



National River Conservation Directorate
Ministry of Jal Shakti,
Department of Water Resources,
River Development & Ganga Rejuvenation
Government of India

Social Environment

Mahanadi River Basin



August 2025



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Social Environment

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National River Conservation Directorate (NRCD)

The National River Conservation Directorate, functioning under the Department of Water Resources, River Development & Ganga Rejuvenation, and Ministry of Jal Shakti providing financial assistance to the State Government for conservation of rivers under the Centrally Sponsored Schemes of 'National River Conservation Plan (NRCP)'. National River Conservation Plan to the State Governments/ local bodies to set up infrastructure for pollution abatement of rivers in identified polluted river stretches based on proposals received from the State Governments/ local bodies.

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Centres for Mahanadi River Basin Management Studies (cMahanadi)

The Centres for Mahanadi River Basin Management Studies (cMahanadi) is a Brain Trust dedicated to River Science and River Basin Management. Established in 2024 by NIT Raipur and NIT Rourkela, under the supervision of cGanga at IIT Kanpur, the center serves as a knowledge wing of the National River Conservation Directorate (NRCD). cMahanadi is committed to restoring and conserving the Mahanadi River and its resources through the collation of information and knowledge, research and development, planning, monitoring, education, advocacy, and stakeholder engagement.

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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 report is a comprehensive outcome of the project jointly executed by NIT Raipur (Lead Institute) and NIT Rourkela (Fellow Institute) under the supervision of cGanga at IIT Kanpur. It was submitted to the National River Conservation Directorate (NRCD) in 2024. We gratefully acknowledge the individuals who provided information and photographs for this report.

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Preface

In an era of unprecedented environmental change, understanding our rivers and their ecosystems has never been more critical. This report aims to provide a comprehensive overview of our rivers, highlighting their importance, current health, and the challenges they face. As we explore the various facets of river systems, we aim to equip readers with the knowledge necessary to appreciate and protect these vital waterways.

Throughout the following pages, you will find an in-depth analysis of the principles and practices that support healthy river ecosystems. Our team of experts has meticulously compiled data, case studies, and testimonials to illustrate the significant impact of rivers on both natural environments and human communities. By sharing these insights, we hope to inspire and empower our readers to engage in river conservation efforts.

This report is not merely a collection of statistics and theories; it is a call to action. We urge all stakeholders to recognize the value of our rivers and to take proactive steps to ensure their preservation. Whether you are an environmental professional, a policy maker, or simply someone who cares about our planet, this guide is designed to support you in your efforts to protect our rivers.

We extend our heartfelt gratitude to the numerous contributors who have generously shared their stories and expertise. Their invaluable input has enriched this report, making it a beacon of knowledge and a practical resource for all who read it. It is our hope that this report will serve as a catalyst for positive environmental action, fostering a culture of stewardship that benefits both current and future generations.

As you delve into this overview of our rivers, we invite you to embrace the opportunities and challenges that lie ahead. Together, we can ensure that our rivers continue to thrive and sustain life for generations to come.

Centre for Mahanadi River Basin
Management and Studies (cMahanadi)
NIT Raipur & NIT Rourkela

Contents

PREFACE	IV
LIST OF FIGURES	7
LIST OF TABLES	8
EXECUTIVE SUMMARY	9
ABBREVIATIONS AND ACRONYMS	11
1. INTRODUCTION	12
1.1 Brief Overview of the Mahanadi River Basin	12
1.2 Importance of the Basin in Chhattisgarh and Odisha	12
2. IDENTIFICATION OF KEY INSTITUTIONS IN BASIN AREAS.....	15
2.1 Government agencies.....	15
2.2 NGOs/Local Community Groups Working on Mahanadi Basin (Chhattisgarh)	21
3. IDENTIFICATION OF KEY PROGRAMMES IN OPERATION IN BASIN	23
3.1 Central government initiatives	23
There are numerous initiatives from the central government that supports different infrastructures of the state.....	23
Table 6: Urban River & Water Infrastructure	24
3.2 State government initiatives	24
3.3 NGO & Local community initiatives.....	26
4. IDENTIFYING KEY STAKEHOLDERS (THOSE WHO HAVE DIRECT CLAIM ON THE RIVER)	30
5. EXAMPLES OF ENABLING/CONSTRAINING ELEMENTS TO IMPLEMENTATION OF POLICIES AND PROGRAMMES (E.G. ROLE OF INFORMATION, AWARENESS, SOCIAL MOVEMENTS, LITIGATIONS, ETC.)	33
5.1 Overview of Policy and Programme Implementation in Basin Context	33
5.2 Enabling Elements.....	34
5.3 Constraining Elements	36
5.4 What Works for Co-existence.....	37
5.5 What Doesn't Work for Co-existence.....	37
6. IDENTIFYING STRATEGIES ADDRESS CONSTRAINTS THROUGH CREATING PUBLIC AWARENESS AND ENCOURAGING PARTICIPATION.....	38
6.1 Introduction to Strategy Needs	38

6.2 Strategies for Creating Public Awareness about the Mahanadi River.....	40
6.3 Strategies for Encouraging Participation in the Mahanadi Basin.....	42
6.4 Integration with Existing Government and NGO Programmes for the Mahanadi River	45
6.5 Suggested Action Plan.....	47
6.5 Significance of the report	50
6.6 Conclusion	51
ACKNOWLEDGEMENT	52
REFERENCES	53

List of Figures

Figure 1 Mahanadi River Basin Map	13
Figure 2 : Chhattisgarh Agricon Samiti (CAS)	26
Figure 3 : "Mahanadi Awakening Abhiyan" (MAA) in Dhamtari Distret, CG.....	27
Figure 4 : Water Governance Standard by WOTR.....	28
Figure 5 : Mahanadi Bachao Andolan (MBA)	29
Figure 6 : Stakeholder Dynamics of the Mahanadi River Basin	32
Figure 7 : Community-Based Monitoring and Evaluation (CBM&E):	44

List of Tables

Table 1 : Key Central Government Institutions and Their Roles in Mahanadi River Basin Management.	15
Table 2 : Key State Government Institutions and Their Roles in Mahanadi River Basin Management	16
Table 3 :Key NGOs/Local Community Groups and Their Roles in Mahanadi River Basin Management	21
Table 4 : Water & River-Specific Schemes	23
Table 5 : Agriculture & Water Use Efficiency.....	24
Table 6 : Urban River & Water Infrastructure	24
Table 7 : Key State Government Initiatives.....	24
Table 8 : Stakeholder Analysis for the Mahanadi River Basin – Dependency, Impact & Influence	31
Table 9 : Short-, Medium-, and Long-Term Actions for River Basin Awareness and Participation	47

EXECUTIVE SUMMARY

The Social Environment Report for the Mahanadi River Basin presents a detailed analysis of the basin's water resources and their integral role in sustaining the region's ecology, communities, and development. The report highlights the Mahanadi's significance to millions in Chhattisgarh and Odisha, who depend on its waters for drinking, sanitation, agriculture, industry, and traditional livelihoods. As the basin experiences increasing population pressures, rapid urbanization, changing land use, and climate variability, multiple challenges have emerged that threaten long-term water security and ecological balance.

Through careful examination of current governance, the report highlights that managing the basin involves coordinated efforts among central, state, and local agencies. Key government schemes support the restoration of water bodies, promote rainwater harvesting, upgrade urban sanitation and sewage infrastructure, regulate industrial pollution, and enhance irrigation efficiency. The report documents several state-led interventions tailored to local needs, such as river cleaning, pond rejuvenation, afforestation, riverbank stabilization, and eco-tourism programs, alongside central missions focusing on drinking water supply and water-use rationalization in agriculture.

Central and state initiatives like the National River Conservation Plan, Jal Jeevan Mission, AMRUT, Pradhan Mantri Krishi Sinchayee Yojana, and state flagship campaigns such as Narva, Garva, Ghurva, Bari or Mo Pokhari Yojana, demonstrate a growing emphasis on holistic water management, urban sanitation, afforestation, and sustainable rural livelihoods. These are complemented by local and grassroots movements, most notably the Mahanadi Bachao Andolan and Mahanadi Awakening Abhiyan which serve as catalysts for public awareness, legal reform, community participation, and direct action on river protection and pollution control.

One of the report's core insights is the essential role civil society, NGOs, and local community groups play in the basin's conservation and social mobilization. These organizations drive local campaigns for river health, develop water literacy and awareness, empower marginal and tribal populations, and address specific environmental threats through advocacy, education, and participatory planning. Their effectiveness, however, is influenced by limitations in policy influence, organizational capacity, and resource availability.

Yet, the analysis exposes persistent structural asymmetries. Those most dependent on the river such as tribal communities, fisherfolk, smallholder and rainfed farmers, often remain on the margins of formal governance and decision-making, despite facing the greatest risks from flow alterations, contamination, and resource depletion. In contrast, powerful industrial actors and large utilities exert significant influence while contributing disproportionately to pollution and resource extraction. The contest between state-level interests in Chhattisgarh and Odisha, culminating in the establishment of the Mahanadi Water Disputes Tribunal, typifies the tensions propelled by diverging development priorities and ecological limits.

The report recognizes the decisive role of civil society in bridging institutional gaps and pressing for more inclusive, accountable, and just river governance. Community groups, NGOs, and social movements have mobilized campaigns for water literacy, river revival, pollution control, and equitable resource access, achieving meaningful improvements in awareness,

empowerment, and localized action, even as structural constraints, weak enforcement, and fragmented authority persist.

The report calls for an ambitious transformation in both policy and practice. It recommends intensifying communication efforts in Odia and Chhattisgarhi, weaving river ecology and participatory water management into education, rolling out community-based monitoring and participatory planning at the grassroots, and leveraging technological innovations such as digital platforms for real-time data and collaborative resource mapping. Policy reforms must institutionalize diverse stakeholder engagement, strengthen legal frameworks, and create incentives for sustainable stewardship.

Most fundamentally, it is the inclusion of diverse voices, especially those historically marginalized, that will define the future health of the Mahanadi. By integrating traditional knowledge systems with modern science and governance models, and fostering a culture of coexistence and collective responsibility, the basin can balance economic development with ecological resilience and social justice. The sustainable future of the Mahanadi River Basin hinges on harmonizing ecological health, equitable water governance, and inclusive development. It emphasizes the need to address institutional fragmentation, empower vulnerable communities, and integrate traditional knowledge with modern science through participatory and multi-stakeholder approaches. By strengthening community engagement, policy coherence, and leveraging innovative tools, the report envisions a collaborative pathway that secures the river's role as a vital ecological and cultural lifeline, supporting diverse livelihoods and fostering social justice for generations to come.

Abbreviations and Acronyms

CAMP	Condition Assessment and Management Plan
cMahanadi	Centre for Mahanadi River Basin Management and Studies
CWC	Central Water Commission
IIT	Indian Institute of Technology
MRB	Mahanadi River Basin
NIT	National Institute of Technology
SHG	Self Help Group
NGO	Non-Governmental Organisation
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
RKVY	Rashtriya Krishi Vikas Yojana
NRCP	National River Conservation Plan
NWM	National Water Mission
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
NGGB	Narva, Garva, Ghurva, Bari Yojana
JJM	Jal Jeevan Mission
MAA	Mahanadi Awakening Abhiyan
MBJB	Mahanadi Bachao Jivika Bachao
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NAFCC	National Adaptation Fund for Climate Change
NWA	National Water Academy
PRA	Participatory Rural Appraisal
IEC	Information, Education and Communication
CBM&E	Community-Based Monitoring and Evaluation
MoEFCC	Ministry of Environment, Forest and Climate Change
MoWR, RD & GR	Ministry of Water Resources, River Development and Ganga Rejuvenation
PVTG	Particularly Vulnerable Tribal Group

1. Introduction

1.1 Brief Overview of the Mahanadi River Basin

The Mahanadi River is one of central India's most important river systems, originating from the Amarkantak Plateau in Chhattisgarh. It flows for approximately 851 kilometers, of which 357 km lie in Chhattisgarh and 494 km in Odisha, before draining into the Bay of Bengal. The basin extends over an area of approximately 141,589 square kilometers, encompassing around 75,506 sq km in Chhattisgarh and 65,628 sq km in Odisha. It supports the livelihoods of millions of people across 27 districts—11 in Chhattisgarh and 16 in Odisha—and sustains agriculture, fisheries, forestry, and industries throughout the region. Major tributaries of the Mahanadi in Chhattisgarh include the Seonath, Hasdeo, Mand, and Jonk, while in Odisha, the river is joined by important tributaries such as the Ib, Ong, Tel, Jira, Suktel, Bheden, and others. In its lower reaches, especially within Odisha, the Mahanadi branches into several distributaries like the Kathajodi, Kuakhai, Devi, Bhargavi, and Daya, forming an extensive and ecologically sensitive delta before reaching the Bay of Bengal. The basin features a varied terrain—forested uplands in the north gradually transition into fertile agricultural plains in the central regions—supporting a wide range of biodiversity and human settlements.

1.2 Importance of the Basin in Chhattisgarh and Odisha

The Mahanadi River plays a vital role in sustaining the lives and livelihoods of millions of people in Chhattisgarh. It provides drinking water and sanitation services to over 15 million individuals, including residents of key urban centers such as Raipur, Bilaspur, and Korba. The river irrigates more than 60% of the state's cultivable land, contributing to Chhattisgarh's reputation as the "Rice Bowl of India." It is also a critical water source for large-scale industrial operations, including the Bhilai Steel Plant, NTPC Sipat, and the Korba Thermal Power Station. Beyond its economic and utilitarian value, the Mahanadi holds deep cultural and spiritual significance, especially for indigenous communities like the Gonds and Halbas. These communities celebrate traditional festivals such as Makar Sankranti and Chhath Puja on its banks, reinforcing their cultural connection to the river.

In Odisha, the Mahanadi River is equally crucial to the well-being and development of the state. It serves as the primary source of drinking water and sanitation for more than 20 million people, including major urban populations in cities such as Sambalpur, Cuttack, Bhubaneswar, and Paradip. The river irrigates a significant portion of Odisha's fertile delta and coastal plains, supporting both rice cultivation—central to the state's food security—and diverse cropping systems. The Mahanadi also sustains Odisha's vital industries, supplying water to key sectors like aluminum smelting (NALCO Angul), power generation, and the Paradip port complex. Culturally, the river is woven into Odisha's social fabric: festivals such as Boita Bandana and Kartik Purnima, along with rituals at river ghats, highlight its spiritual value to communities including the fishing (Nolia) and farming populations. Every year in Cuttack, the grand Bali Yatra festival is held on the Mahanadi's banks, celebrating Odisha's maritime heritage and drawing lakhs of people for riverfront rituals and fairs. The river thus embodies both the ecological and cultural lifeline for Odisha, underpinning livelihoods, traditions, and economic growth across the state.

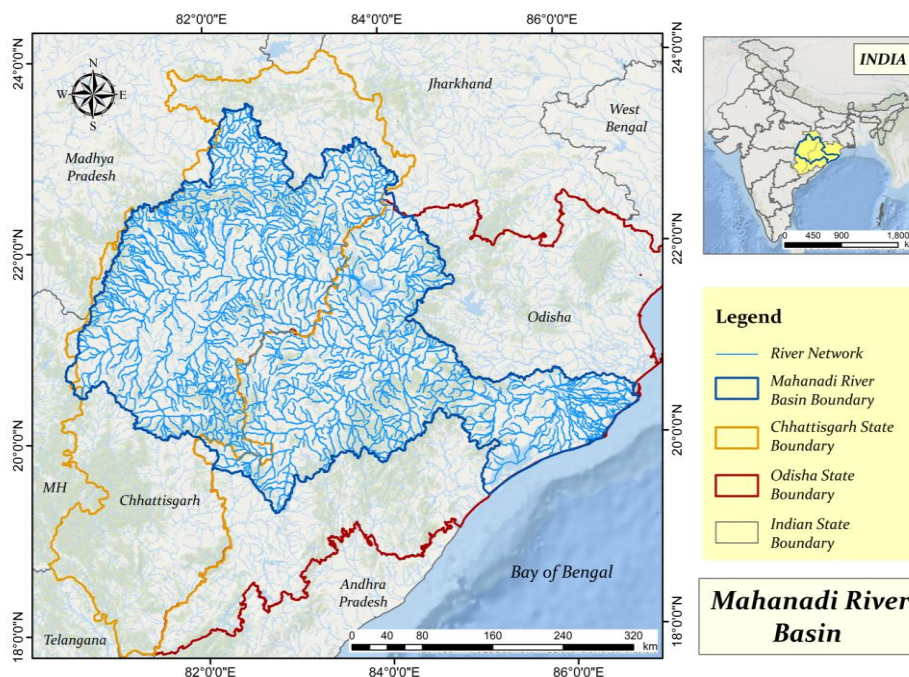


Figure 1 Mahanadi River Basin Map

1.3 Rationale for Preparing the Report

The need for a focused social-environmental assessment arises from the increasing tensions and ecological stress within the Mahanadi basin. Disputes between Chhattisgarh and Odisha over water sharing have escalated in recent years, with Odisha alleging that upstream water retention through dam and barrage construction is affecting downstream flows during the dry season. Chhattisgarh, in turn, argues that its water use is within permissible limits and necessary for its own development needs, citing official estimates that less than 25% of the basin's water is currently being utilized upstream. The formation of the Mahanadi Water Disputes Tribunal in December 2024, under Justice Bela M. Trivedi, further intensified political and administrative responses, with both states proposing competing infrastructure plans to secure their water shares.

Ecological and livelihood challenges in the basin have become increasingly visible. Declining river flows are affecting agricultural productivity and access to water for over 30,000 farmers and 10,000 fishermen. Odisha's western districts (such as Bargarh and Bolangir) face groundwater recharge failures, while parts of Chhattisgarh (Mahasamund and Raigarh) experience borewell losses and crop stress. Urban and coastal areas in Odisha, especially within the populous delta, are also grappling with water stress. Civil society advocacy has gained momentum on both sides. Movements like Mahanadi Bachao Andolan in Odisha and Jan Jal Jagrukta Abhiyan in Chhattisgarh have pushed for dialogue-based conflict resolution and equitable water governance, highlighting shared vulnerabilities that transcend political boundaries.

The situation is further complicated by fragmented governance structures and weak institutional coordination. Reports from research organizations such as NIUA and TERI have pointed out that elite capture, limited stakeholder engagement, and siloed planning have

undermined basin-level policy coherence. This report thus provides a comprehensive social-environmental analysis of the Mahanadi basin as it flows through both Chhattisgarh and Odisha, evaluating resource access, community voices, and governance in this complex, contested water landscape.

1.4 Purpose and Objectives of the Report

The primary objective of this report is to assess the social and environmental dynamics of the Mahanadi basin in both Chhattisgarh and Odisha, with a focus on how communities, policies, and water resources interact across the entire basin. It aims to identify key institutions and stakeholders—including public agencies, NGOs, tribal councils, and industries in each state and assess their capacity to influence water governance and environmental outcomes. The report also analyzes factors that enable or hinder effective water management, such as legal and institutional delays, pollution regulation limits, and governance fragmentation. Ultimately, the report seeks to develop participatory strategies that enhance stakeholder engagement, promote equity in water distribution, and foster transparency in decision-making processes for both Chhattisgarh and Odisha, supporting the sustainable management of the Mahanadi as a shared resource.

1.5 Scope of the Report

This report presents a comprehensive socio-institutional assessment of the Mahanadi River Basin, covering the states of Chhattisgarh and Odisha. The aim is to understand and strengthen the relationship between communities and the river by identifying key institutions, programmes, stakeholders, and factors that influence policy implementation in both states. The scope begins with mapping the institutional landscape, including government bodies, non-governmental organizations (NGOs), and local community organizations involved in various aspects of river governance, conservation, and development in both Chhattisgarh and Odisha. It further explores the major programmes currently in operation within the basin—both centrally and state-sponsored initiatives, along with efforts by notable NGOs and local groups—and assesses their objectives, outcomes, and existing gaps in each state.

The report also focuses on the direct stakeholders of the river—households, farmers, workers, and industries—who depend on the Mahanadi for their livelihoods, water, and economic activities. It highlights their interactions with the river and the challenges they face due to environmental degradation, regulatory constraints, and institutional limitations. To understand the success and failure of past efforts, the report identifies both enabling and constraining elements that influence the effectiveness of programmes and policies drawing from specific examples in both states. These include the role of awareness, information dissemination, community mobilization, public protests, legal actions, and other socio-political dynamics. It examines what has worked for co-existence between people and the river and what hasn't, with references to experiences from both Chhattisgarh and Odisha.

Based on these insights, the report proposes strategies to address the identified constraints through awareness-building and enhanced community participation. It outlines targeted approaches to sensitize the public, foster behavioral change, and promote collective stewardship of the river. These strategies are designed to integrate with ongoing governmental and non-governmental initiatives in both states, ensuring alignment and avoiding duplication of efforts. The final section presents an action plan that can guide future engagement, providing a roadmap for state authorities, civil society, and other stakeholders to revitalize the river's

socio-ecological fabric and promote inclusive, sustainable management of the Mahanadi River Basin across Chhattisgarh and Odisha.

2. Identification of key institutions in basin areas

A wide range of institutions operate across the Mahanadi River Basin, including both government bodies and non-governmental organisations (NGOs). This section identifies these key actors in Chhattisgarh and Odisha, exploring their roles in water governance, ecological management, and community outreach.

2.1 Government agencies

2.1.1 Central Level

Table 1: Key Central Government Institutions and Their Roles in Mahanadi River Basin Management.

Chhattisgarh			
S.No	Institution/Agency	Role in River Basin Context	Full Address
1	Indian Meteorological Department (IMD) – Meteorological Centre Raipur	Provides rainfall forecasts, flood alerts, monsoon tracking for Mahanadi basin planning	Head & Director, Meteorological Centre, Near MMI Hospital, Lalpur, Raipur – 492015, Phone: 0771-2413589 Email: mc.rpr@nic.in
2	Survey of India (SOI) – CG Mapping Centre	Prepares river catchment maps, flood zoning, hydrological maps, supports disaster & planning departments	Director, SOI, Central Secretariat Bhavan, 3rd Floor, B-Wing, Sector-24, Atal Nagar, Naya Raipur – 492109
3	Central Pollution Control Board (CPCB) – Zonal Office (Nearby in MP)	Supervises pollution monitoring & compliance by industries discharging into Mahanadi (works with CECB)	Regional Directorate, CPCB, Parivesh Bhavan, E-5 Arora Colony, Bhopal – 462016, Email: cpcb.bhopal@gov.in (Note: not in Raipur but has jurisdiction)
4	National Highways Authority of India (NHAI) – Chhattisgarh RO	Manages river- crossing bridge design, flood impact mitigation, and road-runoff drainage near rivers	Regional Officer, NHAI Chhattisgarh, House No. 1277/4, Shankar Nagar, Raipur – 492007 Email: rocgnhai.org

5	Indian Audit & Accounts Dept (CAG Office – CG)	Audits river basin expenditure, WRD schemes, canal infrastructure, and disaster fund use	Principal Accountant General (Audit), CAG Office, Zero Point, Baloda Bazar Road, P.O. Vidhan Sabha, Raipur – 492005 Email: agauchhattisgarh@cag.gov.in
Odisha			
1	Indian Meteorological Department (IMD) – Bhubaneswar Meteorological Centre	Provides rainfall forecasts, flood alerts, and monsoon analysis for Mahanadi basin planning in Odisha.	Head & Director, Meteorological Centre, Biju Patnaik International Airport, Bhubaneswar – 751020. Email: imdbbsr@nic.in
2	Survey of India (SOI) – Odisha Mapping Centre	Prepares catchment and flood zoning maps, supports planning and disaster management.	Director, SOI, PO: R.R. Lab, Bhubaneswar – 751013. Phone: 0674-2300355. Email: kcdas.soi@gov.in
3	Central Pollution Control Board (CPCB) – Eastern Regional Directorate (Kolkata)	Coordinates water quality monitoring and pollution assessment for the Mahanadi basin, issuing national standards and reviewing data from Odisha. Local implementation is via OSPCB.	Block 502, Southend Conclave, 1582 Rajdanga Main Road, Kolkata – 700107. Email: cpcb.kolkata@gov.in
4	Indian Audit & Accounts Dept (CAG Office – Odisha)	Audits expenditure on water resource projects, dam maintenance, WRD schemes, and disaster relief.	Principal Accountant General (Audit-1), AG Office, Unit-1, Bhubaneswar – 751001. Phone: (0674)-2390122. Email: agaurissai@cag.gov.in
5	National Highways Authority of India (NHAI) – Odisha RO	Manages river-crossing bridge design, flood mitigation, and drainage for highways near the river.	Regional Officer, NHAI, 301-A, 3rd Floor, Pal Heights, Plot No: J/7, Jayadev Vihar, Bhubaneswar – 751013. Email: roodisha@nhai.org

2.1.2 State Level

Table 2: Key State Government Institutions and Their Roles in Mahanadi River Basin Management

Chhattisgarh			
S.No	Department / Agency	Role in River Basin Context	Full Official Address

1	Water Resources Department (WRD)	Oversees all canal irrigation, dams, river water allocation, inter-basin linkages, and policy-level decisions for Mahanadi & tributaries	Engineer-in-Chief, WRD, Shivnath Bhawan, Sector-19, Atal Nagar, Raipur – 492101 Email: enc-wrd@cg.gov.in
2	Public Health Engineering Department (PHED)	Plans and monitors rural and urban drinking water schemes (many using Mahanadi basin water)	Chief Engineer, PHED, Neer Bhawan, Civil Lines, Raipur – 492001
3	Chhattisgarh Environment Conservation Board (CECB)	Monitors river and industrial pollution, water quality, STPs, and CETPs across the basin	Member Secretary, CECB, Paryavas Bhawan, Sector-19, Atal Nagar, Raipur – 492002 Email: hocecb@gmail.com
4	Town and Country Planning Department (T&CP)	Controls urban expansion, zoning, and land use near rivers/floodplains	Director, Block-4, 3rd Floor, Indrawati Bhawan, Naya Raipur – 492002 & RDA Bhawan, Shastri Chowk, Raipur – 492001
5	State Urban Development Agency (SUDA)	Designs and supervises river sanitation, water supply, AMRUT/SBM projects in towns under Mahanadi basin	SUDA Office, Block-D, 4th Floor, Indrawati Bhawan, Naya Raipur – 492002 Email: osd.suda@gmail.com
6	Chhattisgarh Housing Board (CGHB)	Develops housing schemes near urban riversides and manages river-adjacent residential layouts	Commissioner, CGHB, Paryavas Bhawan, Sector-19, Atal Nagar, Raipur – 492002 Email: cghbho@gmail.com
7	Forest Department (State HQ)	Protects river catchment forests, biodiversity, wildlife corridors, and works on watershed restoration	PCCF Office, Aranya Bhawan, Naya Raipur – 492001 Email: pccf-cg@nic.in
8	Chhattisgarh Renewable Energy Development Agency (CREDA)	Promotes solar pump schemes, solar STPs, and non-conventional water-saving tech across basin	CEO, CREDA HQ, Near Energy Education Park, VIP Road, Raipur – 492006 Email: credacg@nic.in
9	Panchayat & Rural Development Department (State HQ)	Oversees MGNREGA-based pond creation, water recharge, Jal Gram schemes in basin villages	Secretary, P&RD Dept., Mahanadi Bhawan, Naya Raipur – 492002 Email: panchayat@cg.gov.in
10	Chhattisgarh State Disaster Management Authority (SDMA)	Plans for floods, dam break simulation, monsoon alerts related to the Mahanadi system	Joint Director, SDMA, Old Land Record Office, Gandhi Chowk, Raipur – 492001

11	Directorate of Agriculture (DOA)	Develops water-use crop patterns, rain-fed basin cropping, and supports farmer water literacy	Commissioner, DOA, Block-II, 2nd Floor, Indrawati Bhawan, Naya Raipur – 492002 Email: diagricg.cg@nic.in
12	Meteorological Centre (IMD, Raipur)	Provides rainfall forecast, flood prediction, and agro-climatic alerts across basin zones	Director, MC Raipur, Near MMI Hospital, Lalpur, Raipur – 492015 Email: mc.rpr@nic.in
13	Survey of India (SOI – State Mapping Unit)	Prepares topo-sheets, river floodplain maps, and supports catchment-level planning	Director, SOI, Central Secretariat Bhavan, Sector-24, Atal Nagar – 492109
14	Raipur Smart City Ltd. (RSCL)	Executes urban riverfront development, STPs, and solid waste drain redirection projects along Kharun/Mahanadi	CEO, RSCL, Nagar Nigam Bhawan, Gandhi Udyan, Raipur – 492009 Email: smartcityraipur@gmail.com
15	Chhattisgarh State Industrial Development Corporation (CSIDC)	Coordinates industrial estate planning, water resource permissions, and EIA norms in basin zones	Director, CSIDC, Udyog Bhawan, Ring Road No.1, Telibandha, Raipur – 492006 Email: csidc.cg@gov.in
16	Energy Department (Govt. of CG)	Responsible for hydropower projects, thermal plant water allocation, and basin-energy coordination	Principal Secretary, Energy Dept., Mahanadi Bhawan, Atal Nagar – 492002 Email: energy.cg@gov.in
17	Chhattisgarh Transport Department	Works on bridge construction, highway flood planning, and river-crossing corridors	Addl. Transport Commissioner, Indrawati Bhawan, Block C, 3rd Floor, Atal Nagar – 492001
18	Higher Education Department	Collaborates with institutes for water research, youth water literacy, eco- monitoring	Secretary, Higher Education, Mahanadi Bhawan, Atal Nagar, Raipur – 492002 Email: education@cg.gov.in
19	CAG (Audit Office – CG)	Audits state expenditure on river infrastructure, WRD, and dam safety schemes	Principal AG, Zero Point, Baloda Bazar Road, P.O. Vidhan Sabha, Raipur – 492005 Email: agauchhattisgarh@cag.gov.in
20	Tribal Welfare Department (State HQ)	Implements tribal schemes in river-dependent forest regions of the basin	Commissioner, Tribal Welfare, Block-4, Indrawati Bhawan, Naya, Raipur – 492002 Email: tribal.cg@gov.in

21	Bastar Development Authority (BDA)	Coordinates river-linked projects in tribal districts like Kanker (for Sondur, Main Mahanadi River, etc.)	CEO, BDA Office, Jagdalpur, Bastar – 494001
Odisha			
1	Water Resources Department (WRD)	Oversees canal irrigation, dams, flood control, water allocation, and policy for Mahanadi & tributaries	Engineer-in-Chief, WRD, Rajiv Bhawan, Unit-V, Bhubaneswar – 751001 Email: eicodhwr@gmail.com
2	Public Health Engineering Organisation (PHEO)	Plans and monitors urban & rural drinking water schemes (including Mahanadi basin)	Chief Engineer, PHEO, Heads of Departments Bldg, Bhubaneswar – 751001 Email: ce-phe@nic.in
3	Odisha State Pollution Control Board (OSPCB)	Monitors river and industrial pollution, water quality, STPs, CETPs in the basin	Member Secretary, OSPCB, Paribesh Bhawan, A/118, Unit-VIII, Bhubaneswar – 751012 Email: paribesh1@ospcboard.org
4	Directorate of Town Planning (DTP)	Oversees urban expansion, zoning, land use near rivers/floodplains	DTP Odisha, 2nd Flr, Heads of Dept. Building, Bhubaneswar – 751001
5	Odisha Urban Infrastructure Development Fund (OUIDF)	Supports urban sanitation, water supply, AMRUT/SBM projects in Mahanadi basin towns	OUIDF, 2nd Floor, Fortune Tower, Chandrasekharapur, Bhubaneswar – 751023
6	Odisha State Housing Board (OSHB)	Manages riverside residential projects, urban riverside master plans	Secretary, OSHB, Plot C-3, Vani Vihar Square, Bhubaneswar – 751022
7	Forest & Environment Department	Protects catchment forests, wildlife, biodiversity, watersheds	Principal Chief Conservator of Forests (PCCF), Aranya Bhawan, Chandrasekharapur, Bhubaneswar – 751023 Email: pccfodisha@yahoo.com
8	Odisha Renewable Energy Development Agency (OREDA)	Promotes solar/renewable applications for water management (solar pumps, etc.)	CEO, OREDA, S-59, Mancheswar Industrial Estate, Bhubaneswar – 751010 Email: ceoreda@oredaorissa.com
9	Panchayati Raj & Drinking Water Department	Implements MGNREGA, pond creation, “Jal Gram,” & rural water recharge in villages	Secretary, Rajiv Bhawan, Unit-V, Bhubaneswar – 751001 Email: prsec.or@nic.in

10	Odisha State Disaster Management Authority (OSDMA)	Disaster planning for floods, cyclones, dam break simulation, monsoon alerts	OSDMA, Rajiv Bhawan, 2nd floor, Bhubaneswar – 751001
			Email: osdma@osdma.org
11	Directorate of Agriculture & Food Production	Develops water-use agricultural patterns, farmer outreach in Mahanadi basin	Director, Krushi Bhawan, Keshari Nagar, Bhubaneswar – 751001
			Email: dafporissa@gmail.com
12	IMD Meteorological Centre, Bhubaneswar	Provides rainfall forecasts, flood alerts, agro-climatic services	Met Centre, Airport, Bhubaneswar – 751020
			Email: imdbbsr@nic.in
13	Survey of India – Odisha Geo-Spatial Data Centre	Prepares topo-sheets, floodplain/catchment maps, basin studies	Survey Bhawan, RR Lab Campus, Nayapalli, Bhubaneswar – 751013
			Email: kcdas.soi@gov.in
14	Bhubaneswar Smart City Ltd. (BSCL)	Riverfront/urban stretch management (solid waste, STP, urban development)	CEO, BSCL, Block-1, BMC-Bhawani Mall, Saheed Nagar, Bhubaneswar – 751007
			Email: bsclbda@gmail.com
15	Odisha Industrial Infrastructure Development Corp. (IDCO)	Coordinates industrial planning, water permissions, EIA in basin	IDCO Towers, Janpath, Bhubaneswar – 751022
			Email: cmd@idco.in
16	Energy Department (Govt. of Odisha)	Hydropower/thermal plant water allocation, basin energy management	Principal Secretary, Power Dept., Kharavel Bhawan, Bhubaneswar – 751001
			Email: energy@nic.in
17	Works Department (Bridge/Transport)	Bridge construction, river corridor, highway-flood zoning	Chief Engineer (Bridge), Nirman Soudha, Keshari Nagar, Bhubaneswar – 751001
			Email: ce.bridge@worksodisha.gov.in
18	Higher Education Department	Supports water research, water literacy, eco-monitoring collaborations	Secretary, Lok Seva Bhawan, Bhubaneswar – 751001
			Email: hedsec.or@nic.in
19	Principal AG (Audit Office – Odisha)	Audits state expenditure on water, river infrastructure, WRD/dam safety	AG Office, Unit-1, Bhubaneswar – 751001
			Email: agauorissa1@cag.gov.in
20	ST & SC Development Department	Runs tribal/SC schemes in river-dependent forest/delta regions	Commissioner, CRPF Square, Bhubaneswar – 751003
			Email: commissioner.stsc@nic.in

21	Mahanadi Management WRD	Basin Cell,	Coordinates inter-district river management, basin-wide planning	Water Resources Dept., Rajiv Bhawan, Unit-V, Bhubaneswar – 751001
				Email: eicodhwr@gmail.com

2.2 NGOs/Local Community Groups Working on Mahanadi Basin (Chhattisgarh)

Table 3: Key NGOs/Local Community Groups and Their Roles in Mahanadi River Basin Management

Chhattisgarh				
S.No	NGO / Organization Name	Focus Area	River-Linked Work	Head Office Location
1.	Jan Chetna Manch	Tribal rights, displacement, water access	Supported resistance to projects near Hasdeo and Mahanadi-linked forest zones	Bilaspur, Chhattisgarh
2.	Chhattisgarh Nadi Ghati Suraksha Manch (<i>loosely coordinated network</i>)	River conservation, afforestation, anti-pollution drives	Conducts “Save Mahanadi” rallies, plantation along Kharun, Mahanadi banks	Raipur (network-based, not a single office)
3.	Samar NGO	Women’s empowerment, rural water rights	Created water awareness campaigns in villages of Dhamtari, Kanker, Mahasamund	Raipur & Dhamtari
4.	Chhattisgarh Bachao Andolan (CBA)	Anti-displacement, water justice, ecological protection	Has raised issues of river pollution, large dam impact on Seonath, Mand, Hasdeo	Bilaspur & Janjgir
5.	Vikas Samvad (<i>CG chapter</i>)	Community-based water education	Developed “Jal Jagrukta” modules in school & village programs in Raipur, Gariaband, Baloda Bazar	Raipur (state outreach program)

6.	Gramin Vikas Trust (GVT)	Agriculture, watershed, NRM in tribal districts	Implemented small- scale water harvesting & Narva revival near Kanker, Gariaband	Gariaband district office; supported by CAPART
7.	Centre for Science and Environment (CSE) – CG River Unit (<i>supporting partner</i>)	Water literacy, decentralize d wastewater treatment (DEWATS), river policy	Helped PHED & Nagar Nigams implement river-linked STP pilots in Raipur, Durg, Mahasamund	Partnered from New Delhi, field in Raipur
Odisha				
1	Water Initiatives Odisha (WIO)	Water rights, river conservation , public advocacy	Leads “Save Mahanadi” campaigns, organizes community dialogues, awareness drives, and legal/policy monitoring for Mahanadi River protection	Bhubaneswar (statewide network)
2	Mahanadi Bachao Andolan	River protection, water justice, anti-pollution	Mass advocacy and Jal Satyagraha protests, legal challenges to industrial allocations, pollution and displacement awareness	Cuttack/Bhubaneswar, local chapters
3	Pallishree	Wetlands, climate adaptation, disaster risk reduction	Community-led wetland management, biodiversity restoration, and resilience programs in the Mahanadi delta region	Puri district
4	Sanrakshyan	Rural livelihoods, ecosystem adaptation	Supports mangrove and delta restoration, works with vulnerable coastal communities in the Mahanadi basin	Kendrapara/Jagatsinghpur
5	Gram Uday Foundation	Rural water, agriculture, SHGs	Projects on water body revival, climate-resilient farming, and disaster prep in Mahanadi-connected districts	Bhubaneswar/Jagatsinghpur
6	Wildlife Society of Orissa (WSO)	Biodiversity, wetlands, environmental education	Conservation of riverine biodiversity (e.g., turtles), outreach with riverbank communities, anti-poaching campaigns	Bhubaneswar/Cuttack

7	Caritas India – Odisha Chapter	Disaster risk reduction, resilient livelihoods	Post-flood recovery, resilience programs, water/sanitation promotion near the river	Bhubaneswar/regional field offices
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3. Identification of key programmes in operation in basin

3.1 Central government initiatives

There are numerous initiatives from the central government that supports different infrastructures of the state.

3.1.1 Water & River-Specific Schemes

Table 4: Water & River-Specific Schemes

Scheme / Mission	Role in Mahanadi Basin (Chhattisgarh)	Role in Mahanadi Basin (Odisha)
Jal Shakti Abhiyan Catch the Rain	Focus on revival and rejuvenation of traditional water bodies, construction of check dams, and rainwater harvesting in districts like Kanker, Gariaband, Surguja, and Kabirdham. Special focus on groundwater recharge, repair of minor irrigation tanks.	Focus on revival and rejuvenation of traditional water bodies, construction of check dams, and rainwater harvesting in districts like Sambalpur, Bargarh, Cuttack, and Nayagarh. Special focus on groundwater recharge, repair of minor irrigation tanks.
Atal Bhujal Yojana (ATAL JAL)	Not implemented statewide yet, but pilot groundwater recharge techniques are under review for Mahanadi basin replication	Odisha is listed for future expansion; pilot scientific groundwater management and community participation pilots are being tested, particularly in Western Odisha (Boudh, Subarnapur, Balangir) which impacts Mahanadi basin groundwater sustainability.
National River Conservation Plan (NRCP)	Supports STP construction, industrial effluent regulation, and monitoring of polluted stretches like Seonath and Kharoon.	Supports installation and upgradation of STPs (e.g., Sambalpur, Cuttack), pollution load reduction on Mahanadi, monitoring of urban/industrial discharge hotspots (notably in Cuttack, Sambalpur, Paradeep zones).
National Water Mission (NWM)	Encourages efficient irrigation practices (e.g., micro-irrigation), water audits, and awareness campaigns across the basin.	Drives micro-irrigation projects (sprinklers/drip), efficient water management demonstration farms in Mahanadi delta and distributaries, and public campaigns on water conservation in Mahanadi command areas.

Table 5: Agriculture & Water Use Efficiency

Scheme / Mission	Relevance
Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)	Major scheme for canal lining, micro irrigation, field bunding in Janjgir, Dhamtari, Mahasamund, Baloda Bazar
Rashtriya Krishi Vikas Yojana (RKVY)	Promotes efficient crop water use, rainfed farming support, relevant to Surguja, Kanker, Gariaband districts
Soil Health Card Scheme	Helps farmers adjust fertilizer and water input, especially in canal-irrigated zones along Mahanadi/Seonath

Table 6: Urban River & Water Infrastructure

Scheme / Mission	Impact
AMRUT (Atal Mission for Rejuvenation and Urban Transformation)	Used in Raipur, Bilaspur, Durg, Raigarh for sewerage, urban water pipelines, and riverfront sanitation near Mahanadi tributaries

3.2 State government initiatives

Table 7: Key State Government Initiatives

Chhattisgarh				
S.No	Scheme / Plan Name	Purpose / Focus Area	Applicable River Zones	Slogan / Motto (if available)
1.	Narva, Garva, Ghurva, Bari (NGGB) Yojana	Conservation of forest streams (Narva), local livestock, composting, and backyard farming	All forest-fed tributaries like Sondur, Mand, Pairi, Seonath upper basin	"Chhattisgarh ke chaar chinhari – Narva, Garva, Ghurva, Bari"
2.	Jal-Jivan Mission (State Wing)	Ensuring tap water to rural households, often sourcing from Mahanadi/tributaries	Entire basin, especially in rural Seonath, Hasdeo, Mand, Kharun areas	"Har Ghar Nal se Jal" (<i>Central slogan used</i>)
3.	Jal Shakti Abhiyan (State Coordination)	Rainwater harvesting, pond rejuvenation, and spring recharge	Districts with water-stress like Mahasamund, Kabirdham, Baloda Bazar	"Catch the Rain – Where it Falls, When it Falls" (<i>Central slogan</i>)
4.	Jal Gram Yojana (Panchayat Department)	Village-level water resource mapping and NRM works under MGNREGA	Remote tribal blocks (Gariaband, Surguja, Kanker, Dhamtari hills)	-
5.	Mahanadi Jal Sanrakshan Abhiyan (special campaign)	River cleaning, afforestation, awareness rallies across Mahanadi belt	Origin zone (Dhamtari), confluence (Janjgir), urban zones (Raipur, Raigarh)	"Mahanadi ko Bachana, Hamara Kartavya" (<i>used locally</i>)

6.	Mukhyamantri Amrit Sarovar Mission	Revival of ponds, tanks, and surface water bodies through convergence	All basin districts (village ponds linked to Mahanadi/tributaries)	"Har Gram ka Apna Amrit Sarovar"
7.	Rurban Mission (State-Urban Link)	Cluster-based development of peri-urban villages including drainage/water systems	Raipur outskirts, Mahasamund, Durg-Baloda Bazar corridor	-
8.	State Irrigation Modernization Plan (WRD)	Modernization of canals, head regulators, minor dams, & telemetry systems in basin	Janjgir-Champa, Bilaspur, Raigarh, Mahasamund, Dhamtari	-
9.	Harit Chhattisgarh – Riverbank Plantation Plan	Afforestation drives along rivers to prevent soil erosion and support biodiversity	Seonath, Hasdeo, Kharun, Mahanadi in Baloda Bazar, Kabirdham, Janjgir	"Hariyali Se Nadi Surakshit" (<i>local campaign phrase</i>)
10.	Rajim Kumbh & Tourism Riverfront Development	Eco-tourism, religious event management along Mahanadi (Rajim Sangam)	Gariaband, Mahasamund	"Rajim Sangam: Tirth aur Sanskriti ka Milan"
Odisha				
S.No	Scheme / Plan Name	Purpose / Focus Area	Applicable River Zones	Slogan / Motto (if available)
1	Mo Pokhari Yojana	Community-managed Pond creation, revival, groundwater recharge, irrigation	Riverine and water-scarce districts (e.g., Puri, Khurda, Cuttack)	"Mo Pokhari, Mo Parichaya"
2	Biju Krushak Vikas Yojana (BKVY)	Expansion, modernization, and revival of minor irrigation systems	River-fed and delta blocks across Cuttack, Angul, Bargarh, Sambalpur	"Chasa ra Sahayika Nadi"
3	Mukhyamantri Pipe Water Supply Yojana (Odisha's JJM)	Ensuring piped drinking water for rural and riverbank habitations	All Mahanadi basin/rural delta districts	"Har Ghar Jal"
4	Mission Amrit Sarovar (State Implementation)	Identification and rejuvenation of traditional water bodies ("sarovars")	Riverine villages and peri-urban clusters across basin districts	"Har Gramra Apan Sarovar"
5	Odisha Urban Waterbody Mission / Smart City Projects	Urban pond and stormwater rejuvenation, riverbank STPs, and awareness	Bhubaneswar, Cuttack, Sambalpur urban river zones	"Sabu Saharaku Swachha Jala"
6	Odisha State Wetland Authority Initiatives	Wetland and floodplain management, biodiversity restoration	Mahanadi delta/deltaic blocks (Kendrapara, Jagatsinghpur, Puri)	--
7	Riverbank Plantation & River Cleaning Campaigns	Afforestation, anti-erosion, cleanliness drives, public mobilization	Major Mahanadi, Tel, Ib stretches in Sambalpur, Cuttack, Subarnapur	"Nadi Suraksha, Nua Odisha"
8	Directorate of Fisheries – Fishery	Promotion of sustainable fisheries, livelihood support in riverine areas	Mahanadi delta wetlands, Cuttack,	--

	Development Schemes		Kendrapara, coastal blocks	
9	Odisha Disaster Risk Reduction (OSDMA programs)	Flood/cyclone early warning, embankment management, community safety	Flood-prone and coastal river tract districts	--
10	Odisha Ecotourism River Projects	Riverfront ecotourism, festival/fair management (e.g., Bali Yatra)	Cuttack, Satkosia Gorge, Mahanadi-Brahmani delta	"Prakrutira Apan Ghar"

3.3 NGO & Local community initiatives

3.3.1 Initiatives in Chhattisgarh

a) Chhattisgarh Agricon Samiti (CAS):

Aim: To improve rural and tribal livelihoods in Chhattisgarh, particularly in the Mahanadi basin, through sustainable agriculture (e.g., natural farming, efficient water use), natural resource management (e.g., rainwater harvesting, afforestation), and broader community well-being (mental health, social inclusion, youth/women empowerment).



Figure 2: Chhattisgarh Agricon Samiti (CAS)

(Source: <https://cgagricon.org/>)

Outcomes: Has successfully improved livelihoods, conserved natural resources (water, forests), mobilized a large network of youth volunteers, built community capacity, and achieved multi-sectoral impact across 16 districts.

Gaps: Faces challenges in scaling its interventions across the entire state, ensuring sustained behavioral change, overcoming infrastructural limitations (e.g., market access), securing consistent long-term funding, and rigorous long-term monitoring and evaluation.

Address: 404, Fourth Floor, Progressive Point, Near Fruit Market, Lalpur, Raipur, 492001, Chhattisgarh. (Their official website is: <https://cgagricon.org/>)

c) "Mahanadi Awakening Abhiyan" (MAA):



Figure 3: "Mahanadi Awakening Abhiyan" (MAA) in Dhamtari District, CG
(Source: [TOI](#))

Aim: These are public awareness and community mobilization campaigns aimed at instilling a sense of ownership and responsibility for water resources among citizens. They encourage rainwater harvesting, pond cleaning, tree plantation, and sustainable water use practices, often through *shramdaan* (voluntary labor). The recent "Mahanadi Awakening Abhiyan" (MAA) in Dhamtari specifically focuses on the origin of the Mahanadi, aiming for its ecological restoration, beautification, and making it a sustainable tourism spot while involving local communities.

Outcomes: Increased public awareness about water conservation. Successful cleaning and deepening of numerous village ponds. Notable examples of community-led behavioral changes, such as the *Parastarai village in Dhamtari*, where villagers collectively decided to restrict water-intensive Rabi paddy cultivation and adopt less thirsty crops, demonstrating a powerful bottom-up approach to water management. MAA is showing early results in cleaning and greening the river's origin stretch.

Gaps:

- **Behavioral Change Sustainability:** While campaigns generate initial enthusiasm, sustaining long-term behavioral changes (e.g., efficient water use in agriculture, avoiding littering in rivers) requires continuous reinforcement and incentives.
- **Replication Challenges:** Successful localized models like Parastarai often face challenges in replication due to varying socio-economic conditions, local leadership dynamics, and the need for customized approaches.
- **Limited Impact on Large-Scale Issues:** While crucial for local water management, these campaigns, by themselves, cannot resolve major issues like industrial pollution, large-scale deforestation, or inter-state water conflicts.

d) Paryavaran Bachao Samity (Local Environmental Group) - Mahanadi River (Chhattisgarh) (CECB);

Aim: Protect specific local stretches of the Mahanadi from pollution and unsustainable practices, raise community awareness, advocate local environmental concerns to authorities, and preserve traditional river-friendly practices.

Outcomes: Conducts localized river clean-ups; successfully highlights specific local pollution/illegal activities; mobilizes villagers for targeted protests; and increases local environmental awareness.

Gaps: Limited geographical scope and scale; lacks advanced technical/legal expertise and significant funding; struggles against powerful industrial/political interests; faces bureaucratic hurdles; and may lack broader coordination with larger movements.

e) Water Conflicts Forum (and research/advocacy groups on water governance):

Aim: To foster dialogue, conduct research, and advocate for equitable and sustainable water governance. Their work on the Mahanadi basin focuses on the inter-state dispute, the impacts of industrial water allocation, environmental flows, and groundwater conflicts. They aim to provide evidence-based arguments for alternative water management approaches.



Figure 4: Water Governance Standard by WOTR

(Source: <https://wotr.org/>)

Outcomes: Generation of critical knowledge and analysis on water conflicts, policy gaps, and socio-environmental impacts. They contribute to public discourse and inform civil society actions. Their reports often highlight the need to recognize "rivers' right to life."

Gaps:

- **Policy Influence:** While providing valuable insights, directly influencing policy decisions, especially in politically sensitive inter-state disputes, remains a major challenge.

- **Limited Outreach:** The technical nature of their work may limit widespread public understanding and mobilization.

3.3.2 Initiatives (Odisha)

a) Mahanadi Bachao Andolan (MBA)

Aim: Protect water flows in the Mahanadi, advocate for Odisha's rights in inter state disputes, support livelihoods of farmers and fisherfolk downstream.

Outcomes: Mobilized public protests and signature campaigns; pressure on state and central governments to address river disputes; raised awareness extensively.

Gaps: Limited policy influence; lacks structured intervention programs; organizational capacity varies regionally.



Figure 5: Mahanadi Bachao Andolan (MBA)
(Source: Orissapost.com)

b) Gram Vikas, Odisha

Aim: Advance integrated water and sanitation interventions in Odisha villages, promoting piped water systems, toilets, and strong community institutions. gramvikas.org

Outcomes: Reached over 600,000 people in 1,700 villages across Odisha and Jharkhand. Established community-owned piped water supply in more than 1,400 villages, achieving ~87% household tap-connection coverage. Implemented sanitation infrastructure—household toilets and bathing facilities—with community corpus funds and local management systems. Successfully operationalized “Water Secure Gram Panchayats” in 790 villages to democratize water control.

Gaps:

- Primarily focused on rural water and sanitation; limited direct intervention in river basin water governance.
- Limited involvement with Mahanadi inter-state issues and industrial water allocation.

c) Water Initiatives Odisha (WIO)

Focus: Advocacy for environmental flows, rivers' rights, groundwater health, and inclusive basin management.

Outcomes: Influential studies on groundwater depletion and dam-induced flow impacts. Policy dialogues raising awareness of ecological flow requirements in Odisha's River systems.

Gaps: Less traction in sustained grassroots outreach. Advocacy remains primarily research-driven with limited policy penetration.

d) Paschim Odisha Krushak Sangathan (Western Odisha Farmers' Union)

Aim: Represents farmers and fisherfolk in western Odisha's Mahanadi catchment, advocating for equitable water access.

Outcomes: Elevated local water grievances in district-level forums; supported community mobilization.

Gaps: Limited scale and absent legal or institutional binding mandate.

4. Identifying key stakeholders (those who have direct claim on the river)

The Mahanadi River is a lifeline for diverse stakeholder groups across Chhattisgarh and Odisha, with each group depending on the river in distinct ways for their livelihood, sustenance, and industrial activity. This section identifies and classifies key stakeholders based on their level of dependency, impact on river health, and influence in decision-making processes. Understanding these dynamics is essential for designing inclusive and effective river management strategies.

Households, both rural and urban, rely heavily on the Mahanadi for drinking water, sanitation, and domestic uses. Marginalized and tribal communities including the Kondh, Gond, Munda, and others in remote locations have a deeper and more intrinsic dependence on the river due to limited access to alternative water sources. However, their influence in river governance and policymaking remains minimal, underscoring the need for greater inclusion in participatory planning. On the other hand, irrigation-dependent farmers and Water User Associations (WUAs) have medium to high influence, particularly through agricultural collectives and participatory irrigation management institutions. These groups also have a medium impact on river health through abstraction and runoff, especially from fertilizer-intensive cultivation.

The stakeholder analysis of the Mahanadi River reveals a significant mismatch between those most dependent on the river and those with the greatest influence over its management. Rural and urban households marginalized and tribal communities, traditional fisherfolk, and informal laborers such as sand miners and boatmen exhibit high levels of dependency on the river for basic needs, livelihoods, and cultural identity. However, these groups have minimal institutional presence and are often excluded from policy-making processes. Their limited voice in governance leaves them vulnerable to decisions that directly impact their well-being, despite their low ecological footprint and long-standing connection to the river.

Table 8: Stakeholder Analysis for the Mahanadi River Basin – Dependency, Impact & Influence

Stakeholder Group	Dependency on Mahanadi	Impact on River Health	Influence in Decision-Making	Remarks
Rural & Urban Households	High – for drinking, domestic use	Medium – waste disposal, greywater runoff	Low – mostly unorganized	Require improved sanitation and awareness
Marginalized & Tribal Households	High – for all daily needs and livelihood	Low – limited environmental impact	Very Low – least represented	Need targeted inclusion in policies
Irrigation-dependent Farmers	High – for crop irrigation	Medium – overuse, chemical runoff	Medium – through collectives	Strong seasonal dependence
Smallholder & Rain-fed Farmers	Moderate – tank/well recharge	Low – minimal runoff or abstraction	Low – scattered representation	Vulnerable to flow variation
Water User Associations	High – manage irrigation access	Low – promote efficient usage	Medium – formally recognized	Potential facilitators of sustainability
Fisherfolk (traditional & seasonal)	High – livelihood dependent	Low – passive users of river health	Low – weakly organized	Severely affected by pollution & flow regulation
Sand Mining & Transport Workers	High – employment from riverbed	High – contribute to riverbed degradation	Low – informal labor force	Need alternate livelihood options
Boatmen & Tourism Operators	Moderate – rely on navigable flow	Low – low ecological footprint	Very Low – not formally represented	Culturally linked to river usage
Thermal Power Plants & Industries	High – large-scale water abstraction	High – effluent discharge, thermal pollution	High – strong regulatory and financial influence	Require strong monitoring and mitigation compliance
SMEs (e.g., rice mills, food units)	Moderate – use water for operations	Medium – untreated discharge possible	Low – limited individual influence	Cumulative impacts are significant
Urban Water Utilities & Boards	High – bulk water withdrawal, sewage discharge	High – dual role: supply and pollution	High – institutional authority	Central to restoration efforts

Legend:

a) Dependency:

- **High** – Direct and essential reliance on river
- **Moderate** – Indirect or seasonal dependence
- **Low** – Occasional or minor use

b) Impact on River Health:

- **High** – Major contributor to pollution or ecological degradation
- **Medium** – Partial contributor
- **Low** – Negligible effect

c) Influence in Decision-Making:

- **High** – Strong policy access and institutional/financial power
- **Medium** – Organized but with limited influence
- **Low** – Marginalized or informal presence

The mapping exercise highlights the asymmetry between those most dependent on the river and those most influential in its governance. While the livelihoods and well-being of local communities are tightly linked to the river's ecological health, their limited institutional presence makes them vulnerable to the decisions of more powerful actors. A participatory governance approach that incorporates the voices of marginalized and traditional users, along with stronger regulation of high-impact industries, is essential for sustainable river basin management. This also applies to Odisha, where similar asymmetries exist among stakeholders.

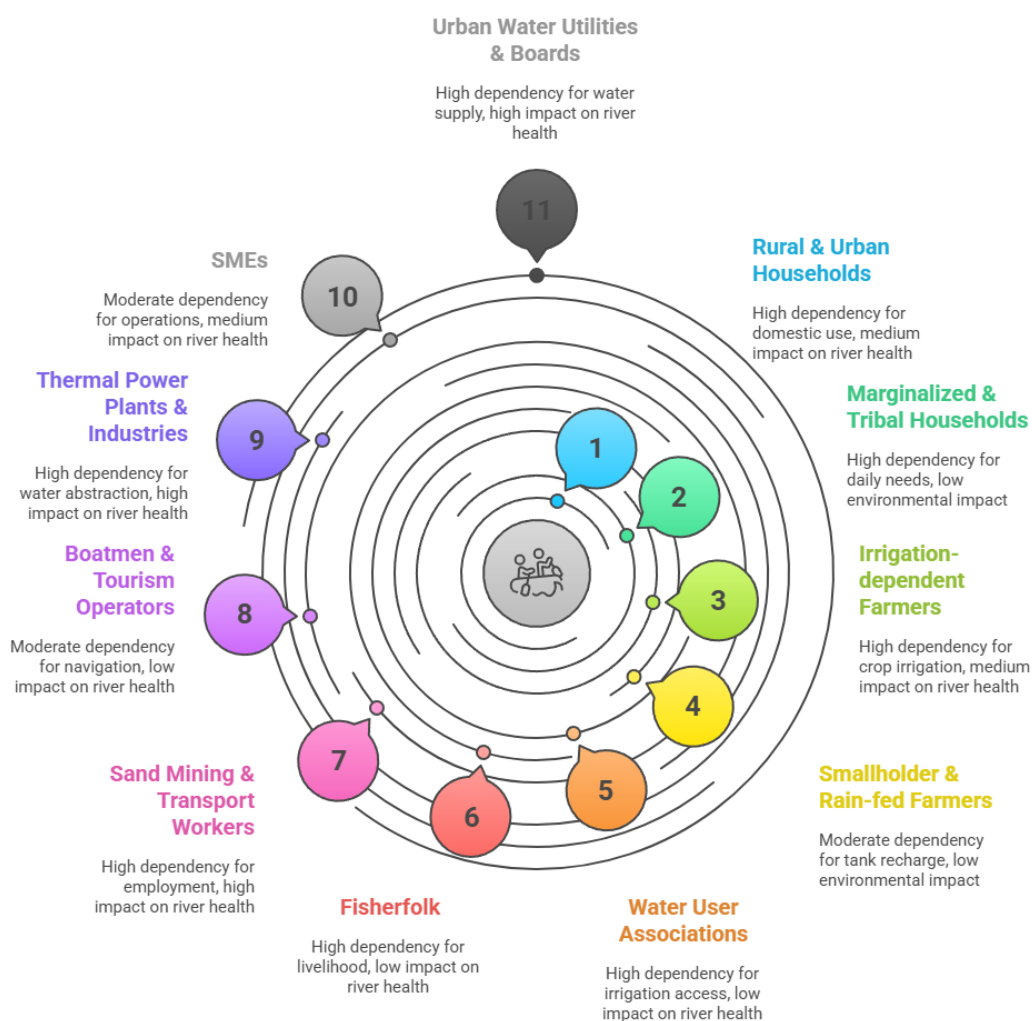


Figure 6: Stakeholder Dynamics of the Mahanadi River Basin

Conversely, high-impact stakeholders such as thermal power plants, large industries, and urban water utilities exert considerable pressure on the river ecosystem through water abstraction, thermal and chemical pollution, and unregulated discharge. These actors also enjoy a high level of institutional and financial influence, giving them disproportionate control over water allocation and environmental regulation. Medium-impact groups like irrigation-dependent farmers and Water User Associations (WUAs) have a more balanced profile, with moderate influence and potential to promote sustainable practices if adequately supported and held accountable.

5. Examples of enabling/constraining elements to implementation of policies and programmes (e.g. role of information, awareness, social movements, litigations, etc.)

5.1 Overview of Policy and Programme Implementation in Basin Context

The Mahanadi River Basin, spanning several states including Chhattisgarh and Odisha, has been the focus of multiple policies and programmes related to water resource management, environmental conservation, rural development, and livelihood enhancement.

In recent years, the policy landscape has shifted from solely infrastructure-based solutions (like dams and canals) to more integrated and participatory approaches, focusing on sustainability, inclusiveness, and resilience. However, the complexity of inter-state water sharing, bureaucratic hurdles, and fragmented implementation have posed significant constraints. This section describes initiatives and constraints as they apply to both Chhattisgarh and Odisha.

Key policy domains include:

a) National Water Policy (2012)

- Encourages integrated river basin planning, directly relevant to the Mahanadi which flows through multiple states.
- Promotes inter-state coordination, crucial due to water disputes between Odisha and Chhattisgarh over dam construction and water use.
- Supports rainwater harvesting and groundwater recharge—important for sustaining agriculture in the Mahanadi basin, especially during dry seasons.

b) Jal Shakti Abhiyan

- Focused on reviving traditional water bodies like ponds and tanks in the basin's rural areas (e.g., Balangir, Raigarh).
- Promoted community-led water conservation in water-stressed districts of Chhattisgarh and Odisha falling under the Mahanadi basin.
- Helped improve soil moisture and agricultural productivity along the river's catchment.

c) MGNREGA

- Widely used in rural districts along the Mahanadi to create water harvesting structures, check dams, and irrigation canals.
- Combined goals of rural employment and water resource development—boosting resilience against floods and droughts common in the basin.
- Plays a key role in increasing groundwater recharge in tribal and forest villages near the river.

d) State-Level Irrigation & Minor Watershed Schemes

- States like Odisha and Chhattisgarh run minor irrigation projects (like lift irrigation from Mahanadi tributaries).

- Watershed development programmes (e.g., IWMP) help reduce runoffs and improve soil-water balance in sloped and degraded areas of the basin.
- Enhances local irrigation in rain-fed regions like Mahasamund, Kanker, and Nuapada.

e) Environmental Protection Act, 1986

- Used to monitor pollution levels in Mahanadi, especially near industrial zones like Raipur, Sambalpur, and Cuttack.
- Supports legal action to protect river ecosystems and prevent industrial discharge into the river.

f) Forest Rights Act, 2006

- Empowers tribal communities in forest areas of the basin (e.g., Dhamtari, Kalahandi) to manage and protect water sources.
- Recognizes customary rights over springs, streams, and forest ponds connected to the river system.
- Promotes community-based watershed protection and sustainable use of river-connected forest lands.

These programmes aim to improve irrigation, protect natural resources, and empower rural communities. However, inter-state tensions and lack of coordination often hamper effective policy implementation.

5.2 Enabling Elements

5.2.1 Role of Information and Knowledge Dissemination

Effective dissemination of scientific and traditional knowledge related to water use, soil conservation, and cropping patterns has enabled better community practices. Initiatives by **CGWB, state irrigation departments**, and NGOs have supported data-based decision-making. In parts of Raigarh district of Chhattisgarh and Keonjhar district of Odisha, training programs for farmers on water-saving irrigation (e.g., drip/sprinkler systems) under watershed projects led to improved productivity and groundwater recharge.

Community-driven water resource planning has proven effective in certain parts of the basin. Involving **Gram Panchayats, Self Help Groups (SHGs)**, and **Water User Associations (WUAs)** in planning and monitoring ensures better local accountability.

In Dhamtari district, local villagers, especially women-led SHGs, were involved in reviving traditional ponds (talabs) through MGNREGA, improving both water availability and livelihoods. Similarly, in Bhainsamunda village in Odisha's Jharsuguda district, the community embarked on an inspiring initiative in September 2023. Guided by the Village Development Committee (VDC) and supported by Gram Vikas, villagers undertook the restoration of their communal pond, transforming it into a productive, community-managed fishery that now contributes to local nutrition and income.

Institutions such as the **State Water Resources Departments, Mahanadi Basin Organization (MBO)** under the Central Water Commission, and **District Rural Development Agencies (DRDAs)** coordinate basin-level planning and implementation.

Multi-stakeholder forums are emerging to ensure better coordination but still need strengthening.

5.2.2 Successful Social Movements or Collective Action

Grassroots environmental and livelihood movements have pushed for accountability and protection of local water sources.

- Civil society mobilizations by farmers, fisherfolk, and residents around Hirakud have shaped water allocation debates and influenced government action.
- Advocacy by groups like Mahanadi Bachao Andolan has kept pressure on policymakers for equitable distribution of water and environmental justice.

5.2.3 Legal Frameworks Supporting Implementation

Laws like the **Environment Protection Act (1986)**, **Water (Prevention and Control of Pollution) Act (1974)**, and **Forest Rights Act (2006)** have provided legal grounds for community claims and action against polluters.

- **Interstate River Water Disputes Act, 1956:** This act provides a mechanism for resolving water disputes between states sharing a river basin. It enables the establishment of tribunals to adjudicate on water sharing and usage issues, which is crucial for managing the Mahanadi basin, where water resources are shared by multiple states.
- **Water (Prevention and Control of Pollution) Act, 1974:** This act focuses on preventing and controlling water pollution. It establishes state and central pollution control boards responsible for monitoring water quality, issuing directives to prevent pollution, and imposing penalties for violations. This is particularly important in the Mahanadi basin, where industrial and agricultural activities can impact water quality.
- **Environment Protection Act, 1986:** This umbrella legislation provides a framework for protecting the environment, including water resources. It empowers the government to take measures to prevent and control pollution, including setting standards for water quality and regulating activities that may harm the environment.
- **National Water Mission:** This mission, part of the National Action Plan on Climate Change, aims to ensure integrated water resource management, promote water-use efficiency, and address the impacts of climate change on water resources. It provides a strategic framework for sustainable water management in the Mahanadi basin, emphasizing conservation and efficient utilization of water resources.
- **National Framework for Sediment Management:** This framework, released by the Ministry of Jal Shakti, provides guidance to states for developing plans and policies related to sediment management in rivers and reservoirs. It addresses the issue of sedimentation, which can impact the capacity and lifespan of dams and reservoirs in the Mahanadi basin.
- **State-Specific Regulations and Policies:** Individual states within the Mahanadi basin also have their own set of laws and policies related to water resources, irrigation, and environmental protection. These state-specific regulations complement the national-level frameworks and are crucial for addressing the unique challenges and opportunities within each state.

- **Condition Assessment and Management Plan (CAMP):** This initiative focuses on developing comprehensive baselines for river health and management plans. It emphasizes the need for coordination among states, stakeholder engagement, and long-term partnerships for effective river health initiatives.
- **Centres for Mahanadi River Basin Management Studies:** These centers aim to gather knowledge and prepare a comprehensive Mahanadi River Basin Management Plan. The plan should include action plans with specific projects, policy interventions, and management actions, along with financial implications, to address various aspects of river basin management.

5.3 Constraining Elements

The implementation of policies in the Mahanadi Basin is hindered by a combination of structural, social, and institutional barriers that limit progress and exacerbate existing challenges.

- **Limited Access to Information:** A significant number of communities, especially in remote tribal areas, remain unaware of critical information related to environmental laws, water quality data, and their rights. This gap in information creates a power imbalance where only a few actors, mostly from industrial and political circles control the narrative and decision-making processes. Without accessible and timely information, local populations cannot effectively advocate for their needs or hold authorities accountable.
- **Low Levels of Awareness:** Even where information is available, awareness levels about sustainable practices, ecological preservation, and participatory governance remain low. This is particularly true in marginalized communities where education levels are poor, and daily struggles for basic necessities overshadow environmental concerns. Awareness campaigns have not yet permeated all social layers uniformly, leaving large sections of society disconnected from conservation efforts.
- **Institutional Fragmentation or Weak Coordination:** One of the most pressing issues is the lack of coordination among various government departments. Water Resources, Environment, Agriculture, and Industry departments often work in isolation with little inter- sectoral communication. The absence of a centralized Mahanadi Basin Authority to oversee integrated planning exacerbates this disjointed approach, resulting in overlapping responsibilities, policy contradictions, and inefficiencies.
- **Conflicts Among Stakeholders:** The inter-state water dispute between Chhattisgarh and Odisha is a glaring example of stakeholder conflict that impedes basin-wide planning. Additionally, there are conflicts at the local level between farmers, industries, urban municipalities, and environmentalists over water allocation, land use, and pollution control. These conflicts are often fuelled by competing economic interests, making consensus difficult to achieve.
- **Litigation Delays or Policy Uncertainty:** The prolonged deliberations of the Mahanadi River Water Disputes Tribunal create an atmosphere of uncertainty. Policy ambiguity hampers long-term investments in sustainable infrastructure and deters comprehensive basin management strategies. The slow pace of legal resolution means that interim measures are piecemeal or reactionary rather than forward-looking.
- **Socioeconomic Barriers:** Widespread poverty, illiteracy, and social marginalization, especially among tribal populations, limit the effective participation of vulnerable groups

in governance and policy implementation. Additionally, displacement due to industrialization and mining, particularly in regions like Hasdeo Aranya, further marginalizes these communities. They face a dual challenge: loss of traditional livelihoods and inadequate rehabilitation, pushing them into deeper socio-economic distress. In the Hasdeo Aranya coal mining region, local communities continue to face environmental degradation, loss of forest cover, and water pollution. Despite policies for compensation and rehabilitation, implementation remains weak, and affected families often struggle for basic entitlements and livelihood restoration. Similarly, in Odisha's Talcher-Angul as well as Keonjhar industrial belt, rapid industrialization and mining have led to widespread displacement and environmental degradation. Communities displaced by coal mining and power plant development often face delays in compensation, limited livelihood options, and deteriorating water quality, compounding existing vulnerabilities.

5.4 What Works for Co-existence

For sustainable co-existence of diverse stakeholders in the Mahanadi Basin, certain strategies have proven effective:

- **Participatory Planning Processes:** Involving local communities in the planning and management of water resources ensure that solutions are context-specific and culturally sensitive. Programmes that develop Village Water Security Plans empower communities to map their water sources, identify local challenges, and collaboratively devise solutions.
- **Multi-Stakeholder Coordination Platforms:** Establishing basin-level committees or forums where representatives from government, industry, NGOs, academia, and local communities can come together fosters holistic planning. Such platforms encourage dialogue, share knowledge, and help align diverse interests for the common good of the river basin.
- **Conflict Resolution Mechanisms:** Creating structured avenues for conflict resolution, such as mediation panels or water user committees, enables stakeholders to address disputes amicably. These mechanisms are essential for resolving inter-sectoral tensions, especially where water usage priorities clash.
- **Incentives for Sustainable Practices:** Financial incentives, such as subsidies for adopting drip irrigation, rainwater harvesting, organic farming, and afforestation, encourage communities and industries to engage in sustainable practices. These incentives not only support environmental goals but also provide economic benefits to participants.
- **Education and Outreach Programmes:** Continuous education and awareness campaigns, tailored to different demographic groups, help sustain public interest and engagement in conservation efforts. School-based eco-clubs, adult literacy programs on environmental stewardship and mass media campaigns contribute to building an informed and proactive citizenry.

5.5 What Doesn't Work for Co-existence

While several initiatives show promise, certain approaches have consistently failed to foster harmonious and sustainable coexistence in the basin:

- **Top-down Policy Imposition:** Without Consultation Policies designed and implemented without engaging local communities often fail to address ground realities. Such top-down approaches breed resentment and resistance, as seen in cases where large-scale industrial projects were approved without adequate local consultation or environmental impact assessments.
- **Exclusion of Vulnerable Groups from Decision-making:** Marginalized groups, including tribal communities, women, and economically weaker sections, are frequently sidelined in policy dialogues and governance structures. Their exclusion leads to policies that overlook the unique challenges and needs of these populations, thereby perpetuating inequality and social injustice.
- **Conflicting Policy Mandates:** There is often a disjoint between industrial development policies and environmental conservation efforts. For instance, while water is allocated generously to industries, ecological requirements for maintaining river health are neglected. This policy conflict undermines the very sustainability of the river basin. Chhattisgarh Govt. policy to promote industrialization and build dams on the upstream Mahanadi River to provide water to industries conflicts with Odisha Govt. policy to ensure adequate water flow for its downstream agricultural and ecological needs, including the Hirakud Dam, leading to an inter-state water dispute and fears of reduced water availability in the lower basin.
- **Poor Enforcement of Environmental Regulations:** Regulatory frameworks for pollution control and environmental conservation are in place, but enforcement is typically weak. Monitoring agencies are often understaffed and under-resourced, leading to unchecked industrial pollution and illegal activities like sand mining.
- **Lack of Grievance Redress Mechanisms:** Communities affected by environmental degradation or displacement often have no effective platform to voice their concerns or seek justice. The absence of a proper system in place to handle and resolve complaints or concerns raised by individuals or groups leads to frustration, social unrest, and in some cases, violent protests.

Ensuring effective policy implementation in the Mahanadi Basin requires a multi-pronged approach that emphasizes inclusivity, transparency, and coordination. Strengthening participatory mechanisms, improving inter-departmental synergy, enforcing regulations, and ensuring that the voices of the most vulnerable are heard are crucial steps towards achieving sustainable and equitable development in the region.

6. Identifying strategies address constraints through creating public awareness and encouraging participation

6.1 Introduction to Strategy Needs

- **Lack of Public Understanding/Awareness:** Limited knowledge among the general populace about the ecological importance of the Mahanadi, the impacts of pollution,

unsustainable resource extraction (e.g., sand mining, excessive water withdrawal), climate change effects, or the benefits of conservation efforts.

- **Insufficient Community Participation:** Low engagement of local communities in decision-making processes, monitoring initiatives, or implementing sustainable practices, perhaps due to a lack of platforms, incentives, or perceived relevance.
- **Policy/Enforcement Gaps:** Weak or unenforced regulations, inadequate institutional capacity, or fragmented governance structures.
- **Economic Disincentives:** Livelihood dependencies that conflict with sustainable practices, or a lack of economic alternatives for communities reliant on unsustainable activities.
- **Technical/Infrastructural Limitations:** Insufficient infrastructure for waste management, water treatment, or monitoring, or a lack of technical expertise.

6.1.1 Linking Constraints to Strategy Needs:

- If lack of public understanding is a constraint, a key strategy is to *create widespread public awareness* campaigns.
- If insufficient community participation is a barrier, then strategies must focus on *encouraging active participation* from all stakeholders.
- If policy gaps exist, strategies might involve advocating for policy reforms or strengthening enforcement mechanisms.
- If economic disincentives are present, strategies could include developing alternative sustainable livelihoods or providing incentives for eco-friendly practices.

6.1.2 Role of Awareness and Participation in Relation to the Mahanadi:

For a complex and vital river system like the Mahanadi, creating public awareness and encouraging participation are not merely components of a strategy; they are often the foundational pillars upon which all other successful interventions rest.

- **Ecological Significance:** Many people may not fully grasp the Mahanadi's immense ecological role – from supporting diverse aquatic life and migratory birds to recharging groundwater and sustaining crucial ecosystems like wetlands and forests in its basin. Awareness campaigns can highlight this.
- **Threats and Impacts:** Public awareness is crucial for people to understand how their actions (specially pollution) contribute to the degradation of the Mahanadi. This includes making them aware of industrial pollution, agricultural runoff, municipal waste, and the impacts of large-scale infrastructure projects.
- **Climate Change Vulnerability:** The Mahanadi basin is increasingly vulnerable to extreme weather events (floods, droughts) due to climate change. Awareness can educate communities about these risks and the need for adaptive strategies.
- **Water Scarcity and Sharing:** Understanding the finite nature of water resources and the complexities of inter-state water sharing in the Mahanadi basin is vital for fostering responsible water use.

6.1.3 Encouraging Participation and the Mahanadi

- **Local Ownership:** Sustainable management of the Mahanadi cannot be top-down. Local communities, who live along its banks and depend on its resources, must be empowered to participate in decision-making. This fosters a sense of ownership and responsibility.
- **Traditional Knowledge:** Indigenous and local communities often possess invaluable traditional knowledge about the river's hydrology, ecosystems, and sustainable resource use. Their participation ensures this knowledge is integrated into modern management plans.
- **Monitoring and Reporting:** Engaged citizens can act as "eyes and ears" on the ground, helping to monitor pollution, illegal activities, and changes in the river's health. They can report issues to authorities, enhancing enforcement.
- **Implementing Solutions:** Whether it's adopting water-saving irrigation techniques, participating in tree-plantation drives along riverbanks, or segregating waste, direct community participation is essential for the on-ground implementation of sustainable practices.
- **Conflict Resolution:** In a basin with multiple stakeholders and competing demands for water (agriculture, industry, domestic use,), participatory platforms can facilitate dialogue, build consensus, and help resolve conflicts peacefully.
- Without a well-informed public that understands the challenges and is actively involved in seeking solutions, efforts to address constraints on the Mahanadi will likely remain superficial and unsustainable. Awareness catalyzes behavioural change, and participation ensures that strategies are relevant, equitable, and effectively implemented at the grassroots level.

6.2 Strategies for Creating Public Awareness about the Mahanadi River

We need a comprehensive approach to inform and engage everyone. These strategies aim to make river conservation a community-wide effort:

1. Information, Education, and Communication (IEC) Campaigns:

Think of these as organized campaigns designed to spread key messages far and wide:

- **Crafting Clear Messages:** What are the most vital things people need to know? Perhaps it's "Don't pollute the river," "Conserve water," or "Trees protect riverbanks." These messages need to be simple and impactful.
- **Diverse Formats:** We'd use a mix of tools like posters, educational pamphlets, short videos, catchy jingles, and engaging street plays. Even public announcements and community meetings can play a big role.
- **Targeted Outreach:** Different groups need different approaches. Farmers might respond best to visual demonstrations, while urban residents might prefer social media content.

2. Using Local Languages and Culturally Appropriate Materials:

This is crucial for connecting with the diverse communities across the Mahanadi basin, spanning Chhattisgarh, Odisha, and parts of neighboring states.

- ✓ **Speak Their Language:** Messages must be in local languages like Odia, Chhattisgarhi, Hindi, and various regional dialects. This ensures the information is not just heard, but truly understood and felt.
- ✓ **Embrace Local Culture:** We should weave in local art forms, traditional folk tales, regional music, and storytelling into our awareness materials. Imagine a Mahanadi conservation message told through a traditional dance or a local hero's story – it would resonate deeply.
- ✓ **Respect Local Beliefs:** Understanding and respecting local customs and spiritual connections to water bodies can help integrate conservation efforts seamlessly into community life.

3. School and Community-Based Education Programs:

Education is a powerful tool, especially when started early and reinforced within the community.

- ✓ **In Schools:** We can introduce teaching children about the river's unique ecosystem, its history, economic importance, and the threats it faces. Interactive activities like river clean-up drives, drawing contests, water quality experiments, and even visits to local wetlands along the rivers can make learning fun and memorable. Starting "River Clubs" or "Eco-Clubs" in schools can also foster long-term engagement.
- ✓ **In Communities:** This involves holding regular awareness camps in villages and urban neighborhoods to discuss specific river-related issues, such as proper waste disposal or sustainable farming practices near the river. Empowering local bodies through village-level water committees can also help manage water resources and spread awareness from within.
- ✓ **Example:** "Mahanadi River Olympiad" for students, or "Pani Chaupals" (Water Forums) in villages discussing efficient irrigation.

4. Mass Media and Social Media Outreach:

To reach a vast audience quickly and consistently, we need to leverage modern communication channels.

- ✓ **Mass Media:** This includes TV documentaries or short films that showcase the beauty and challenges of the Mahanadi river. Public Service Announcements (PSAs) on local TV and radio channels can deliver quick, impactful messages about pollution control or water saving. Radio talk shows with experts and community members, along with newspaper articles, can also keep the conversation going.
- ✓ **Example:** Animated "Mahanadi Ki Kahani" short films on local TV, or a #CleanMahanadi social media challenge.
- ✓ **Social Media:** We can run dedicated campaigns on platforms like Facebook, Instagram, YouTube, and WhatsApp. Sharing compelling visuals, short videos, easy-

to-understand infographics, and success stories can capture attention. Using local influencers or environmental activists online can also amplify our messages, especially among younger audiences.

5. Capacity-Building Workshops

These workshops go beyond just sharing information; they teach practical skills and empower individuals to become active participants in river conservation.

- ✓ **Training Local Champions:** We can train local leaders, youth, and volunteers to become "Mahanadi Ambassadors." They could learn basic water quality testing, understand environmental laws, or how to organize community clean-ups.
- ✓ **Empowering Farmers:** Workshops can focus on sustainable agricultural practices like water-efficient irrigation, organic farming, and ways to prevent chemical runoff from reaching the river.
- ✓ **Engaging Businesses:** For local industries, workshops on best practices for waste reduction, water recycling, and compliance with environmental regulations are crucial.
- ✓ **Women's Self-Help Groups (SHGs):** Empowering these groups with knowledge about water, sanitation, and hygiene (WASH) practices can have a ripple effect throughout communities.

By combining these strategies, we can create a comprehensive and effective public awareness movement around the Mahanadi River, encouraging everyone to play their part in its protection and sustainable management.

6.3 Strategies for Encouraging Participation in the Mahanadi Basin

6.3.1 Strengthening Local Institutions (Panchayats, User Groups):

The Mahanadi flows through numerous villages and districts. Empowering local bodies is fundamental:

- **For Panchayats:** Provide training and resources to Gram Panchayats in Chhattisgarh and Odisha, making them central to local river management. This includes training on water resource policies, environmental protection rules, and conflict resolution related to water use. This can be responsible for ensuring proper waste disposal near riverbanks, regulating small-scale sand mining, or maintaining village ponds that recharge groundwater linked to the Mahanadi system.
- **Forming and Supporting User Groups:** Encourage the creation and effective functioning of various local groups.
- **Water User Associations (WUAs) / Pani Panchayats:** These farmer groups, especially in the command areas of Mahanadi's irrigation projects (like Hirakud), can manage water distribution, resolve local disputes, and promote efficient irrigation techniques to reduce water draw from the river.

- **Fisherfolk Cooperatives:** Support communities dependent on fishing to manage their resources sustainably, protect breeding grounds, and monitor fish health in the Mahanadi and its tributaries.
- **River Protection/Monitoring Committees:** Form local committees at the village or cluster level along the riverbanks to serve as "eyes and ears," reporting pollution, illegal activities, or changes in river flow to relevant authorities.

Example: In Chhattisgarh's Mahanadi basin, **Panchayats** and **Water User Associations (WUAs)** are being strengthened. For example, in villages along the Pairi River (a Mahanadi tributary), WUAs now receive training and authority to manage and maintain local irrigation canals, leading to more efficient and equitable water distribution.

6.3.2 Inclusive Decision-Making Processes

Ensuring all voices are heard in decisions affecting the Mahanadi is critical for equitable and effective outcomes:

- **Empowering Women:** Women often bear the primary responsibility for fetching water and managing household water use. Their unique perspectives on water quality, availability, and sanitation are invaluable. Actively involve women's self-help groups (SHGs) or create specific platforms for women's representation in all water management and river conservation committees within the Mahanadi basin. Training programs on water quality testing and sustainable practices can further empower them.
- **Voice for Marginalised Communities:** Tribal communities, Scheduled Castes, and other economically weaker sections often have strong traditional ties to the river and are disproportionately affected by its degradation. Ensure their representation in planning and decision-making bodies. This might involve holding meetings in their local dialects, using participatory rural appraisal (PRA) tools to gather their traditional knowledge about the river, and ensuring benefit-sharing from conservation efforts.

Example: In a tribal area of Chhattisgarh's Mahanadi basin, **inclusive decision-making** for check dam construction involved women's SHGs and PVTG representatives. Their input led to modifying the dam's design/location to protect traditional fishing access and adding community handpumps, ensuring a more equitable water management plan.

6.3.3 Participatory Planning Exercises (Village-Level, Block-Level)

Allowing communities to co-create solutions fosters ownership and relevance:

- **Village Water Security Plans:** Facilitate workshops in villages along the Mahanadi and its tributaries. Here, community members can collectively map their local water sources, identify specific problems, and collectively brainstorm solutions. This could lead to micro-plans for riverbank protection, waste segregation, or pond rejuvenation.
- **Block-Level Integration:** Consolidate these village-level plans at the Block or Tehsil level. This allows for identifying common challenges, sharing best practices, and coordinating efforts across a larger geographical area within the Mahanadi basin, ensuring coherence in the overall basin management strategy.

Example: In Chhattisgarh's Mahanadi basin, **participatory planning** involves villages (like Sihawa) identifying local water needs (e.g., pond desilting) and consolidating these at the block

level for coordinated, larger-scale water management solutions, like interconnected check dams along tributaries.

6.3.4 Community-Based Monitoring and Evaluation (CBM&E)

Empowering communities to observe, record, and assess the river's health firsthand:

- **Citizen Science Networks:** Train local youth, school children, or interested citizens in simple methods of water quality testing, documenting pollution incidents, or observing changes in fish populations or river flow. This data, even if basic, can provide crucial real-time insights for authorities in the Mahanadi basin.
- **Transparent Reporting Mechanisms:** Establish easy-to-use and trusted channels for communities to report environmental violations directly to relevant government departments. This could involve dedicated helplines, WhatsApp groups, or online portals.
- **Participatory Impact Assessment:** Involve communities in evaluating whether the conservation strategies are actually working. Are fish populations increasing? Is the water cleaner? Are livelihoods improving? Their direct feedback is vital for adapting and improving programs.

Example: In a Chhattisgarh village within the Mahanadi basin, "Water Watchers" use **Community-Based Monitoring and Evaluation (CBM&E)** to track local well levels and river pollution (like industrial discharge). Their data empowers them to both implement local solutions (e.g., pond desilting) and successfully advocate to authorities for action against polluters, showcasing CBM&E's effectiveness in addressing basin-specific environmental issues.



Figure 7: Community-Based Monitoring and Evaluation (CBM&E):

(Source: <https://i.ytimg.com/vi/rZEPWGPm5jl/maxresdefault.jpg>)

6.3.5 Motivating positive actions through recognition and support

- **Recognition and Awards:** Institute "Mahanadi Mitra" or "River Champion" awards at district or state levels to publicly recognize villages, Panchayats, or individuals in the basin who demonstrate exemplary efforts in river conservation (e.g., successful afforestation, zero waste villages, water conservation).

- **Financial Incentives/Subsidies:** Explore providing financial support or subsidies for adopting practices beneficial to the Mahanadi, such as:
 - ✓ Switching to water-efficient irrigation methods (e.g., drip irrigation for specific crops in the Mahanadi command areas).
 - ✓ Organic farming practices that reduce chemical runoff into the river.
 - ✓ Rainwater harvesting structures in individual households or public buildings.
 - ✓ Support for eco-friendly livelihood alternatives that reduce pressure on river resources.
- **Market Linkages:** Help communities engaged in sustainable livelihoods (e.g., producing organic vegetables near the river, eco-tourism initiatives around wetlands in the basin) find better markets and fair prices for their produce or services. This provides economic motivation for protecting the river.

Example: Parastarai village in Dhamtari district is a live example of how **motivating positive actions through recognition and support** works. Their collective commitment to water conservation (reducing paddy, diversifying crops, rainwater harvesting) has earned them **state-level recognition and a platform to share their "model village" success**, directly inspiring neighboring communities and demonstrating the benefits of their efforts on the Mahanadi River Basin's health.

6.4 Integration with Existing Government and NGO Programmes for the Mahanadi River

To effectively manage and conserve the Mahanadi River, it's vital to weave new initiatives into the fabric of ongoing work by both government bodies and non-governmental organizations across its basin in Chhattisgarh, Odisha, and other states.

6.4.1 Leveraging Existing Central and State Schemes

Many established government programs can be a powerful vehicle for Mahanadi conservation:

- **National River Conservation Plan (NRCP):** This is a direct fit. Projects related to pollution abatement, riverfront development, and ecological restoration can be proposed and funded under the NRCP framework.
- **Jal Jeevan Mission (JJM):** While focused on providing piped water to households, JJM emphasizes sustainable water sources. Mahanadi basin efforts can align by promoting source sustainability of village water supplies drawing from the river or its tributaries, and encouraging groundwater recharge that impacts the river's base flow.
- **Swachh Bharat Abhiyan (SBA):** Gramin and Urban: River clean-up drives, solid waste management (especially near urban centers and pilgrim sites on the Mahanadi), and liquid waste management (greywater management at the village level) along the river's course can be integrated with SBA goals and funding. Preventing waste from entering the Mahanadi is a direct outcome of this mission.
- **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA):** This scheme provides a massive workforce for rural areas. It can be strategically utilized for Mahanadi-specific activities like:

- ✓ **Afforestation:** Planting trees along riverbanks (riparian buffer zones) to prevent soil erosion and improve water quality.
 - ✓ **Watershed Development:** Building check dams, farm ponds, and contour bunding in the Mahanadi's catchment areas to improve groundwater recharge and reduce sediment flow into the river.
 - ✓ **Desilting of Ponds/Tanks:** Restoring traditional water bodies linked to the river system.
- **National Adaptation Fund for Climate Change (NAFCC):** As the Mahanadi basin faces climate change impacts, projects focusing on climate-resilient water management, wetland conservation, and adaptation strategies can seek support from this fund.
 - **State-Specific Schemes: Both Chhattisgarh and Odisha have their own schemes.**
 - ✓ **Chhattisgarh:** Initiatives like the 'Narva Garuva Ghurva Bari' scheme can be directly applied to the Mahanadi's smaller tributaries and watershed areas, emphasizing water conservation and sustainable agricultural practices that benefit the river.
 - ✓ **Odisha:** Schemes related to water resource management, irrigation efficiency, and coastal zone management should be leveraged.

Example: The 'Narva Vikas Yojana' in Chhattisgarh is a prime example of leveraging both **Central (MGNREGA,)** and **State (Narva, Garuva, Ghurva, Bari program)** schemes. It uses these funds and frameworks to implement numerous small to medium-scale water conservation structures and initiatives across the Mahanadi River Basin's feeder streams, directly contributing to groundwater recharge, reduced erosion, and improved water availability for the main river, all through a decentralized, community-driven approach.

6.4.2 Partnerships with NGOs and Local Community Organizations

NGOs and CBOs are critical grassroots implementers and advocates for the Mahanadi:

- **Leveraging Expertise and Reach:** Many NGOs, like ActionAid (who conducted a study on the Mahanadi) or local environmental groups, have deep understanding of community dynamics and specific ecological challenges. Partner with them for:
- **Community Mobilization:** Utilizing their trusted relationships to organize river clean-ups, awareness campaigns, and participatory planning workshops.
- **Technical Support:** NGOs with scientific expertise can assist in water quality monitoring, biodiversity surveys, and developing eco-friendly livelihood alternatives.
- **Advocacy:** Collaborating on advocacy efforts to influence policy changes for better Mahanadi protection, especially concerning issues like industrial pollution and inter-state water sharing.
- **Capacity Building:** NGOs can play a major role in training local community members and Panchayat leaders on sustainable practices, environmental laws, and project management.
- **Bridging Gaps:** They can serve as a vital link between government programs and the local communities, ensuring that benefits reach the most vulnerable and that community feedback reaches policymakers.

Example: The MAA campaign is a very recent, active initiative aiming for comprehensive reformation of the Mahanadi's origin. It demonstrates a multi-stakeholder approach where the district administration acts as a facilitator, but the **active participation and collaboration of**

thousands of villagers, supported by technical experts and aligning with state schemes, are the driving force. This collaborative model is a strong example of how partnerships are crucial for large-scale river basin conservation.

6.4.3 Aligning with District and State Development Plans

Ensuring Mahanadi conservation is not a stand-alone project but an integrated part of broader development:

- **Mainstreaming River Health:** Advocate for the Mahanadi's ecological health and sustainable water management to be explicitly included as key objectives and performance indicators within the District Development Plans and State Development Plans of Chhattisgarh and Odisha. This ensures resource allocation and political will.
- **Inter-Departmental Coordination:** Promote better coordination committees at district and state levels involving departments like Water Resources, Environment, Forests, Agriculture, Fisheries, Rural Development, Urban Development, and Industry. For the Mahanadi, this is paramount given its multi-faceted importance.
- **Budgetary Allocation:** By aligning river conservation goals with existing development plans, it becomes easier to secure dedicated budget lines and human resources, ensuring the longevity and effectiveness of Mahanadi protection initiatives.
- **Land Use Planning:** Integrate river conservation into regional land use planning to prevent encroachment on floodplains, regulate development near riverbanks, and promote sustainable agriculture in the basin.

By strategically integrating Mahanadi conservation efforts into these existing frameworks, we can achieve a more holistic, efficient, and sustainable approach to managing this vital lifeline for millions.

6.5 Suggested Action Plan

Focus Area: Enhancing Public Awareness and Participation in Mahanadi River Basin for Sustainable Water Management

Table 9: Short-, Medium-, and Long-Term Actions for River Basin Awareness and Participation

Action Category	Specific Actions	Timeline	Responsible Agencies/Stakeholders	Potential Resources/Funding Sources
Short-Term (0-12 months)	1. Baseline Assessment & Materials Development: Conduct rapid assessment of awareness levels. Develop IEC materials in Odia/Chhattisgarhi.	3-6 months	State Water Resources Dept., Rural Development Dept., Local NGOs, Academics	State Budgets, CSR Funds, UNICEF/UNDP grants
	2. Training of Trainers: Train local government officials, NGO workers, and community leaders	6-9 months	State Training Institutes, NGOs with expertise in participatory approaches	State Capacity Building Funds, NGOs' project funds

	on awareness and participation methodologies.			
	3. Pilot Awareness Campaigns: Launch targeted IEC campaigns in selected high-priority villages/blocks using local media, street plays.	9-12 months	District Administrations, Panchayats, Local NGOs, Community Volunteers	District Mineral Foundation (DMF) funds, MGNREGA for IEC activities
Medium-Term (1-3 years)	1. Establish Multi-Stakeholder Platforms: Formally establish or strengthen Basin-level and District-level Water Forums/Committees with diverse representation.	1-1.5 years	Mahanadi Basin Authority (if exists), State Water Resources Dept., Line Depts.	State Budgets, Central Schemes (e.g., National River Conservation Plan)
	2. Integrate into School Curriculum: Introduce age-appropriate modules on river basin ecology and water conservation in local schools.	1.5-2 years	State Education Dept., NCERT/SCERT, Environmental NGOs	State Education Budgets, MoEFCC grants
	3. Participatory Planning Workshops: Conduct village and block-level participatory planning workshops for water resource management plans, incorporating gender and vulnerability analysis.	2-3 years	Panchayats, Rural Development Dept., NGOs, Line Depts. (Agriculture, Health)	MGNREGA, Jal Jeevan Mission, State Rural Livelihood Missions
	4. Community Monitoring Training: Train and equip community members for basic water quality monitoring and project oversight.	2-3 years	Public Health Engineering Dept., NGOs, Krishi Vigyan Kendras (KVKs)	State Health Dept. funds, MoWR, RD & GR funds
Long-Term (3-5+ years)	1. Policy Integration and Legal Reforms: Advocate for legal and policy changes to institutionalize participatory approaches and ensure	3-5+ years	State Government (Law Dept., Water Resources Dept.), Civil Society Organizations	Advocacy groups, research grants

	accountability in basin governance.			
	2. Incentive Framework Development: Develop and implement sustainable incentive mechanisms for good water stewardship (e.g., community-based awards, preferential access to schemes).	3-5+ years	State Planning Dept., Agriculture Dept., Industries (CSR)	State Budgets, Green Funds, Industry CSR contributions
	3. Digital Platforms for Information: Establish interactive online portals for real-time data dissemination, grievance redress, and collaborative mapping of basin resources.	4-5 years	State IT Dept., Water Resources Dept., NRSC	Ministry of Electronics and IT (MeitY) funds, Digital India initiatives
	4. Long-Term Capacity Building & Research: Establish centers of excellence for water management in the basin, promoting continuous learning, research, and innovation.	5+ years	Universities, Research Institutions, Water Resources Dept.	UGC, DST, International Research Grants

6.5 Significance of the report

The Social Environment Report for the Mahanadi River Basin serves as an actionable blueprint for policymakers and administrators, offering strategic guidance to the government in enhancing governance and stewardship of the basin's resources. By mapping the entire ecosystem of institutions, agencies, community organizations, and local movements involved in basin management, the report enables governments at both the central and state level to identify the existing strengths and the operational gaps within multi-tiered river governance.

Decision-makers can use the report's detailed institutional analysis to foster better coordination between departments responsible for water supply, pollution regulation, disaster management, and rural and urban development. The catalog of active schemes from central missions like the NRCP, Jal Jeevan Mission, and AMRUT to key state-led efforts—helps government officials to benchmark ongoing programs, avoid duplication of effort, and scale up best practices across districts. The report's diagnostics on gaps in policy enforcement, fragmented jurisdiction, and insufficient data-sharing provide a roadmap for targeting reforms and capacity-building efforts where they are most needed.

Importantly, the documentation of participatory campaigns, community-based monitoring, and grassroots mobilization points policymakers toward approaches that build societal ownership and accountability for river health. Governments can leverage these insights to design interventions that involve local SHGs, NGOs, panchayats, and tribal councils, as well as ensure that marginalized groups often the most affected by resource degradation—are included in planning and benefit-sharing.

The specific action recommendations—ranging from integrating water literacy into the school curriculum to establishing multi-stakeholder water forums and digital platforms for real-time data equip the government to promote transparency, strengthen community-government feedback loops, and accelerate decentralized planning. Using the report's framework, state agencies can tailor communication materials in regional languages, undertake pilot reforms, and access new funding windows by demonstrating integrated, inclusive approaches to water resource management.

Ultimately, this report provides a snapshot of current conditions and practical guide to developed adaptive, resilient governance structures. If adopted, it will help governments forge a pathway for the Mahanadi that unites ecological sustainability, developmental aspirations, and social justice ensuring that the river continues to serve as a lifeline for all its people.

6.6 Conclusion

The Mahanadi River Basin stands as a vital ecological and socio-economic lifeline for millions of people across Chhattisgarh and Odisha. This comprehensive Social Environment Report has illuminated the complex interplay of natural, social, and institutional factors shaping the basin's current realities and future trajectories. The evidence presented underscores how deeply intertwined human livelihoods and cultural identities are with the health of the river ecosystem.

While significant progress has been made through a mosaic of government programmes ranging from the National River Conservation Plan and Jal Jeevan Mission to numerous state-led initiatives, persistent challenges remain. These include the fragmentation of institutional responsibilities, inadequate enforcement of environmental regulations, rising pollution loads, and the marginalization of vulnerable groups such as tribal communities and fisherfolk, who remain highly dependent on the river yet have limited voice in decision-making processes.

The report highlights the indispensable role of civil society organizations, grassroots movements, and community-based monitoring in bridging gaps and fostering greater awareness, stewardship, and accountability. It also points to the critical need for integrating traditional knowledge with scientific data, embracing participatory governance models, and leveraging technological innovations to enhance transparency and responsiveness.

Going forward, the sustainability of the Mahanadi River Basin depends on a concerted effort to harmonize developmental ambitions with ecological integrity and social justice. This involves strengthening multi-stakeholder collaboration, ensuring equitable resource sharing, and embedding resilience into water management strategies. The recommendations provided herein offer a roadmap for policy reforms, capacity-building, and community engagement to realize these goals.

In conclusion, the report calls on governments, institutions, and communities alike to unite in their commitment to nurturing the Mahanadi as both a life-giving river and a shared public trust. By acting decisively and inclusively today, stakeholders can safeguard the basin's ecological vitality and the well-being of its people for generations to come.

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