

Welcome !

**Centre for Ganga River
Basin Management and
Studies, IIT Kanpur**



cGanga

Water Resource

**‘Namami Gange’ to ‘Arth Ganga’:
Building Commonomics**

Organized by



ISRS

and



ISG

Co-Organizer



SUPPORTING PARTNER



KNOWLEDGE PARTNER



Centre for Ganga River Basin Management and Studies [cGanga]



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River Restoration and Conservation

Missions of GRBMP by 7 IITs Consortium (IITC)

1. Aviral Dhara
2. Nirmal Dhara
3. Ecological Restoration
4. Sustainable Agriculture
5. Geological Safeguarding
6. Basin Protection Against Disasters
7. River Hazards Management
8. Environmental Knowledge-Building and Sensitization

15 - 17 November 2022
HICC, Hyderabad

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Samarth Ganga “Able Ganga” A Noble Concept for Rejuvenation and Conservation of Rivers



Dr Vinod Tare
Founding Head – cGanga
&
Team

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Ganga

- **A Biophysical entity that originates in Himalaya and merges in Indian Ocean**
- **Symbol of rivers and represents culture of river in the region, particularly in India**

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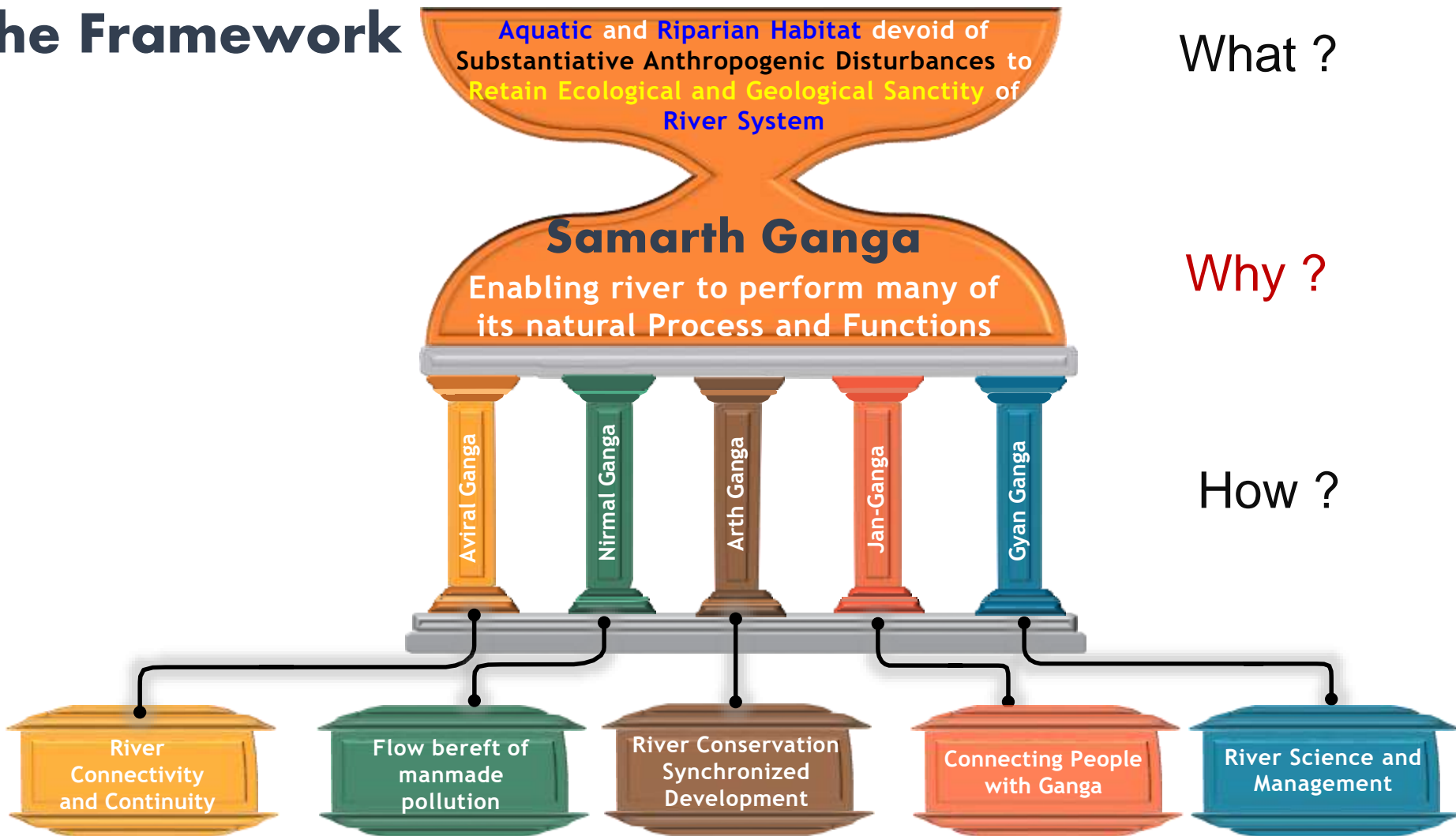


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Samarth Ganga

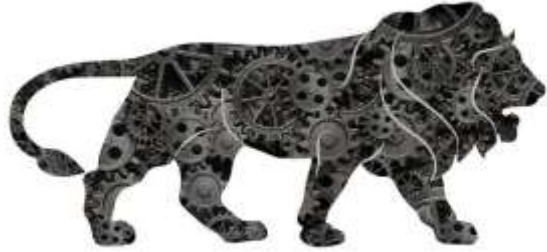
- A river which can perform most of its processes and deliver on many of its functions sustainably
- Deliver on our commitments towards UN SDG

The Framework



“Arth Ganga: River Conservation Synchronized Development”

“अर्थ गंगा: नदी संरक्षण समन्वित विकास”



Faith Leaders, CSO

High on Traditional
Knowledge & Wisdom
Long Term Perspective



Industry, Business,
Contractor Groups

High on Modern Science
Short & Medium Term
Perspective

Implementation – Guiding Principles

1. Apply Modern Science & Technology with Traditional Wisdom;
2. Think Globally but Strat Acting Locally;
3. **Imbibe the Concept of** Vasudhaiv Kutumbkam (वसुधैव कुटुम्बकम्) but participate in preparing, implementing and monitoring a Bottom-up action plan

Arth Ganga

Major Influencing and/or Impacted Sectors



Restoration and Conservation of Small Rivers in a Large Basin - Implementation Challenges

Managing Interests

of Diverse Set of Stakeholders
& Actors

Residence Time & Interest

Elderly/Superannuated or Young/Active
Service

Convergence of 5 Ps

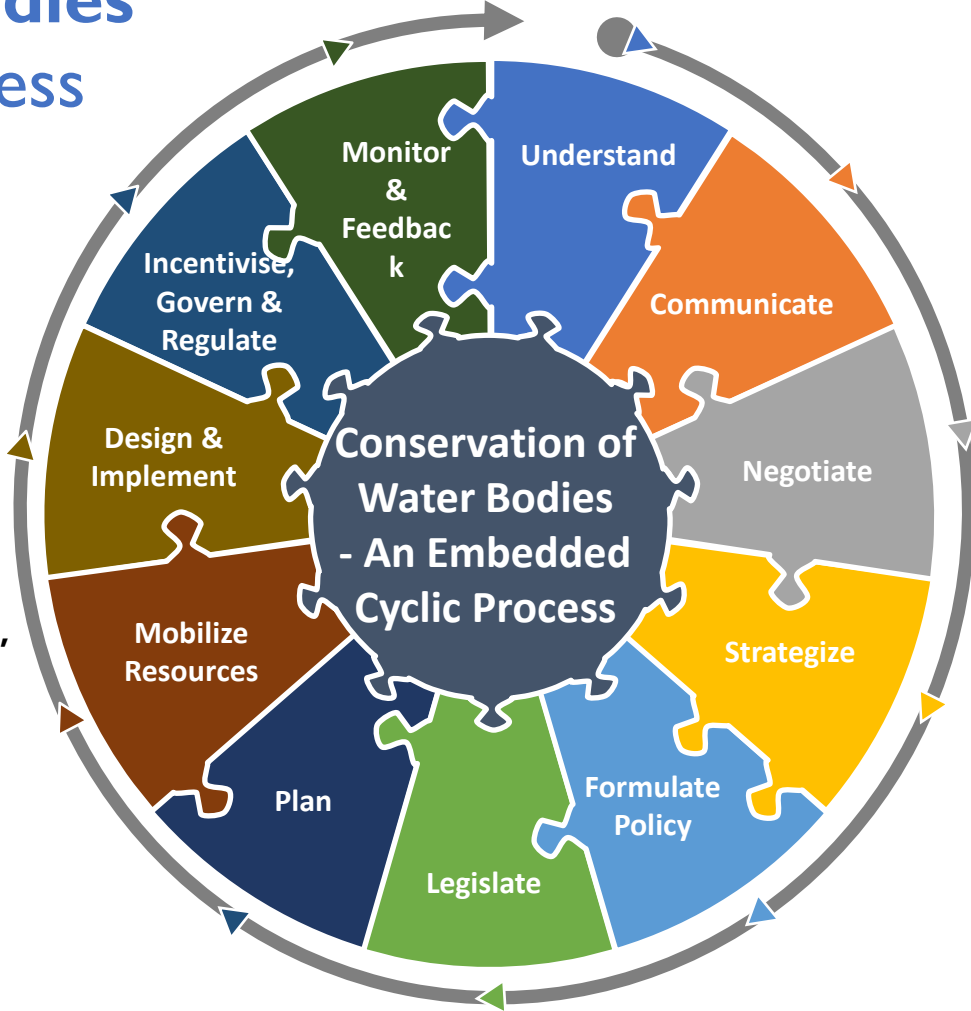
1. People
2. Policies
3. Plans
4. Programmes
5. Projects



Conservation of Water Bodies

— An Embedded Cyclic Process

- **Understanding**
- **Communication**
- **Negotiation**
- **Strategizing**
- **Formulating Policies**
- **Legislations**
- **Planning**
- **Identification of Responsive Agencies, Institutions, Individuals, etc. & Mobilization of Resources**
- **Design & Implementation**
- **Incentives, Governance & Regulation**
- **Monitoring & Feedback**



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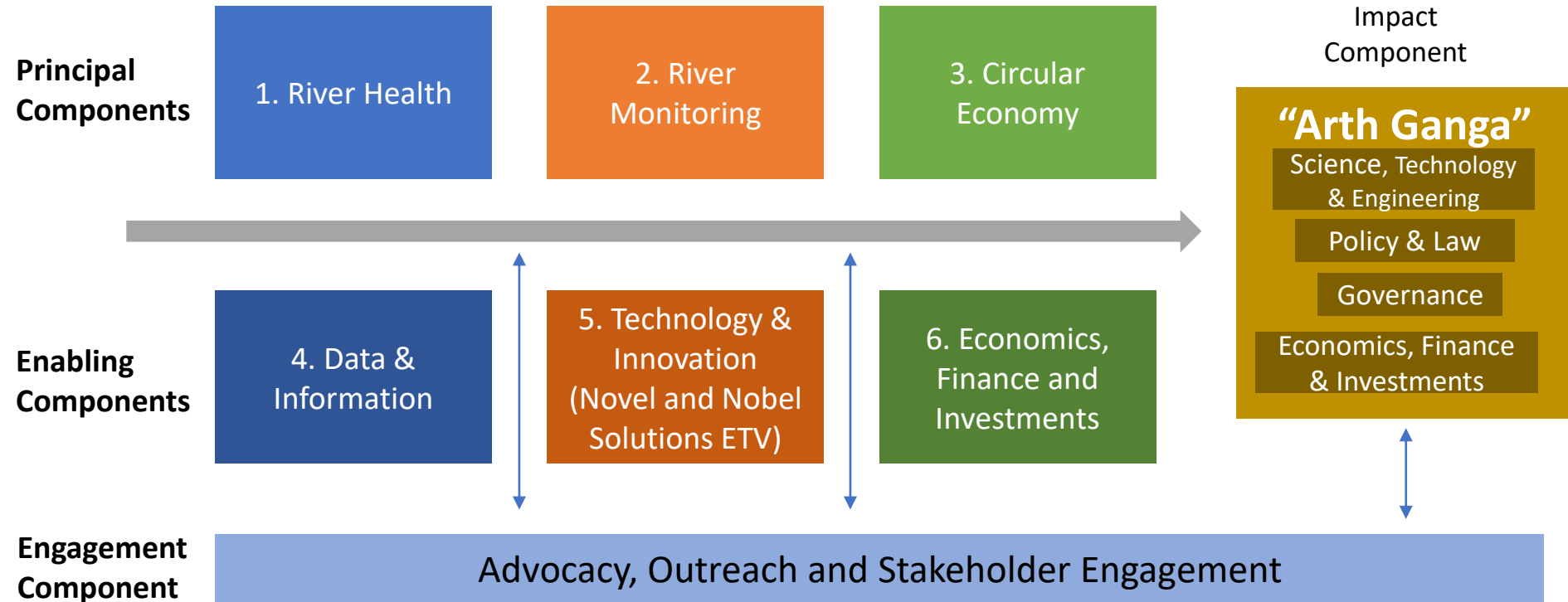


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Framework for **GRBMP 2.0**

[Ganga River Basin Management Plan 2.0]

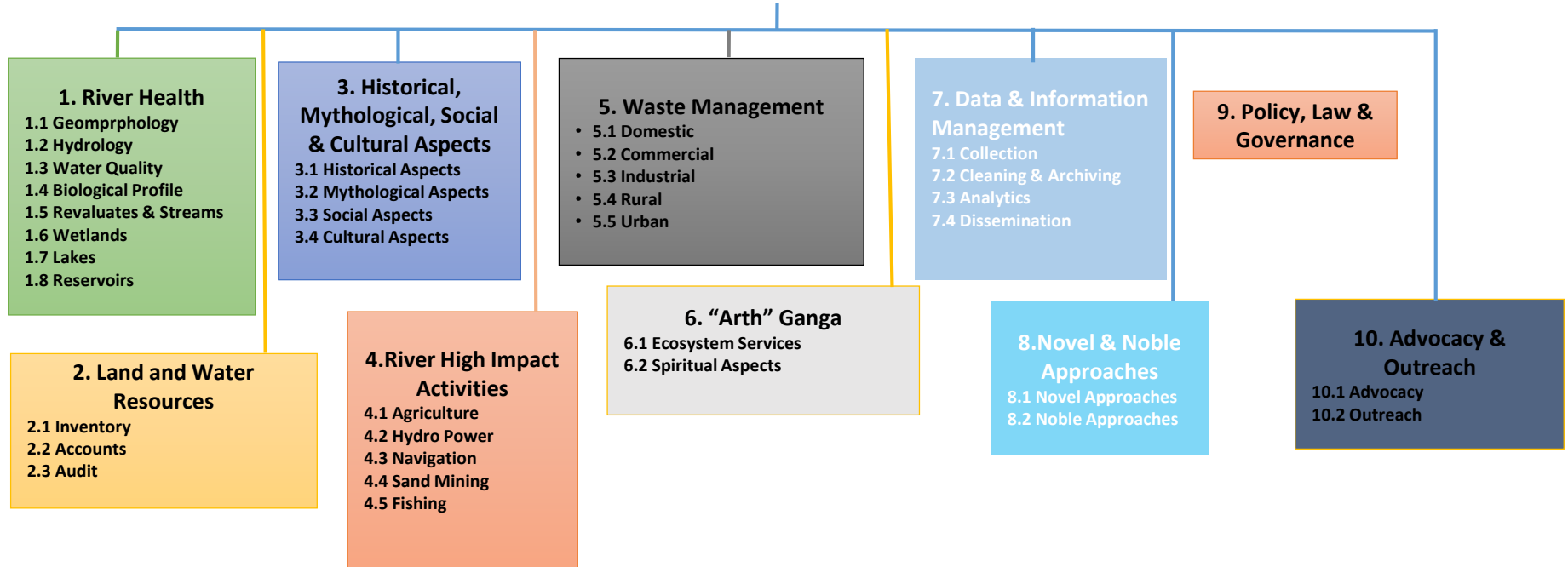
Towards Samarth Ganga



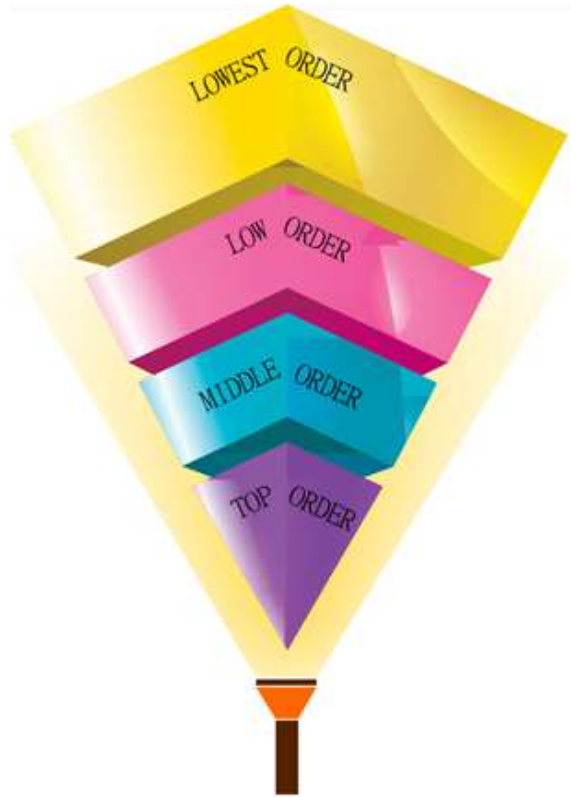
cGanga Portfolios



cGanga Portfolios and Domains



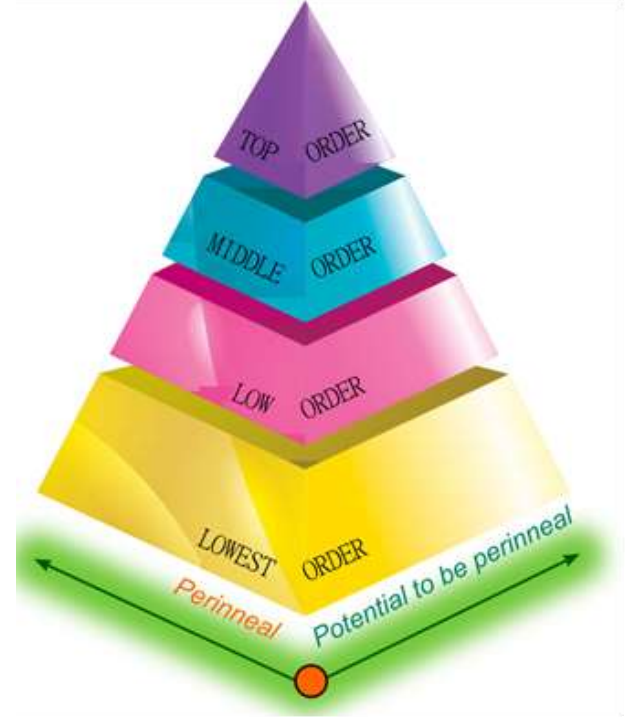
Study and Planning



Useful for strategic planning
But unrealistic to build

Approach

Strategy for Implementation and Execution



Can only construct a right
pyramid for actions on ground

Approach



GRBMP 1.0 (Macro Level Study)

Studies & Planning: Natural Boundaries

Continent

Sub-Continent

Basin

Sub-Basin

River

Tributary

GRBMP 2.0 (Micro Level Study)

Continent

Sub-Continent

Ganga Basin

Kshipra Basin

Kshipra River

Kanh
River

Approach



GRBMP 1.0 (Macro Level Study)

Implementation: Administrative Boundaries

World

Region

Country

State

District

Urban

Rural

URMP

RRMP

GRBMP 2.0 (Micro Level Study)

World

Asia

India

Uttar Pradesh

Balia

Class
I – V Towns

Rural

Balia
Towns

Gram
Panchayats

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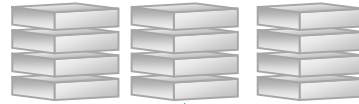


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Basin and District Wise Condition Assessment from “Samarth Ganga” Perspective

Dr Vinod Tare
Founding Head – cGanga
&
Team

Gyan Ganga: Virtual/Digital Library

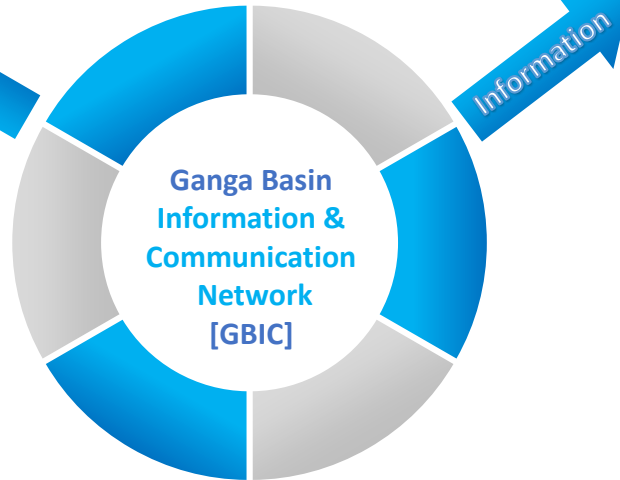


Stakeholders

- ✓ Policy Makers
- ✓ Govt: Central/State/Local
- ✓ NGO/Civil Societies
- ✓ Researchers
- ✓ General Public
- ✓ Tourists
- ✓ Spiritual Leaders
- ✓ Religious Leaders
- ✓ Historians
- ✓ Socialists
- ✓ Lawyers
- ✓ Administrators

Types

- ✓ Historical
- ✓ Economic
- ✓ Forests
- ✓ Water Resources
- ✓ Agriculture
- ✓ Energy/Power
- ✓ Recreational
- ✓ Navigation
- ✓ Floods
- ✓ Pollution
- ✓ Political
- ✓ Laws and Regulations
- ✓ Governance
- ✓ Geographical
- ✓ Geomorphological
- ✓ Ecological
- ✓ Environmental
- ✓ Social
- ✓ Cultural
- ✓ Mythological



festivals & events
video & photography
interviews & stories
facts & myths

Gangalore

news & views

Features

Gangapedia
www.gangapedia.in
 External Social Site

**Virtual Network
 Centre as
 Website**

**Geospatial Data
 Management**

Links to

Gangalaya
www.gangalaya.in

- Observations
- Measurements
- Photographs

Data

- Generation
 - Representation
 - Classification
 - Category
- temporal
 spatial

- Graphs
- Charts
- Maps
- Images
- Movies

classified / unclassified

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1. Digital Catalogue of River Systems

**River Systems: Rivers,
Wetlands, Ponds, Reservoirs
and Aquifers**

National Waterbody Catalogue



**UTTARAKHAND
RIVER ATLAS**

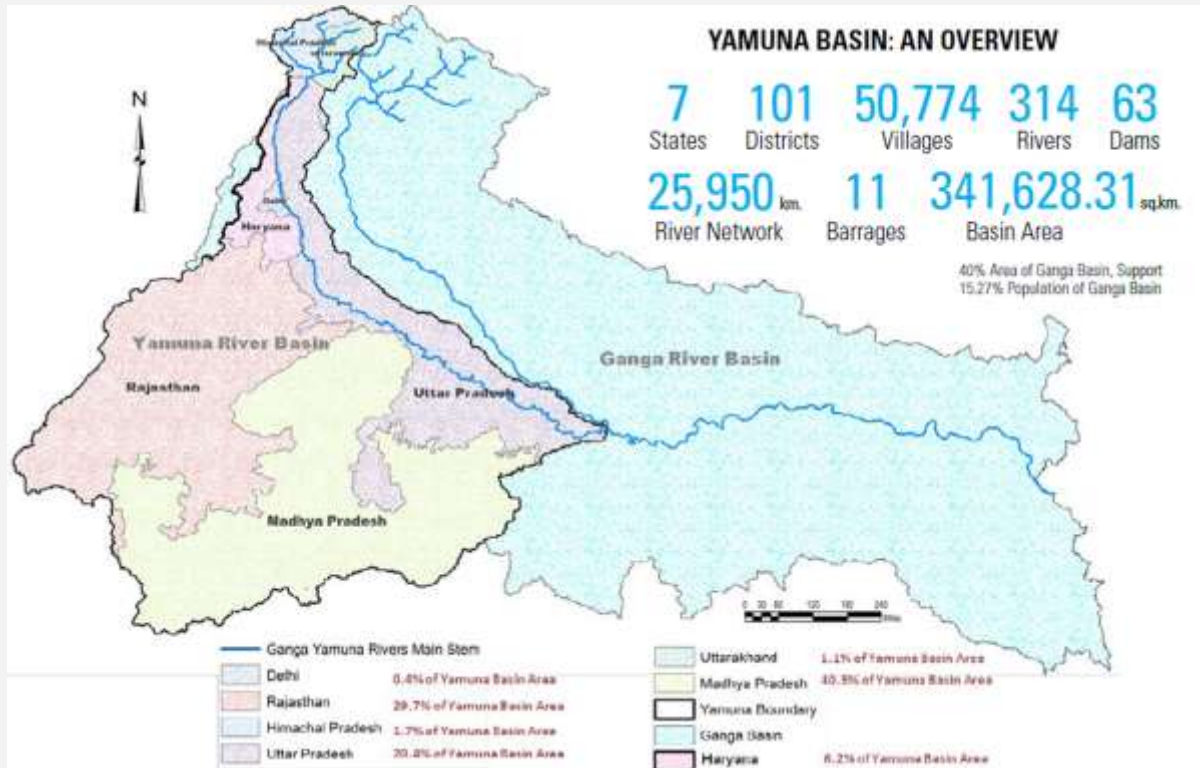


Administrative Delineation

Natural Delineation



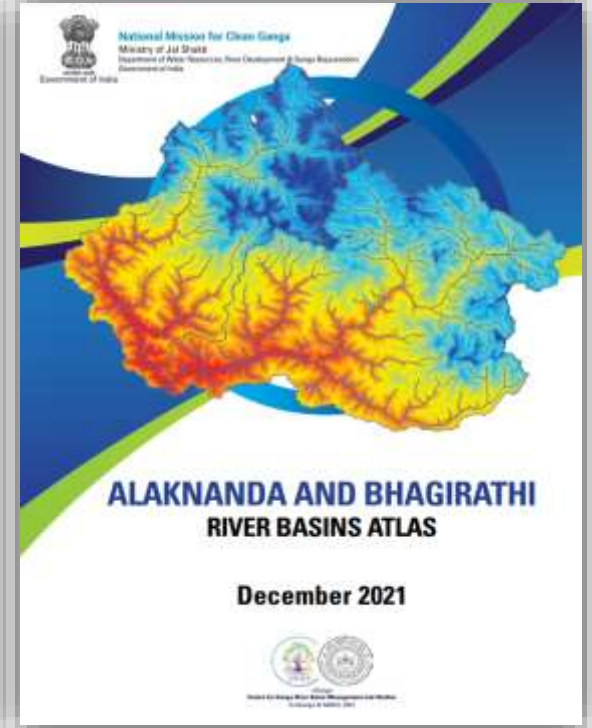
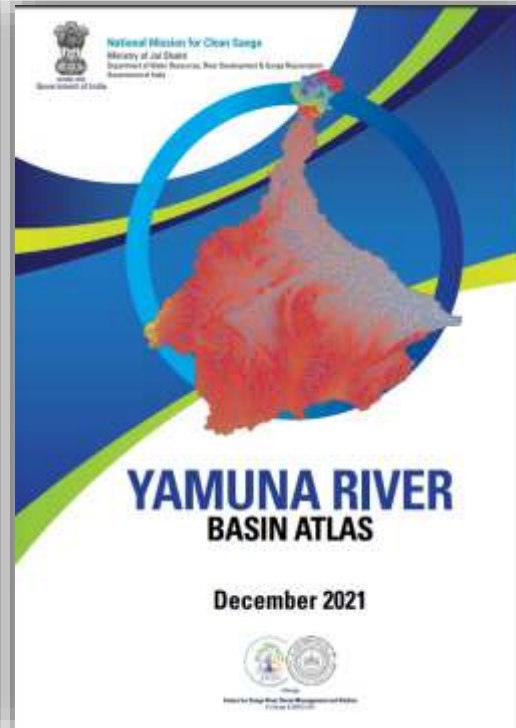
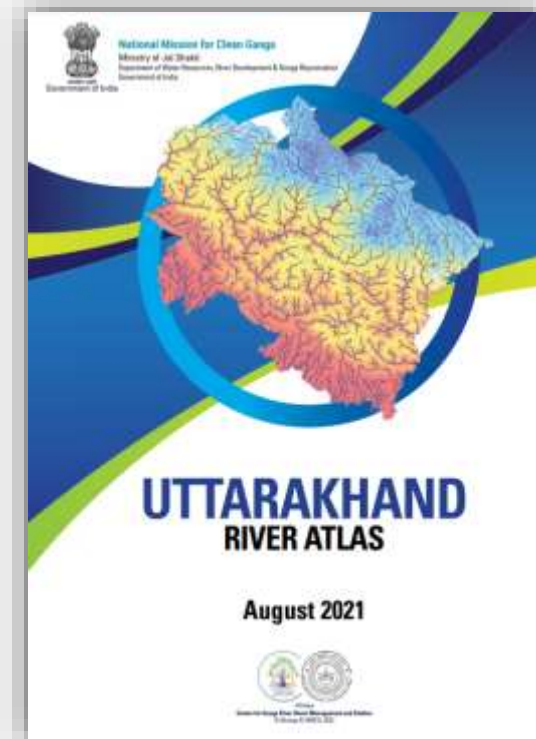
Yamuna River Basins Atlas



Major sub-basins:

- Chambal basin
- Sindh basin
- Betwa basin
- Ken basin
- Utangan basin
- Senger basin
- Najafgarh basin
- Hindon basin
- Tons basin

River Atlas



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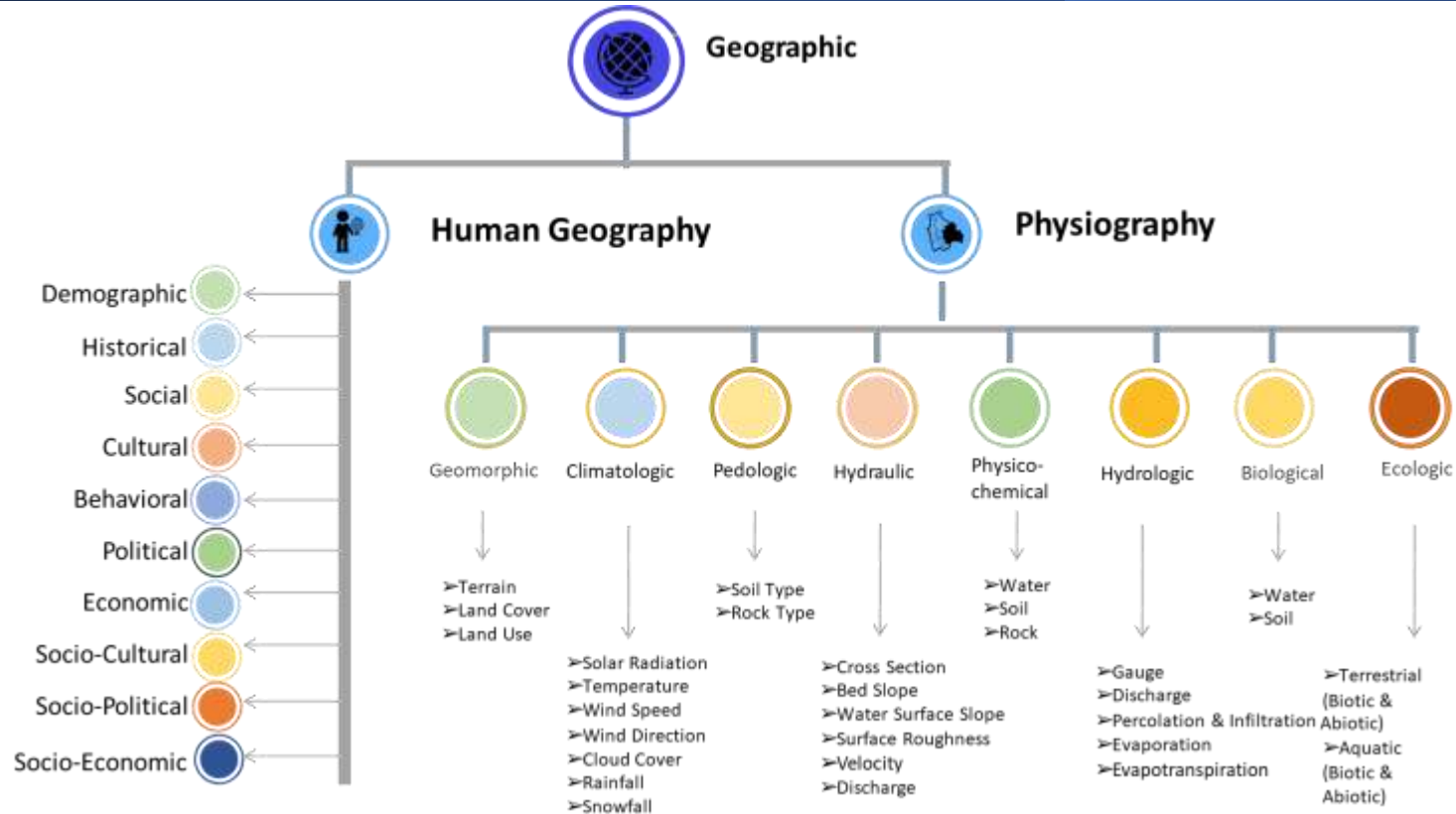


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2. Data and Information

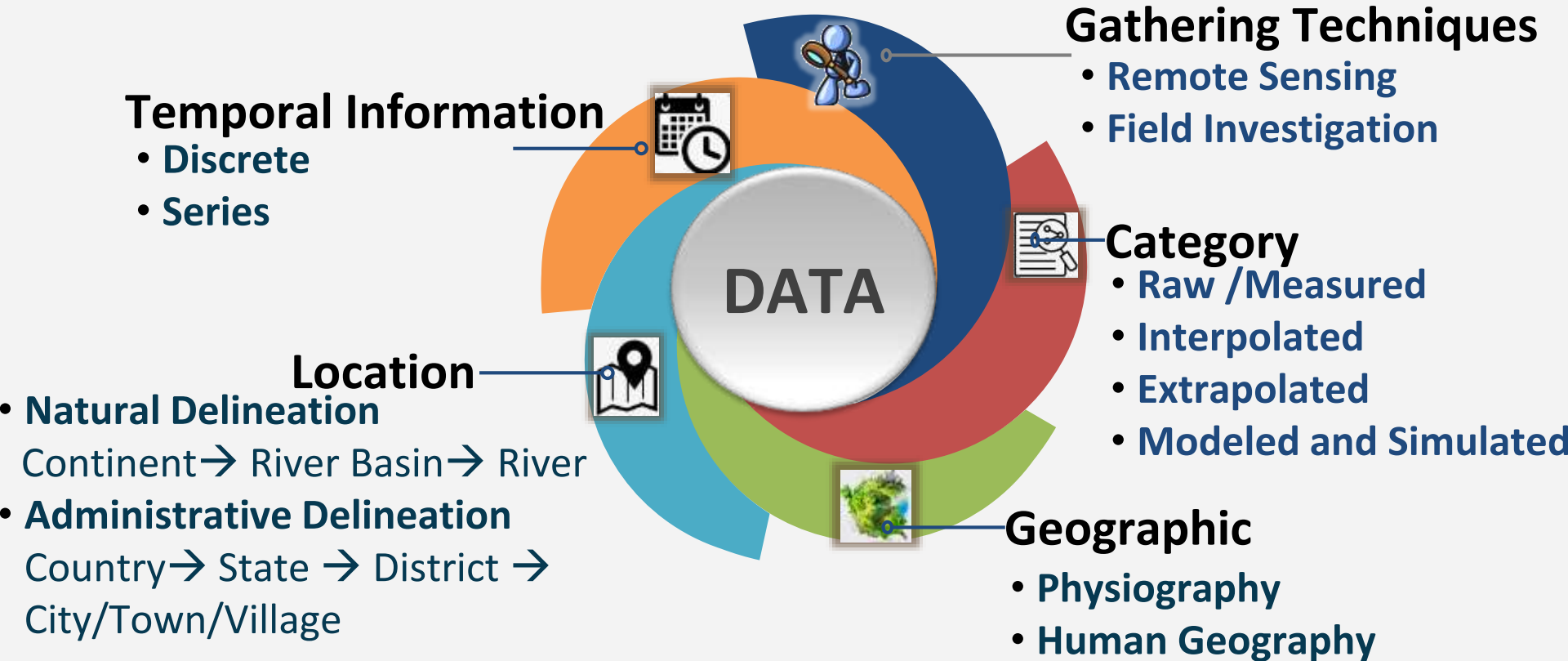
cGanga Data Classification and Metadata Framework

cGanga Database Management Framework



Data and Information

cGanga Data Classification and Metadata Framework



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3. Rejuvenation of 75 Lower Order Rivers in UP under MGNREGA

Technical Support through
BBAU, Lucknow; IIT BHU;
NIH Roorkee & IIT Kanpur

1st Stage



Identification of critical Stretches

Criteria for Critical Stretches

- **Urban/Rural Stretch**
- **Perennial/ Seasonal River**
- **Fragmented channel/ Chain of water-bodies**
- **Oxbow lakes**
- **Encroachment**
- **Eutrophication/algal bloom**
- **Silt deposition**

Steps toward Preparation of DPRs for Critical Stretches

Tracing of rivers on Google Earth.

1

Assessment of river critical stretch using Google Earth timeline.

2

Detailing of critical stretches (coordinates, condition, and other relevant information)

3

Ground truthing and meeting with local administration (BDO, DFO, etc.)

4

Preparation of final validated list of critical stretches and interventions required

5

Preparation of DPR by the concerned departments with technical guidance and support from Team cGanga

6

List of Potential Activities

Potential activities are divided into two categories.

1. River Specific Activities:

- Identification of Rivers land (removal of encroachment)
- Channel restoration, de-siltation/dredging
- Riverbank stabilization
- Restoration of linkage with local waterbodies
- Tapping of rural wastewater, create ponds to release treated water only in river
- Installation of monitoring devices (Gauge/discharge measurement devices)
- Utilization of animal wastes and Cremation

List of Potential Activities

2. General Activities:

- Wastewater Treatment facility development using four-layer treatment technique
- Development of solid Waste management facility in village/panchayat level (Jointly under SBM-Rural and MGNREGA)
- Animal waste management and village level composting and biogas plant (Jointly under SBM-Rural and MGNREGA)
- Development of Surface waterbodies in area with arsenic affected groundwater (Jointly under JJM and MGNREGA)
- Support for organic farming to help reducing the capital cost (Jointly under Agriculture/irrigation and MGNREGA)

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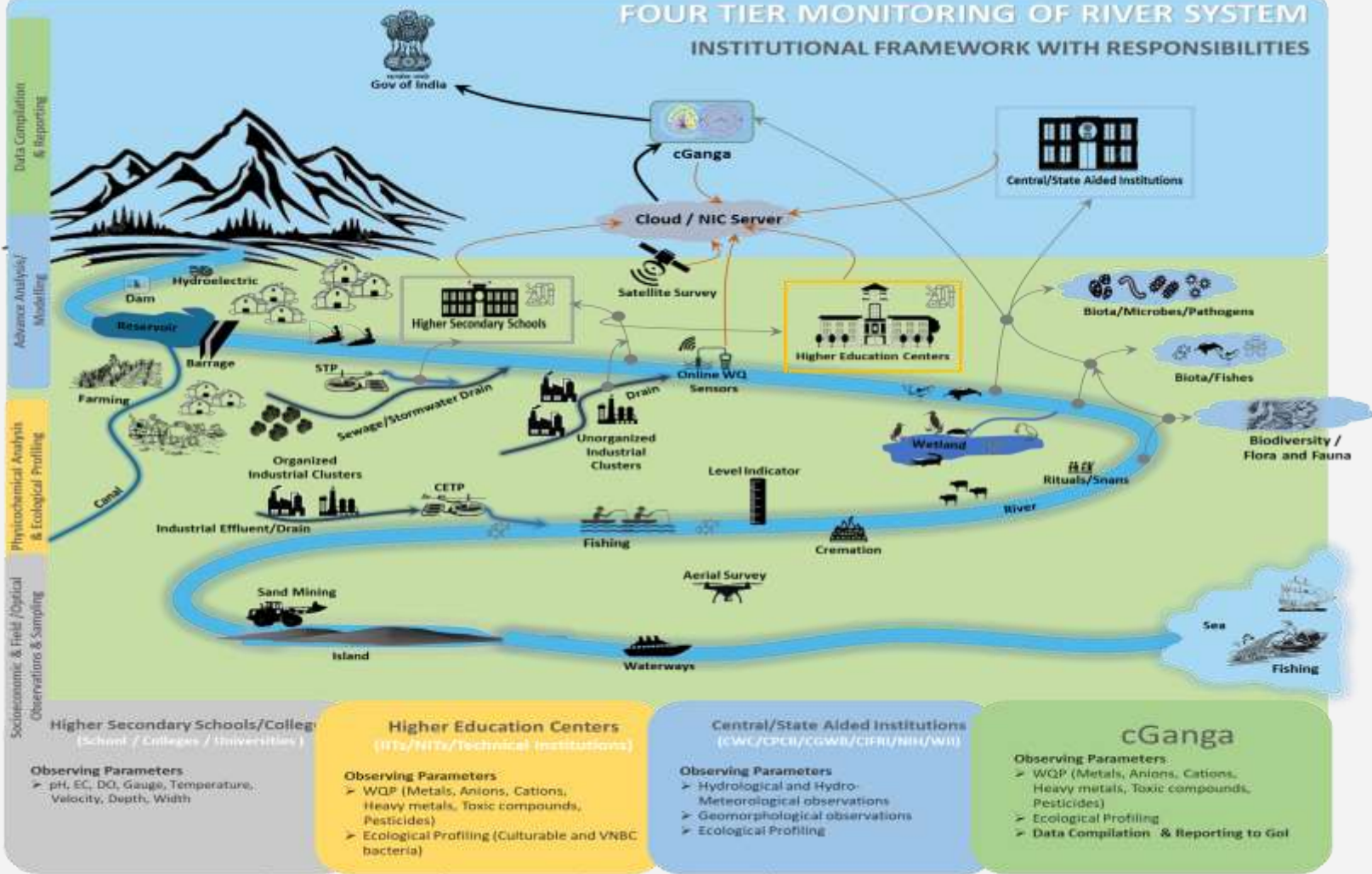
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4. River Monitoring Framework

Four Tier Monitoring System

FOUR TIER MONITORING OF RIVER SYSTEM

INSTITUTIONAL FRAMEWORK WITH RESPONSIBILITIES



Higher Secondary Schools/Colleges
(School / Colleges / Universities)

- Observing Parameters**
- > pH, EC, DO, Gauge, Temperature, Velocity, Depth, Width

Higher Education Centers
(IITs/NITs/Technical Institutions)

- Observing Parameters**
- > WQP (Metals, Anions, Cations, Heavy metals, Toxic compounds, Pesticides)
 - > Ecological Profiling (Culturable and VNBC bacteria)

Central/State Aided Institutions
(CWC/CPCII/CGWB/CIFRI/IRRI/WII)

- Observing Parameters**
- > Hydrological and Hydro-Meteorological observations
 - > Geomorphological observations
 - > Ecological Profiling

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- Observing Parameters**
- > WQP (Metals, Anions, Cations, Heavy metals, Toxic compounds, Pesticides)
 - > Ecological Profiling
 - > Data Compilation & Reporting to GoI

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5. Decentralized Sewage Treatment Restoring Rivers & Other Water Bodies Using Treated Wastewaters

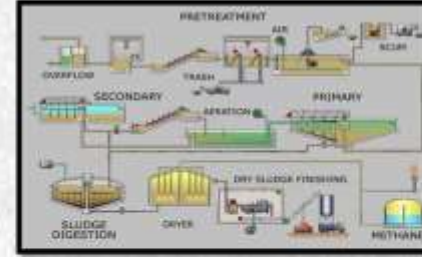
**Sewage Treatment – No
Regret Activity → Planning and
Management**



**Har Ghar Jal
Jal Jeevan Mission**

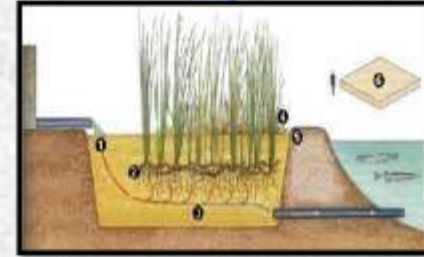
Balancing Anthropogenic and Natural Processes: 4 Layer Treatment Cycle

Household Sewage Generation



First Layer:
Sewage Treatment Plant

Four Layer Treatment Cycle



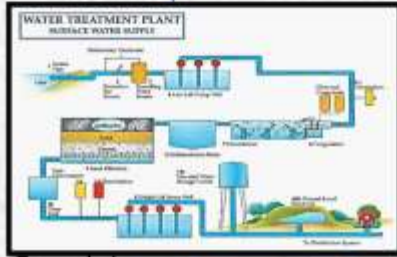
Second Layer:
Treatment through Wetland



Third Layer:
Treatment in Drain/Rivers



Fourth Layer:
Water Treatment Plant



Balancing Treatment Efforts through Manmade and Natural Processes: 4 Layer Treatment Cycle



Treated water for Gardening and Horticulture

**Fountain
(Aeration)**

**Fountain
(Aeration)**

Media

Well

**Channel Simulating
Small River**

Root Zone System

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6. STP Sludge Management

**Master Planning for Sludge
Management in Selected Cities
with Norwegian Support**

Considerations

- Quality and Risk
- Economics
- Financing
- Ease of Implementation

STP Sludge Management

Policy: Existing, Proposed & Changes Required

Value for Efforts Made and Risk Taken

Matrix of Decision Factors



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“Condition Assessment and River Basin Management Plan (RBMP) for 5 River basins” under NRCP

Dr Vinod Tare
Founding Head – cGanga

7th India Water Impact Summit IWIS 2022

Valuing Water | Transforming Ganga

15-17, December 2022 | Dr Ambedkar International Centre (DAIC), New Delhi

Restoration and Conservation of Small Rivers in a Large Basin

“Mapping and Convergence of 5Ps”
(People, Policies, Plans, Programmes & Projects)

www.iwis.cganga.org

15-17 December, DAIC, New Delhi

बड़े बेसिन में छोटी नदियों की बहाली और संरक्षण:
“5P का मानचित्रण और अभिसरण”
(लोग, नीतियां, योजनाएं, कार्यक्रम एवं परियोजनाएं)

Questions, Comments & Suggestions!



Questions, Comments & Suggestions may be sent to
vinod@iitk.ac.in

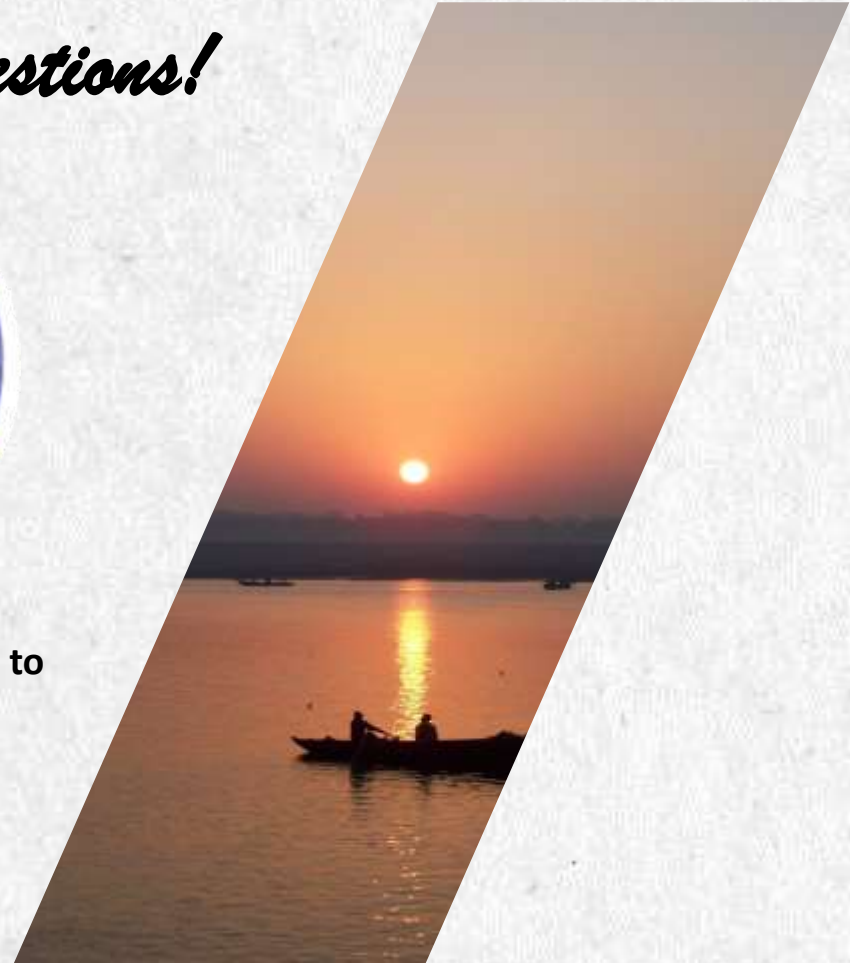
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