

River Basin Management Cycle Training Series

Case Study – Ganga River Basin



Implemented by

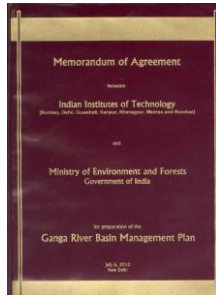
giz Deutsche Gesellschaft
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**GNANAMI
GANGE**



Ganga River Basin Management (GRBM) Milestones and Legal foundation

National Ganga
River Basin
Authority (NGRBA)
constituted



06/2010

Memorandum
of Agreement between
7 IITs and MoEF
for preparation
of GRBMP

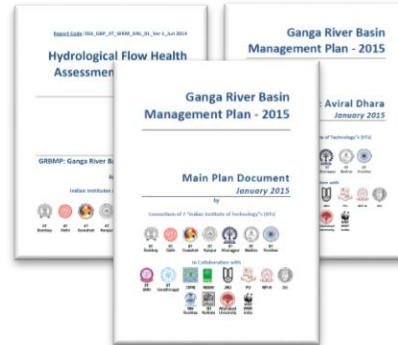
Interim
GRBMP
Report

09/2013



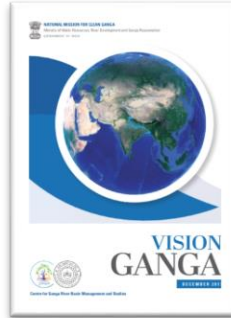
01/2015

main plan document
8 mission reports,
73 thematic reports



River Ganga
Order:
Dissolution of NGRBA
Constitution of National
Ganga Council (NGC)

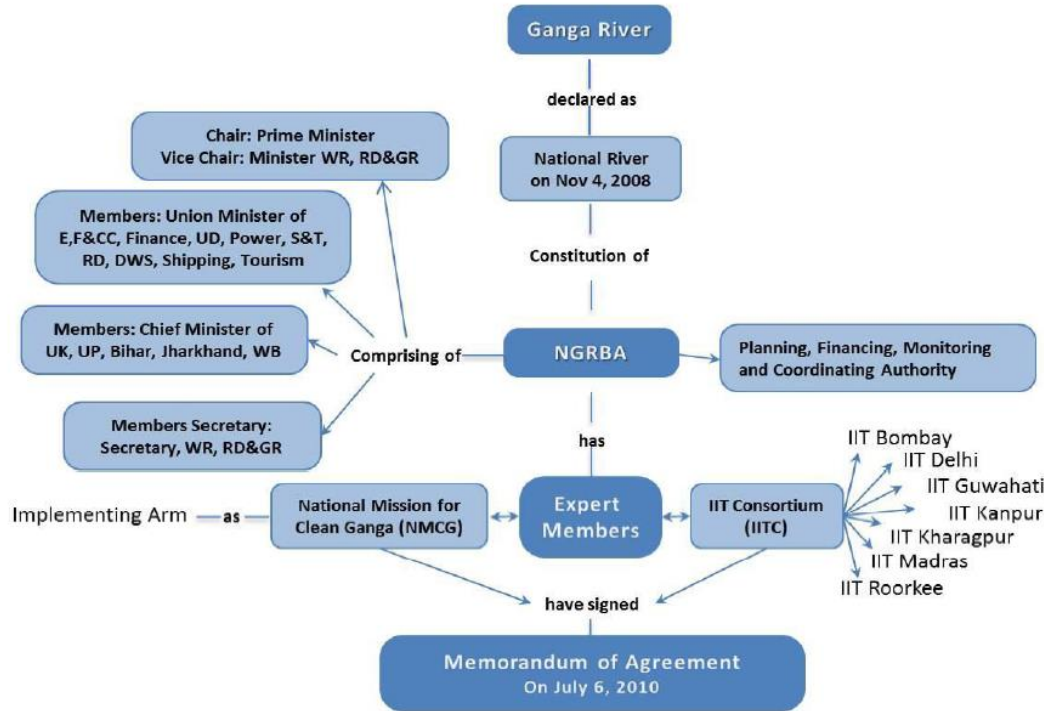
10/2016



12/2017

Vision
Ganga

Ganga River Basin Management Plan (GRBMP) Coordination Structure

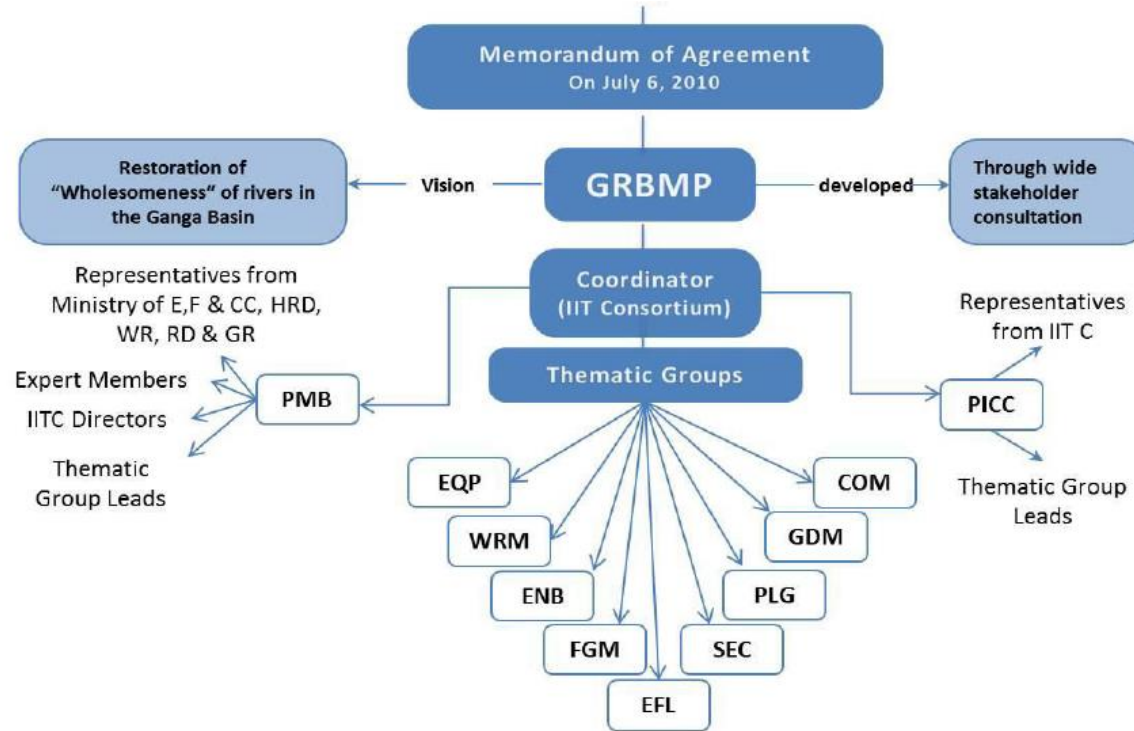


NGRBA: National Ganga River Basin Authority
NMCG: National Mission for Clean Ganga
MoEF: Ministry of Environment and Forests
MHRD: Ministry of Human Resource and Development
MoWR, RD&GR: Ministry of Water Resources, River Development and Ganga Rejuvenation
GRBMP: Ganga River Basin Management Plan
IITC: IIT Consortium
PMB: Project Management Board
PICC: Project Implementation and Coordination Committee

Source: Ganga River Basin Management Plan (GRBMP)

Ganga River Basin Management Plan (GRBMP)

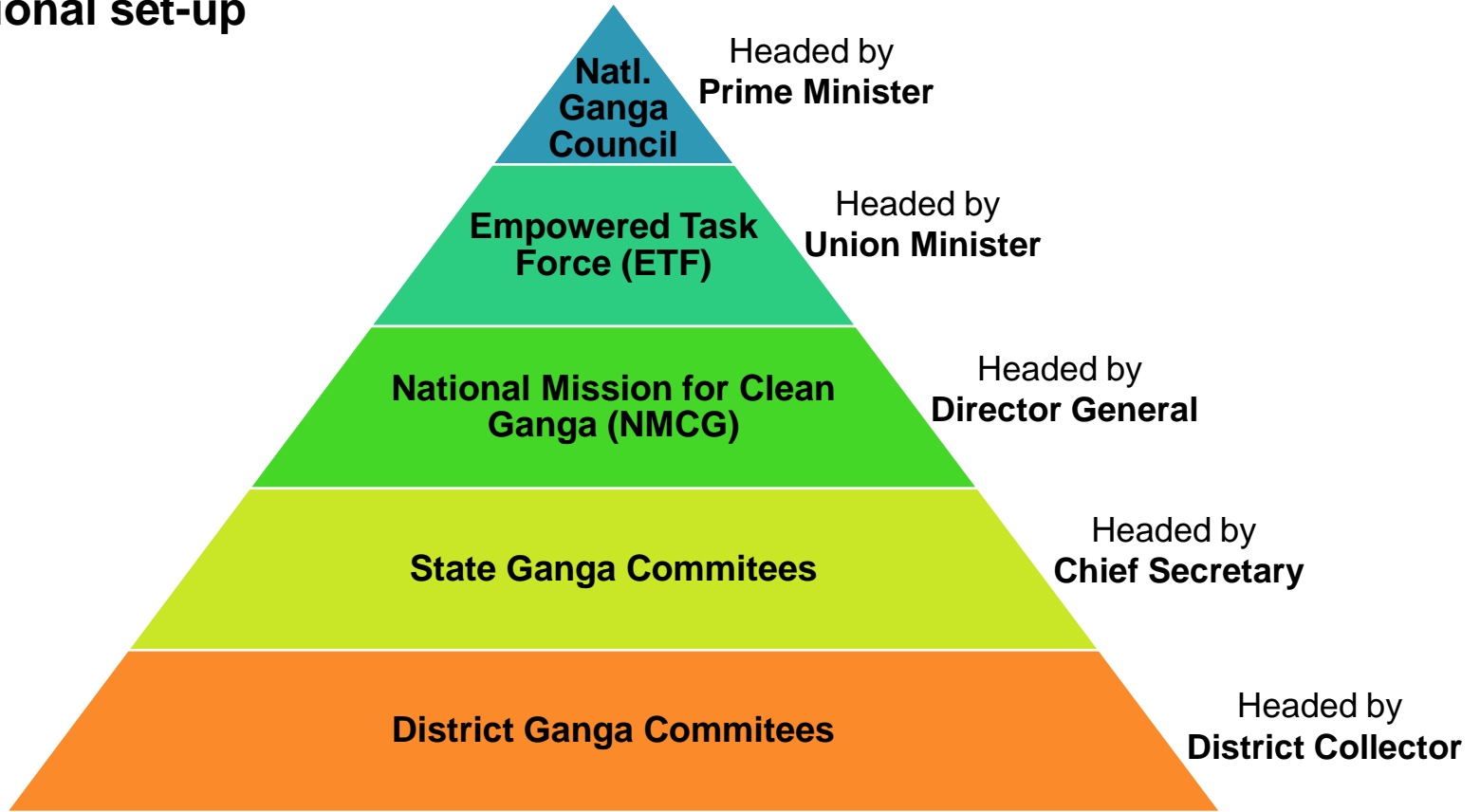
Coordination Structure II



NGRBA: National Ganga River Basin Authority
NMCG: National Mission for Clean Ganga
MoEF: Ministry of Environment and Forests
MHRD: Ministry of Human Resource and Development
MoWR, RD&GR: Ministry of Water Resources, River Development and Ganga Rejuvenation
GRBMP: Ganga River Basin Management Plan
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Source: Ganga River Basin Management Plan (GRBMP)

Institutional set-up



Ganga River Basin Management Plan (GRBMP)

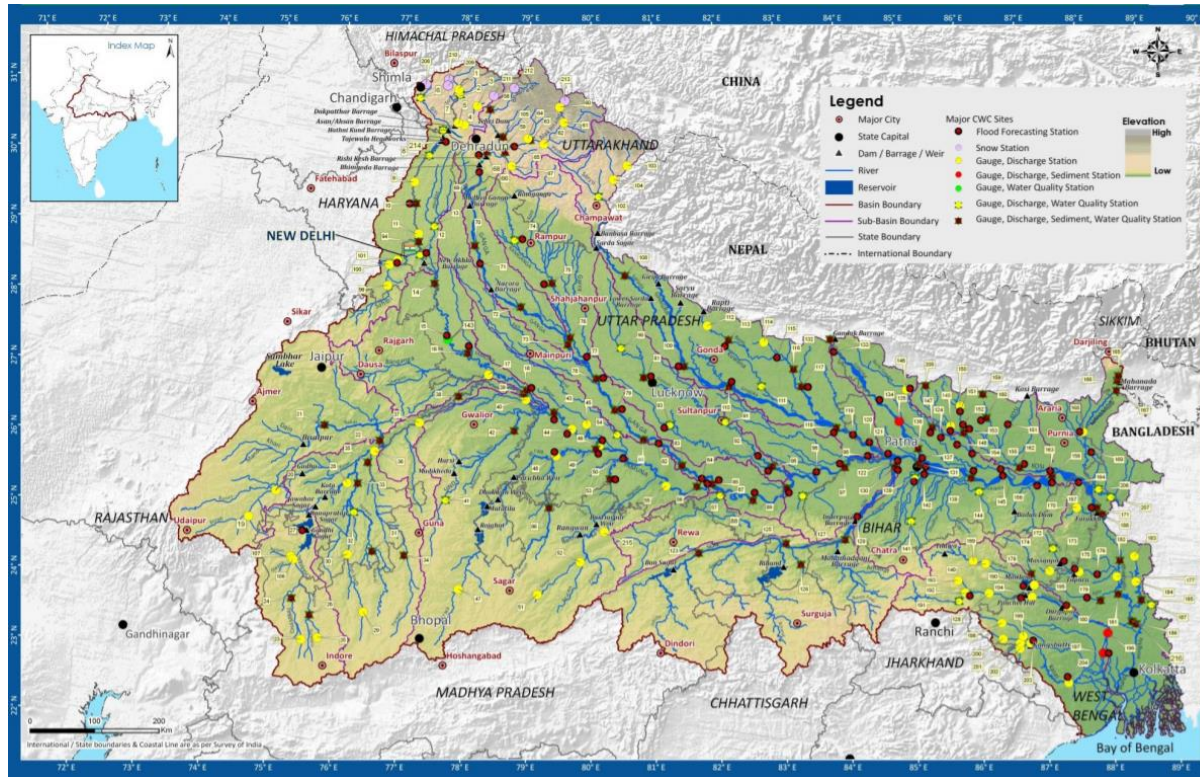
Nine themes

1. Environmental Quality and Pollution
2. Water Resources Management
3. Fluvial Geomorphology
4. Ecology and Biodiversity
5. Socio Economic and Cultural
6. Policy Law and Governance
7. Geo-Spatial Database Management
8. Communication
9. Environmental Flows

Ganga River Basin Management Plan (GRMP)

- The Ganga RBMP has done a very comprehensive **Basin Characterisation**.
- Each assessment report ends with some recommendation actions to improve the wholesomeness of the river:
 - “Aviral Dhara” (Continuous Flow”),
 - “Nirmal Dhara”(“Unpolluted Flow”),
 - Geologic Entity,
 - and Ecological Entity improve the situation.
- However these recommendation actions have not been translated yet into comprehensive Measures.

Water Resources Monitoring Data



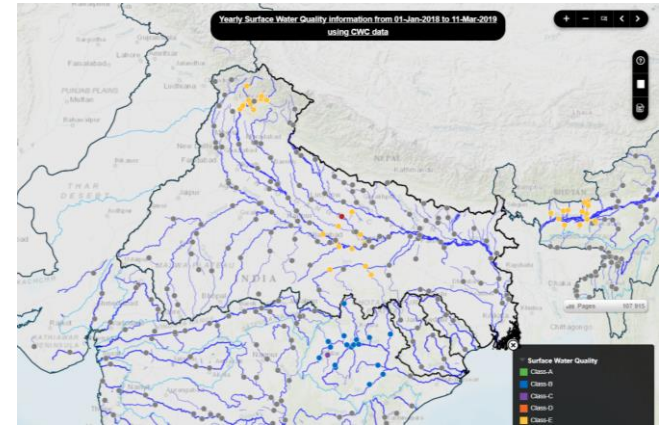
Source: Ministry of Water Resources (2014) Ganga Basin

Water Resources Monitoring Data

Example: Surface Water Quality

- 36 Real Time Water Quality Monitoring Station (RTWQMS) are operational
- Water quality monitoring is carried out 130 locations
- Dissolved Oxygen levels improved at 39 locations, Biological Oxygen Demand (BOD) decreased at 42 locations and coliform bacteria count decreased at 47 locations (2017 vs 2018 data).
- Bio-monitoring of river Ganga at various locations (Haridwar to Diamond Harbour in West Bengal) has been carried out to study the Benthic Macro Invertebrates, which reflects the biological health of river

India Water Resources Information System (WRIS)




Link: <http://indiawris.gov.in/>

Source: Press Information Bureau (2018) Year end Review-2018

Water Resources Monitoring Data – Real time Monitoring

Ministry of Environment, Forest and
Climate Change

Central Pollution Control Board



Ministry of Water Resources, River Development
& Ganga Rejuvenation

National Mission for Clean Ganga

Real Time Water Quality Monitoring of River Ganga

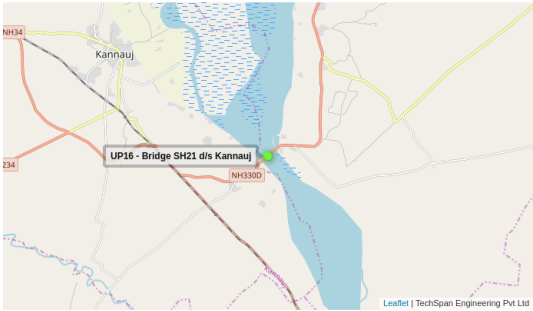
State: Uttar Pradesh UP16 - Bridge SH21 d/s Kannauj

Fit for irrigation (when meeting criteria limits of pH 6 to 8.5 & Electrical Conductivity < 2000 µm/cm)

Fit for propagation of wildlife and Fisheries (when meeting criteria limits of DO ≥ 4 mg/l, pH 6.5 to 8.5 & Free Amonia ≤ 1.2 mg/l)

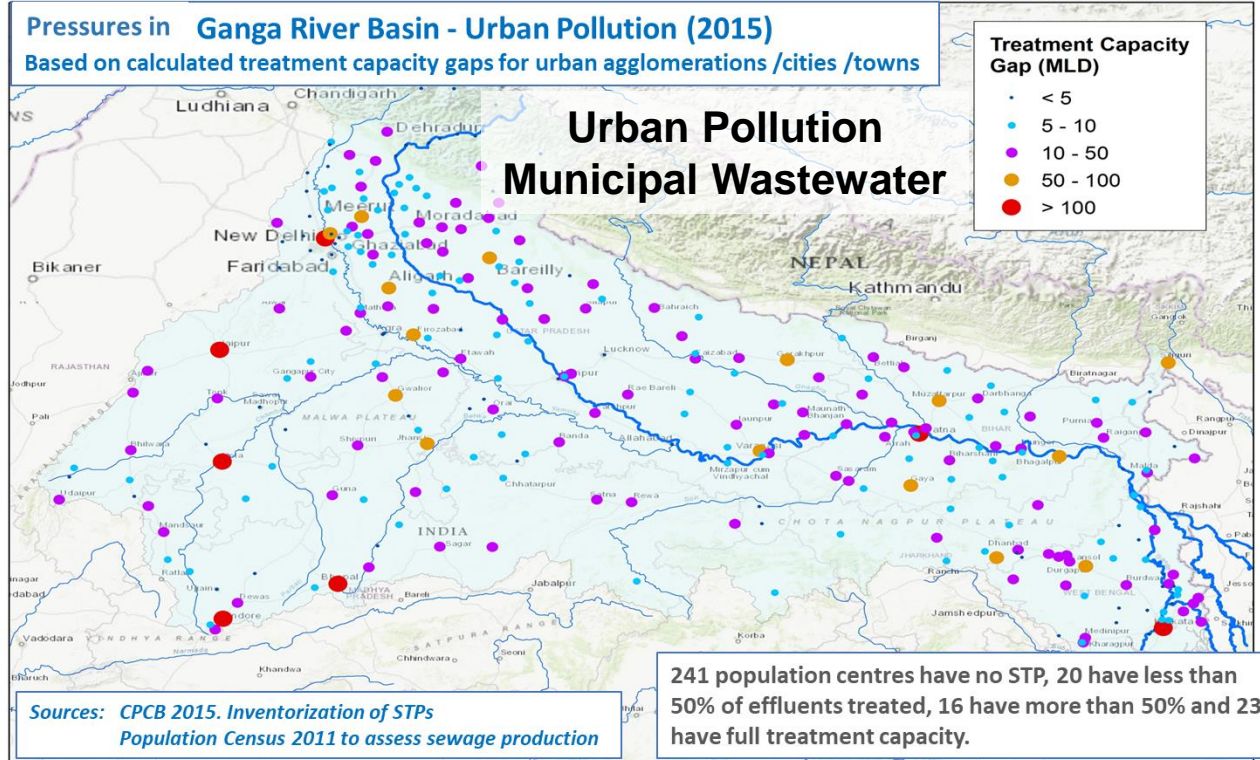
Fit for drinking water (raw) sourcing for conventional treatment (when meeting criteria limits of BOD ≤ 3 mg/l, DO ≥ 4 mg/l & pH 6 to 9)

Fit for Bathing (when meeting criteria limits of BOD ≤ 3 mg/l, DO ≥ 5 mg/l & pH 6.5 to 8.5)



Parameters	Criteria limit (River)	Observed Value
BOD	≤ 3 mg/l	3
DO	≥ 5 mg/l	7.75
EC	< 1000 µm/cm	
pH	6.5 - 8.5	7.91
Temperature	≤ 35°C	22.7
Ammonia	≤ 1.2 mg/l	0.82
Chloride	< 250 mg/l	
COD	< 10 mg/l	9
TSS	< 10 mg/l	9

Hot Spots/Pressures



Vision Ganga 2017

 **NATIONAL MISSION FOR CLEAN GANGA**
Ministry of Water Resources, River Development and Ganga Rejuvenation
GOVERNMENT OF INDIA



VISION GANGA

DECEMBER 2017



Centre for Ganga River Basin Management and Studies
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WHOLESONENESS
OF RIVER GANGA



Source: NMCG (2017) Vision Ganga. Page 14.

Vision Ganga 2017

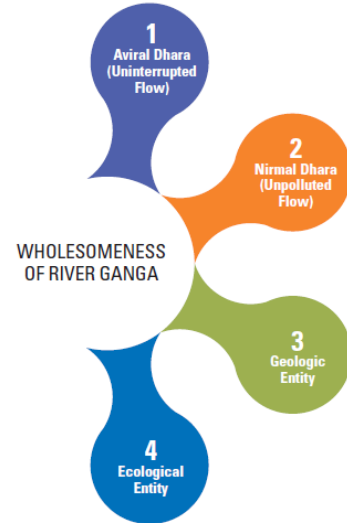
[...] the “**wholesomeness of national river Ganga**”, viewed from a dynamic perspective, was determined in GRMPB to be the **sanctity of the river system** imbibed in the following four points:

I. “Aviral Dhara” (Uninterrupted 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. Hence in-stream barriers, water diversions and barriers to surface runoff must be regulated.”

II. “Nirmal Dhara” (Unpolluted Flow)

“The flow in the Ganga river network is bereft of manmade pollution. hence the river waters in present times should also not be sullied by polluting human activities.”



Source: NMCG (2017) Vision Ganga. Page 14

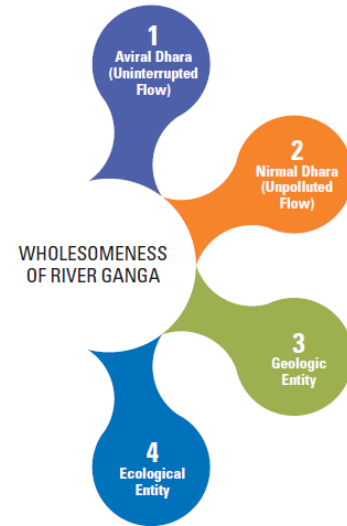
Vision Ganga 2017

III. Geologic Entity

“The Ganga river system is the earth’s creations of ancient times, which may not be reparable if damaged. The geological integrity of the entire basin must therefore be protected.”

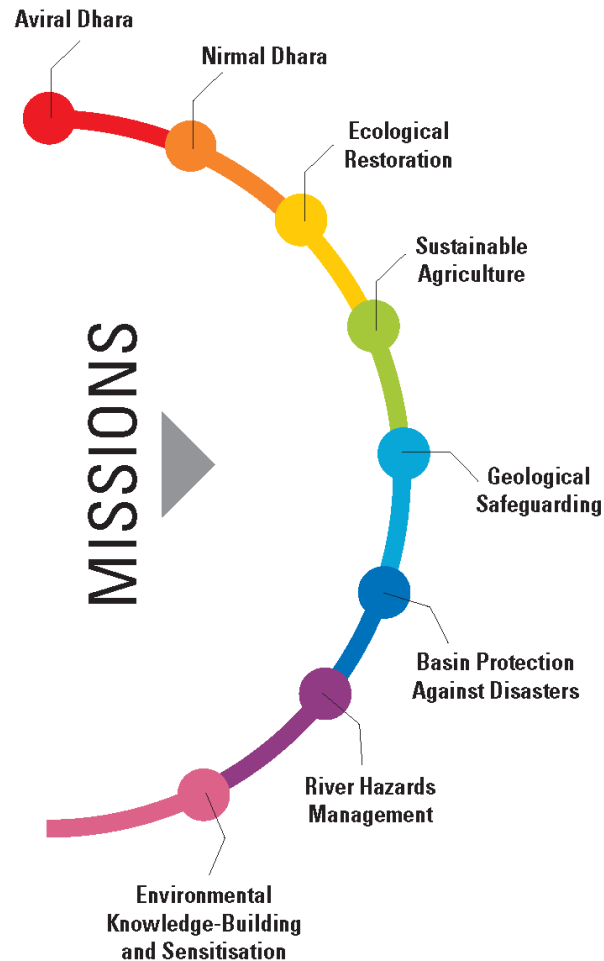
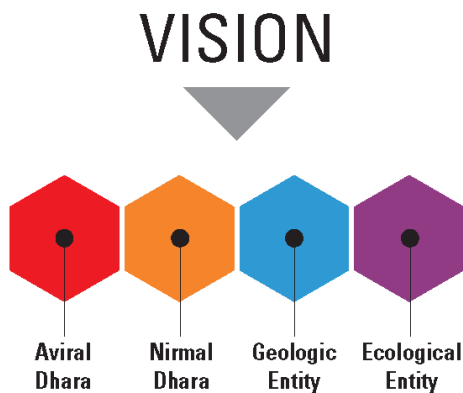
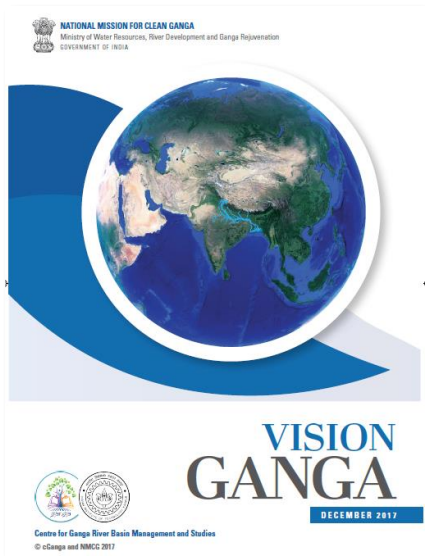
IV. Ecological Entity

“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. Overexploitation and unhealthy interferences with the biophysical resources of the river system must therefore be abandoned outright.”



Source: NMCG (2017) Vision Ganga. Page 14

Vision Ganga 2017 – from Vision to 8 Missions (Objectives)



Vision Ganga 2017 – from Vision to 8 Missions (Objectives)



MISSION 1

Aviral Dhara

- i.** Accurate determination of NRGB's hydrological status.
- ii.** Water resources planning with emphasis on wetlands, forests and distributed groundwater and surface water storages.
- iii.** Increase in water use efficiency through: (a) realistic pricing of fresh water; (b) incentives, technical assistance, and allocation of water rights and entitlements to consumers; and (c) reuse and recycling of water.
- iv.** Policy shift with emphasis on water resource preservation, stakeholder control, expert guidance and regulation.
- v.** Ensuring longitudinal river connectivity and E-Flows at dams, barrages, etc., and new criteria for approving such projects.
- v.** Regulating water withdrawals in water depleting regions.
- vi.** Assessment and monitoring of sediment resources of the network including their quantity, quality and nutrient value.

MISSION 2

Nirmal Dhara

- i.** Management of solid and liquid wastes generated from Domestic/ Commercial Sources.
- ii.** Riverfront development, floodplain management and rejuvenation of water bodies.
- iii.** Management of Industry-generated solid and liquid wastes.
- iv.** Management of Polluted Agricultural Run-off.

MISSION 3

Ecological Restoration

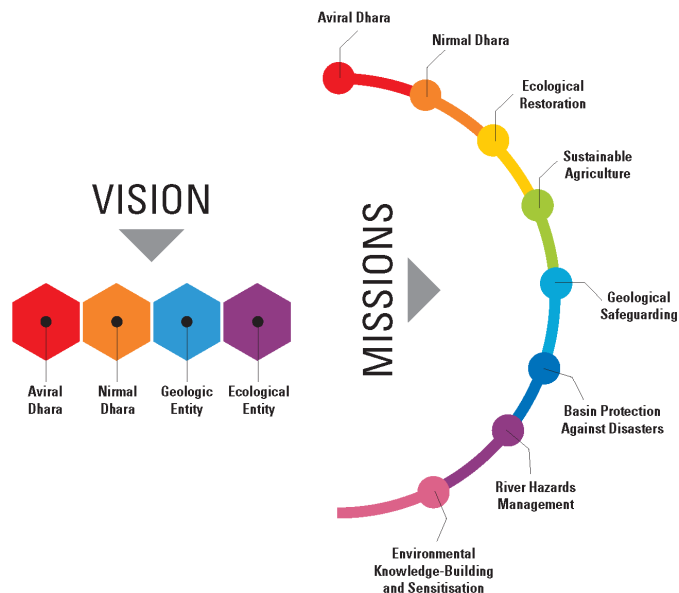
- i.** Restoration of longitudinal connectivity along with E-flows at dams, barrages and other obstructions.
- ii.** Maintenance of lateral connectivity across floodplains.
- iii.** Restoration of unpolluted rivers.
- iv.** Regulation of river bed farming and sand-mining from river beds.
- v.** Regulation of plying of noisy ships, dredging, and river modifications.
- vi.** Control of alien species invasions, overfishing and fishing during spawning seasons.
- vii.** River nutrient assessment and release of sediments trapped behind dams/barrages into downstream river reaches.
- viii.** Long-term bio-monitoring of the Ganga river network.
- ix.** Synergising actions with the Dolphin Conservation Action Plan—2010.
- x.** Comprehensive research on ecological dynamics of the River System.

MISSION 4

Sustainable Agriculture

- i.** Adoption of Conservation Agriculture (no tillage, crop diversification, and mulching), especially in degrading lands, to enhance soil fertility and agricultural output with resource conservation.
- ii.** Promotion of Organic Farming where needed or economically feasible.
- iii.** Beneficial water and nutrient application techniques in rice cultivation, such as SRI (System of Rice Intensification) and Urea Deep Placement.
- iv.** Promoting other established resource conservation technologies.
- v.** Promoting regional (landscape-scale) resource conservation steps to counter monotonous agro-ecosystem impacts.
- vi.** Experimentation, adaptability and flexibility in agriculture to synthesise traditional knowledge with ongoing and future scientific discoveries.
- vii.** Suitable policy measures and strengthening of institutional framework.

Vision Ganga 2017 – from Vision to 8 Missions (Objectives)



MISSION 5

Geological Safeguarding

- i. Control/regulation of geologically hazardous activities including deep groundwater withdrawals, underground excavations, explosions, tunnelling, mining, hydraulic rock fracturing, and operation of large reservoirs.
- ii. Restrictions on geomorphologically harmful land-use practices such as deforestation and construction activities on hill slopes and floodplains, excessive tillage, river bed mining, and river bank modifications.
- iii. Improved drainage of low-lying areas and disturbed areas stabilisation.
- iv. Mapping river migration zones and geological monitoring of basin.

MISSION 6

Basin Protection Against Disasters

- i. Routine hydro-meteorological and biological events should not be countered.
- ii. Ecosystems should be strengthened against catastrophic disasters by preserving wetlands, promoting mixed vegetation and indigenous forests, and curbing human land-use disturbances and encroachments.
- iii. Floodplain regulations and vegetative measures to combat extreme river floods are preferable to embankments/ levees.
- iv. The ecology of Forest Fires and Epidemics & Biological Invasions need to be studied extensively. Until then, active interventions to counter such events should be limited.
- v. Deforestation, road and building constructions, and unsafe debris disposal need to be strictly checked in the Upper Ganga Basin and other hilly regions to minimise land-slides and landslips.
- vi. Early rejuvenation of disaster-struck ecosystems should be aided by re-introducing indigenous species resistant to the specific disaster types and re-creating an enabling physical environment.

MISSION 7

River Hazards Management

- i. Basin scale flood-risk maps should be prepared and linked to an online data base and flood warning system.
- ii. Drainage improvement and land reclamation in low-lying areas should be taken up systematically and urgently.
- iii. Assessment of soil salinity and its mitigation strategy to be taken up with use of salinity resistant crops and soil improvement practices.
- iv. Alternatives to embankments for flood management with emphasis on 'living with the floods' concept must be emphasised; this may include floodplain zoning and other nonstructural approaches.
- v. Research needed on sediment dynamics and its application in river management projects for sustainable river management strategies.
- vi. Some pilot projects may be undertaken in partnership with state governments, e.g.: (a) Reactivation of paleochannels in the Kosi basin and design of flood spillway; (b) Improving drainage congestion caused by unplanned rail/road network; (c) Designing canals to drain water.

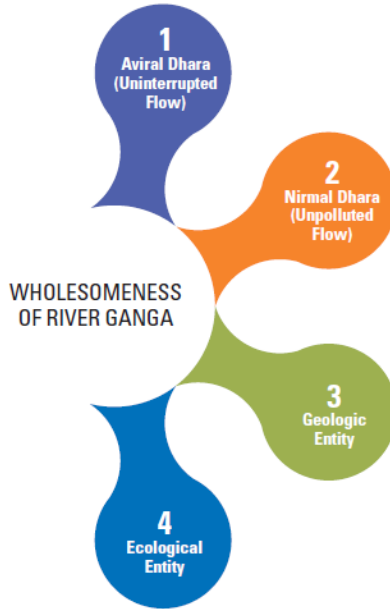
MISSION 8

Environmental Knowledge Building and Sensitisation

- i. Establishment of a comprehensive Data Bank by continuous collection, processing and storage of information on the basin's natural resources, anthropogenic activities, and environmental monitoring of basin.
- ii. Preparation of secondary results (representative parameters, charts, tables, etc.) based on primary data.
- iii. Preparation of documents and materials for easy understanding by non-specialised people.
- iv. Keeping the above information in the open domain for easy access by interested individuals and institutions.
- v. Conducting educational workshops and campaigns with stakeholders and interested citizens to enable their sensitisation and comprehensive understanding of basin processes.
- vi. Conducting ground-level monitoring and field researches of the Ganga River Basin's environment with stakeholder participation.

Vision Ganga 2017 – Missions in UP and UK

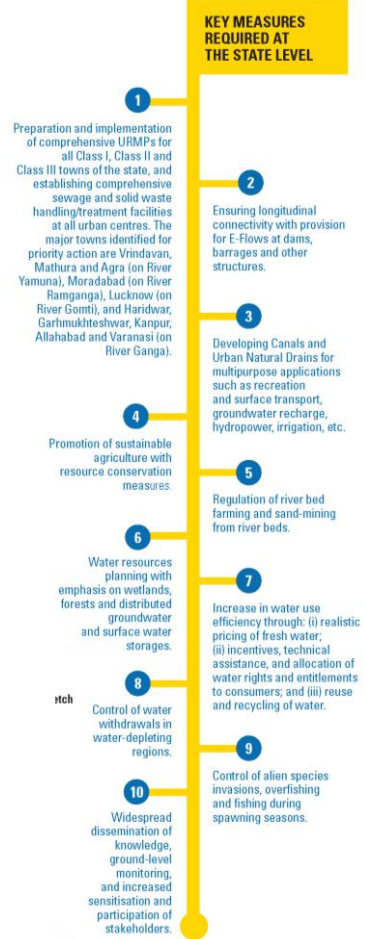
- The Vision Ganga has been drafted in 2017 from the Ganga RBMP.
- It identifies some Strategic Steps and Actions.



Uttarakhand



Uttar Pradesh



Video – Namami Gange Programme Advertisement



Link: <https://www.youtube.com/watch?v=Crfqx4RB3rg> (Duration 4:21 min)

References

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Continued engagement pre and post webinar

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2. E-Learning platform - <http://78.46.247.119/>

(Temporarily hosted on AHT servers and will be transferred to the servers of training institutes.)

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