditions of Director, officers, inter alia of the Commission

- 1) The Commission shall appoint the Director, Additional Director, Joint Director, Deputy Director and Assistant Director, officers and other employees required to assist the Commission in the discharge of its functions.
- 2) The terms and conditions of the service of the Director, Additional Director, Joint Director, Deputy Director and Assistant Director, officers and other employees of the Commission shall be made by the Chairperson in such manner as may be prescribed.
- 3) The officers and other employees of the Commission shall discharge their functions under the general superintendence of the Chairperson.
- 4) The salaries and allowances and conditions of service of the officers and other employees of the Commission shall be such as may be prescribed.

26. Power and Functions of Director

The Director shall discharge the following:

- a) Be responsible for the overall working of the Wing.
- b) Control and Superintend the administration of the Wing

- c) Implement the policies, programs, etc. of the Commission, as may be decided, from time to time.
- d) Report to the Commission, on regular basis, about the activities of the Wing.
- e) Coordinate with the individual member of the Commission, where so appointed under Section 20, the working of the Wing.
- f) Prepare Internal Report annually
- g) Such other matters as may be decided by the Commission from time to time.

Powers of Inquiry and Investigation

27. Procedure for Inquiry and Investigation

- 1) On receipt of a complaint by any person or a reference from an Authority or on its own knowledge or otherwise, if the Commission is of the opinion that there exists a prima facie case, it shall direct the Director, Investigation to cause an investigation to be made into the matter.
- 2) Where however the Commission is of the opinion that there exists no prima facie case, it shall close the matter forthwith and pass such orders as it deems fit and send a copy of its order to the Authority or the person concerned, as the case may be.
- 3) The Director shall, on receipt of direction, submit a report on his findings within such period as may be specified by the Commission.
- 4) The Commission may forward a copy of the report to the parties concerned; Provided that in case the investigation is caused to be made based on a reference from any authority, the Commission shall forward a copy of the report to the authority as the case may be.
- 5) If the report of the Director recommends that there is no contravention of the provisions of this Act, the Commission shall invite objections and suggestions from the Authority or the person concerned or any other person, as the case may be.
- 6) If, after consideration of the objections or suggestions, the Commission agrees with the recommendation of the Director, it shall close the matter forthwith and pass such orders as it deems fit and communicate its order to the Authority or the persons concerned, as the case may be.
- 7) If, after consideration of the objections or suggestions referred to above the Commission is of the opinion that further investigation is called for, it may direct such further investigation in the matter by the Director or itself proceed with further inquiry in the matter in accordance with the provisions of the Act.

- 8) On receipt of report of the Director or a further inquiry referred to above, the Commission may close the matter forthwith and pass such orders as he deems fit and communicate its order to the Authority or the persons concerned as the case may be.

28. Power of Commission to Regulate its own Procedure

- 1) The Commission shall not be bound by the procedure laid down by the Code of Civil Procedure, 1908 (5 of 1908), but shall be guided by the principles of Natural Justice and, subject to the provisions of these Act and of any rules made there under, the Commission shall have powers to regulate its own procedure including the places at which they shall have their sittings, duration of oral hearings when granted, and times of its inquiry.
- 2) The Commission shall have, for the purposes of discharging its functions under these Act, the same powers as are vested in a Civil Court under the Code of Civil Procedure, 1908 (5 of 1908), while trying a suit.
- 3) Every proceeding before the Commission shall be deemed to be a judicial proceeding within the meaning of sections 193 and 228 and for the purposes of section 196 of the Indian Penal Code (45 of 1860) and the Commission shall be deemed to be a civil court for the purposes of disposal of the matters pending before it and shall be deemed to be civil court for the purposes of section 195 and Chapter XXVI of the code of Criminal procedure 1973 (2 of 1974).
- 4) The Commission may call upon such experts, from the field of Science and Technology, Legal Affairs, Economics, Finance, Socio-Cultural, Faith Leaders as it deems necessary, to assist the Commission in the conduct of any inquiry or proceeding before it.

29. Power of Director, Investigation Wing

- 1) The Director, Investigation shall, when so directed by the Commission, assist the Commission in investigating into any contravention of the provisions of these Act or any rules or regulations made there under.
- 2) The Director shall have all the powers as are conferred upon the Commission herein before stated.
- 3) The Director shall have power to direct every person/company/authority against whom the enquiry/investigation is ordered to afford reasonable facilities for the same.

30. Orders by Commission after Inquiry/ Investigation

Where after inquiry or investigation, the Commission finds that any act in contravention of the provisions of the Act has been established on the part of any person or authority, it may pass all or any of the following orders, namely:

- a. Direct the immediate discontinuance of the act;
- b. Order payment of damages;
- c. Order restitution, restoration and such other remedial measures for the conservation and protection of the National River Ganga Basin as may be necessary in the circumstances;
- d. Pass such other order as it may deem fit.

31. Power to grant interim relief

- 1) Where during an inquiry or investigation before the Commission or under the directions of the Commission, it is proved to the satisfaction of the Commission, by affidavit or otherwise, that an act in contravention of the provisions of the Act has been committed or continue to be committed or that such act is about to be committed, the Commission may, by order, grant a temporary injunction restraining any party from carrying on such act till the conclusion of the inquiry/investigation or until further orders.
- 2) The provisions of rules 2A to 5 (both inclusive) of Order XXXIX of the first Schedule to the Code of Civil Procedure, 1908, shall, as far as may be, apply to a temporary injunction issued by the Commission under the Act, as they apply to a temporary injunction issued by a civil court, and any reference in any such rule to a suit shall be construed as a reference to any inquiry/investigation before the Commission.

32. Appeal

Any person or authority aggrieved by any decision or order of the Commission may file an appeal to the National River Ganga Basin Tribunal within sixty days from the date of communication of the decision or order of the Commission;

Provided that the Tribunal may, if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal within the said period, allow it to be filed within a further period not exceeding thirty days.

33. Execution of Orders of Commission

- 1) Any order passed by the Commission under this Act shall be enforced and executable by the Commission in the same manner as if it were a decree or order made by Civil Court in a suit pending therein and for that purpose the Commission shall have all the executing powers of a civil court.

- 2) For the sake of expeditious disposal or otherwise the Commission if deems fit, may transmit any order or award or decision made by it to a civil court having local jurisdiction and such civil court shall execute it as a decree by that Court.

34. Penalty for failure to comply with orders of the Commission

Whoever fails to comply with any order made by the Commission, he shall be punishable with imprisonment for a term which may extend to 3 years, or with fine which may extend to ten crore rupees, or with both.

35. Members, Officers, etc. of Commission deemed to be Public Servants

All members, officers and other employees of the Commission shall be deemed, when acting or purporting to act in pursuance of any of the provisions of this Act, to be public servants within the meaning of Section 21 of the Indian Penal Code (45 of 1860).

36. Protection of Action taken in good faith

No suit, prosecution or other legal proceedings shall lie against any member, officer or employee of the Commission for anything done or intended to be done in good faith under this Act or rules or regulations made thereunder.

37. Contravention of Order by Companies and Authorities

- 1) Where any contravention under this Act has been committed by a company, every person, who, at the time, the contravention was committed was in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company itself, shall be deemed to be liable to be proceeded against in accordance with the provisions of the Act.

Provided that nothing contained in this section shall render any such person liable, if he proves that the contravention was committed without his knowledge or that he had exercised all due diligence to prevent the commission of the contravention and the contravention was an Act of God.

- 2) Notwithstanding anything contained above, where any contravention under this Act has been committed with the consent or connivance of or is attributable to, any neglect on the part of any director, manager, secretary or other officer of the company, such person aforesaid shall be deemed to be liable for such contravention and proceeded against.

Explanation: For the above purposes,

- (a) “company” means any body corporate and includes a firm or other association of individuals; and
 - (b) “Director” in relation to a firm, means a partner in the firm and proprietor in a proprietorship firm and in case of trust, cooperative and society the person responsible for management of the same.
- 3) Where any contravention under this Act has been committed by an authority, every person, who, at the time, the contravention was committed was in charge of, and was responsible to, for the conduct of the business of the authority, as well as the authority itself, shall be deemed to be liable to be proceeded against in accordance with the provisions of the Act.
- Provided that nothing contained in this section shall render any such person liable, if he proves that the contravention was committed without his knowledge or that he had exercised all due diligence to prevent the commission of the contravention and the contravention was an Act of God.
- 4) Notwithstanding anything contained above, where any contravention under this Act has been committed with the consent or connivance of or is attributable to, any neglect on the part of any superintendent, manager, secretary or other officer of the authority, such person aforesaid shall be deemed to be liable for such contravention and proceeded against.

CHAPTER VIII

NATIONAL RIVER GANGA BASIN TRIBUNAL

38. Establishment of Tribunal

- 1) The Central Government shall, by notification, establish an Tribunal to be known as National River Ganga Basin Tribunal:
 - a. to hear and dispose of appeals against any direction issued or decision made or order passed by the Commission under the Act;
 - b. to adjudicate on claim for damages that may arise from the findings of the Commission, or orders for the recovery of damages under this Act.
- 2) The Headquarter of the Tribunal shall be at such place as the Headquarter of the Commission.

39. Jurisdiction of the Tribunal

Any person or authority, aggrieved by any direction, order or decision passed by the Commission may prefer an appeal to the Tribunal.

40. Limitation

- 1) Every appeal under sub-section (2) shall be filed within a period of sixty days from the date on which a copy of the direction or decision or order made by the Commission is received by the authority or person referred to and it shall be in such form and be accompanied by such fee as may be prescribed within the rules so framed by the Commission;
- 2) The Tribunal may entertain an appeal after the expiry of the said period of sixty days if it is satisfied that there was sufficient cause for not filing it within that period.

41. Procedure of the Tribunal

- 1) On receipt of an appeal, the Tribunal may, after giving the parties to the appeal, an opportunity of being heard, pass such orders thereon as it thinks fit, confirming, modifying or setting aside the direction, decision or order appealed against.
- 2) The Tribunal shall send a copy of every order made by it to the Commission and the parties to the appeal.
- 3) The appeal filed before the Tribunal shall be dealt with by it as expeditiously as possible and endeavor shall be made by it to dispose of the appeal within six months from the date of receipt of the appeal and beyond that period on recording the reasons.
- 4) No appeal under clause (1) shall lie unless the memorandum of appeal is certified with the copy of the order, direction or decision passed by the Commission and with the grounds to the effect that the appellant has plausible defense to be protected against such order. However, while admitting the appeal, the Tribunal may direct to deposit a part or whole of the amount so payable under the direction, order or decision appealed against.
- 5) The appellant shall get the deposited amount back, with rate of interest fixed by nationalized bank during that time, in case he/it succeeds in the appeal.

42. Composition of Tribunal

The Tribunal shall consist of a Chairperson and at least one Judicial Member and other members to be appointed by the Central Government from the panels of name so recommended by the Selection Committee constituted for that purpose.

43. Qualifications for appointment of Chairperson and Members of Tribunal

- 1) The Chairperson of the Tribunal shall be a person, who is, or has been a Judge of the Supreme Court of India.
- 2) The other members of the Tribunal shall be persons of ability, integrity and standing having special knowledge of, and professional experience of not less than twenty years in science and technology, environmental matters, law and policy, public affairs or in any other matter which in the opinion of the Central Government, may be useful to the Tribunal.

44. Selection Committee

- 1) The Chairperson and Members of the Tribunal shall be appointed by the Central Government from a panel of names recommended by a Selection Committee comprising of:
 - a. the Chief Justice of India, Chairperson;
 - b. the Cabinet Secretary, Central Government, Member Secretary
 - c. the Chairperson, Law Commission of India, Member
 - d. the Director of any National Institute of importance so nominated, Member
- 2) The terms of the Selection Committee and the manner of selection of panel of names shall be such as may be prescribed.

45. Term of office of Chairperson and Members of Tribunal

The Chairperson or a member of the Tribunal shall hold office as such for a term of five years from the date on which he enters upon his office, and shall be eligible for re-appointment only for a period of two years and not afterwards;

Provided that no Chairperson or other member of the Tribunal shall hold office as such after he has attained,

- 1) in the case of the Chairperson, the age of seventy years;
- 2) in the case of any other member of the Tribunal, the age of sixty-seven years.

46. Terms and conditions of service of Chairperson and Members of Tribunal

- 1) The salaries and allowances and other terms and conditions of service including the conditions of removal of the Chairperson and other members of the Tribunal shall be such as may be prescribed by the rules so notified by the Central Government.

- 2) The salaries, allowances and other terms and conditions of service of the Chairperson and other members of the Tribunal shall not be varied to their disadvantage after their appointment.

47. Vacancies

- 1) If, for any reason other than temporary absence, any vacancy occurs in the office of the Chairperson of the Tribunal, the senior most Member shall act as Chairperson until another person is so appointed by the Central Government in the above stated manner to fill the vacancy and the proceedings may be continued before the Tribunal from the stage at which the vacancy is filled by the Tribunal with that new combination and there shall be no irregularity of law in disposal of such matter pending before the Tribunal.
- 2) When the Chairperson of the Tribunal is unable to discharge his functions owing to absence, illness or any other cause, the senior-most member or, as the case may be, such one of the Members of the Tribunal, as the Central Government may, by notification, authorize in this behalf, shall discharge the functions of the Chairperson until the date on which the Chairperson resumes his duties.

48. Resignation of Chairperson and Members of Tribunal

The Chairperson or a member of the Tribunal may, by notice in writing under his hand addressed to the Central Government, seek resignation from his office;

Provided that the Chairperson or a member of the Tribunal shall, unless he is permitted by the Central Government to relinquish his office sooner, continue to hold office until the expiry of three months from the date of receipt of such notice and until a person duly appointed as his successor enters upon his office or until the expiry of his term of office, whichever is earlier.

49. Removal and suspension of Chairperson and Members of Tribunal

- 1) The Central Government may, in consultation with the Chief Justice of India, remove from office the Chairperson or any other member of the Tribunal, who;
 - a. has been adjudged an insolvent; or
 - b. has engaged at any time, during his term of office, in any paid employment; or
 - c. has been convicted of an offence which, in the opinion of the Central Government, involves moral turpitude; or
 - d. has become physically or mentally incapable of acting as such Chairperson or other Member of the Tribunal; or

- e. has acquired such financial or other interest as is likely to affect prejudicially his functions as such Chairperson or Member of the Tribunal; or
 - f. has so abused his position as to render his continuance in office prejudicial to the public interest.
- 2) Notwithstanding anything contained above, no Chairperson or a Member of the Tribunal shall not be removed from his office on the ground specified in clause (e) or clause (f) of sub-section (1) except by an order made by the Central Government after an inquiry made in this behalf by a Judge of the Supreme Court in which such Chairperson or member had been informed of the charges against him and given a reasonable opportunity of being heard in respect of those charges.

50. Restriction on employment of Chairperson and other Members of the Tribunal

The Chairperson and other members of the Tribunal shall not, for a period of two years from the date on which they cease to hold office, accept any employment in, or connected with the management or administration of, any enterprise which has been a party to a proceeding before the Tribunal under this Act, nor shall they associate or personally establish any NGO in related field.

Provided that nothing contained in this section shall apply to any employment under the Central Government or a State Government or Local authority or in any statutory authority or any corporation established by or under any Central, State or Provincial Act or a Government Company as defined in section 617 of the Companies Act, 1956 (1 of 1956).

51. Staff of Tribunal

- 1) The Central Government shall frame the rules by way of Notification, in consultation with the Chairperson of the Tribunal, for providing the procedure of appointment of such officers and other employees as it may think fit.
- 2) The salaries, allowances and conditions of service, including tenure and terms of removal, of the officers and other employees of the Tribunal shall be such as may be prescribed.
- 3) The officers and other employees of the Tribunal shall discharge their functions under the general superintendence and control of the Chairperson of the Tribunal.

52. Procedures and Powers of Tribunal

- 1) The Tribunal shall not be bound by the procedure laid down in the Code of Civil Procedure, 1908 (5 of 1908), but shall be guided by the principles of natural justice and, subject to the other provisions of the Act and of any rules made by the Central Government, the Tribunal shall have power to regulate its own procedure including the places at which they shall have their sittings.
- 2) The Tribunal shall have, for the purposes of discharging its functions under this Act, the same powers as are vested in a Civil Court under the Code of Civil Procedure, 1908 (5 of 1908) while trying a suit in respect of the following matters, namely:
 - a. summoning and enforcing the attendance of any person and examining him on oath;
 - b. requiring the discovery and production of documents;
 - c. receiving evidence on affidavit;
 - d. subject to the provisions of Sections 123 and 124 of the Indian Evidence Act, 1872 (1 of 1872), requisitioning any public record or document or copy of such record or document from any office;
 - e. issuing summons for the examination of witnesses or documents;
 - f. reviewing its decisions;
 - g. dismissing a representation for default or deciding it *ex parte*;
 - h. setting aside any order of dismissal of any representation for default or any order passed by it *ex parte*;
 - i. any other matter which may be prescribed.
- 3) Every proceeding before the Tribunal shall be deemed to be judicial proceeding within the meaning of Sections 193 and 228, and for the purposes of Section 196, of the Indian Penal Code (45 of 1860) and the Tribunal shall be deemed to be a Civil Court for the purposes of Section 195 (2 of 1974) and Chapter XXVI of the Code of Criminal Procedure, 1973.

53. Execution of Orders of Tribunal

- 1) Every order made by the Tribunal shall be enforced by it in the same manner as if it were a Court of appeal, and it shall be lawful for the Tribunal to send, in case of its inability to execute such order, to the court within the local limits of whose jurisdiction:
 - a. in the case of an order against a company, the registered office of the company is situated; or
 - b. in the case of an order against any other person, place where the person concerned voluntarily resides or carries on business or personally works for gain, is situated.

- 2) Notwithstanding anything contained in sub-section (1), the Tribunal may transmit any order made by it to a Court (civil or criminal, as the case may be) having local jurisdiction and such Court shall execute the order as if it were the orders passed by that court.

54. Saving of inherent Powers of the Tribunal

Notwithstanding anything contained in this Act or any other provisions of any enactment in force, nothing shall be deemed to limit or affect the inherent powers of the Tribunal as of the powers of any High Court of India, to make such orders as may be necessary to give effect to any order passed under this Act or to prevent abuse of the process of the Tribunal or otherwise, to secure the ends of justice, needed to impart justice in consonance of object and reasons and effect to the enactment of the Act.

55. Suo-moto Powers of the Tribunal

Notwithstanding anything contained in this Act or any other provisions of any enactment in force, nothing shall be deemed to limit or affect the Suo-moto powers of the Tribunal as of the powers of any High Court of India or Supreme Court, to make such orders on its own motion if the Tribunal feels in rarest of rare circumstances and on taking cognizance of the facts to be taken by the Tribunal in the interest or relating to the National River Ganga, as may be necessary to give effect to any order passed under this Act or to prevent abuse of the process of the Tribunal or otherwise, to secure the ends of justice, needed to impart by the Tribunal.

56. Power to Punish for Contempt

The Tribunal shall have, and exercise, the same jurisdiction, powers and authority in respect of contempt of itself as a High Court has and may exercise and, for this purpose, the provisions of the Contempt of Courts Act, 1971 (70 of 1971) shall have effect subject to modifications that:

- 1) the reference therein to a High Court shall be construed as including a reference to the Tribunal;
- 2) the references to the Advocate-General in Section 15 of the said Act shall be construed as a reference to such Law Officer as the Central Government may, by notification, specify in this behalf.

57. Contravention of Order of the Tribunal

Without prejudice to the Act, if any person or authority contravenes, any Order of the Tribunal, he/it shall be liable for a damages not less than fifty crore or forfeiture of property or imprisonment for a term upto ten years or with both.

58. Vacancy in Tribunal not to invalidate acts or proceedings

No act or proceeding of the Tribunal shall be questioned or shall be invalid merely on the ground of existence of any vacancy or defect in the constitution of the Tribunal.

59. Right to Legal Representation

- 1) A person or authority preferring an appeal to the Tribunal may either appear in person or authorize one or more legal practitioners or any of its officers to present his or its case before the Tribunal.
- 2) The Commission may authorize one or more legal practitioners or any of its officers to act as presenting officers and every person so authorized may present the case with respect to any appeal before the Tribunal.

60. Appeal to Supreme Court

Any person aggrieved by any decision, direction or order of the Tribunal, may, file an appeal to the Supreme Court, within ninety days from the date of communication of the decision, direction or order of the Tribunal, to him, on any one or more of the grounds specified in Section 100 of the Code of Civil Procedure, 1908.

CHAPTER IX MISCELLANEOUS PROVISIONS

61. Power of the Central Government to Make Rules

The Central Government may, by the notification in the Official Gazette, make rules for carrying out the purposes of this Act, however such rules shall be framed only in consultation with the Full House comprising of the Chairman and the Members of the commission and only after confirmation.

62. Bar of Jurisdiction

No Civil Court shall have jurisdiction to entertain any suit or proceedings in respect of any matter which the Tribunal constituted under this Act is empowered by or under this Act to determine, and no injunction shall be granted by any court or other authority in respect of any action taken or to be taken in pursuance of any power conferred by or under this Act.

63. Overriding effect

The provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any enactment other than this Act.

64. National River Ganga Basin Management Fund

- 1) Where any amount by way of damages is ordered to be paid under any order made by the Commission or Tribunal, that amount shall be remitted to the National River Ganga Basin Management Fund established under the Act;
- 2) The National River Ganga Basin Management Fund under sub-section (1) shall be utilized by Central Government on the advice and with concurrence of the Commission.
- 3) The National River Ganga Basin Management Fund shall be used for,
 - a. Environmental development and improvement of National River Ganga Basin
 - b. Conduct of research on National River Ganga Basin
 - c. Institution of Award
 - d. Any other purpose as may be identified and advised by the Commission.
- 4) Restitution, Restoration and Rehabilitation of the Basin caused due to Natural calamity or disaster shall be done by Government independent of funds being available from the National River Ganga Basin Management Fund established under the Act.

65. Institution of Award

The Central Government shall institute Monetary Rewards for exceptional contributors including Researchers, Academicians, Institutes, Universities, Centres of Excellence and civil society for conservation, development and improvement of the National River Ganga Basin, in conformity with the Commission's goals and guidelines.