

July 2025

National Mission for Clean Ganga

Ministry of Jal Shakti

Department of Water Resources, River Development &
Ganga Rejuvenation, Government of India



A COMPREHENSIVE FRAMEWORK FOR

District River Management Plan [DRMP]



cGanga

**Centre for Ganga River Basin
Management and Studies**

Indian Institute of Technology Kanpur



REPORT PREPARED BY:

Vinod Tare

Former Professor, Founder and Advisor
cGanga, IIT Kanpur

© cGanga & NMCG, 2025

National Mission for Clean Ganga (NMCG)

NMCG is the implementation wing of National Ganga Council which was setup in October 2016 under the River Ganga Authority order 2016. Initially NMCG was registered as a society on 12th August 2011 under the Societies Registration Act 1860. It acted as implementation arm of National Ganga River Basin Authority (NGRBA) which was constituted under the provisions of the Environment (Protection) Act (EPA) 1986. NGRBA has since been dissolved with effect from the 7th October 2016, consequent to constitution of National Council for Rejuvenation, Protection and Management of River Ganga (referred to as National Ganga Council).

www.nmcg.in

Centre for Ganga River Basin Management and Studies (cGanga)

cGanga is a think tank formed under the aegis of NMCG, and one of its stated objectives is to make India a world leader in river and water science. The Centre is headquartered at IIT Kanpur and has representation from most leading science and technological institutes of the country. cGanga's mandate is to serve as think-tank in implementation and dynamic evolution of Ganga River Basin Management Plan (GRBMP) prepared by the Consortium of 7 IITs. In addition to this it is also responsible for introducing new technologies, innovations and solutions into India.

www.cganga.org

Acknowledgment

This document is a collective effort of many experts, institutions and organisations, in particular MIs and PIs of cGanga, Institutions engaged by NRCD in CAMP Project, NMCG, Jal Shakti Ministry, GoI. Contributions to the photographs and images by individuals are gratefully acknowledged.

Suggested Citation

cGanga & NMCG, 2025, A Comprehensive Framework for District River Management Plan (DRMP)

Contacts

Centre for Ganga River Basin Management and Studies (cGanga) Indian Institute of Technology Kanpur, Kanpur 208 016, Uttar Pradesh, India

Author

Vinod Tare

Former Professor, Founder & Advisor, cGanga, IIT Kanpur

A Comprehensive Framework for District River Management Plan (DRMP)

July 2025



**Centre for Ganga River Basin Management and Studies
Indian Institute of Technology Kanpur**



Preface

Rivers are the lifelines of human civilization, shaping ecological, cultural, and economic landscapes for centuries. In India, the health of our rivers is increasingly under pressure from rapid urbanization, industrial growth, agricultural expansion, and changing climatic conditions. Addressing these challenges requires a comprehensive and integrated approach that balances ecological realities with administrative frameworks.

This report, *A Comprehensive Framework for District River Management Plan (DRMP)*, has been prepared with the objective of providing such an approach. While river basin management has traditionally been conceptualized at macro scales, the district is proposed here as the most effective administrative unit for implementation. The DRMP framework integrates the distinct needs of both urban and rural areas, ensuring that interventions are synchronized, holistic, and aligned with the larger vision of the Ganga River Basin Management Plan (GRBMP).

cGanga, a think tank created as a knowledge partner to NMCG in 2016 as a follow-up to the Ganga River Basin Management Plan (GRBMP) submitted by the Consortium of 7 IITs (IITC) in 2015, holds the mandate to support the implementation of the GRBMP and dynamically evolve future versions. It is with this background that cGanga, IIT Kanpur and twelve other Indian premier institutions involved in the Condition Assessment and Management Plan (CAMP) project of the National River Conservation Directorate (NRCD), Do WR, RD & GR, MoJs, Gol for six other rivers of India (other than the Ganga) have been brainstorming on this subject.

This report presents an integrated approach to river management at the district level—an administrative unit most suited for effective implementation. Building upon the Urban River Management Plan (URMP) and aligned with the Ganga River Basin Management Plan (GRBMP), the DRMP framework bridges urban and rural contexts, addressing upstream–downstream linkages, ecological needs, and administrative realities in a unified manner.

Prepared by the Centre for Ganga River Basin Management and Studies (cGanga), IIT Kanpur, with the support of the National Mission for Clean Ganga (NMCG), this framework is intended as a guiding document for policymakers, administrators, and stakeholders to operationalize sustainable river management strategies at scale.

Dr Vinod Tare
Former Professor, Founder & Advisor
cGanga, IIT Kanpur



Contents

S No.		Page No.
	Preface	5
	Executive Summary	9
1	Need for a District River Management Plan (DRMP)	9
2	River Basin Management Studies and Planning to Grounding River Basin Management Plans	10
	2.1. A Hierarchical Approach to Planning (Natural Boundaries)	10
	2.2. The Ground-Level Solution (Administrative Boundaries)	10
	2.3. The DRMP as a Unified Tool for the District	10
3	Present Status	12
	3.1 Synergies and Foundational Strengths	12
	3.2 Gaps and Divergence from the DRMP Concept	13
	3.3 DRMP vis-à-vis URMP	13
4	Importance of a Cyclic Planning Process for River Management	14
	4.1. The Criticality of Understanding, Communication, and Negotiation	15
	4.2. Consequences of a Linear Approach	15
	4.3. Cyclical Framework for Sustainable Management	15
5	Linkage to River Basin Management Plans (RBMPs)	16
6	Definition and Core Concepts of a DRMP of River Systems	16
7	Data and Information Requirements	17
8	Methodology to Prepare a DRMP	18
9	Desirable Structure of a DRMP	19
10	Benefits of a DRMP	19
11	Review of URMP Ayodhya and URMP Kanpur in Light of DRMP Framework	20
	11.1 Synergies and Foundational Strengths	20
	11.2 Gaps and Divergence with DRMP	21
	11.3 Conclusion: A DRMP is Required for Implementation	21
12	Conclusion: The Imperative for a DRMP	22
	References	22
	Policy Framework for Implementation of the District River Management Plan (DRMP)	23
	Proposal for Preparation of Detailed Project Report (DPR) for the District River Management Plan (DRMP) for a Typical District with Kanpur Nagar District as an Example	28



A Comprehensive Framework for District River Management Plan (DRMP)

Executive Summary

India's rivers are facing a severe crisis due to urbanization and unscientific management, underscoring an urgent need for a paradigm shift from a reactive to a proactive, science-driven approach. The District River Management Plan (DRMP) concept serves as the framework for this shift, aiming to manage human activities within an administrative unit to conserve and rejuvenate rivers. A foundational step in this direction is the Urban River Management Plan (URMP) framework, developed by the National Institute of Urban Affairs and National Mission for Clean Ganga (NIUA & NMCG, 2020). The URMP is a commendable and holistic framework that promotes a decentralized approach, stakeholder collaboration, and a data-driven monitoring mechanism (URMindex) in line with GRBMP prepared by IIT Consortium and subsequent efforts made by cGanga as part of developing GRBMP 2.0.

The report identifies critical gaps in the URMP. Its city-centric focus is its primary limitation, as a river is a dynamic ecosystem that functions across a natural basin that rarely aligns with a city's administrative boundaries. This approach fails to address the upstream-downstream continuum, neglects rural areas that significantly impact river health, and risks a fragmented, piecemeal implementation of national mandates like the Ganga River Basin Management Plan (GRBMP). The DRMP is proposed as a logical and necessary evolution of the URMP. By using the district as a cohesive administrative unit, a DRMP inherently integrates urban and rural river segments into a single, comprehensive plan. This provides a more practical and functional mechanism to coordinate actions, ensuring that the progressive ideas of the URMP are realized across the entire landscape. The DRMP, therefore, offers the necessary scale and integration to effectively translate the holistic principles of the GRBMP into tangible, on-the-ground action, making river rejuvenation truly sustainable and resilient.

1. Need for a District River Management Plan (DRMP)

The health of India's rivers is inextricably linked to human activities, with a distinct and often detrimental impact from urban centers and villages. The condition of the Yamuna River, which deteriorates significantly after passing through Delhi, is a stark example of this crisis. Urban areas place enormous pressure on rivers by demanding fresh water, generating polluted wastewater, and increasing stormwater runoff. This leads to rivers becoming shrunk, polluted channels and experiencing frequent flooding during monsoons. Small rivers have been reduced to sewage drains, polluting major rivers like the Ganga and increasing the pressure on them for water supply due to excessive extraction.

A DRMP is therefore necessary to shift from a reactive, post-disaster response to a proactive, preventative approach. Its primary goal is to manage human activities within a geographical unit to conserve and rejuvenate its rivers. This ensures that when a river leaves an

administrative boundary, its ecological status is no worse than when it entered, and if possible, is better.

2. River Basin Management Studies and Planning to Grounding River Basin Management Plans

The effective management of India's rivers requires bridging a fundamental gap: the disconnect between ecological planning, which is governed by natural boundaries like river basins, and administrative implementation, which is bound by political borders like states and districts. The Ganga River Basin Management Plan (GRBMP) can be effectively grounded at the district level by adopting a **District River Management Plan (DRMP)**. This approach, which links urban and rural management strategies, provides a cohesive and actionable framework for a single administrative unit.

2.1. A Hierarchical Approach to Planning (Natural Boundaries)

Effective river management begins with a top-down, holistic planning approach that respects natural boundaries. The process should follow a hierarchical structure, akin to focusing a flashlight from a wide beam to a narrow one (Refer Figure 1). At the highest level, planning considers the entire continent and sub-continent. This narrows down to the specific river basin (e.g., the Ganga Basin) and its major sub-basins (e.g., the Kshipra Basin). The planning process continues down to the level of the main river and its tributaries (e.g., the Kanh River; Refer Figure 1). This "studies and planning" phase, based on natural delineations, provides the scientific and ecological foundation required to understand the river system's dynamics.

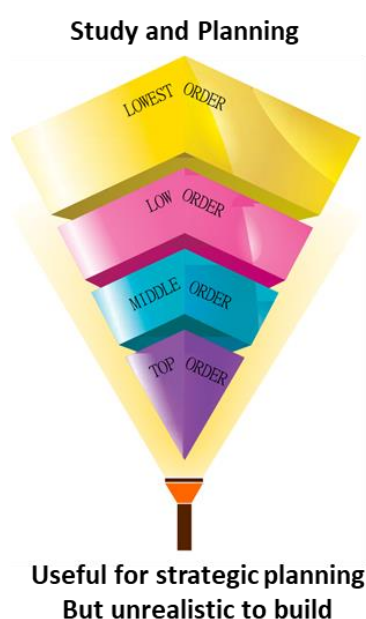
2.2. The Ground-Level Solution (Administrative Boundaries)

For a plan to be successfully implemented, it must transition from these natural boundaries to administrative ones. This is the crux of the DRMP approach. The implementation hierarchy begins with the country (India) and flows down to the state (e.g., Uttar Pradesh), and then to the district (e.g., Ballia; Refer Figure 1). Within the district, the plan is further detailed for urban and rural areas. This is where the DRMP becomes the key operational tool, as it is designed to be implemented within this administrative unit.

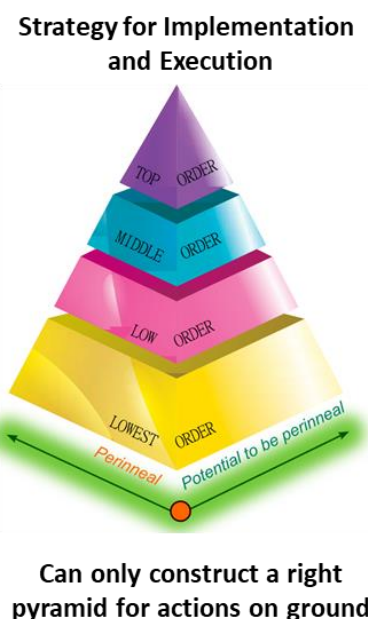
2.3. The DRMP as a Unified Tool for the District

A DRMP is a comprehensive, single plan that integrates the distinct needs of both urban and rural areas within a district. It functions as a combined **Urban River Management Plan (URMP)** and **Rural River Management Plan (RRMP)**. This is a crucial distinction, as urban issues (e.g., drainage, water needs, recreation, domestic and industrial waste, etc.) and rural issues (e.g., sanitation, grey water, agricultural and its residues, livestock and its waste, etc.) are fundamentally different.

In India, urban and rural governance structures policies and programmes are separate. This often leads to fragmented efforts. The DRMP attempts to solve this by positioning the **District Magistrate (DM)** as the central administrative head. The DM is uniquely empowered to oversee the implementation of all central, state, and local schemes within their jurisdiction. This places the authority for a unified, cohesive plan under a single individual, ensuring that urban and rural river management activities are synchronized and that actions in one area do not undermine efforts in another. This approach directly addresses the challenge of implementing basin-level plans through a coordinated, practical, and accountable on-the-ground mechanism.



Approach GRBMP I.0

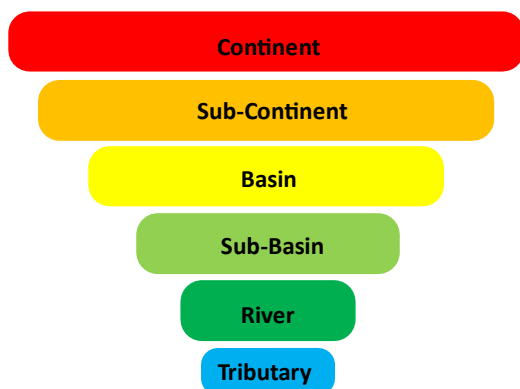


Approach

Studies & Planning: Natural Boundaries

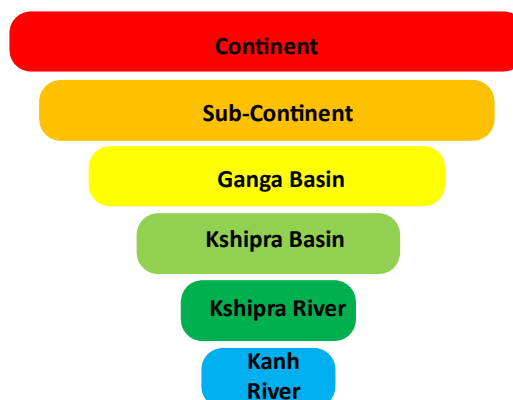


Generic



GRBMP 2.0 (Micro Level Study)

Example



Approach

Implementation: Administrative Boundaries

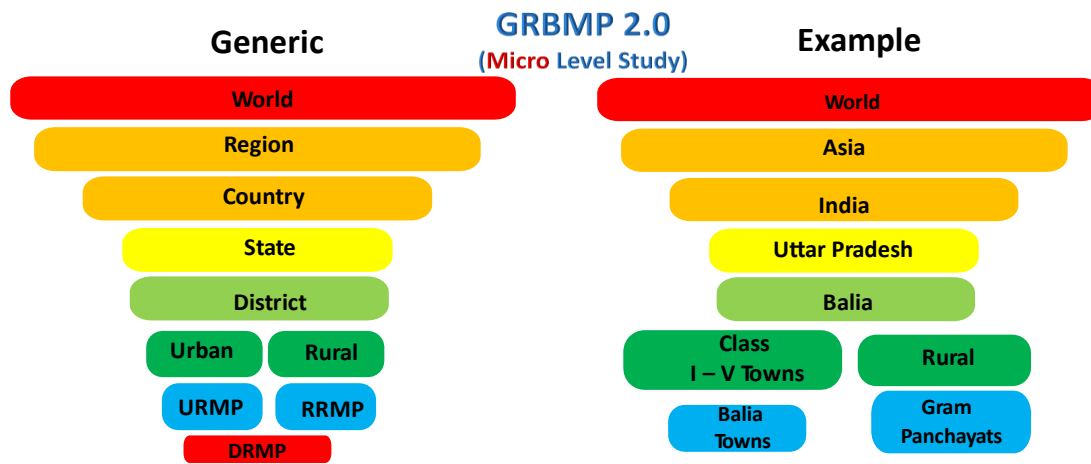


Figure 1: Approach for River Basin Management Strategic Planning as well as Micro Level Studies and Planning, and Actions on Ground

3. Present Status

The idea, need and preliminary framework of Urban River Management Plan was first brought out by the Consortium of 7 IITs (IITC) set up for preparing Ganga River Basin Management Plan by the Ministry of Environment and Forest, GoI (IITC, 2015) for the then National Ganga River Basin Authority (NGRBA). Subsequently, Centre for Ganga River Basin Management & Studies (cGanga) led by IIT Kanpur and supported by the Ministry of Jal Shakti, GoI through National Mission for Clean Ganga (NMCG) was set up to dynamically evolve GRBMP. cGanga as part of its mandate to prepare GRBMP 2.0 has broadened the concept to DRMP considering District as an Administrative Unit for implementation of River Basin Management Plans realizing that studies and planning need to be carried out considering natural boundaries (say River Basin) but for grounding the plan it is necessary to decipher the plan through Administrative Boundaries. NMCG also engaged NIUA (National Institute of Urban Affairs, MOHUA GoI) to further evolve URMP and published a report titled: "A Strategic Framework for Managing Urban River Stretches in the Ganga River Basin". While this framework is a foundational and progressive step, a critical review reveals its strengths and limitations, particularly when viewed in the context of the broader **District River Management Plan (DRMP)** concept as follows.

3.1. Synergies and Foundational Strengths

The URMP framework provides an excellent starting point and shares several key principles with the DRMP approach:

- **Holistic Vision:** The URMP correctly identifies that river health is not merely a technical or engineering challenge but a socio-cultural one, and that effective management must be grounded in a holistic understanding of the river-city relationship. Its three pillars of sustainability—environmental, economic, and social—provide a strong foundation for comprehensive planning.
- **Decentralization and Customization:** The framework promotes a decentralized approach, advocating for small, locally managed STPs and recognizing that interventions should be city specific. The two-part structure, with common objectives and city-specific interventions, ensures a balance between national vision and local realities.
- **Accountability and Public Engagement:** The framework's inclusion of a measurable index (URMindex) for monitoring and evaluation is a vital step toward accountability. Furthermore, it emphasizes the importance of community participation and "citizen science," advocating for a shift from "citizens as spectators" to "citizens as actors" in river management.

3.2. Gaps and Divergence from the DRMP Concept

Despite its strengths, the URMP framework's city-centric approach presents significant gaps and divergences when it comes to the ground-level implementation of a holistic plan like the Ganga River Basin Management Plan (GRBMP).

- **Administrative vs. Ecological Boundaries:** The primary limitation is its focus on a city's administrative boundaries. A river is an integrated, dynamic ecosystem that functions across a natural basin or watershed, which rarely aligns with urban limits. This city-centric approach fails to address the upstream-downstream continuum and the impacts of non-urban areas.
- **Exclusion of Rural Areas:** The URMP is primarily designed for "Class I towns" (population > 1 lakh), leaving rural stretches and smaller settlements largely unaddressed. This creates a critical gap, as the influence of rural portion on river health is "equally significant". A city-specific plan cannot effectively manage the collective impact of these unaddressed rural zones.
- **Fragmented Governance:** The URMP model, if implemented city by city, can lead to fragmented governance. While a common framework exists, the lack of an overarching administrative unit like a district to coordinate urban and rural segments creates potential for conflicting actions and a piecemeal approach. This stands in direct contrast to the GRBMP's vision of a holistic, integrated management framework.

3.3. DRMP vis-à-vis URMP

The DRMP is not a replacement but a logical and necessary evolution of the URMP, designed for the effective implementation of national plans like the GRBMP on the ground.

- **Holistic Integration:** A DRMP, by using the district as its administrative unit, inherently integrates urban and rural river segments into a single, cohesive plan. This ensures that the efforts in a city are not undermined by unregulated activities in adjacent rural areas, thereby addressing the urban-rural synergy that the URMP identifies as a crucial challenge.
- **Coherence with National Vision:** The GRBMP's mandate to treat the Ganga as a "integrated, dynamic ecosystem" can only be truly implemented through a plan that respects the river's ecological boundaries. A DRMP, aligned with the district-level governance structure, provides a more coherent and functional mechanism to achieve this.
- **Actionable Blueprint:** The DRMP provides a more robust blueprint for action by institutionalizing data gathering, planning, and implementation across the entire district, ensuring that the progressive ideas of the URMP are realized across the entire landscape.

URMP is a highly commendable and valuable framework, however, its city-specific nature makes it a partial solution to a whole-basin problem. The DRMP, by expanding this vision to the district level, provides the necessary scale and integration to effectively translate the holistic principles of the GRBMP into tangible, on-the-ground action.

4. Importance of a Cyclic Planning Process for River Management

River basin management (RBM) and district river management (DRM) must be treated as continuous, cyclic processes, not as one-time, linear projects. This approach is essential for ensuring that management strategies are periodically updated and remain effective over time. As illustrated in Figure 2, the planning process involves a series of embedded steps that are designed to build upon one another.

Series of embedded steps

- 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

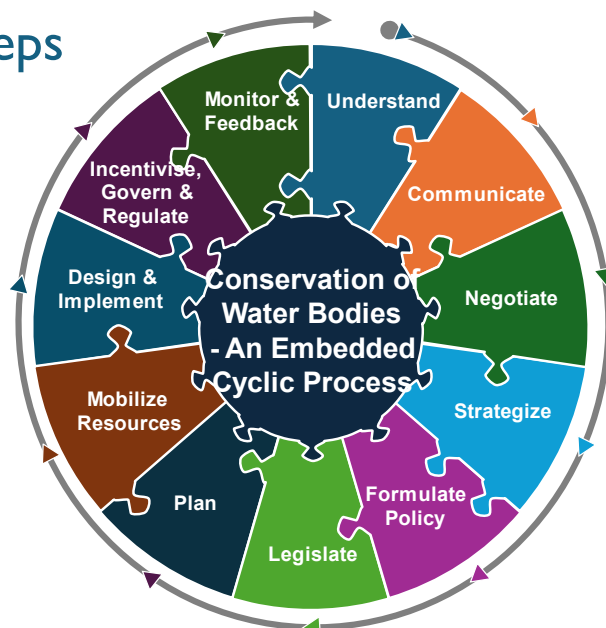


Figure 2: River Basin Planning & Preparation of DRMP — An Embedded Cyclic Process

4.1. The Criticality of Understanding, Communication, and Negotiation

The first three steps of the planning cycle—Understanding, Communication, and Negotiation—are the most crucial for successful and sustainable river management.

- **Understanding:** Effective River Management starts with a deep, science-based understanding of the subject matter. This includes knowing the river's resources, its behaviour, and the pressures it faces. This foundational knowledge, supported by scientific evidence, is indispensable for making informed and rational decisions about a complex and limited resource.
- **Communication:** Once this understanding is established, it must be effectively communicated to all stakeholders and actors involved in the river system. This step is vital for building a shared perspective and ensuring that everyone from policymakers to local communities is aligned on the challenges and objectives.
- **Negotiation:** The reality of river management is that resources are limited and there are multiple stakeholders with often conflicting demands. These conflicts cannot be resolved through unilateral action. Meaningful negotiation, based on the shared understanding of scientific evidence, is the only way to reconcile these conflicts and secure the necessary buy-in for a plan to succeed.

4.2. Consequences of a Linear Approach

The greatest pitfall in river management is the tendency to bypass these initial, critical steps and jump directly to "Design & Implement". This invariably results in a lack of trust among stakeholders, social unrest, and the implementation of plans that are ultimately undesirable and unsustainable. A linear approach, by its nature, is not adaptive and cannot respond to the dynamic changes in a river's ecosystem or the needs of its communities.

4.3. Cyclical Framework for Sustainable Management

The proposed cyclic framework for River Basin Planning and DRMP provides a robust alternative. After the initial steps of understanding, communication, and negotiation, the process moves to:

- **Strategize, Formulate Policy, and Plan:** Here, the collective insights are used to develop actionable policies and plans.
- **Design & Implement:** This is where the physical work begins, from designing infrastructure to executing on-the-ground projects.
- **Monitor & Feedback:** This final step of the cycle is crucial. The outcomes are monitored, and feedback is collected to inform the next "Understanding" phase, starting the cycle anew.

This continuous, embedded process ensures that both the RBMP and the DRMP are living documents that are constantly refined based on real-world outcomes and emerging challenges. It provides a governance model that is not only effective but also transparent, inclusive, and built for long-term sustainability.

5. Linkage to River Basin Management Plans (RBMPs)

A DRMP is a decentralized plan that functions within the broader framework of a River Basin Management Plan (RBMP). The Ganga Basin, for example, is a large natural boundary that spans 11 states and is divided into 274 districts. The governance structure for the Ganga Basin reflects this, with national-level authorities like the National Mission for Clean Ganga (NMCG) as an authority and implementing agency associated with the Department of Water Resources, River Development and Ganga Rejuvenation of the Ministry of Jal Shakti (MoJS) at the first level, State Missions for Clean Ganga (SMCGs) at the second level, etc. This structure extends down to the sub-basin and district levels, with bodies like the District Ganga Committee. The DRMP, therefore, serves as the operational blueprint for river management at the district level, ensuring that local actions align with the overall vision of the larger basin management plan.

6. Definition and Core Concepts of a DRMP

A District River Management Plan (DRMP) is a plan aimed at managing human activities within the administrative boundaries of a district to conserve and rejuvenate its rivers following the “Samarth Ganga” framework as shown in Figure 1 (cGanga & NMCG, 2021). The core philosophy is to minimize urban water withdrawals and stop polluted discharges into rivers.

This is best achieved by **closing the water usage loop** at an appropriate scale (e.g. at a local scale). This means recycling used water within the district through decentralized Sewage Treatment Plants (STPs), natural drains, and water bodies, rather than discharging it into rivers using four-layer concept of water quality alterations as outline in River Restoration and Conservation Manual prepared by cGanga (cGanga & NMCG, 2019). This process serves the dual purpose of protecting rivers from over-exploitation and ensuring local water security. The only annual net input is rainfall, and the net output is evaporation/transpiration, with rivers acting as a link to flush out accumulated salts and nutrients. A key technical consideration in such a closed-loop system is the potential for a gradual build-up of Salinity or Total Dissolved Solids (TDS) in the waterbodies due to continuous recycling. However, this is naturally managed on an annual basis. The rainfall during the monsoon season serves to dilute and flush the recycled water in urban drains and waterbodies, restoring the original low salinity levels each year and ensuring the long-term sustainability of the system.

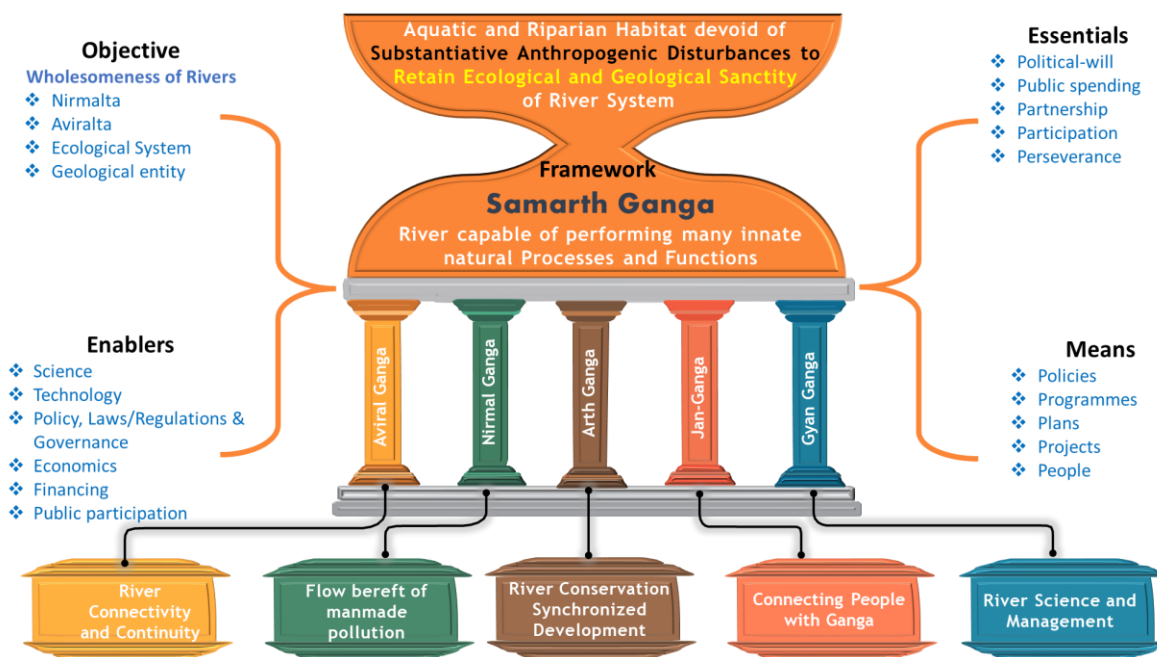


Figure 1: Representation of River Rejuvenation and Conservation Efficacy as an Interplay Amongst Several Aspects

7. Data and Information Requirements

An effective DRMP requires a broad spectrum of data for detailed analysis and planning. This data must cover technical, socio-economic, and environmental dimensions. A comprehensive plan should include:

- **Geospatial Data:** Geographical and administrative boundaries, high-resolution Digital Elevation Models (DEMs), and Land Use & Land Cover (LULC) maps.
- **Hydrological Data:** Daily rainfall data for the last 30 years, groundwater levels, and flow capacity of natural drains.
- **Urban Infrastructure Data:** Maps of the city's Master Plan, sanitation plans, sewerage networks, and the location and capacity of Water Treatment Plants (WTPs) and STPs.
- **Socio-Economic Data:** Population distribution, residential areas, and industrial water usage data.
- **Satellite Imagery:** The plan should utilize data from sources like **USGS (CORONA imagery)** and **AIRBUS (World DEM)** for historical context and micro-level planning.

The case study of Kanpur District highlights the data status, showing that while very limited digitized data is available from agencies like SOI and KNN, substantive efforts have been made by cGanga, IIT Kanpur (cGanga & NMCG, 2025) some other critical data such as high-resolution DEMs, local rainfall, industrial wastewater generation, capacity of drains, flows in rivers while entering and leaving the districts, groundwater extracted by individual household, farmers,

industries & businesses, etc. are not available. This underscores the need for a robust data gathering and digitization effort.

8. Methodology to Prepare a DRMP

The methodology for preparing a DRMP is adaptive, addressing both urban and rural landscapes through a two-stage procedure for each component, corresponding to dry/non-monsoon and monsoon seasons.

Urban Component (URMP)

Stage 1: Urban Water Recycling and Reuse (for ~330 dry days)

- **Identify Outfall Points:** Locate secondary/tertiary sewer outfall points near natural drains and determine sewage flows.
- **Decentralized STP Planning:** Plan for new decentralized STPs near residential clusters to treat sewage.
- **Waterbody Integration:** Divert treated water from STPs into natural drains ("nalas") and then into nearby ponds/lakes for natural polishing and storage.
- **Water Reuse:** Pump water from these water bodies to Water Treatment Plants (WTPs) for reuse within the city.
- **Make-up Water:** Compensate for water lost to evaporation and seepage by drawing marginal amounts from rivers or groundwater, thereby maintaining the water loop.

Stage 2: Urban Monsoon Runoff Management (for ~35 rainy days)

- **Drainage Capacity Assessment:** Use Rainfall Intensity-Duration-Frequency (IDF) curves and catchment characteristics to determine peak runoff rates and check if drains have adequate capacity (CPHEEO, 2019).
- **Flood Mitigation:** Refill water bodies with a portion of the storm runoff and ensure the drainage network can carry surplus runoff to the river. Clear drains of obstructions before the monsoon to prevent flooding.
- **Holistic Solutions:** In low-lying areas, implement solutions like underground drainage or pumping to remove stagnant water.

Rural Component (RRMP)

Stage 1: Water Management during Non-Monsoon (approx. 330 days)

- **Minimize Water Withdrawal:** Reduce direct water withdrawal from rivers for irrigation by promoting effective use of local water sources.
- **On-Farm Water Use:** Implement practices like rainwater harvesting and using rural ponds and natural depressions to store water for livestock and irrigation.
- **Animal Husbandry Waste Management:** Develop and promote systems for the collection and treatment of animal waste (dung and urine) to prevent it from contaminating local water bodies and runoff into rivers. This could include community-level biogas plants or composting facilities.

- **Wastewater Treatment:** Use natural wetlands or filtration systems to treat water contaminated by livestock and other sources before it re-enters the local water cycle.

Stage 2: Flood Management during Monsoon (approx. 35 days)

- **Flood Prevention:** Ensure that natural drainage paths, streams, and village ponds are clear of blockages and silt to handle excess runoff from heavy rains.
- **Groundwater Recharge:** Use the monsoon season to replenish groundwater and refill local water bodies, which can dilute any salinity buildup from the dry season.
- **Preventing Pollution:** Prevent agricultural runoff, which may contain chemicals from fertilizers, from flowing directly into the main river during storms.

9. Desirable Structure of a DRMP

An effective DRMP should include a detailed set of components to ensure a symbiotic relationship between a district and its rivers.

- **Waste Management:** A plan for the collection and treatment of liquid waste, solid waste, and STP sludge. Ensuring separation of untreated sewage and stormwater.
- **Storm Water Management:** Strategies for managing monsoon runoff, including improving drainage systems and linking water bodies to control flooding.
- **Conservation:** A plan for conserving river areas and surrounding water bodies, creating habitats and spaces for human-river interaction.
- **Blue and Green Infrastructure:** Planning for the preservation of wetlands, surface water bodies, and vegetation that are important for ecological health.
- **Multipurpose Use:** Planning for using rivers for cultural, recreational, and other socio-economic activities, ensuring no adverse effects on river health.
- **Transparency:** The plan should be transparent, publicly accessible, and clearly outline the benefits, accountability, and phased implementation timeline.

10. Benefits of a DRMP

A DRMP is a strategic economic investment that goes beyond environmental duty. Its benefits include:

- **Increased Water Security:** By closing the water loop and reusing treated wastewater, cities can reduce dependence on fresh water and enhance local water security.
- **Public Health and Productivity:** Clean water bodies directly improve public health by reducing water-borne diseases, which in turn leads to a healthier and more productive workforce.

- **Economic Development:** The rejuvenation of water bodies can boost tourism, recreation, and property values, while the infrastructure required for these projects creates new jobs and promotes innovative technologies.
- **Disaster Risk Reduction:** Protecting floodplains and wetlands reduces the risk of flooding and protects urban infrastructure, saving significant costs on repairs and reconstruction.
- **Monetization of Ecosystem Services:** Healthy water bodies provide ecosystem services like natural water purification, which creates long-term economic value for the city.

11. Review of URMP Ayodhya and URMP Kanpur in Light of DRMP Framework

The Urban River Management Plan (URMP) documents for Ayodhya and Kanpur represent a monumental step toward sustainable river management in India. Developed under the framework by the National Mission for Clean Ganga (NMCG) and the National Institute of Urban Affairs (NIUA), they embody a progressive, holistic approach (NIUA & NMCG, 2021; NIUA & NMCG, 2023). However, in the context of a comprehensive District River Management Plan (DRMP), these URMPs, while excellent starting points, reveal both synergies and critical gaps in their ability to translate the overarching vision of a plan like the GRBMP into effective, on-the-ground action.

11.1. Synergies and Foundational Strengths

Both the Ayodhya and Kanpur URMPs demonstrate strong alignment with the core principles of a DRMP:

- **Holistic Vision and Three Pillars:** Both plans are built on the foundational principles of sustainable development—environmental, economic, and social—with a set of ten common objectives. This holistic vision, which treats the river as a valuable asset rather than a mere drain, is a direct synergy with the DRMP approach.
- **Decentralization and Stakeholder Collaboration:** Both URMPs advocate for decentralized solutions, such as locating STPs to reuse treated water in local drains, thereby closing the water loop within the city. The formation of dedicated working groups, comprising officials from various departments (e.g., Jal Nigam, Forest, Tourism, Pollution Control) and NGOs, is a prime example of the multi-stakeholder governance model essential for a successful DRMP.
- **Data-Driven and Quantifiable:** Each plan undertakes a baseline assessment to identify issues and data gaps, a crucial first step for any science-based plan. The use of a quantifiable metric like the

Urban River Management Index (URMindex), with its ten indicators, provides a transparent mechanism for monitoring and accountability, which is a key component of the DRMP framework.

11.2. Gaps and Divergence with DRMP

Despite these synergies, the URMP framework's city-centric nature creates significant gaps that a DRMP is designed to fill. This is the core divergence and the justification for its necessity on the ground.

- **Administrative vs. Ecological Boundaries:** The URMP is inherently limited to a city's administrative boundaries—the Ayodhya Nagar Nigam (ANN) and Ayodhya Development Authority (ADA) limits, and the Kanpur Nagar Nigam (KNN) limits. A river, however, is an integrated ecosystem that functions across a natural basin, which rarely aligns with these administrative divisions. This city-centric approach fails to address the upstream-downstream continuum and the ecological impacts of non-urban areas.
- **Exclusion of Rural Stretches:** The DRMP framework emphasizes an "urban-rural synergetic model", recognizing that rural areas and villages have an equally significant, though different, impact on a river's health. In Ayodhya, for example, the document notes that the opposite bank of the Sarayu river has minimal anthropogenic activity but also acknowledges that these pristine areas are planned for future inclusion in the expanded ADA limits. Similarly, in Kanpur, the plan focuses heavily on urban pollution, while noting that the Pandu River is polluted by waste from the city, and Ganga faces pollution from upstream towns. A URMP, by its very definition, is ill-equipped to manage the rural landscape that feeds into the river within a district.
- **Fragmented Implementation of GRBMP:** A central challenge of implementing a holistic plan like the **Ganga River Basin Management Plan (GRBMP)** is ground-level fragmentation. The GRBMP's vision of treating the Ganga as a single, dynamic ecosystem cannot be achieved through a piecemeal, city-by-city approach. The **DRMP**, by using the district as a cohesive administrative unit, provides a more practical and functional mechanism to coordinate actions across both urban and rural segments, thus directly translating the GRBMP's holistic principles into a unified, actionable blueprint.

11.3. Conclusion: A DRMP is Required for Implementation

The URMPs for Ayodhya and Kanpur are not the ultimate solution but are vital first steps toward a **DRMP**. The documents' own findings—on incomplete data, the existence of a fragile riparian zone, and the prevalence of on-site sanitation systems in non-sewered areas—all point to the need for a more comprehensive, district-wide strategy. The DRMP is a logical and necessary evolution of the URMP. It expands the foundational principles of holistic planning and decentralization to the more appropriate scale of a district, thereby bridging the critical

gap between administrative boundaries and ecological reality. By doing so, it provides the necessary scale and integration to effectively implement national mandates like the GRBMP on the ground, making river rejuvenation efforts truly sustainable and resilient.

12. Conclusion: The Imperative for a DRMP

The Urban River Management Plans (URMPs) for Ayodhya and Kanpur represent a monumental and commendable first step toward river rejuvenation, offering a data-driven, holistic, and decentralized framework for urban centres. However, as this report has demonstrated, their city-centric approach, while progressive, remains a partial solution to a whole-basin problem. A river is a single, integrated, and dynamic ecosystem that functions across a natural basin, a reality that administrative boundaries, by their nature, fail to capture. The implementation of a national mandate like the Ganga River Basin Management Plan (GRBMP), which envisions treating the Ganga as a holistic entity, cannot be achieved through a fragmented, piecemeal approach. The DRMP, by using the district as a cohesive administrative unit, emerges as the logical and necessary evolution of the URMP. It provides the crucial scale and integration required to bridge the gap between ecological planning and ground-level implementation, ensuring that both urban and rural segments are managed in a synchronized manner. By championing this integrated, district-wide strategy, we can translate the progressive ideas of the URMP into tangible, on-the-ground action, making our river rejuvenation efforts truly sustainable and resilient for generations to come.

References

- cGanga & NMCG (2019). *River Restoration and Conservation: A Concise Manual and Guide*.
- cGanga & NMCG (2021). *Samarth Ganga: Arth Ganga Framework with Case Study of Bulandshahr*.
- CPHEEO, May 2019. *Manual on Storm water Drainage systems Volume 1*. Ministry of Housing and Urban Affairs, GoI.
- NIUA & NMCG (2020). *A Strategic Framework for Managing Urban River Stretches in the Ganga River Basin: Urban River Management Plan (URMP)*.
- NIUA & NMCG (2021). *Urban River Management Plan: Kanpur*.
- NIUA & NMCG (2023). *Urban River Management Plan: Ayodhya*.

Policy Framework for Implementation of the District River Management Plan (DRMP)

Executive Summary for Policy Makers

India's river rejuvenation efforts—anchored in the Namami Gange Programme—require a local, accountable framework that translates basin-level vision into district-level action. The District River Management Plan (DRMP), proposed by cGanga under the aegis of NMCG, positions the district as the fundamental administrative unit for integrated river governance. DRMP operationalizes the Samarth Ganga Framework and National Water Policy (2012) by ensuring convergence of rural and urban interventions, participatory monitoring, and outcome-based planning. Its objectives are to institutionalize river-centric planning at the district scale, improve water quality and flow regimes through coordinated action, generate livelihood opportunities through eco-restoration, and establish transparent monitoring through the District River Management Index (DRMIndex). Implementation follows a four-tier governance structure (National–State–District–Community) supported by digital data systems and adaptive planning cycles. Expected outcomes include measurable improvement in river health, administrative convergence, enhanced water security, and community stewardship.

Executive Summary

Rivers are integral to India's ecological and socio-economic well-being. The District River Management Plan (DRMP), developed by cGanga under NMCG, operationalizes integrated river management at the district level by uniting urban and rural governance. The DRMP ensures that each district functions as a coherent ecological and administrative unit, aligning with the Samarth Ganga Framework and National Water Policy (2012) to deliver water security, pollution control, and sustainable livelihoods under the supervision of the District Magistrate.

1. Background and Rationale

Rivers form the ecological, cultural, and economic foundation of India. Despite major programmes such as Namami Gange, many stretches remain polluted due to fragmented implementation. The Ganga River Basin Management Plan (GRMBP) provides the scientific framework, but convergence between hydrological and administrative boundaries is lacking. The District River Management Plan (DRMP) addresses this gap by designating the district as the actionable unit for integrated river-basin management.

The DRMP aligns with the Samarth Ganga Framework, which identifies Jan Ganga (public participation) and Arth Ganga (river-linked livelihoods) as core pillars, and with the National Water Policy (2012) that promotes integrated, participatory water-resources management.

2. Policy Objectives

- Institutionalize district-level integrated planning for river rejuvenation.
- Operationalize Samarth Ganga through local governance.
- Ensure that a river's quality and flow improve as it exits a district.
- Converge urban and rural actions for pollution control, flood management, and water security.

3. Institutional Framework

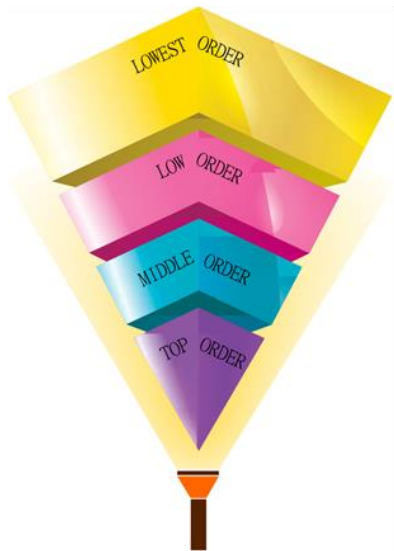
Level	Institutions & Roles
National	MoJS (DoWR, RD & GR) – Policy guidance and funding. NMCG – Coordination, standardization and monitoring.
State	SMCGs – Review, capacity building and support to districts.
District	District Magistrate – Chairperson of DRMP Committee. District River Committee – Integrates line departments and local bodies.
Technical Support	cGanga, IITs, NIUA, CPCB, State PCBs – Scientific and data support for planning and evaluation.

4. Strategic Implementation Framework

Implementation follows a hierarchical and cyclic approach ensuring alignment with basin management while maintaining administrative accountability.

- Basin → Sub-basin → District → Block/Ward alignment.
- Six-step adaptive cycle: Understand → Communicate → Negotiate → Strategize → Implement → Monitor & Feedback.

Study and Planning



Useful for strategic planning
But unrealistic to build

Approach GRBMP 1.0

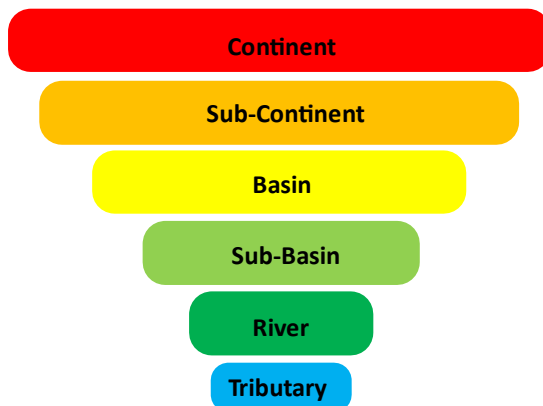
Strategy for Implementation and Execution



Can only construct a right
pyramid for actions on ground

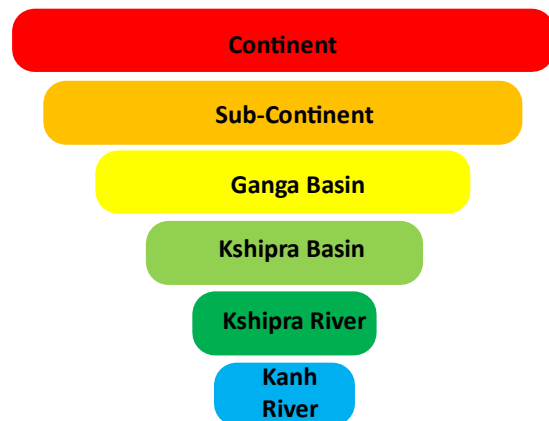
Approach: Studies and Planning

Generic



GRBMP 2.0 (Micro Level Study)

Example



Approach: Implementation – Administrative Boundaries

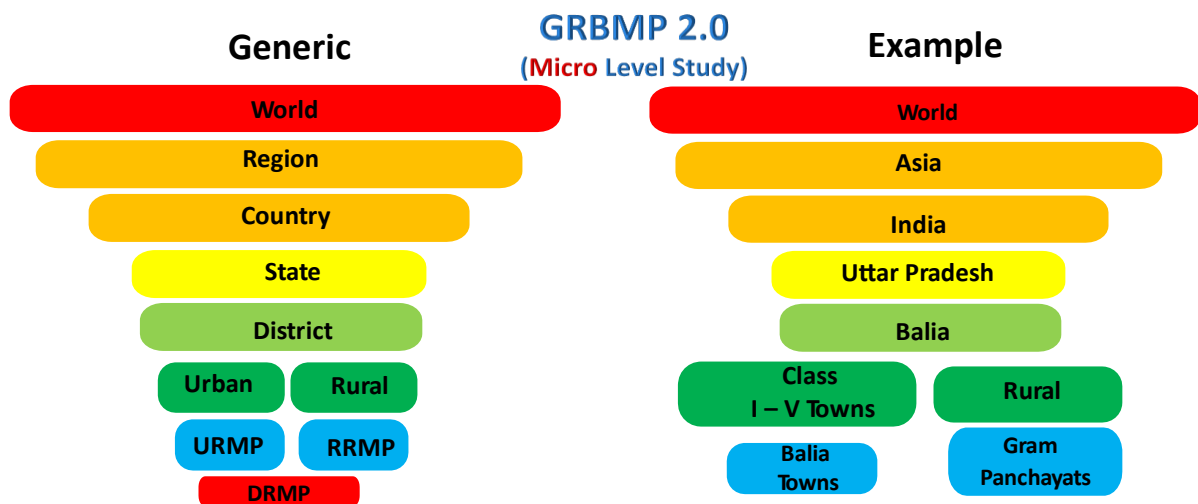


Figure 1: Approach for River Basin Management Strategic Planning as well as Micro Level Studies and Planning, and Actions on Ground

Series of embedded steps

- 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

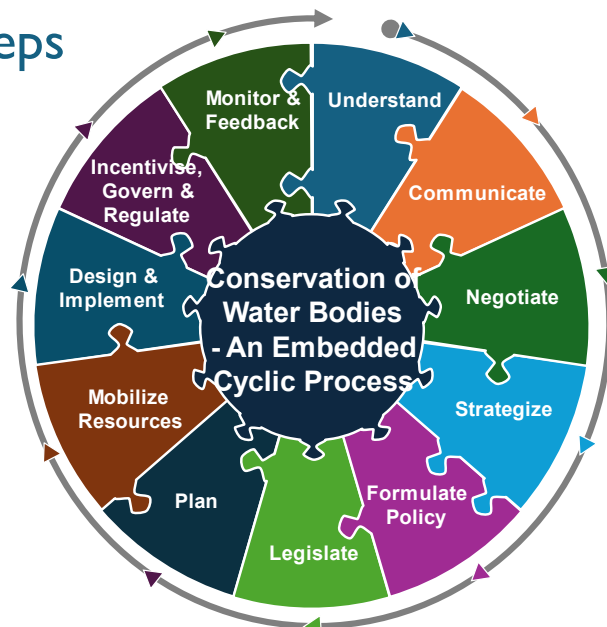


Figure 2: River Basin Planning & Preparation of DRMP — An Embedded Cyclic Process

5. Core Components of the DRMP

The DRMP integrates both urban (URMP) and rural (RRMP) components:

- **URMP:** wastewater management, stormwater control, and water reuse.
- **RRMP:** agricultural runoff, solid waste management, and water conservation.

Key themes: pollution abatement, blue-green infrastructure, participatory monitoring, and disaster risk reduction.

6. Financing Mechanism

Funding sources include GoI (MoJS, MoEFCC, Jal Jeevan Mission) for planning and monitoring; State Governments & ULBs for implementation; CSR/Industry for green infrastructure; and international climate funds for technology pilots.

7. Monitoring, Evaluation, and Reporting

Monitoring will be based on the District River Management Index (DRMIndex) covering environmental, social, and institutional indicators, with quarterly reporting and third-party audits.

8. Capacity Building and Stakeholder Engagement

NMCG and cGanga will lead training of officials and NGOs. River Scouts and schools will aid participatory monitoring, supported by local awareness campaigns.

9. Expected Outcomes

- Improved river water quality and base flow.
- Institutional convergence.
- Data-driven decision-making.
- Enhanced community participation.
- Livelihood generation through eco-restoration.

10. Policy Recommendations

- Notify DRMP as a statutory instrument under the Environment (Protection) Act, 1986.
- Establish District River Committees (DRCs).
- Integrate DRMP with District Environment Plans (DEPs).
- Create a National DRMP Cell under NMCG.
- Mandate DRMP preparation for all Ganga Basin districts by 2027 and nationwide by 2030.

11. Conclusion

The DRMP provides a bridge between policy and practice, linking basin-level science with district governance. Its success depends on convergence, participatory monitoring, and sustained funding.

Proposal for Preparation of Detailed Project Report (DPR) for the District River Management Plan (DRMP) for a Typical District with Kanpur Nagar District as an Example

Under the Comprehensive Framework for District River Management Plans (cGanga, 2025)

1. Rationale

Kanpur District, a major industrial and urban hub of the middle Ganga Basin, continues to experience severe water-quality degradation from domestic and industrial discharges. Existing centralised STPs and drainage works have only partially reduced loadings because many sewers and storm-water channels still discharge untreated flows into natural drains and the Ganga.

The **District River Management Plan (DRMP)** concept converts each district into a self-contained hydrological and administrative unit for river-centric development. Preparing a **Detailed Project Report (DPR)** for Kanpur District will establish an implementable blueprint consistent with the *Samarth Ganga Framework* and the *National Water Policy (2012)*.

2. Objectives

1. Integrate all hydrological, ecological, and socio-economic data for Kanpur District.
2. Create a **LiDAR/Drone-based high-resolution DEM** to delineate catchments and design a **hydrologic–hydraulic model**.
3. Locate all **sewer–storm-water junctions** and plan **decentralised STPs** at those outfalls.
4. Develop a **10-daily water-budget model** covering rainfall, runoff, infiltration, evaporation, and abstractions.
5. Formulate a **District River Management Index (DRMIndex)** for monitoring and evaluation.
6. Deliver a **comprehensive DPR** integrating engineering, financial, and institutional plans.

3. Approach and Methodology

Component	Key Activities
Data & GIS Framework	Collate all digital datasets (land-use, drainage, groundwater, rainfall, evapotranspiration, industries) and integrate them in GIS.
Primary Surveys	Map sewers, drains, and outfalls; collect flow and quality data; undertake socio-economic surveys.
LiDAR/Drone Survey	Acquire 10–30 cm vertical-accuracy DEM for drainage modelling.
Modelling & Water Budget	Build an integrated drainage–sewer–hydrology model; compute 10-daily water balance.
Planning & Design	Identify decentralised STPs (0.1–5 MLD), reuse networks, and priority interventions.
Outputs	DPR document, GIS dashboard, DRMIndex baseline, and participatory implementation roadmap.

4. Implementation Timeline

S No	Activity / Phase	Description	Start Month	End Month	Remarks
1	Inception & Mobilization	Project initiation, team setup, stakeholder meetings, inception report	1	1	Foundational activity before data collection
2	GIS Data Compilation & Integration	Collation of secondary datasets, preparation of GIS base maps	1	2	Runs parallel with LiDAR Survey
3	LiDAR / Drone Survey	Aerial mapping, DEM generation, and processing	2	4	Overlaps with GIS and Field Surveys
4	Field & Primary Surveys	Mapping drains, sewers, and outfalls; water-quality sampling	2	5	Conducted in parallel with LiDAR Survey
5	Hydrologic–Hydraulic Modelling	Catchment delineation, calibration, flow simulation	5	8	Begins with preliminary DEM; continues with refined LiDAR data
6	Water-Budget & Pollution Analysis	10-daily rainfall-runoff balance and load estimation	7	8	Runs parallel with last phase of modelling
7	Planning & Design of Interventions	Siting of decentralized STPs, reuse strategy, and institutional framework	6	8	Starts mid-modelling phase for concurrent design
8	DPR Preparation, Review & Consultation	Compilation of DPR, stakeholder consultations, and submission	9	12	Overlaps final design months and includes validation workshops

5. Institutional Framework

- **Nodal Agency:** NMCG / DoWR, RD & GR, MoJS
- **Lead Technical Agency:** cGanga, IIT Kanpur
- **Implementation Partners:** Kanpur Nagar Nigam, UP Jal Nigam, UPPCB, Irrigation Department, District Administration
- **Supporting Institutions:** NIUA and regional academic bodies

6. Expected Deliverables and Outcomes

- District-specific **DPR for DRMP-Kanpur** with actionable engineering and policy recommendations.
- **High-resolution DEM** and drainage model enabling flood and pollution mapping.
- **Decentralised STP network plan** with reuse and recycling strategies.
- **Water-budget tool** for ongoing resource-balance management.
- **GIS Dashboard and DRMIndex** for continuous monitoring by NMCG.
- **Enhanced livelihoods and community stewardship** through participatory river management.

7. Key Figures (to be inserted in DPR)

1. *Figure 1:* Drainage and Sub-Basin Boundaries of Kanpur District
2. *Figure 2:* Sewer and Storm-Water Outfall Locations
3. *Figure 3:* Proposed Decentralised STP Sites and Flow Paths
4. *Figure 4:* 10-Daily Water Budget Schematic

8. Conclusion

The proposed DPR will provide NMCG and the Government of Uttar Pradesh with an implementable, data-driven framework for sustainable river rejuvenation in Kanpur District. It embodies the principles of *Samarth Ganga*—linking science, governance, and community action—while creating a replicable model for all riverine districts in India.





cGanga