

10th India Water Impact Summit (IWIS)

Valuing Water | Transforming Ganga



**DECEMBER
9-11, 2025
New Delhi**

3rd Climate Investments Technology Impact Summit (CITIS)

First-of-a-kind (FOAK) as an Asset Class, Nth-of-a-kind (NOAK) as the Scaling Model



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

A CONSOLIDATED REPORT ON

10th India Water Impact Summit (IWIS)

Valuing Water | Transforming Ganga

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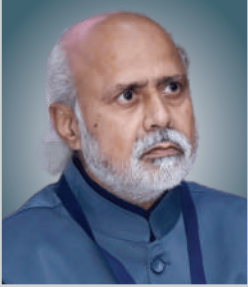
3rd Climate Investments Technology Impact Summit (CITIS)

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9th - 11th
DECEMBER
2025

Auditorium, FITT, IIT Delhi
New Delhi

Preface



DR VINOD TARE

Chairman, 10th India Water Impact Summit & 3rd Climate Investments and Technology Impact Summit
Founder & Advisor, cGanga, IIT Kanpur
Former Professor, IIT Kanpur & Distinguished Professor, IIT Hyderabad

Over the past decade, the India Water Impact Summit (IWIS) has evolved from a focused scientific and technical dialogue into a national platform for re-examining how India understands, governs, and engages with its rivers and water systems. What began in 2012 during the preparation of the Ganga River Basin Management Plan (GRBMP 2015) has matured into a continuous, reflective process, one that recognises river rejuvenation not as a finite project, but as an enduring societal responsibility.

The 10th edition of IWIS, held alongside the 3rd Climate Investments and Technology Impact Summit (CITIS), marked an important inflection point in this journey. The Twin Summits were consciously designed to move beyond diagnosis and advocacy, towards **actionable frameworks capable of being implemented on the ground**, while remaining rooted in sound science,

institutional realism, and long-term ecological thinking.

The central theme of IWIS & CITIS 2025: **“From Segmented Efforts to Holistic Stewardship: Forging District River Management Plans for India’s Water Future”**, captures this transition succinctly. It reflects a collective recognition that fragmented, sector-specific, and project-based interventions, however well-intentioned, are inadequate to address the complex, interconnected challenges facing India’s rivers. The need of the hour is integrated, district-centric stewardship that aligns science, governance, finance, technology, and community engagement within a coherent framework.

At the heart of this year’s deliberations lies the **District River Management Plan (DRMP)**, an approach that reconciles natural river basin processes with administrative realities. By integrating Urban River Management Plans (URMPs) and Rural River Management Plans

At the heart of this year's deliberations lies the District River Management Plan (DRMP), an approach that reconciles natural river basin processes with administrative realities. By integrating Urban River Management Plans (URMPs) and Rural River Management Plans (RRMPs), the DRMP framework provides a practical mechanism to translate basinscale vision into district-level action.

(RRMPs), the DRMP framework provides a practical mechanism to translate basin-scale vision into district-level action. It builds directly on the evolving thinking behind **GRBMP 2.0**, the **Condition Assessment and Management Plan (CAMP)** studies across multiple river basins, and the accumulated learning from a decade of IWIS deliberations.

The proceedings captured in this volume reflect a rich and nuanced discourse across scientific, technical, administrative, economic, and societal dimensions. IWIS sessions systematically examined the conceptual architecture of GRBMP 2.0, the operational logic of DRMPs, the ecological imperative of closing loops between water, soil, and ecosystems, and the critical need to convert diagnostics into sustained action. These discussions reaffirmed that rivers are inherently **स्मर्थ** (capable systems), and that management efforts must focus on regulating human actions rather than attempting to "engineer" rivers themselves.

CITIS, conceived as a natural companion to IWIS, brought an equally important dimension to the Twin Summits. It addressed a persistent gap in India's water and river governance landscape - the disconnect between planning and finance, between technological potential and scalable deployment. By engaging investors, innovators, policymakers, and practitioners on a common platform, CITIS reinforced the idea that **districts can and must become credible units for climate and water investment**, supported by robust plans, clear outcomes, and appropriate risk-sharing mechanisms.

Together, IWIS and CITIS underscored the necessity of moving from valuing water in principle to **investing in water and rivers in practice**, without compromising ecological integrity or public purpose. The emphasis on sludge management, wastewater reuse, soil rejuvenation, biogas, and nature-based solutions illustrated how circular economy principles can be embedded

Together, IWIS and CITIS underscored the necessity of moving from valuing water in principle to investing in water and rivers in practice, without compromising ecological integrity or public purpose. The emphasis on sludge management, wastewater reuse, soil rejuvenation, biogas, and naturebased solutions illustrated how circular economy principles can be embedded within district-level river management, provided they are guided by sound regulation, scientific evidence, and social acceptance.

within district-level river management, provided they are guided by sound regulation, scientific evidence, and social acceptance.

This post summit proceedings volume is therefore not merely a record of presentations and discussions. It is intended as a **reference document for administrators, planners, researchers, practitioners, investors, and policymakers**, offering structured insights into the evolving frameworks, areas of consensus, points of debate, and pathways for implementation that emerged during the Twin Summits. It captures both the continuity of thought that has defined IWIS over the years and the forward-looking orientation required to address emerging challenges.

I take this opportunity to express my sincere appreciation to all partner institutions for their steadfast support. I am equally grateful to the academic and research institutions, state and district administrations, industry partners, technology providers, investors, civil

society organisations, and individual experts whose contributions enriched the deliberations. The commitment and engagement of participants from across disciplines and sectors reaffirm the relevance and responsibility of IWIS–CITIS as a collective endeavour.

As we move forward, the true measure of success of the 10th IWIS and 3rd CITIS will lie not in the breadth of discussions alone, but in how effectively the ideas articulated here are translated into **district-level action, institutional learning, and sustained ecological outcomes**. River rejuvenation demands patience, humility, and persistence. It is a journey without a fixed endpoint, one that must be carried forward across administrative tenures and generations.

It is my hope that this proceedings volume will serve as both a **compass and a catalyst**, guiding future efforts and inspiring continued collaboration toward a more resilient, equitable, and ecologically vibrant water future for India.





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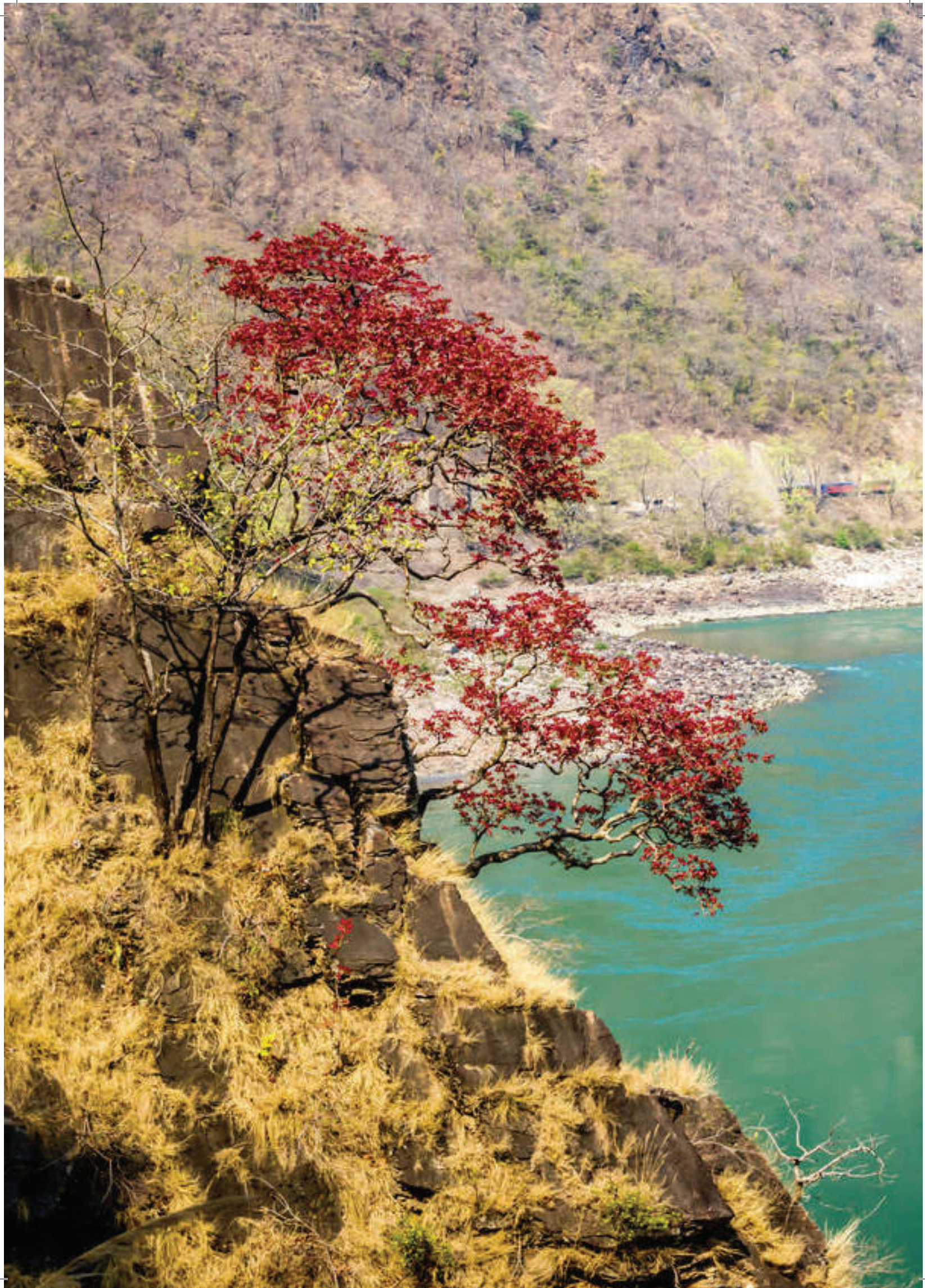
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10th IWIS AND 3rd CITIS

10th IWIS & 3rd CITIS

Theme: From Mission to Action

JOINT OVERVIEW SESSION

Theme : From Valuing Water to District-Level Action
Date : 9 December 2025
Time : 14:00–15:30 h
Venue : Auditorium, FITT, IIT Delhi

Moderator : **Dr Vinod Tare** (Founder and Advisor, cGanga, IIT Kanpur)
Mr Sanmit Ahuja (Founding Director, Climate and Energy Transition Finance Initiative (CETFI) and MD & CEO, Bharatia)
Dr Manoj Tiwari (Associate Professor; Co-Principal Investigator, cGanga, IIT Kanpur)

Dr Manoj Tiwari, IIT Kanpur, representing the Centre for Ganga River Basin Management and Studies (cGanga). He welcomed participants to the 10th edition of IWIS and the 3rd edition of CITIS, highlighting the sustained growth of IWIS from a technically focused meeting into a national and international platform engaging policymakers, administrators, researchers, civil society organisations, technology developers, and financial institutions.

Dr Tiwari emphasised that the expansion of cGanga's work through the CAMP Project, involving twelve premier institutions and multiple river basins, has broadened the relevance of IWIS well beyond the Ganga, while retaining its basin-centric, science-led ethos.

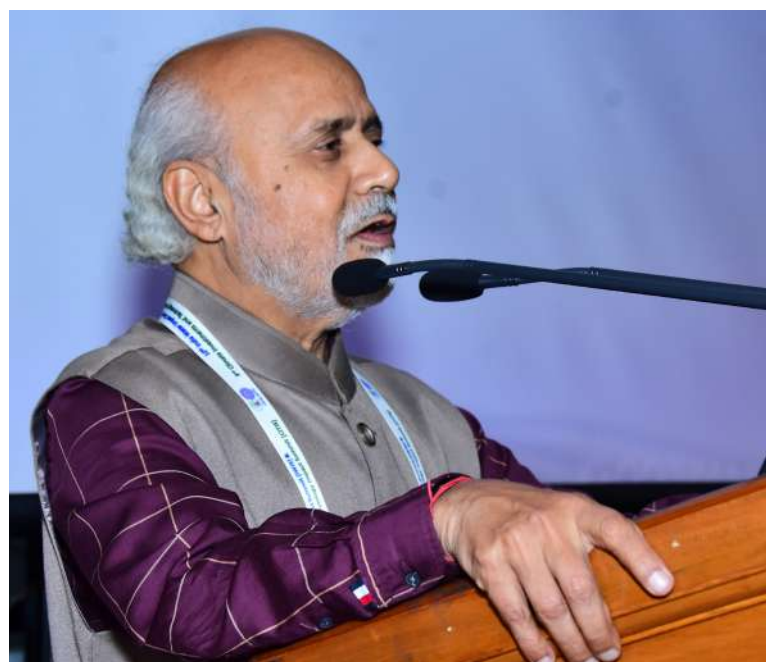
1. PURPOSE AND SIGNIFICANCE OF THE OVERVIEW SESSION

The Overview Session of IWIS–CITIS 2025 was conceived as the context-setting and integrative session of the Twin Summits. Its primary purpose was to trace the evolution of IWIS and CITIS, articulate the intellectual journey from valuing water to actionable governance, and situate the 10th IWIS and 3rd CITIS within a decade-long continuum of learning, reflection, and refinement in river basin management, climate action, and sustainable development.

The session served to connect policy, planning, technology, and finance, and to clarify why the current focus on District River Management Plans (DRMPs) and district-scale climate investment frameworks represents a natural and necessary progression in India's water governance journey.

2. WELCOME AND INSTITUTIONAL CONTEXT

The session commenced with a welcome address by



3. ORIGINS OF IWIS: FROM GRBMP TO A NATIONAL PLATFORM

In his overview address, Dr Vinod Tare (Founder Head and Advisor, cGanga; Former Professor, IIT Kanpur) traced the origins of IWIS to the preparation of the Ganga River Basin Management Plan (GRBMP) 2015 by the Consortium of seven IITs. He recalled that the GRBMP exercise revealed not only the scale of ecological and institutional challenges, but also the limitations of one-time planning efforts in addressing complex, evolving river basin problems.

IWIS was therefore conceived as a continuing deliberative platform, intended to revisit unresolved questions, share learning from implementation, and progressively refine frameworks in response to emerging realities. Dr Tare emphasised that IWIS was never designed as an event with a fixed endpoint, but as an ongoing process of collective learning and adaptation.

4. CONTINUITY, GENERATIONAL RESPONSIBILITY, AND THE “BHAGIRATH EFFORT”

A central reflection of the session was the idea of continuity across generations. Dr Tare noted that questions such as “When will the Ganga be clean?” are fundamentally flawed unless society recognises that river rejuvenation is a long-term societal responsibility, not a short-term project.

Invoking the metaphor of the Bhagirath effort, he described river rejuvenation as a task requiring sustained commitment across political, administrative, and generational cycles. IWIS was likened to a journey without a fixed origin or destination, one that must continue to move forward as long as rivers remain central to India’s civilisation and economy.

5. EVOLUTION OF IWIS THEMES IN RESPONSE TO NATIONAL PRIORITIES

The session reviewed the thematic progression of IWIS from its inception to the present edition. Early summits focused on interpreting and operationalising GRBMP 2015, while later editions progressively addressed:

- Integration of river rejuvenation with national missions.
- Convergence of water, sanitation, livelihoods, and development.
- Learning from implementation under Namami Gange and allied programmes.
- Economic dimensions of river rejuvenation through Arth Ganga.
- The need to move from segmented projects to holistic stewardship.

This evolution culminated in the present focus on district-centric planning and implementation, forming the conceptual bridge to GRBMP 2.0 and DRMPs.





6. RATIONALE FOR CITIS: FROM VALUING WATER TO FINANCING ACTION

A key contribution of the Overview Session was the articulation of the rationale behind CITIS. Dr Tare highlighted the persistent mismatch between the scale of public funding available, and the magnitude of investment required to restore rivers, treat wastewater, manage floods, and adapt to climate change.

He argued that unless water and river services are economically valued, the sector will remain under-invested, technologically constrained, and institutionally weak. CITIS was therefore conceptualised as a complementary platform to IWIS, explicitly designed to bring investors, financiers, technology providers, and innovators into dialogue with policymakers and planners.

7. REMARKS BY MR SANMIT AHUJA: POSITIONING CITIS

Mr Sanmit Ahuja, Founding Director of the Climate and Energy Transition Finance Initiative (CETFI) and MD & CEO of Bharatia, delivered key remarks elaborating the investment and finance perspective of CITIS.

He emphasised that while India has made significant progress in policy formulation and programme design in the water and climate sectors, investment flows remain fragmented and risk-averse, particularly at sub-national levels. He noted that investors seek:

- Clarity of outcomes, not just expenditure.
- Predictability and continuity, beyond individual projects.
- Scalable and replicable models, rather than isolated pilots.
- Risk-mitigation mechanisms, especially for first-of-a-kind investments.

Mr Ahuja positioned CITIS as a platform to translate plans and priorities into bankable propositions, bridging the gap between public purpose and private capital. He stressed that districts, when supported by robust plans such as DRMPs, can become credible units for climate and water investment.

8. AUDIENCE INTERVENTIONS AND INTERACTIVE DISCUSSION ON CITIS

The session featured an active interaction with the audience, with several questions and comments focused on the practical challenges of climate finance and private sector engagement. Participants raised issues related to:

- How district administrations can engage with private investors.
- The perceived mismatch between ecological objectives and financial returns.
- Risk allocation between public agencies and private entities.
- Whether climate and water investments can be scaled beyond pilot projects.

In response, Mr Sanmit Ahuja clarified that CITIS does not advocate indiscriminate privatisation of water resources. Rather, it seeks to:

- Identify specific investment opportunities aligned with public objectives (e.g., wastewater reuse, nature-based solutions, river and top soil rejuvenation, monitoring systems, etc.).
- Design risk-sharing and blended finance structures, where public funds de-risk private investment.
- Build institutional capacity at district and state levels to structure, procure, and manage investments.
- Focus on outcomes and performance, not asset ownership.

He emphasised that clear planning frameworks, such as DRMPs, are essential to provide investors with confidence regarding priorities, timelines, and governance arrangements.

9. DISTRICT AS THE CONVERGENCE POINT FOR IWIS AND CITIS

A recurring theme in the discussion was the convergence of IWIS (planning and knowledge) and CITIS (investment and







technology) at the district level. The district was identified as the most practical scale where:

- Basin-scale science can inform action.
- Administrative authority exists for convergence of schemes.
- Investment opportunities can be bundled and scaled.
- Accountability for outcomes can be clearly assigned.

This directly reinforced the theme of the Twin Summits and set the stage for subsequent sessions focusing on District River Management Plans (DRMPs) as the operational interface between planning, programmes, and finance.

10. SAMARTH GANGA AND MATURATION OF CONCEPTUAL THINKING

The Overview Session also reflected on the maturation of concepts such as Samarth Ganga and Arth Ganga, clarifying that these are not standalone ideas but components of an integrated framework. Rivers were described as inherently capable systems, whose health depends on how human actions—economic, technological, and institutional—are organised and regulated.

Over successive IWIS editions, these concepts have evolved into a coherent philosophical foundation for GRBMP 2.0, DRMPs, and CITIS-led investment thinking.

11. TRANSITION TO THEMATIC SESSIONS

The session concluded by outlining how the Overview Session feeds into the subsequent technical sessions of IWIS 2025, particularly:

- Session I on the GRBMP 2.0 framework
- Sessions on DRMP architecture and pathways
- Sessions addressing integration of ecology, engineering, governance, and finance

Participants were encouraged to engage with the Summit not merely as observers, but as contributors to a collective, action-oriented process.

12. CONCLUDING OBSERVATIONS

The Overview Session established the intellectual continuity, conceptual clarity, and strategic direction for the Twin Summits. By integrating reflections on planning, governance, finance, and implementation, it reaffirmed IWIS–CITIS as a platform dedicated to moving from missions to measurable action, and from fragmented efforts to holistic stewardship of rivers and water systems.

IWIS SESSION I

Session Title : Framework for Ganga River Basin Management Plan (GRBMP) 2.0

Date : 9 December 2025

Time : 10:00–13:00 h

Venue : Auditorium, FITT, IIT Delhi

Chair : Mr Rajiv Ranjan Mishra (Former DG, NMCG)

Moderator : Dr Vinod Tare (Founder and Advisor, cGanga, IIT Kanpur)

Panellist: : Dr AK Gosain (Former Professor, IIT Delhi; Founder & Director, INRM Consultants Pvt Ltd)
Ms Laura Sustersic (Project Manager, GIZ)
Mr Suresh Babu (Director, River Basins & Water Policy, WWF-India; WWF-India)

1. INTRODUCTION AND CONTEXT

Session I of IWIS 2025 was designed as the foundational and directional session of the Summit. Its primary purpose was to establish the conceptual, methodological, and institutional framework that would guide all subsequent technical and thematic deliberations. The session focused on the evolution, rationale, and structure of the Ganga River Basin Management Plan (GRBMP) 2.0, drawing upon the experience of GRBMP 2015 and nearly a decade of implementation under the Namami Gange & other water related programmes.

Unlike earlier basin plans that largely functioned as strategic vision documents, GRBMP 2.0 is envisaged as an action-oriented, implementable framework, explicitly designed to connect basin-scale science with district-level governance and execution. The session therefore marked a shift from “mission statements” to “mechanisms for action,” fully aligned with the overarching theme of the Summit.



2. SESSION LEADERSHIP AND PARTICIPATION

The session was chaired by Shri Rajiv Ranjan Mishra, Former Director General, National Mission for Clean Ganga (NMCG), who played a pivotal role in conceptualising and operationalising the Namami Gange Programme. The session was anchored by Dr Vinod Tare, Former Professor, IIT Kanpur; Founder and Advisor, Centre for Ganga River Basin Management and Studies (cGanga); Lead, CAMP Project; and Coordinator of the Consortium of seven IITs that prepared GRBMP 2015.

Key contributors and participants included:

- Dr AK Gosain, Former Professor, Department of Civil Engineering, IIT Delhi; Founder & Director, INRM Consultants Pvt Ltd who served as Theme Lead of the Water Resources Group of 7 IITs Consortium (IITC) that prepared GRBMP 2015.
- Ms Laura Sustersic, Project Manager, GIZ (India–EU Water Partnership), with experience in river basin planning in India and Europe; GIZ has done studies on Tapi and Ramganga River Basins in India.
- Mr Suresh Babu, Director, River Basins & Water Policy, WWF-India; WWF-India has been working on assessing E-Flows on Indian Rivers and rejuvenation & conserving wetlands, and small rivers.



- Representatives from academic and research institutions, government departments, NGOs, civil society organisations, and partner institutions involved in river basin management, environmental flows, and district-level planning.

The diversity of national and international participants reinforced the multi-institutional and collaborative nature of the GRBMP 2.0 process.

3. OBJECTIVES OF SESSION I

The session was structured around the following objectives:

- To reflect on the experience and learnings from GRBMP 2015 and implementation of various river rejuvenation and conservation related programmes including the Namami Gange Programme.
- To articulate the conceptual shift from a top-down strategic basin plan to a bottom-up, action-oriented planning framework.
- To introduce the Framework Document of GRBMP 2.0, including its structure, thematic scope, and implementation logic.
- To demonstrate how natural river basin boundaries can be translated into administrative, district-level action plans.
- To provide a conceptual foundation for subsequent

IWIS sessions, which would address specific thematic components in greater depth.

4. EVOLUTION FROM GRBMP 2015 TO GRBMP 2.0

Dr Vinod Tare elaborated on the fundamental distinction between GRBMP 2015 (GRBMP 1.0) prepared by the Consortium of 7 IITs (IITC) and the proposed GRBMP 2.0. GRBMP 2015 was developed as a top-down, strategic basin plan, examining the Ganga as a highest-order river system and analysing the basin at a macro scale. It comprised a comprehensive main report, eight mission documents, and approximately 70–80 thematic studies covering hydrology, ecology, pollution, governance, and socio-economic dimensions.

GRBMP 2.0 represents a paradigm shift. It is designed as a bottom-up, action-driven framework, responding to the practical challenges of implementation experienced over the past decade. Using the metaphor of two pyramids, it was explained that while vision and policy formulation can be top-down, construction, restoration, and management actions must begin at the base—small streams, drains, tributaries, floodplains, and districts—which collectively determine the health of the main river.



5. RECONCILING NATURAL AND ADMINISTRATIVE SCALES

A central theme of the session was the reconciliation between:

- Natural boundaries, essential for scientific understanding and assessment (river basins, sub-basins, aquifers, floodplains), and
- Administrative boundaries, which govern decision-making, budgeting, and implementation (states, districts, urban and rural local bodies).

It was emphasised that while rivers and aquifers follow natural boundaries, all actions are executed through administrative systems. GRBMP 2.0 therefore explicitly positions the district as the most effective unit of implementation.

The existing institutional architecture under Namami Gange was highlighted, comprising the NMCG at the national level, State Missions for Clean Ganga (SMCGs), and District Ganga Committees (DGCs) chaired by District Magistrates. GRBMP 2.0 seeks to operationalise this structure by providing District River Management Plans (DRMPs) that can be directly adopted and implemented by DGCs.

6. STRUCTURE AND THEMATIC COVERAGE OF THE GRBMP 2.0 FRAMEWORK

The Framework Document of GRBMP 2.0, circulated as part of the pre-proceedings, was presented as a comprehensive yet modular structure, comprising 21 interlinked sections. These include:

- Multi-level basin characterisation [Major River Basins (Say Level 1) to Minor Sub Basins (Say up to Level 5 basins)].
- River system typologies (perennial, seasonal, anthropogenically sustained).
- Flow regimes addressing Aviralta (quantity) and Nirmalta (quality).
- Ecological restoration, biodiversity conservation, wetlands, and floodplains.
- Groundwater–surface water interactions.
- Sectoral influences including agriculture, industry, and urbanisation.
- Explicit linkage between soil health and river health.
- Governance structures, monitoring systems, and adaptive management mechanisms.

The framework integrates learnings from flagship national programmes such as Namami Gange, Jal Jeevan Mission, Swachh Bharat Mission, Atal Bhujal Yojana, other national and state level schemes, and relevant international best practices.

7. THE SAMARTH GANGA CONCEPTUAL FRAMEWORK

A key conceptual foundation of GRBMP 2.0 is the Samarth Ganga Framework, built on the understanding that rivers are inherently capable (samarth), and that management plans are essentially about regulating human actions, not “fixing” rivers. The framework rests on five interlinked pillars:

- Aviral Ganga – ensuring adequate and continuous flows
- Nirmal Ganga – maintaining water quality and ecological integrity



- Gyan Ganga – building robust, science-based knowledge systems
- Jan Ganga – community participation and societal engagement
- Arth Ganga – sustainable economic activities aligned with river health

The session stressed that these pillars must be pursued simultaneously, rather than in isolation.

8. KNOWLEDGE SYSTEMS AND RIVER HEALTH MONITORING

The importance of data, monitoring, and knowledge integration was emphasised as a prerequisite for action-oriented planning. Reference was made to initiatives such as the Virtual River Knowledge Centre and Command Centre at IIT Kanpur, ongoing monitoring efforts by agencies including CWC, CPCB, WWF, and WII, and emerging models of participatory river health monitoring involving local communities.

The need for a coordinated national river health monitoring framework, with higher spatial and temporal resolution and integration of modern tools (GIS, remote sensing, AI/ML), was identified as a key enabler for GRBMP 2.0.

9. ILLUSTRATIVE APPLICATION: HINDON RIVER BASIN CASE STUDY

The Hindon River Basin was presented as an illustrative case demonstrating the application of the GRBMP 2.0 framework at

sub-basin and district scales. Key findings included:

- The basin was found to be hydrologically surplus on an annual basis, challenging common perceptions of water scarcity.
- Water quality, driven primarily by domestic and industrial discharges, emerged as the dominant challenge.
- Groundwater analysis indicated negligible base flow contribution, with non-monsoon flows largely wastewater driven.
- Extensive riverbed encroachment (approximately 81%), loss of floodplain connectivity, and urban–industrial pressures were documented.

The case study demonstrated how evidence-based diagnostics can correct assumptions and guide more effective, district-specific interventions.

10. DELIBERATIONS ON PROGRAMME CYCLES, EVALUATION, AND GOVERNANCE

A substantive discussion focused on the alignment between the GRBMP planning cycle (diagnosis, target setting, phased implementation, monitoring, learning, and course correction) and the way national programmes are designed and executed.

Dr Tare emphasised the need to explicitly recognise programme cycles, with clear articulation of budgets, time horizons, expected outcomes, end-of-cycle assessment, and





learning-based redesign. While planning cycles are widely discussed, programme cycles often remain implicit, and fear of audit-driven accountability discourages honest evaluation and learning.

Shri Rajiv Ranjan Mishra clarified that formal programme reviews mechanisms do exist, involving the Finance Ministry, empowered committees, NITI Aayog, and third-party evaluations, and that without such reviews, subsequent programme phases are not approved. However, these evaluations are largely financial and administrative, focused on expenditure and asset creation.

Prof Gosai highlighted a critical gap: evaluations tend to prioritise outputs over outcomes and impacts. For example, in programmes such as AMRUT or Jal Jeevan Mission, infrastructure delivery is tracked, but the sustainability of water sources and long-term system performance are rarely assessed.

The discussion also underscored the importance of transparency and public-domain access to evaluation findings, and the need to better articulate the time lag between infrastructure creation and environmental outcomes.

11. BROADER REFLECTIONS ON REGULATION AND LONG-TERM EFFECTIVENESS

Dr Tare extended the discussion to the regulatory domain, questioning the effectiveness of long-standing instruments such as the Water (Prevention and Control of Pollution) Act, 1974. Despite five decades of regulation, many rivers and streams have effectively degraded into drains, indicating a persistent gap between legal intent, programme execution, and ecological outcomes.

This reinforced the argument that regulation, planning, and implementation must be integrated within a basin-scale, outcome-oriented framework, as envisaged under GRBMP 2.0.

12. AREAS OF CONSENSUS

The session converged on several points of broad agreement:

- Districts must be the fulcrum of implementation.
- DRMPs are essential to translate basin-scale vision into sustained action.
- Fragmented, project-based interventions are insufficient for river rejuvenation.
- Integration of water, soil, groundwater, ecology, livelihoods, and governance is non-negotiable.

13. OUTCOMES AND WAY FORWARD

The session concluded with a shared understanding that GRBMP 2.0 constitutes a major shift from vision documents to implementable, district-centric action frameworks. DRMPs were recognised as the operational core of basin management.

It was agreed that the framework developed under GRBMP 2.0 would inform not only Ganga basin planning, but also Condition Assessment and Management Plans (CAMPs) for other river basins across India. Subsequent IWIS sessions would deepen deliberations on DRMP architecture, ecology–engineering integration, and pathways for implementation.

Session I thus laid the conceptual, methodological, and institutional foundation for IWIS 2025, reaffirming the Summit as a platform for translating knowledge into action for river rejuvenation and sustainable water management.

IWIS SESSION II

Session Title : **District River Management Plans (DRMPs):
Translating Basin-Scale Vision into District-
Level Action**

Date : 10 December 2025

Time : 10:00–13:00 h

Venue : Auditorium, FITT, IIT Delhi

Moderator : **Dr Vinod Tare** (Founder and Advisor,
cGanga, IIT Kanpur)

Panellist: : **Dr Shweta Lokhande** (Prime Minister's
Research Scholar, IIT Bombay)
Mr Siddharth Desai (Joint Managing Director,
Kishor Pumps Pvt Ltd, Pune)

1. INTRODUCTION AND CONTINUITY WITH EARLIER SESSIONS

Session II of IWIS 2025 was explicitly positioned as the operational continuation of Session I, which had articulated the conceptual and institutional framework of GRBMP 2.0. While Session I addressed the why and what of river basin planning reform, Session II focused on the how—specifically, how river rejuvenation can be executed meaningfully at the district level through District River Management Plans (DRMPs).

The session emphasised that without district-centric operationalisation, basin plans risk remaining strategic documents with limited on-ground impact. DRMPs were therefore discussed as the core instrument for bridging the gap between science, governance, finance, and execution.

2. SESSION LEADERSHIP AND STRUCTURE

The session was anchored and led by Dr Vinod Tare, Former Professor, IIT Kanpur; Founder and Advisor,



cGanga; and Lead of the CAMP Project. He was supported by Mr Siddharth Desai, Joint Managing Director, Kishore Pumps Pvt Ltd, Pune and Dr Shweta Lokhande, Prime Minister's Research Scholar, Indian Institute of Technology, Bombay. Dr Tare guided the discussion through a combination of structured presentation and open-floor interaction, encouraging practitioners, administrators, and researchers to critically examine the feasibility of DRMPs.

Participants included representatives from:

- Academic and research institutions
- Government agencies (central, state, and district levels)
- Urban water and sanitation practitioners
- NGOs and civil society organisations
- Professionals engaged in wastewater, groundwater, ecology, and infrastructure planning

The session format deliberately allowed substantial audience participation, recognising that district-level implementation challenges cannot be addressed through one-way presentations.

3. FROM DISTRICT GANGA PLANS TO DISTRICT RIVER MANAGEMENT PLANS

Dr Tare began by clarifying the rationale for adopting the term District River Management Plan instead of District Ganga Plan. While District Ganga Plans already exist under the Namami Gange institutional framework, the DRMP concept was introduced to:

- Enable applicability across all river basins, not only the Ganga.
- Provide a uniform planning architecture for CAMPs nationally.
- Avoid basin-specific nomenclature that limits scalability.

He emphasised that DRMPs are not additional plans, but integrative planning frameworks that consolidate and rationalise existing sectoral plans at the district level.

4. NATURAL BOUNDARIES VS ADMINISTRATIVE BOUNDARIES

A core issue discussed was the fundamental mismatch between natural hydrological boundaries and administrative jurisdictions.

Dr Tare explained the hierarchical basin structure commonly used in scientific planning:

- Level 1: Major river basins (as per CWC classification; 22 such basins)
- Level 2, 3, 4 ...: Sub-basins and tributary systems

While basin-scale diagnosis must follow hydrological boundaries, implementation inevitably occurs through

districts, as all projects, budgets, and enforcement mechanisms are routed through administrative systems.

This makes the district the most effective unit of action, despite its hydrological limitations.

5. ROLE OF THE DISTRICT MAGISTRATE AND DISTRICT GANGA COMMITTEE

The session highlighted that DRMPs leverage existing governance structures, rather than proposing new ones.

The District Magistrate (DM), supported by the District Ganga Committee (DGC), was identified as the key authority capable of:

- Coordinating across more than 20 departments.
- Aligning urban, rural, groundwater, irrigation, sanitation, industry, and biodiversity actions.
- Ensuring accountability and convergence.

DRMPs were thus framed as decision-support and coordination instruments for district administrations.

6. FRAGMENTATION OF NATIONAL PROGRAMMES AND THE NEED FOR CONVERGENCE

Dr Tare critically examined the current programme landscape, noting that initiatives such as:

- Namami Gange
- Jal Jeevan Mission
- Swachh Bharat Mission
- AMRUT
- MGNREGA





Operate largely in silos, each with its own planning documents, timelines, and metrics.

This fragmentation often leads to:

- Infrastructure creation without ecological outcomes.
- Missed synergies between programmes.
- Inefficient use of public funds.

DRMPs were proposed as the convergence platform that identifies:

- What needs to be done (based on river system diagnostics)?
- Which programme can fund which component?
- How multiple schemes together contribute to river health outcomes?
- Identifying gaps in which of the components are weakly addressed.

7. HYDROLOGICAL REALITY: MONSOON VS NON-MONSOON REGIMES

A major technical discussion centred on recognising two fundamentally different hydrological regimes:

- Monsoon period (≈30–35 days):
 - Dominated by runoff and flooding.
 - Requires stormwater and floodplain management.
- Non-monsoon period (≈300–330 days):
 - Dominated by sewage, industrial effluents, and groundwater interactions.
 - Rivers often function as drains.

Dr Tare stressed that most planning and infrastructure design fails because it does not explicitly address this distinction. DRMPs must therefore plan separately and coherently for both regimes.

8. URBAN DRAINS, SEWAGE, AND INTERCEPTION-AND-DIVERSION

The discussion critically examined the long-standing reliance on interception and diversion of drains.

Key observations included:

- Drains remain ecologically dead even after interception.
- Mixing sewage with base flows increases treatment costs.
- Large centralised STPs demand extensive land, pipelines, and energy.
- Reuse of treated wastewater faces social, technical, economic and institutional barriers.

Dr Tare cautioned against viewing interception as a universal solution and emphasised the need for context-specific combinations of centralised, decentralised, and ecological treatment systems.

9. AUDIENCE INTERVENTION: URBAN INFRASTRUCTURE CONSTRAINTS

Urban Local Body representative, raised concerns regarding:

- Severe land constraints in dense urban areas.
- Practical limitations in siting decentralised STPs.
- Resistance from communities to local treatment facilities.

Response: Dr Tare acknowledged these constraints and noted that DRMPs do not prescribe a single model. Instead, they enable districts to explore:

- Underground and vertical treatment systems.
- Drain-based and in-situ treatment options.
- Strategic use of peripheral land and floodplains.

10. GROUNDWATER–RIVER DISCONNECT

A recurring theme was the disconnection between groundwater management and river rejuvenation.

Participants noted that:

- Excessive groundwater abstraction eliminates base flows.
- Rivers increasingly depend on wastewater for dry season flows.
- Groundwater programmes and river programmes rarely interact.

Dr Tare emphasised that DRMPs explicitly integrate groundwater–surface water interactions, making aquifer health a core component of river management.

11. BIOSOLIDS, REUSE, AND CLOSING THE NUTRIENT LOOP

The session examined the treatment and reuse of biosolids generated from STPs.

Key clarifications included:

- Biosolids should be viewed primarily as soil conditioners, not fertilisers.
- Soil organic carbon restoration is central to river health.
- One-size-fits-all reuse mandates are impractical.

Possible pathways discussed:

- Controlled agricultural application.
- Biogas and energy recovery.
- Biochar and construction materials.
- Incineration where unavoidable.

DRMPs allow districts to select pathways based on land use, agriculture patterns, and social acceptance.

12. AUDIENCE INTERVENTION: FEAR OF AUDIT AND INNOVATION

Academic participant, highlighted that fear of audit and vigilance discourages innovation and experimentation at district level.

Response: Dr Tare acknowledged this institutional reality and stressed that:

- DRMPs create a transparent, documented basis for decisions.
- Evidence-based planning reduces arbitrary decision-making.
- Learning from failure must be institutionalised.

13. DATA, MONITORING, AND REALITY CHECKS

Several participants raised concerns about:

- Inadequate data resolution.
- Poor monitoring of drains and small streams.
- Lack of feedback on whether interventions improve river health.

Dr Tare emphasised that DRMPs embed:

- Diagnostic assessment as a starting point.
- Continuous monitoring and feedback loops.
- Scope for mid-course correction.

14. KEY AREAS OF CONSENSUS

The session converged on the following:

- Districts are the operational fulcrum of river management.
- DRMPs are essential for convergence and accountability.
- Hydrological, ecological, and administrative integration is non-negotiable.
- Programme fragmentation undermines outcomes.
- Rivers cannot be rejuvenated through isolated projects.

15. OUTCOMES AND WAY FORWARD

Session II firmly established DRMPs as the implementation engine of GRBMP 2.0. It was agreed that:

- DRMPs translate basin science into district action.
- They enable convergence of programmes, finance, and governance.
- They operationalise the Samarth Ganga philosophy.

Subsequent IWIS sessions would further deepen discussions on:

- DRMP architecture and templates.
- Ecology–engineering integration.
- Financing, monitoring, and institutionalisation.

16. CONCLUDING NOTE

Session II reinforced the central message of IWIS 2025: river rejuvenation in India will succeed only when districts become empowered custodians of their rivers, supported by science, governance, finance, and societal participation.

IWIS SESSION III

Session Title : **Closing the Loop Between Water, Soil and Aquatic Ecosystems: Operationalising DRMPs through a Unified Ecological Framework**

Date : 10 December 2025

Time : 14:00–15:30 h

Venue : Auditorium, FITT, IIT Delhi

Moderator : **Dr Vinod Tare** (Founder and Advisor, cGanga, IIT Kanpur)

Panellist: : **Dr Shweta Lokhande** (Prime Minister's Research Scholar, IIT Bombay)
Mr Siddharth Desai (Joint Managing Director, Kishor Pumps Pvt Ltd, Pune)

1. SESSION CONTEXT AND POSITIONING

Session III was designed as a deep-dive conceptual and operational session, building directly upon the district-centric planning logic established during Session II earlier in the day. While Session II focused on why District River Management Plans (DRMPs) are necessary and how they bridge basin science with governance, Session III addressed what ecological logic must underpin DRMP implementation.

The session positioned the “Closing the Loop” framework as the ecological engine of DRMPs, without which district-level actions risk degenerating into fragmented infrastructure projects.

2. SESSION LEADERSHIP

The session was led and anchored by Dr Vinod Tare, Former Professor, IIT Kanpur, Founder & Advisor, Centre for Ganga





River Basin Management and Studies (cGanga), Lead, CAMP Project. He was supported by Mr Siddharth Desai, Joint Managing Director, Kishore Pumps Pvt Ltd, Pune and Dr Shweta Lokhande, IIT Bombay. Dr Tare guided the discussion through a combination of structured presentation and open-floor interaction, encouraging practitioners, administrators, and researchers to critically examine the feasibility of DRMPs.

The session was deliberately structured as an interactive deliberation, encouraging questions on feasibility, governance, ecological safeguards, and institutional design.

3. FRAMING THE CORE QUESTION

Dr Tare opened the session by clarifying that its purpose was to address concerns, ambiguities, and contestable issues related to the proposed DRMP framework, especially:

- Whether DRMPs should follow a uniform national template or allow district-specific pathways.
- Whether the District Magistrate (DM)-centric governance model is overly centralised or pragmatically unavoidable.
- How much ecological intelligence should be embedded explicitly in the DRMP framework versus left to district discretion.
- Whether the proposed 12-component DRMP structure is excessive or appropriately comprehensive.

He emphasised that while flexibility is essential, there would be no dilution of the Samarth Ganga principles, particularly:

- Aviralta (uninterrupted flow)
- Nirmalta (water quality and ecological integrity)

4. THE “CLOSING THE LOOP” CONCEPTUAL FRAMEWORK

Dr Tare presented the Closing the Loop framework as a response to the linear wastewater paradigm, which has historically failed in India.

4.1 The Linear (Long Loop) Paradigm and its Failure

The conventional model follows a fragmented path:

- Human waste → STP → nitrogen (ammoniacal, organic, nitrite & nitrate) and phosphorous discharge into rivers (leading to eutrophication) or nitrogen and phosphorous control in treated wastewater leading to high expenditure.
- Simultaneously, agriculture depends on synthetic fertilisers, produced using high energy inputs.

This creates:

- Persistent river pollution
- Nutrient wastage
- Rising treatment and fertiliser costs

4.2 The Circular (Short Loop) Alternative

The proposed alternative reconnects water cycles and soil cycles:

- Wastewater treated at decentralised or clustered systems and managing eutrophication rather than eliminating



eutrophication.

- Nutrient-rich biosolids and treated water returned to land and water bodies respectively.
- Reduced river pollution.
- Improved soil organic carbon and fertility.

This approach:

- “Short-circuits” pollution pathways.
- Saves fertiliser energy costs.
- Converts waste into a resource.

5. WHY EUTROPHICATION MUST BE MANAGED, NOT ELIMINATED

A key conceptual clarification was that complete elimination of nutrients is neither feasible nor desirable in Indian conditions.

Dr Tare explained that:

- Nutrients are intrinsic to aquatic and terrestrial ecosystems.
- The challenge is uncontrolled accumulation, not presence.
- Managed eutrophication—through wetlands, biomass harvesting, and soil reuse—is ecologically sound.

This reframing marked a deliberate departure from engineering-only pollution control narratives.

6. DRMPs AS THE ECOLOGICAL ENGINE OF GOVERNANCE

It was emphasised that the Closing the Loop framework is not an abstract philosophy, but the operational logic behind DRMP clusters.

DRMPs were described as:

- Integrating urban water, rural sanitation, groundwater, industry, wetlands, and biodiversity.
- Organising interventions into interdependent clusters, rather than isolated projects.
- Enforcing the “short loop” so that districts do not externalise pollution downstream.

7. AUDIENCE INTERVENTION: ECO-SENSITIVE AND PROTECTED AREAS

Dr Anshumali, IIT-ISM Dhanbad raised a critical concern regarding the treatment of eco-sensitive and protected areas:

- Should these areas be classified under URMP or RRMP?
- Or should DRMPs explicitly introduce a separate ecological protection dimension?



Response

Dr Tare clarified that:

- Eco-sensitive zones must be embedded across all components.
- They exist in both urban and rural contexts.
- DRMPs must mandate identification of absolute “no-go” areas.

He illustrated this using the example of IIT Kanpur campus, where certain ecologically sensitive areas are voluntarily designated as non-developable, irrespective of ownership or development pressure. He further stressed that:

- Eco-sensitive areas may be fragmented or discontinuous.
- Heritage sites, recharge zones, forests, wetlands, valleys, and floodplains must all be mapped.
- Land-use change in these zones must be categorically prohibited.

The identification of such areas must be the first step in DRMP mapping, not an afterthought.

8. CLARIFYING “ECOLOGICAL INTELLIGENCE”

Ms Shweta Lokhande sought clarification on the term “ecological intelligence”, asking whether it refers only to eco-sensitive zones or includes broader considerations.

Response

Dr Tare cautioned against rigid definitions, noting that:

- Ecological sensitivity is inherently local and contextual.
- Local communities often possess deeper ecological knowledge than external experts.
- District Ganga Committees (DGCs) must rely on local intelligence to notify protected zones.

He reiterated that DRMPs should empower districts to formally recognise and protect such areas through governance mechanisms.

9. AUDIENCE INTERVENTION: FLEXIBILITY OF DATA AND PROCESSES

Dr Vikrant Jain, IIT Gandhinagar highlighted that:

- Districts differ fundamentally in geology, climate, and risk profiles.
- Himalayan districts require landslide, seismic, and slope stability datasets.
- Plains districts face entirely different challenges.
- Basin boundaries often cut across districts, creating mixed hydrological contexts.

Response

Dr Tare acknowledged these complexities and clarified that:



- The framework is generic, not the data.
- Data, processes, and sensitivities will vary by district and basin.
- Border districts (e.g., Indore spanning Ganga and Narmada basins) must apply basin-specific logic within the same administrative boundary.

He rejected the notion of “copy-paste” planning, clarifying that:

- Concepts like Aviralta and Nirmalta are universal.
- Their application is context-specific.

10. METHODOLOGY VS UNIFORMITY

Mr Siddharth Desai distilled the debate into a key question:

- Should the methodology of DRMP preparation be uniform, even if data and outcomes differ?

Clarification

Dr Tare confirmed that:

- The process of planning (diagnosis → prioritisation → implementation → monitoring) must be consistent.
- The content and solutions will necessarily differ.

This distinction between process standardisation and contextual customisation was identified as central to DRMP credibility.

11. AUDIENCE INTERVENTION: DM-CENTRIC MODEL AND TECHNICAL CAPACITY

Dr Ajay Patel, NIT Warangal questioned:

- How a District Magistrate, primarily an administrator, can handle the technical complexity of DRMPs?
- Whether basin-level expert groups or independent technical committees should be institutionalised?

Response

Dr Tare offered a detailed governance clarification:

- The DM is the accountable authority, not the sole technical expert.
- DRMPs require a dedicated district unit, combining:
 - In-house technical staff (hydrologists, engineers, ecologists, etc.)
 - Outsourced expertise from institutions (IITs, research centres, etc.)

He stressed the difference between:

- Knowledge (often with academics)
- Accountability (rests with administrators)

Using the analogy of an institute director, he explained that:

- Responsibility lies with the head, supported by experts.
- Queries, audits, and parliamentary questions must be answered by accountable officials.

12. DEFINING THE DISTRICT DRMP TEAM STRUCTURE

In response to a follow-up by Dr Ajay Patel, Dr Tare confirmed that:

- DRMP guidelines will explicitly define team composition.
- Roles will be clearly demarcated between:
 - In-house staff (decision-making and accountability).
 - External experts (analysis and advisory support).

This institutional design was identified as a key deliverable of the DRMP framework.

13. AREAS OF BROAD CONSENSUS

The session converged on several critical points:

- DRMPs must encode ecological logic, not just infrastructure.
- Eco-sensitive and heritage areas require absolute protection.
- Flexibility in data and solutions is essential.
- Methodological consistency is necessary for governance credibility.
- The DM-centric model is pragmatic, provided it is technically supported.

14. OUTCOMES AND WAY FORWARD

Session III established that:

- The Closing the Loop framework is the ecological backbone of DRMPs.
- DRMPs represent a shift from pollution control to hydro-ecological systems management.
- Districts must be empowered to manage nutrients, biomass, water, soil, and livelihoods as a single system.

The session reinforced the central IWIS 2025 message: River rejuvenation will succeed only when ecological intelligence, governance accountability, and district-level action operate as one integrated system.

IWIS SESSION IV

Session Title : **DGP SWOT & Gap Analysis: Why District Ganga Plans (DGPs) Must Evolve into District River Management Plans (DRMPs) Framework**

Date : 10 December 2025

Time : 16:00–17:30 h

Venue : Auditorium, FITT, IIT Delhi

Moderator : **Dr Vinod Tare** (Founder and Advisor, cGanga, IIT Kanpur)

Panellist: : **Dr Shweta Lokhande** (Prime Minister's Research Scholar, IIT Bombay)
Mr Siddharth Desai (Joint Managing Director, Kishor Pumps Pvt Ltd, Pune)

1. INTRODUCTION AND RATIONALE OF THE SESSION

Session IV of IWIS 2025 was conceived as a diagnostic and reflective session, aimed at critically examining the status, strengths, limitations, and structural gaps of District Ganga Plans (DGPs) prepared by GIZ and WWF-India for the National Mission for Clean Ganga (NMCG), and articulating why and how these must evolve into comprehensive District River Management Plans (DRMPs) under the GRBMP 2.0 framework.

Building upon the architectural and ecological discussions of Sessions II and III, this session addressed a central question confronting river governance in India:

Why have large investments and extensive planning efforts not translated into sustained river health outcomes at the district scale?

The session explicitly positioned DGPs not as failures, but as necessary first-generation instruments, whose limitations now clearly indicate the need for a second-generation, integrated, outcome-oriented planning framework—the DRMP.

2. SESSION LEADERSHIP AND PANEL COMPOSITION

The session was led and anchored by Dr Vinod Tare, Former Professor, IIT Kanpur, Founder & Advisor, Centre for Ganga River Basin Management and Studies (cGanga), Lead, CAMP Project. He was supported by Mr Siddharth Desai, Joint Managing Director, Kishore Pumps Pvt Ltd, Pune and Dr Shweta Lokhande, IIT Bombay. Dr Tare guided the discussion through a combination of structured presentation and open-floor interaction, encouraging practitioners, administrators, and researchers to critically examine the feasibility of DRMPs.

Key panel contributors included senior practitioners and experts associated with river planning, programme implementation, governance, and district-level execution. The session also witnessed active participation from officers, researchers, practitioners, and representatives of civil society present in the audience, whose interventions significantly enriched the discussion.

3. CONCEPTUAL FRAMING: FROM DGPS TO DRMPs

Dr Tare opened the session by clarifying that District Ganga Plans were never intended to be full river management plans. They were designed primarily as programme-aligned action documents, focused on pollution abatement, infrastructure creation, and scheme convergence within the Namami Gange framework.



However, rivers do not respond to projects, assets, or expenditure heads. They respond to hydrology, ecology, land use, governance coherence, and human behaviour—dimensions that DGPs only partially addressed.

The evolution from DGPs to DRMPs was therefore framed not as an administrative renaming exercise, but as a fundamental shift in planning philosophy, scope, and accountability.

4. SWOT ANALYSIS OF EXISTING DISTRICT GANGA PLANS (DGPs)

4.1 Strengths of DGPs

The session acknowledged several positive contributions of DGPs:

- Institutionalisation at the district level, with District Magistrates chairing District Ganga Committees (DGCs).
- Creation of a single planning document bringing together multiple departments.
- Strong focus on sewage management, solid waste, ghats, crematoria, and riverfront assets.
- Alignment with centrally sponsored schemes and availability of funding channels.
- Establishment of administrative familiarity with river-related planning.

These strengths were recognised as critical enabling foundations upon which DRMPs could be built.



4.2 Weaknesses and Structural Limitations

The session then systematically examined the limitations of DGPs, which constrain their effectiveness as river management instruments:

1. Sectoral Fragmentation

DGPs largely mirror departmental silos—urban sewage, rural sanitation, solid waste—without integrating them into a unified river system perspective.

2. Infrastructure-Centric Orientation

Emphasis remains on asset creation rather than river outcomes, such as flow restoration, ecological recovery, or reduction in pollutant loads at the river scale.

3. Limited Ecological Intelligence

Floodplains, wetlands, riparian buffers, aquatic biodiversity, soil–water linkages, and groundwater–surface water interactions are weakly represented or absent.

4. Inadequate Hydrological Diagnosis

DGPs often lack:

- Sub-basin and micro-watershed characterisation.
- Drain-level flow analysis.
- Understanding of seasonal variability and baseflow dynamics.

5. Weak Monitoring–Feedback Loops

Monitoring is largely compliance-based, with limited mechanisms for learning, adaptation, and mid-course correction.

6. Absence of Behavioural and Institutional Reform Levers

Human interaction with rivers—land encroachment, waste disposal practices, agricultural runoff—remains inadequately addressed.

5. GAP ANALYSIS: WHY DGPS CANNOT DELIVER RIVER REJUVENATION ALONE

Dr Tare emphasised that DGPs are programme documents, whereas rivers demand system plans.

The gap analysis highlighted that:

- DGPs address “what projects to execute”, but not “how the river system functions.”
- They are aligned to budget cycles, not hydrological or ecological cycles.
- Accountability is tied to financial utilisation, not river health indicators.

This mismatch explains why improvements in infrastructure coexist with persistently degraded river conditions in many districts.



6. DRMP AS THE NEXT-GENERATION PLANNING INSTRUMENT

The session articulated DRMPs as comprehensive, integrative, and outcome-oriented plans, designed to:

- Treat the district as a river management unit, not merely an administrative unit.
- Integrate:
 - Urban water and sanitation.
 - Rural sanitation and agriculture.
 - Drains, tributaries, wetlands, and floodplains.
 - Groundwater and aquifers.
 - Soil health and biomass cycles.
 - Industry, MSMEs, and livelihoods.
- Embed ecological processes as infrastructure, not as add-ons.
- Operate through adaptive management, supported by continuous monitoring and learning.

DRMPs were presented as the operational core of GRBMP 2.0, translating basin-scale vision into implementable district action.

7. AUDIENCE INTERVENTIONS AND PANEL RESPONSES

7.1 Questions on Administrative Load and Feasibility

Participants from the audience raised concerns regarding:

- Whether preparations of DRMPs would overburden District Magistrates?
- How inter-departmental coordination could be realistically sustained?

Response:

The panel clarified that DRMPs are not additional work, but a restructuring of existing work. They aim to reduce duplication, contradictions, and inefficiencies by aligning departmental actions within a single river systems framework.

7.2 Concerns on Uniform Templates vs Local Flexibility

Audience members questioned whether DRMPs would impose a rigid, one-size-fits-all structure across districts.

Response:

It was clarified that the DRMP framework is common in architecture but flexible in pathways. Diagnostics, priorities, and sequencing would be district-specific, guided by local hydrology, ecology, and socio-economic contexts.

7.3 Discussion on Monitoring, Accountability, and Evaluation

Participants highlighted that existing programme evaluations focus on outputs, not outcomes, and sought clarity on how DRMPs would change this.

Response:

The panel emphasised that DRMPs explicitly link:

- Interventions → Indicators → Outcomes → Learning loops, thereby enabling transparent assessment of what works, what does not, and why.

8. INTEGRATION WITH CITIS AND INVESTMENT LOGIC

The session underscored that DRMPs provide the missing investment logic for initiatives such as CITIS:

- They identify where investments create ecological and social returns, not just assets.
- They reduce risk for climate and impact investors by embedding projects within a district-scale systems plan.
- They enable bundling of interventions—wastewater, biomass, soil regeneration, livelihoods—into bankable portfolios.

This alignment was identified as essential for grounding climate finance at the district level.



9. AREAS OF BROAD CONSENSUS

The session converged on several shared conclusions:

- DGPs are useful but insufficient instruments for river rejuvenation.
- River health cannot be delivered through projects alone.
- Districts must move from programme compliance to system stewardship.
- DRMPs provide the only viable pathway for operationalising GRBMP 2.0.

10. OUTCOMES AND WAY FORWARD

Session IV concluded with a clear articulation of next steps:

- Systematic upgrading of DGPs into DRMPs should be prioritised.
- DRMPs must become the primary planning and governance instrument at the district level.
- Capacity building, technical backstopping, and knowledge platforms (such as cGanga) are essential enablers.

- Subsequent IWIS sessions would focus on converting diagnostics into actionable interventions, including institutional reforms and financing pathways.

11. CONCLUDING REFLECTION

Session IV served as a critical bridge between diagnosis and transformation, making explicit why incremental improvements within existing frameworks are inadequate for river rejuvenation.

By demonstrating the structural limitations of DGPs and articulating a coherent pathway toward DRMPs, the session reinforced the central message of IWIS 2025:

India's rivers will recover not through more projects, but through better systems, better integration, and better governance at the district scale.



IWIS SESSION V

Session Title : **DGP vis-à-vis DRMP: Converting Diagnostics into Action**

Date : 10 December 2025

Time : 16:00–17:30 h

Venue : Auditorium, FITT, IIT Delhi

Chair : **Dr Sreedhar Cherukuri** (IAS, District Magistrate & Collector, YSR District)

Moderator : **Dr Vinod Tare** (Founder and Advisor, cGanga, IIT Kanpur)

Dr Shweta Lokhande (Prime Minister's Research Scholar, IIT Bombay)

Mr Siddharth Desai (Joint Managing Director, Kishor Pumps Pvt Ltd, Pune)

Session V of the 10th India Water Impact Summit (IWIS) focused on a critical and practical question confronting river rejuvenation efforts across India: how to convert District Ganga Plans (DGPs), which are largely diagnostic in nature, into actionable, adaptive, and outcome-oriented District River Management Plans (DRMPs). The session marked a transition from conceptual frameworks discussed in earlier sessions to institutional design, governance structuring, and implementation logic.

The session was anchored by Dr Vinod Tare, who initiated the discussion by clarifying that the intent was not to engage districts in isolation, but to communicate a coherent planning framework to States, emphasising why district-level river planning is indispensable, and why

inter-district coordination mechanisms are equally critical. A key signal of administrative ownership was highlighted through the active interest of the District Magistrate of YSR District, whose participation underscored the growing receptiveness within district administrations to structured river management planning.

From Diagnostics (DGPs) to Management Logic (DRMPs)
The session began by systematically reviewing the strengths and limitations of existing DGPs. It was acknowledged that DGPs represent a significant advancement in river planning, providing robust diagnostics—including detailed mapping of drains, wetlands, industries, agriculture, groundwater resources, and stakeholder consultations. These diagnostics offer a strong foundation for further planning.



However, participants collectively recognised that DGPs remain static, one-time documents, lacking defined governance roles, convergence mechanisms, project pipelines, monitoring dashboards, and cyclic review processes. Critical gaps were identified, including the absence of nutrient balance analysis, pesticide and soil-carbon strategies, weak linkage between groundwater and rivers, limited perennialisation approaches, and insufficient integration of wetlands into hydrological and nutrient cycles.

In contrast, DRMPs were presented as dynamic, five-year cyclic plans, designed to integrate planning, implementation, monitoring, and course correction. The core conceptual shift articulated during the session was from “mapping to management”, from sectoral silos to holistic hydro-ecological systems, and from isolated projects to integrated cluster-based interventions.

KEY CONCEPTUAL SHIFTS ARTICULATED

Several foundational shifts were elaborated through the session:

1. *Static Inventories to Dynamic Hydrological Continuum*

While DGPs excel at asset inventories, DRMPs treat hydrology as a connected continuum, tracking every drop from rainfall through drains, wetlands, groundwater, agriculture, and ultimately to river discharge.

2. *Sewage Treatment to Hydro-Ecological Restoration*

The discussion moved decisively beyond a narrow focus on sewage and pollution control. It was emphasised that nutrient

elimination under Indian conditions is neither feasible nor desirable. Instead, DRMPs aim to manage nutrients through ecological processes, including regular aquatic biomass harvesting, converting eutrophication risks into livelihood and resource opportunities.

3. *One-time Reports to Cyclic Planning*

DGPs were characterised as time-bound diagnostics that rapidly become outdated. DRMPs, by contrast, are conceived as adaptive management instruments, capable of responding to climate variability, urban expansion, industrial growth, and ecological change.

4. *District Actions to Basin-Level Accountability*

A central theme was ensuring that district-level interventions demonstrably improve downstream river health. The concept of shifting from the current “long loop” (pollution passed downstream) to a “short loop” (local reuse and polishing) was repeatedly emphasised, with monitoring at district exit points becoming a key accountability mechanism.

INTEGRATED DRMP FRAMEWORK

The session outlined a comprehensive DRMP design framework, comprising interlinked components covering hydrological integration, river system management, urban and rural water loops, drainage management and perennialisation, wetlands and floodplains, industrial wastewater, groundwater security, reservoirs, ecology and biomass, and digital monitoring through a District River Information System (DRIS). Importantly, DRMPs were presented not as a compilation of projects but as an integrated management architecture, where each component reinforces the others.

INSTITUTIONAL ARCHITECTURE AND GOVERNANCE DELIBERATIONS

A substantial portion of the session was devoted to institutional arrangements for planning, implementation, and monitoring. Dr Tare proposed that while implementation must remain firmly anchored at the district level, effective planning and oversight require a higher-level inter-district mechanism, preferably aligned with existing administrative divisions.

Where divisional structures exist, Divisional Commissioners were identified as the most appropriate authorities to chair such groupings, given their seniority and statutory authority over District Magistrates. In states without formal divisional structures, equivalent groupings were suggested, with the emphasis placed not on nomenclature but on authority and functional clarity.





A key question deliberated at length was the location and structure of technical support units. Drawing from experiences of river basin organisations and multilateral projects, strong consensus emerged around the need for a state-level technical unit that supports all divisions and districts. Participants cautioned against replicating full technical teams at every divisional level, noting constraints of expertise availability, efficiency, and consistency.

The proposed model envisages:

- Districts as executing agencies through District Ganga Committees;
- Divisions as supervisory and coordination platforms; and
- States as the locus for policy integration, technical support, basin-scale analysis, monitoring, and knowledge management.

ROLE OF INDEPENDENT KNOWLEDGE INSTITUTIONS AND STAKEHOLDER ENGAGEMENT

The session strongly emphasised that technical units must be multidisciplinary, encompassing hydrology, ecology,

agriculture, climate science, economics, governance, and finance. Equally important was the inclusion of independent knowledge institutions—such as cGanga, cNarmada, and similar centres—to bring scientific rigour, independent thinking, and innovation into planning processes.

Dr Tare underlined that stakeholder consultation is not optional but foundational. Drawing on lessons from the GRBMP experience, he stressed that ground-level feedback—farmers, urban residents, industries, NGOs, and local institutions—constitutes a critical form of data, just as important as technical datasets. DRMPs must therefore institutionalise two-way feedback loops, ensuring that plans are informed by ground realities and that decisions taken at higher levels are transparently communicated back to stakeholders.

BRIEF OF INDIVIDUAL INTERVENTIONS

(i) Mr PS Rana's intervention focused on the clarity of institutional roles and separation of functions within the proposed DRMP governance framework.



He emphasised that execution, supervision, and monitoring must be institutionally separated to avoid conflicts of interest and dilution of accountability. In his view, districts should remain the executing agencies, divisions should act as the supervisory tier, and the state should assume responsibility for policy formulation and monitoring. He cautioned that unless power delegation is strictly aligned with defined responsibilities, supervisory or monitoring bodies may overstep their mandate. Mr Rana broadly endorsed the proposed three-tier model, noting that with clear role definition, it has strong potential to function effectively.

(ii) Mr Suresh Babu from WWF-India strongly supported the idea of a state-level technical unit, highlighting practical constraints in replicating specialised expertise at every divisional level. Drawing from experience, particularly in Uttar Pradesh, he noted that multiple institutions already engage in river basin analytics and planning, raising the question of institutional placement, neutrality, and scientific rigor. He stressed that river management must not be dominated solely by hydrology and wastewater considerations, but should integrate ecology, climate variability, and socio-environmental dimensions. A key concern he raised

was ensuring that a state-level technical unit remains connected to ground realities, with well-designed two-way feedback mechanisms between districts and the state, so that technical planning does not become detached from implementation realities.

(iii) Mr Anshuman from TERI underscored the importance of administrative practicality and on-ground feasibility in adopting DRMP structures. He highlighted that district and inter-district mechanisms must be designed in a manner that aligns with existing administrative workflows, rather than creating parallel or overly complex systems. His remarks reinforced the need for flexibility in institutional design, allowing states to adapt the DRMP framework to their governance context while adhering to the core principles of convergence, accountability, and integrated river management.

(iv) Dr Rajesh Biniwale from CSIR-NEERI, Nagpur emphasised the technical robustness and scientific depth required in DRMP preparation. He pointed out that river management planning must be supported by credible data, validated methodologies, and interdisciplinary analysis, particularly when translating diagnostics into actionable interventions. Dr Biniwale highlighted the importance of evidence-based prioritisation of interventions, cautioning against generic or template-driven approaches that may not reflect district-specific ecological and hydrological conditions.

(v) Dr M Jawed from IIT Guwahati focused on the implementation challenges at the district level, particularly the capacity constraints faced by district administrations. He noted that while district ownership is essential, technical handholding and sustained support are equally critical for successful execution of DRMPs. His intervention highlighted the need for capacity building, structured guidance, and simplified decision-support tools, so that districts can translate complex plans into timely and effective actions.

(vi) Mr Sundeep Chauhan drew upon his experience with multilateral and externally aided projects, strongly advocating for a state-level technical support mechanism. He observed that states rarely possess all required expertise in-house, especially across domains such as hydrology, climate science, agriculture,



economics, finance, and project management. He stressed the importance of knowledge capture and institutional memory, noting that repeated reinvention of plans due to poor data access and documentation is a persistent weakness. Mr Chauhan argued for open, accessible, and well-managed data systems, where reports and datasets are stored in usable formats, enabling cumulative learning rather than repetitive planning. In his view, while implementation must remain district-led, the state's role in technical oversight, monitoring, and knowledge management is indispensable.

(vii) Mr Siddharth Desai highlighted the diversity of governance structures across Indian states, particularly in the urban sector, where many large cities operate through state-controlled parastatal bodies rather than district administrations. He argued that this heterogeneity makes a state-level planning and technical oversight framework more practical and inclusive. According to him, locating technical planning and monitoring at the state level allows DRMPs to better accommodate such institutional variations, ensuring that urban water and river







management interventions are not weakened by administrative misalignment.

Intervention of Dr Sreedhar Cherukuri, IAS, District Magistrate & Collector, YSR District, Andhra Pradesh was widely acknowledged as a strong signal of administrative ownership and leadership at the district level. The DM expressed keen interest in the DRMP framework and conveyed a clear willingness to engage proactively in district-level river planning and implementation. His participation underscored the practicality of anchoring river rejuvenation efforts at the district level, provided that clear guidance, technical support, and institutional backing are available.


The DM's remarks reflected an appreciation of the need to move beyond diagnostics and embrace action-oriented, implementable plans that align environmental objectives with local development priorities. His readiness to participate personally in the process reinforced the session's central premise that district leadership—particularly by empowered District Magistrates—is essential for translating river management frameworks into on-ground outcomes. The intervention was seen as validating the proposed DRMP architecture, especially its emphasis on district execution supported by higher-level coordination and technical assistance.

CONCLUDING REFLECTIONS

The session concluded with a shared recognition that DRMPs represent a qualitative leap from earlier planning approaches—moving from fragmented, sector-specific interventions to integrated, adaptive, and accountable river management systems. Participants noted that while the first planning cycle may be imperfect, the cyclic nature of DRMPs ensures continuous learning and improvement.

Session V thus served as a capstone discussion, translating the scientific, technological, and governance concepts articulated throughout IWIS 2025 into a clear institutional and operational roadmap for districts, divisions, and states to collaboratively steward India's rivers.



An aerial photograph of a coastal town at dusk. The foreground shows a rocky beach with waves crashing against the shore. In the middle ground, several buildings are visible, some with lit windows. The background is dominated by a dense forest of trees, with a few tall structures visible in the distance. The sky is a deep, dark blue, suggesting twilight.

ETV 2025



SESSION C-I

Date : 09 December 2025



Lise Le Blanc

Organisation: LP Consulting (Canada)

Topic: Global Approaches to Managing Biosolid Risks for Agricultural Land Application

SUMMARY:

This presentation delved into science-based regulatory frameworks that govern the safe agricultural use of biosolids across Canada, the EU, the US, and Australia. The presenter clarified the difference between risk detection and actual health risk, emphasizing that risk depends on factors like exposure, dose, and pathway, rather than just the analytical presence of contaminants.

The session addressed key regulatory concerns, including metals, pathogens, PFAS, and persistent organic pollutants. Evidence from decades of monitoring data demonstrated how well-regulated biosolid programs mitigate public health risks by replacing unmanaged exposure pathways with controlled, transparent systems. This is especially relevant in places like India, where untreated sludge remains a major public health risk.

Best practices for biosolid management included:

- Continuous monitoring
- Upstream industrial source control
- Farmer education
- Transparent reporting

These practices were emphasized as essential for building public trust and regulatory confidence in biosolid programs.

COMMENTS:

- The presentation was purely academic, focusing on education, continuous program monitoring, and reporting. There was no mention of technology that could facilitate these processes, so this may not be the ideal candidate for an ETV (Environmental Technology Verification) program.
- The transportation of biosolids to agricultural fields involves costs, which is a major concern.
- Nice presentation that shared the prevailing thinking in Canada but this is not an ETV candidate.

LP Consulting – Regulatory, Environmental & Agricultural Governance Expertise

- 30 years working with agriculture, government policy, and environmental regulation
- Federal and Provincial regulatory advisor
- Canada's largest independent agricultural biosolids/residuals research program
- 150+ on-farm trials annually
- ISO certification underway for our FieldCarbon™ digital platform for carbon and GHG accounting
- Technical oversight of \$1B+ in agricultural field assets



LP CONSULTING

What “Risk” Means in Biosolids Programs

Primary risks managed through regulation: Risk protection requires: regulation:

- Metals
- Pathogens
- Per- and Polyfluoroalkyl Substances (PFAS)
- Persistent Organic Pollutants (POP's)
- Treatment performance
- Testing & verification
- Application controls
- Long-term monitoring
- Upstream source control

Need Better Understanding of Risk vs Benefit

Scoping Reviews

- Identify knowledge gaps
- Flag emerging contaminants
- Do NOT quantify probability of harm, safe exposure limits or regulatory safety

Scientific Principle - Detection ≠ Danger

Risk depends on dose, exposure, and pathway — not on analytical detection.

Health & Environmental Risk Assessments (Used for Regulation)

- Multi-pathway human-health exposure modelling (soil, water, air, food chain)
- Based on decades of field monitoring and epidemiological data
- Apply conservative safety and uncertainty factors
- Form the legal basis for global standards and regulations

LP CONSULTING

Need Better Understanding of Risk vs Benefit

Policy can be influenced by:

- Public perception
- Media framing
- Advocacy pressure
- Technical complexity
- Confusion between sludge vs biosolids vs enhanced biosolids

Best regulatory outcomes occur when:

- Evidence and public communication advance together
- Transparency builds confidence
- Monitoring results are openly reported

Managing Risks: A Global Perspective

Metals:

- Canada, EU, US, Australia use cumulative loading limits
- Long-term monitoring shows:
 - ✓ Very low accumulation under managed programs
- Standards are conservative, and protective

Pathogens:

- Controlled through heat, digestion, composts, drying
- Modern systems consistently achieve:
 - ✓ Pathogen levels far below health thresholds

Global Successful Best-Practices

Successful biosolids programs share five characteristics:

- Science-based regulation standards
- Validated pathogen and contaminant treatment
- Continuous monitoring and transparent reporting
- Industrial source control
- Farmer education

Risk is not eliminated by banning biosolids. Risk is reduced through:

- Treatment
- Monitoring
- Regulation
- Traceability
- Continuous improvement

Improving Canadian Soil Health & Reducing Climate Impact with Biosolid Land Applications

Submitted to: CFIA-ACIA

FEBRUARY 2023

LP Consulting Ltd
201-445 Sackville Dr,
Lower Sackville, NS B4C 2S1
902-256-2636

SESSION C-I

Date : 09 December 2025



Lise Le Blanc

Organisation: LP Consulting (Canada)

Topic: Carbon Opportunities in Biosolid-Based Agricultural Programs

SUMMARY:

This presentation explored the limitations of conventional soil carbon sequestration markets and proposed biosolid-based agricultural programs as a more reliable climate solution. The speaker discussed key challenges in voluntary carbon markets, such as issues with additionality, permanence, and verification. Biosolids were presented as delivering three verified climate benefits:

- Avoided landfill emissions
- Displacement of fossil-fuel-based fertilizers
- Measurable soil carbon enhancement

The session introduced LP Consulting's FieldCarbon™ methodology, a scientifically sound framework aligned with ISO standards. This methodology offers:

- Transparent baselines
- Durability buffers

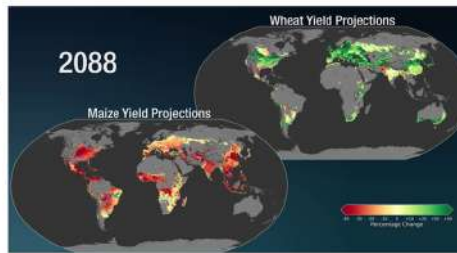
Avoidance of double counting
Biosolids were reframed not merely as waste management tools but as climate, soil-health, and food-system investments, making them a strong candidate for scalable climate action.

COMMENTS:

- Although the presentation offered valuable insights into the potential of biosolid-based agricultural programs, there was hardly any mention of the technology or platform behind it.
- The opportunity for biosolid-based agricultural programs was highlighted, but this may not be sufficient to consider the same as a candidate for an ETV (Environmental Technology Verification) program.
- The panel agrees with Lise's thesis and methodology. However, expressed concerns about whether Bharatia can support the promotion of this methodology. If so, who will manage and enforce its implementation in India?

Why Soil Regeneration Is Now a Global Priority

- **Food security:** Declining soil organic matter is destabilizing crop yields
- **Climate resilience:** Degraded soils are less drought-, flood-, and heat-resilient
- **Fertilizer exposure:** Lower nutrient efficiency is driving higher input dependence
- **Water systems:** Poor soils increase runoff, flooding, and irrigation demand
- **Carbon strategy:** Soil is one of the few scalable carbon-avoidance and storage systems
- **Public return:** Regenerated soils deliver long-term multi-sector benefits



Limits of Relying on Soil Carbon Sequestration for Climate Targets

- **Soil Diversity:** Soils vary in their composition and behavior
- **Sampling complexity:** Measurement remains costly and inconsistent at scale
- **Different Methods:** Scientists use different techniques to measure soil carbon; direct sampling, modeling or technology such as remote sensing. These methods can give different results.
- **Uncertainty Over Long-Term Storage:** Long-term storage stability is difficult to guarantee. Reversals can occur through tillage, drought, or flooding

VOLUNTARY CARBON MARKET



Carbon markets are driven by 5 main players

1. **Project Developers** - create and manage projects that generate carbon credits.



Large projects like hydro plants, to small-community based projects, like clean cookstove programs.

2. End Buyers

Companies who buy carbon credits to offset some or all of their GHG. Paris Agreement allows countries to use voluntary credits to meet their targets



Apple and Google, airlines, finance sectors, and oil and gas companies.

3. Retail Traders **cbl**

Buy carbon credits, bundle them, and sell to end buyers, either privately or through standardized trading formats. Traders favor standardized credits for simplicity and value, while end buyers often like non-standardized credits to ensure project quality and prevent greenwashing.

4. Brokers **ecoact**

Brokers act as intermediaries between buyers and sellers of carbon credits, facilitating transactions without taking ownership of the credits themselves. Their primary function is to connect parties.

5. Standards **American Carbon Registry** 1st - 1996 **CLIMATE ACTION RESERVE** 2001 **VERRA** 2009

Organizations that certify carbon projects and verify emissions reductions. They develop methodologies for different project types and ensure adherence to carbon finance principles.

The Voluntary Carbon Market (VCM) is facing a critical challenge

The VCM has been growing very fast, and is estimated to grow to \$10-40 B in value by 2030

85-90% of voluntary carbon credits may not represent real, additional, or permanent emissions reductions.

Key Issues:

- **Lack of Transparency:** Insufficient clarity on credit origins and impact.
- **Lack of Additionality:** Credits do not represent new & real reductions.
- **Permanence Concerns:** Projects may not guarantee long-term carbon storage.
- **Verification Failures:** Poor oversight allows low-quality credits.
- **Greenwashing:** Companies may misuse substandard credits to falsely claim sustainability.



The Missed Opportunity in Conventional Ag Carbon Markets

Agriculture is a major climate source contributing ~ 25% of global greenhouse gas emissions, through:

- Nitrogen fertilizer use • Manure management
- Soil processes.
- Most carbon programs rely on soil carbon sequestration
- Over-reliance on SOC sampling limits scale and investor confidence

Avoidance + regeneration delivers faster, lower-risk climate outcomes

Biosolid products use in agriculture aligns directly with this policy shift

This process included extensive research, risk and cost assessments, and the creation of an early prototype to enhance the credibility of agriculture carbon crediting.

Pending - ISO 14064 alignment

- Standard and Methodology created CNMP Software and App
- Additionality
- Credit Backdating
- Rigour & Credibility
- Baseline
- Leakage Test
- Durability
- Buffer Pool

Agriculture has a Significant Opportunity for Climate Impacts 2013 to 2022, USDA Reports

10 million carbon credits were issued by US agriculture projects, US forestry issued 191 million credits

1. **Soil Carbon Sequestration**
2. Improved Livestock Management
3. Optimized Fertilizer Use
4. Carbon-Friendly Crops
5. Integrated Systems
6. **Reducing Waste Emissions**
7. **Enhanced Soil Health**
8. Climate-Smart Agriculture

SESSION C-I

Date : 09 December 2025



Makarand Patankar

Organisation: Auric Techno Services Pvt. Ltd.

Topic: Sludge Treatment Using Dehumidification and Pathogen Elimination (Class A Biosolids)

SUMMARY:

This presentation focused on Auric Techno Services Pvt. Ltd.'s innovative low-temperature, heat-pump-based belt dryer system for producing US-EPA Class A biosolids. The technology utilizes a closed-loop, exhaust-free dehumidification process, offering significantly lower energy consumption compared to conventional thermal dryers. Key advantages of the system include:

- Modular design
- Small footprint
- Reduced operating costs
- Elimination of fossil fuel dependency
- Compatibility with solar integration

Performance data presented during the session highlighted the system's ability to achieve:

- High moisture reduction
- Pathogen destruction

The production of granular biosolids


that are suitable for reuse as manure or alternative fuel.

The presentation emphasized the technology's potential for use in Indian STPs (Sewage Treatment Plants) and ETPs (Effluent Treatment Plants), where it could help achieve regulatory compliance, reduce sludge disposal costs, and contribute to circular economy outcomes.

COMMENTS:

- The panel would like to explore this technology demonstration further. Sludge treatment is an important focus area moving forward. The company mentioned that they have set up a technology pilot in Pune, which is promising.
- It would be beneficial for them to provide comprehensive performance data from the pilot. A pilot project under the monitoring of ETV would be an excellent option for a neutral evaluation. However, to use this system, the solid concentration must be raised to around 20%, which requires further research and improvement.
- The Technology Readiness Level (TRL) seems to be around 4. It would be good to reconnect with the team once the forthcoming pilot has been running for a few months. However, the panel didn't get the impression that there is much distinctive intellectual property (IP) behind this.

ABOUT US:



- SINCE 2000 – 25 YEARS OF EXCELLENCE**
- EQUIPMENT SUPPLIED – OVER 1200**
- OVER 500 SATISFIED CUSTOMERS**
- 30+ ENGINEERS AND EXPERTS**
- APPROVED VENDOR IN MJP AND UPJN, WITH PENDING APPROVALS IN DJB**
- 15000+ sqft MANUFACTURING SPACE**

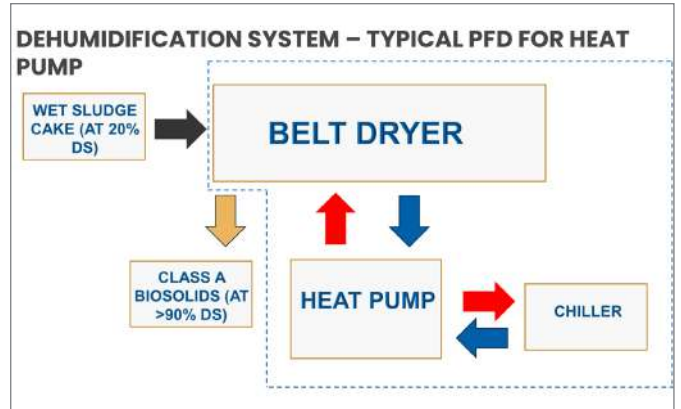
AURIC PRODUCTS



- Half Drum Screen
- Poly-Dilution Unit
- Quarterturn Screen
- Shaftless Screw Conveyor
- Multi Rake Screen Coarse/Fine
- Sand/Grit Classifier
- Screening Compactor
- Rotary Drum Screen
- Rotary Drum Screen (Shafted)

DEHUMIDIFICATION SYTEM – GENERAL FEATURES

- EXHAUST FREE SLUDGE DRYING SYSTEM**
The system works on a **complete air recirculation** basis, hence, no exhaust treatment required.
- HEAT PUMP/WASTE HEAT BASED SYSTEM**
The system works on a **heat pump/waste heat** basis. Hence, fossil fuel based energy not required.
- CHILLING LOAD FULLY USED**
Additional Chillers are deployed to ensure **maximum utilization** of available cooling duty of heat pump.
- LOW ENERGY CONSUMPTION**
The dehumidification system requires significantly **less energy** than "thermal dryers".
- SAFE OPERATIONS**
Since the system runs on **low temperature** and requires only power, chances of accidents at the plant are minimized.



HEAT PUMP BASED DEHUMIDIFICATION SYSTEM

PROS

- Ideal for **typical STP** where heat source may not be available.
- Substitutes** fossil fuels for power only.
- Entirely closed loop system.
- Power requirement can be fulfilled with **Solar Panels**.
- Inherently safe system with low temperatures.

CONS

- Higher Capex** and infrastructural costs.
- Higher **Power consumption**, since thermal energy demand is satisfied with Power.

BELT DRYER – OVERVIEW

The Belt Dryer is comprised of drying belts with a perforated sheet/wire mesh attached to a chain sprocket mechanism.

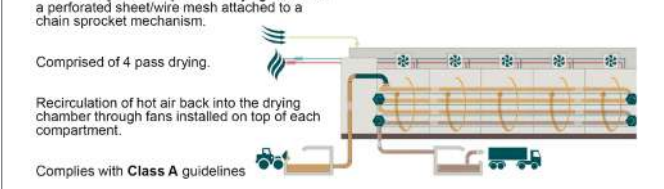
Comprised of 4 pass drying.

Recirculation of hot air back into the drying chamber through fans installed on top of each compartment.

Complies with **Class A** guidelines.

Dried sludge will be obtained in granular form. Can be used as alternative fuel/manure.

MOC – GI Powder coated / SS304 / SS316



CLASS A COMPLIANCE

REQUIREMENT AS PER US-EPA FOR CLASS A BIOSOLIDS

Biosolids with 7% solids or greater in the form of small particles and heated by contact with either warmed gases or an immiscible liquid.

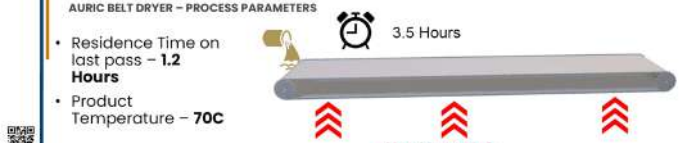
Temperature of biosolids must be 50°C or higher for 15 seconds or longer.

$$D = \frac{131,700,000}{10^{1.4T}}$$

Sr No	Particulars	Value
a	Equation Numerator as per Regime A	131700000
b	D, 14%	9.8
c	Denominator Calculation	8309573444
d = a/c	Days Required for Class A	0.0208
e = d*24	Hours Required for Class A	0.5 (30 Mins)

AURIC BELT DRYER – PROCESS PARAMETERS

- Residence Time on last pass – **1.2 Hours**
- Product Temperature – **70C**



DH SYSTEM – BENEFITS TO CUSTOMER

- DISPOSAL COSTS** - Reduction in Sludge Disposal costs due to reduction in sludge volume
- MANURE SOURCE** - Convert the sludge into a potential revenue/energy source through sale as organic manure/alternative fuel
- CLASS A** - Compliance with the stringent "Class A" biosolid guidelines from US-EPA
- GLOBAL COMPETITIVENESS** - Customers can comply with Global tenders at low operating cost

SESSION C-I

Date : 09 December 2025



Anthony Davies

Organisation: Bio2Pure

Topic: Decentralised Wastewater Treatment Using Enhanced Fixed Film Technology (EFFT)

SUMMARY:

This presentation introduced Bio2Pure's Enhanced Fixed Film Technology (EFFT), a modular biological treatment system designed for in-situ wastewater treatment, including drains, ponds, and lakes. The system uses enzyme-assisted microbial digestion to break down complex organic matter, leading to rapid reductions in:

- BOD (Biochemical Oxygen Demand)
- Foul odour
- Mosquito breeding

Case studies from India—including projects in Central Vista, Varanasi, Chennai, and Uppanar Drain—demonstrated significant improvements in water quality within hours to

days, without requiring major civil infrastructure. Key features of the technology include:

- Low footprint
- Low OPEX (operational expenditures)
- Quick deployment

Suitability for upgrading underperforming STPs or treating decentralized wastewater systems.

COMMENTS:

- This technology should definitely be considered for the ETV program. There is a significant need in India for smaller decentralized systems, and Bio2Pure offers a promising solution for evaluation.
- Currently, the enzymes used in the process are imported, so there is a need to explore indigenous enzymes for this application.
- Excellent presentation, biological approaches are very attractive when managed properly. Appears to be a fit case for ETV consideration.

Background of Bio2Pure



UK Based Bio-Engineering Company:

- Established with a strong foundation in bio-engineering solutions.
- Operating from the United Kingdom for the past 25 years.
- Recognized for its commitment to advancing sustainable and innovative environmental technologies.

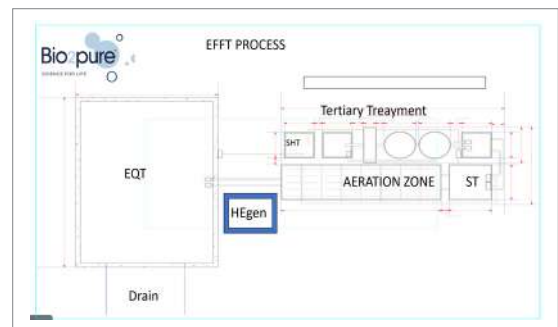
Global Presence

- Bio2Pure extends its impact globally with a subsidiary company established in India as Bio2Pure India
- The international presence reinforces Bio2Pure's dedication to addressing environmental challenges on a broader scale.
- Bio2Pure tailors solutions to meet the specific environmental needs of the Indian market.

Enhanced Fixed Film Technology

PRINCIPLES OF THE PROCESS

- Bacteria are the active ingredients in sewage degradation
- To digest the waste and multiply waste needs to be small enough ie less than 1000 Daltons
- Most waste contains proteins, carbohydrates and lipids greater than 1000 Daltons
- First stage is secretion of enzymes to break down molecules
- Microbes then digest smaller molecules and multiply



Projects In India

Central Vista Project

- Phase 1 - POC Maintenance of ponds at India Gate
- Phase 2 - Deploys January 2026

Varanasi

- Ponds & Talab : Rejuvenation of still water ponds

Pondicherry

- Phase 1 : Treatment of Uppanar Drain, reduction of foul smell and elimination of mosquitos

Chennai

- CSR Project (BASF) rejuvenation and beautification of still water ponds & lakes.
- Acquiring work order for multiple ponds in the area

West Bengal

- Completed 2 POC's in Kolkata.

Haryana

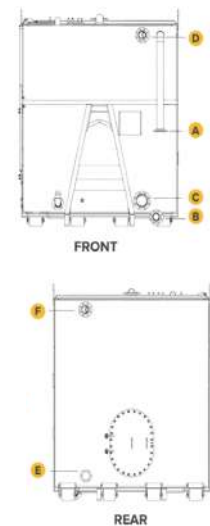
- Rejuvenation & Operation of 2.7 MLD STP

Jharkhand

- 20KLD ETP Design, Build & Commission

Features

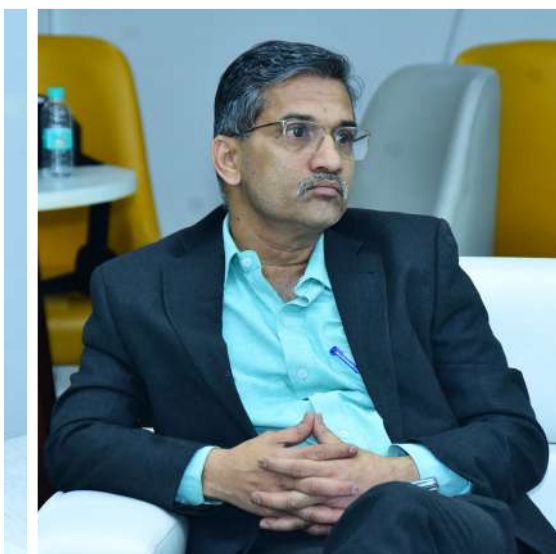
- Modular in design
- Production of units on a large scale
- Treatment on site
- Very low footprint
- Low civil and land requirement
- Low opex - power, manpower, chemicals
- Eliminates foul smells
- Eliminates mosquitos
- Improves health and quality of life for locals



Solutions offered for INDIA

Bio2Pure has undertaken a crucial initiative to address and enhance the water quality in various water bodies across India. The company's comprehensive approach involves identifying three distinct categories of polluted water bodies, each posing unique challenges and requiring tailored solutions.





SESSION C-II

Date : 10 December 2025



Dipendu Saha

Organisation: Eco-Carbon

Topic: Conversion of Polystyrene Waste into High-Value Carbon

SUMMARY:

This presentation introduced a waste-to-value pathway for converting non-recyclable polystyrene into high-value carbon materials. The technology addresses one of the most persistent plastic waste streams by

transforming it into usable carbon products, thereby:

- Reducing landfill dependency
- Minimizing environmental leakage

The session highlighted the potential of advanced material recovery

solutions in:

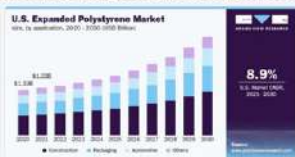
- Supporting circular economy objectives
- Reducing emissions from waste disposal
- Creating economic value from problematic plastics

COMMENTS:

- There are serious concerns regarding access to non-recyclable polystyrene. The company could not showcase a well-thought-out strategy for acquiring material from landfills. The company needs to provide a more complete solution to be considered for further evaluation going forward.
- Technologies like this could produce pure graphite as a potential end-product. However, this technology is still at laboratory scale using virgin polystyrene, so there is a need to scale up the technology to use waste polystyrene.
- The aggregation and separation of feedstock were completely missing in the discussion, as were details on the technology solution itself. The focus was primarily on financial estimates for fundraising, which lack basis given the feedstock issue. The Technology Readiness Level (TRL) seems to be low.

Carbon Market Tension vs. Ubiquitous EPS

Growing Usage of EPS (Styrofoam)

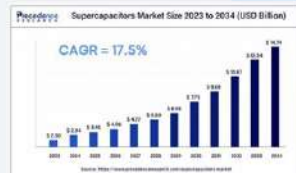
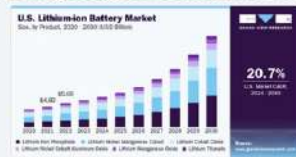


POOR RECYCLING
<1%



SATURATES SIGNIFICANT VOLUME OF LANDFILL (~30%)

Growing Usage of Carbon Products



USA = Largest importer

Challenges or opportunities ?

Innovative Conversion Technology

LOW VALUE FEEDSTOCK



Post-consumer EPS

PROPRIETARY PROCESS



Chemical & Thermal Treatment

HIGH-VALUE CARBON MATERIALS



PROFITABLE

Products and Traction

Eco Carbon's Products

Carbon Molecular Sieves

• Market = 0.8 - 1.4 B

• CAGR = 5.4%

Synthetic Graphite

• Market = 9.4 - 12.7 B

• CAGR = 5.4%



Activated Carbons

• Market = 3.8 - 5.4 B

• CAGR = 4.2%

Traction to Date

- ✓ Prototypes **Ready/MVP** achieved
- ✓ 2 US Non-Provisional Patents **Submitted**
- ✓ 2 International Patent (PCT) **Submitted**
- ✓ **Indian Patent** in Process
- ✓ Key Applications **Tested**

Ready for Scale-Up

Business Opportunities

Applications



Potential Customers

Market Tension



SUPPLY CHAIN ISSUE:

- Supercapacitor-grade carbon/graphite: Limited supply
- USA = largest importer in the world



PERFORMANCE ISSUE:

- Lack of high-performance carbons

1 LOI received

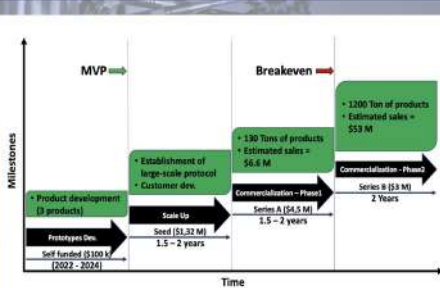
Go-to-Market (GTM) Strategy



Proforma Income Statement

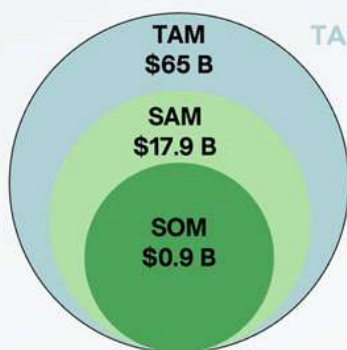
	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7
Total Revenues		\$11,831	\$1,207,230	\$5,375,080	\$15,449,700	\$17,741,100	\$65,833,150
Cost of Goods Sold (COGS)			\$742,442	\$2,345,520	\$6,646,678	\$15,737,643	\$27,359,744
Gross Profit			\$464,788	\$5,029,560	\$8,803,022	\$22,003,457	\$38,473,406
Gross Margin			39%	56%	57%	58%	58%
Total Operating Expenses	\$92,108	\$189,746	\$590,954	\$657,000	\$712,250	\$739,000	\$899,750
EBITDA	(\$92,108)	(\$189,746)	(\$590,959)	(\$192,146)	\$2,317,315	\$8,064,082	\$21,124,107
EBITDA Margin			(16%)	43%	52%	56%	57%

Milestones



Market Opportunity

Beachhead Market



Business Model



12

SESSION C-II

Date : 10 December 2025



Devendra Phonia

Organisation: BioPetroClean

Topic: Modular Automation and Digitisation for Wastewater Treatment Plants (STP, ETP, CETP)

SUMMARY:

This presentation focused on the automation and digital optimisation of wastewater treatment infrastructure.

BioPetroClean showcased modular systems designed to enhance:

- Operational efficiency
- Real-time monitoring
- Process control across STPs

(Sewage Treatment Plants), ETPs (Effluent Treatment Plants), and CETPs (Common Effluent Treatment Plants).

The goal is to:

- Reduce human error
- Improve regulatory compliance
- Lower operational costs

- Enable data-driven decision-making for plant operators.

The presentation emphasized how digitisation can significantly improve:

- Treatment reliability
- Scalability in both urban and industrial wastewater systems

COMMENTS:

- The panel recommend that they showcase their solution in a municipal sewage plant environment. This would give a clearer understanding of how the system performs in a real-world, large-scale setting.
- However, sensors might require frequent recalibration, which needs to be addressed before such automation can succeed under field conditions.
- It would be good to see the outcome of the IOCL Panipat project in more detail. It would also help to drill down further into the technology itself. Otherwise, the concept seems promising and should be investigated further.

Transformation into Predictive Operations

- Current Challenge
 - STP's/ETP's rely on end-of-pipe OEMS sensors (TSS, COD, pH) that detect issues only after failure.
 - There is nothing you can do if now you know that 5-10-100-200 MLD wastewater is off-spec.
 - Leads to poor treatment, regulatory penalties, and inefficient operations.

AI keeps the boiler running lean — maximizing energy, minimizing water and chemical loss.

BPC's solution

- A centralized Smart Sampling & Automation Skid providing real-time, multi-stage monitoring and predictive control.
- Sampling Architecture (4 Locations)
 - Equalization Tank – TDS, Turbidity/TSS, TOC
 - Primary Clarifier Outlet – Turbidity/TSS, TOC
 - Biological Stage Effluent – Turbidity/TSS, TOC
 - Final Treated Water – Turbidity/TSS, COD, TOC, TDS, Residual Chlorine (if required)
- Sampling System Design
 - Dedicated pumps at each point feeding a central sample tank in controlled environment
 - Integrated TSS/Turbidity & TDS sensors; TOC analyzer draws from tank
 - Automated purge/wash cycles eliminate cross-contamination.

Key Advantages

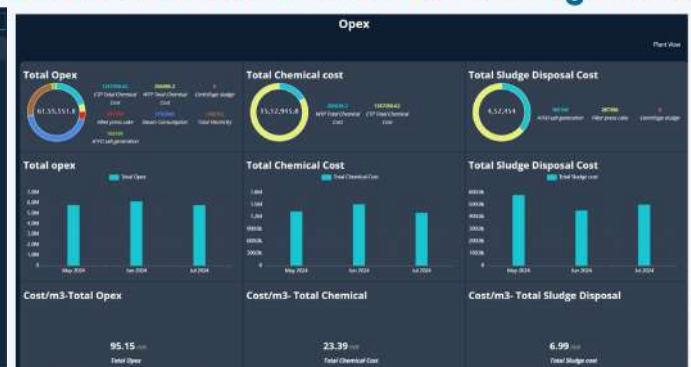
Key Advantages Over Conventional Monitoring

- Multi-stage predictive monitoring instead of reactive outlet-only sensing
- Centralized sensors reduce instrumentation cost by ~75%
- AC-controlled analyser environment improves sensor life & reliability
- Enables digital visibility from influent to treated water
- Reduces manual sampling and operator dependency
- Easy to implement, easy to maintain, off the shelf components, made for large organizations.

AI Driven Water Wastewater Management



AI Driven Water Wastewater Management



BPC's solution

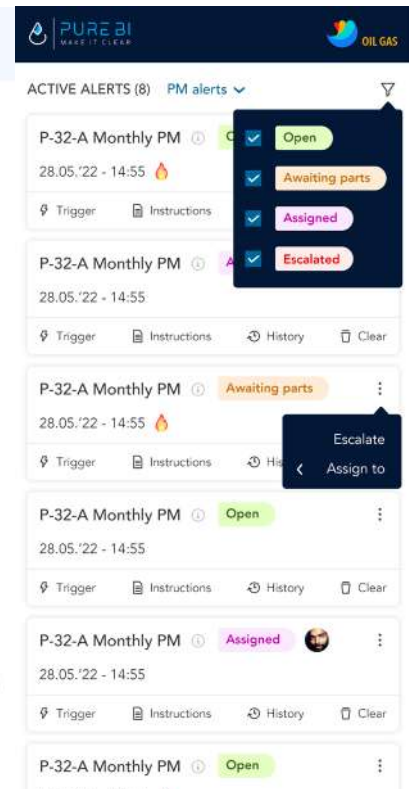


Sampling Points

1. Equalization Tank Outlet
2. Pre-Treatment Outlet
3. Biological Treatment Outlet
4. Disinfection outlet/final outlet.



BPC's Sampling & Monitoring Skid



SESSION C-II

Date : 10 December 2025



Dr N Raghuram

Organisation: Indraprastha University

Topic: Nutrient Recovery and Recycling from Wastewater for Fertilizers, Energy, and Metals

SUMMARY:

This presentation focused on the resource recovery potential of wastewater, exploring technologies that can extract nutrients, energy, and metals. The speaker emphasized viewing wastewater as a valuable

resource rather than a waste product.

Key points included:

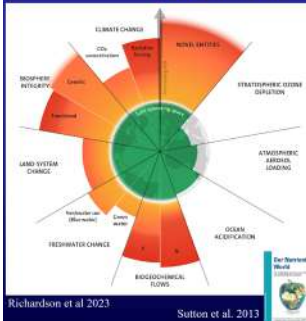
- Nutrient recycling to support soil rejuvenation
- Reducing synthetic fertilizer dependence
- Enhancing sustainability.

The presentation strongly aligned with circular economy principles and underscored the importance of scientific innovation in transforming wastewater management into a multi-benefit system that contributes to both environmental and economic goals.

COMMENTS:

- The problem area was clearly identified, but the technology proposed was not fully showcased or explained in detail. The company needs to provide more details about the technology and its mechanisms before it can be considered further.
- The real challenge is how to take this technology to field application. Scaling up from concept to practice remains a significant hurdle.
- Promising technology, but more details are needed on the pilot projects, particularly the scope of the projects being developed in Europe, and the cost base involved.

Nutrients are at the heart of the triple planetary crisis of pollution, biodiversity & climate change



- Nutrients sustain life on earth as key constituents in all life forms
- As fertilizers, they feed the world, but unused nutrients pollute
- Nutrient pollution of air/water/soil affects health, biodiversity, climate
- Some pollutants are nutrients in the wrong place and cost us twice!
- Most N inputs pollute air as NH₃, N₂O (a GHG) & NO_x from fuels
- Nitrates, phosphates, sulfates etc. pollute water, cause eutrophication
- They adversely impact sustainability, ecosystem services, livelihoods
- Less than half the wastewater generated is in urban areas with STPs
- 40% of our fertilizers can be replaced with nutrients from wastewater
- Recovery & reuse of nutrients important for sustainable development
- Nutrients can be recycled from both solid and liquid wastes
- Manure recycling is <25%, others negligible- urine, solid/liquid wastes

Richardson et al 2023
Sutton et al. 2013

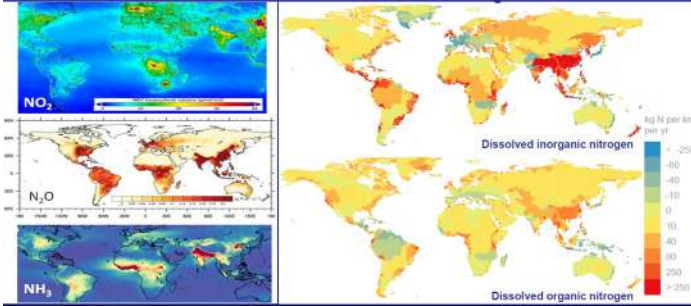
SUSTAINABLE DEVELOPMENT GOALS

Core SDG targets on sustainable nutrient management

- Target 2.4 – sustainable food production
- Target 6.3 – good ambient water quality
- Target 14.1 – reduced nutrient pollution in the marine environment

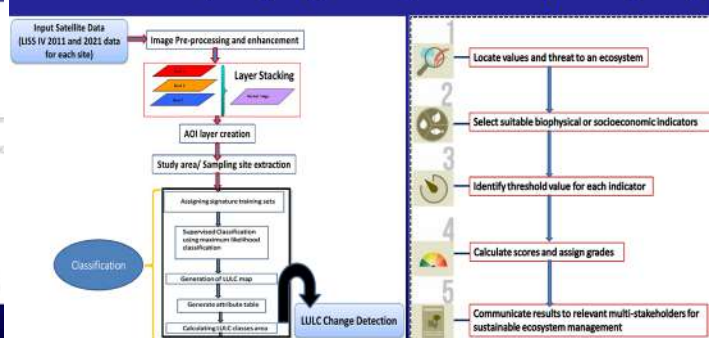


India is among the global hotspots for nitrogenous pollution in air and water

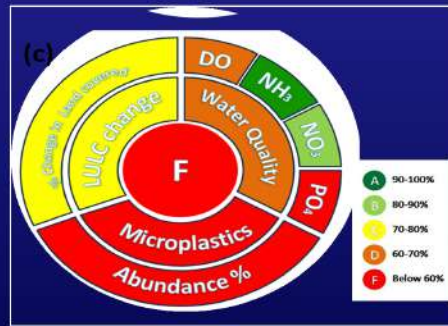
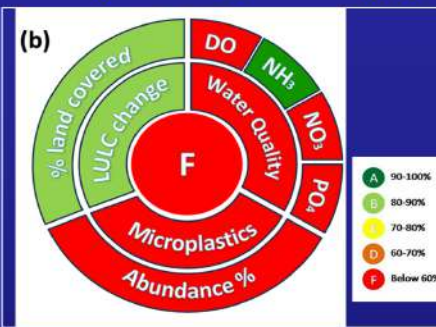


Recent global maps of nitrogen dioxide, a major constituent of NO_x (Stephen Porter, ESA2019) soil N₂O emissions in the recent decade 2007-2016 (Tian et al. 2019) and ammonia emissions (Van Damme et al. 2018). Colour intensities towards red indicate high emissions

Land Use/Land Cover (LULC) Analysis & Ecosystem Health Report Card (EHRC)



Ecosystem Health Report Card (EHRC) of Sanjay Lake



Ecosystem Health Report Card of Sanjay Lake

(a) EHRC of 2022 from UNEP SSFA 1 Report, (b) EHRC of 2023 and (c) EHRC of 2024





SESSION C-III

Date : 10 December 2025



Rohit Vedhara

Organisation: Equil

Topic: Seaweed to Biofuel: A Sustainable Energy Pathway

SUMMARY:

This presentation explored the potential of seaweed-based biofuels as a renewable energy solution. Seaweed was emphasized as a fast-growing biomass that does not compete with food crops or freshwater resources.

Key discussion points included:

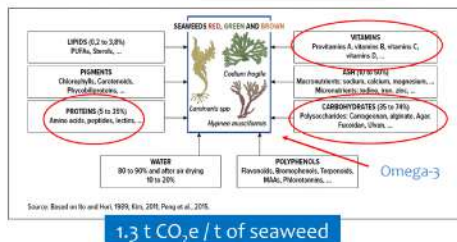
- Conversion pathways for producing biofuels from seaweed
- Scalability prospects for large-scale implementation
- Environmental benefits of using seaweed for biofuel production

The presentation positioned seaweed biofuel as a promising component of India's broader clean energy and blue economy strategies, with the potential to contribute to both sustainable energy and environmental goals.

COMMENTS:

- This technology can be taken forward for ETV. The potential of seaweed as a biofuel source aligns well with renewable energy and sustainability goals, making it a strong candidate for further evaluation.
- Even seaweed could be grown using shrimp farm wastewater, and the treated effluent from this process could potentially be reused for shrimp production.
- This could create a valuable symbiotic relationship between the biofuel production and aquaculture industries.

1 - A highly underplayed regenerative solution:



A fast-growing plant with amazing properties
 More carbon impact/acre than forests with 3-4x higher photosynthetic efficiency
 Low environmental impact. Removal of excess nutrients and all carbonates (alkalinization)
 10,000 varied species. Requires expertise to optimise seed and growth. More valuable than wood and crops

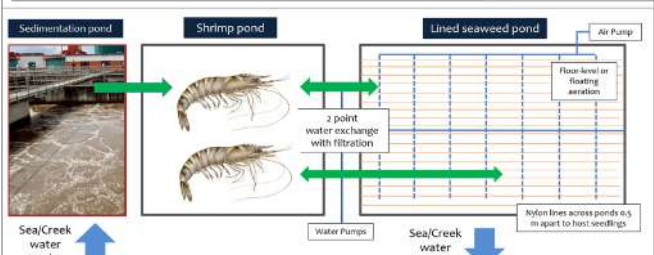
2 - Shrimp 2025 – 15% of India's aquaculture:

- 100 k farms. Average stocking density 10% of Indonesia. 1 MT output needs 1.3 MT of feed
- 95% exports (\$ 5.5 bn and > 75% of all fish exports)
- AP dominates - cheap power, larvae and feed
- Vannam is 65% of land (190 k ha) and 90% of output
- Local associations = key influencers
- CAA/MPEDA regulates activity and complies with overseas regulators but reputation on HSE is mixed.
- PMMSY Scheme to strengthen industry. FIDF to lend in support of infra upgrades



Margins significantly reduced due to global oversupply and lack of competitiveness, leading to '000s of abandoned farms

3 – IMTA solves SPW:



- IMTA – Integrated multitrophic aquaculture. SPW + excess nutrients are filtered and flow into seaweed ponds where nutrients, carbonates and trace minerals absorbed within c. 14 days
- Aeration improve growth. Seaweed typically tied to nylon lines, but can be free-floating
- HDPE lining reduces uptake of mud and allows older ponds to be used

IMTA in South Africa – Viking Aquaculture:



450 t/a of abalone and 600 t/a Ulva. One of the first large commercial farms in South Africa to recirculate 50 % of seawater by making use of the bioremediation capacity of Ulva. 7 modular abalone-Ulva IMTA systems which are each composed of four clusters. Each consists of one D-ended Ulva paddle-raceway and 42 abalone raceway tanks. Strong bio-security design features ensure continuous operation

Equil impact for an Intensive shrimp farmer:

Rental / Fees	Cleaner System	Lining	Physical	Reduced Feed Cost	Net Benefit / acre / yr for Intensive shrimp farmers
Equil provides rental in cases where only seaweed is grown Where co-cultivating with shrimp, a formula can be derived which rewards for incoming nutrients	Higher productivity via faster growth / lower mortality. More reliable output Assume a 10% increase in productivity	Assuming INR 135/m ² , lining (min 0.75 mm and 750 GSM) can be amortised over a 10-year life	Costs can be shared for at least 2 operators/acre	Seaweed Residue used to reduce input of commercial feed (expected health benefits)	

Demonstrations – the first four locations:

- West Bengal – Significant opportunity across Sundarbans and towards Odisha
- Andhra Pradesh – Nellore and Kaval – high density of shrimp farms
- Palk Strait area, Tamil Nadu to grow *Kappaphycus* / *Gracilaria* within reach of CSMCRI and CMFRI
- Navsari, Gujarat, to grow *Kappaphycus*, *Gracilaria* and *Ulva* alongside creek-based shrimp farms

Reverse from trials and subsequent support from local stakeholders can potentially fund additional trials, designed to increase data and socialize future impact

Target species:

Species	India ex-Farm Price (dry \$/t) 2025	Target market for the trials	Long-term value driver	WB / Odisha	Gujarat	TN	AP
<i>Gracilaria (Edulis and Salonica)</i>	400 - 500	Bio-stimulants	Alginate / Agar (a hydrocolloid)	Occasional	Possible	Possible	Southern AP
<i>Ulva</i>	700 – 1,800	Food grade for low metals. Packaging for higher metals	Biofuels	More likely	Possible	Possible	Preferable for lower salinity
<i>Kappaphycus Alvarezii (eucheumatoid)</i>	1,000 - 1,200	Bio-stimulants	Carrageenan (a polysaccharide)	Occasional	Preferable	Preferable	Southern AP

Removal Percentages at Regen Aqua



Race 1 = 5 days, Race 2 – 7 days and Race 3 = 14 days

SESSION C-III

Date : 10 December 2025



Virtual Presentation by: Oliver

Organisation: Rootzone

Topic: Lake and Pond Rejuvenation Solutions

SUMMARY:

This presentation focused on nature-based and engineered solutions for rejuvenating urban lakes and ponds. Rootzone's approach integrates:

- Ecological restoration with water quality improvement
- Targeting key issues like nutrient overload, eutrophication, and stagnant water bodies

The presentation highlighted the importance of long-term sustainability, ecosystem health, and the system's adaptability to diverse urban contexts. The approach is particularly relevant for cities seeking low-impact, scalable water-body restoration strategies.

COMMENTS:

- The technology was not explained in detail during the session. More information about the specifics of the technology and how it functions is needed to better assess its viability.
- Scaling up this system requires in-depth investigation to determine its effectiveness across different environments and scales.
- It is worth considering in more detail. A follow-up call would help to better understand the challenges, where the technology works and where it doesn't work, as well as any potential limitations.

BIO INNOVATIVE SOLUTIONS



WASTEWATER



ORGANIC WASTE



AIR TREATMENT



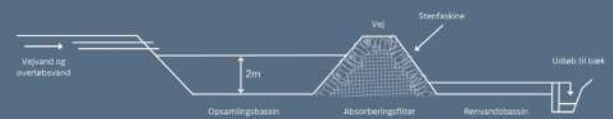
NATURAL COOLING



URBAN ECOLOGY

Karlebro Absorberingsfilteranlæg

Principskitse



Transform
DANISH
ETA
DANMARK

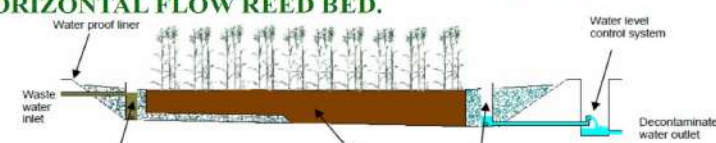
Transform of 2004 ApS,
Danish Biozone Technology / MACSS
ApS

WATER TREATMENT USING ROOTZONE TECH.

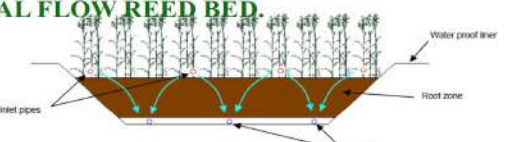
- Color reduction
- Oily smell reduced
- Oil in water reduced with 91%
- BOD5 reduced with 97%
- Heavy metals in outlet are reduced: Pb with 72%, Cu with 97% and Zn with 98%
- BTEX below detection level in outlet
- Phenols below detection level in outlet
- PAH mostly under detection and up to 10time under legal required level in outlet

CIRCULAR ECONOMY, REUSE, RECYCLING

DIAGRAMMATIC CROSS SECTION THROUGH A HORIZONTAL FLOW REED BED.



DIAGRAMMATIC CROSS SECTION THROUGH A VERTICAL FLOW REED BED.




Treatment of Exploration Waste Water.

Site: KELT, Trinidad, Colombia
 Size: 2,700 m², load: 600-1,200 m³ per day
 System: Horizontal * vertical rootzone filter
 Startup phase: Until Mid-September 1995



**Storm and lake water treatment
Utherslev, Denmark**

Size and form:

- The pond is circular
- Diameter: 90 m
- Area: 6300 m²
- Volume: 4500 m³ water
- The bottom material: 2 m of subsoil/gravel/river stones

KASESE-UGANDA



OMAN



KYAKKA II-UGANDA



KAMPALA-UGANDA



PROPOSED SYSTEM FOR ESTATES



KCCA-UGANDA



SESSION C-III

Date : 10 December 2025



Virtual Presentation by: Søren Overgaard Knudsen

Organisation: Mash Makes

Topic: Biochar as a Waste-to-Value Climate Solution

SUMMARY:

This presentation focused on biochar production from waste biomass as a scalable solution for:

- Waste management
- Carbon sequestration
- Soil improvement

The presenter emphasized biochar's ability to lock carbon into a stable

solid form, delivering long-term climate benefits. Additionally, biochar enhances soil fertility and water retention, offering multiple environmental benefits. The presentation also discussed biochar's role in the circular economy, converting organic waste streams into high-value, climate-positive products.

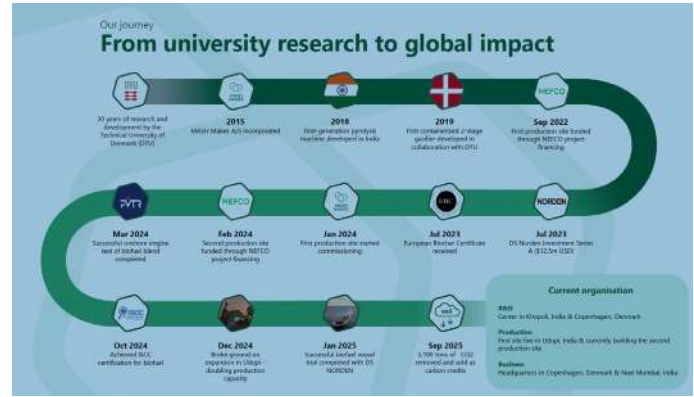
Key applications highlighted:

- Agriculture
- Soil rejuvenation
- Emissions reduction

Biochar was positioned as particularly relevant for urban and peri-urban waste management systems, especially under the CITIS framework.

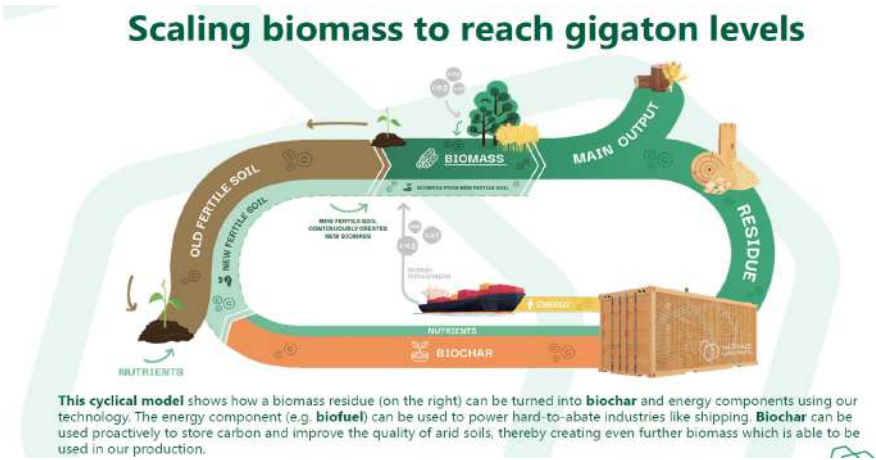
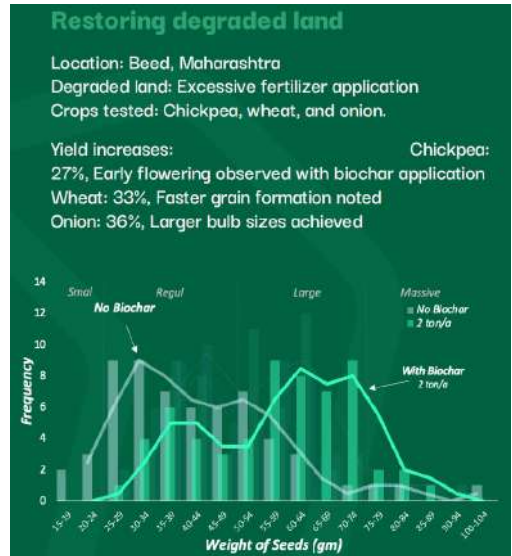
COMMENTS:

- The technology itself was not showcased. The presentation primarily focused on operations and the financial opportunity of biochar production, but more detailed information on the technology behind the process is needed to assess its full potential.
- While biochar's ability to improve soil is promising, further investigation is needed into how biochar specifically helps with soil improvement and the underlying mechanisms involved.



Our technology From waste to renewable resources

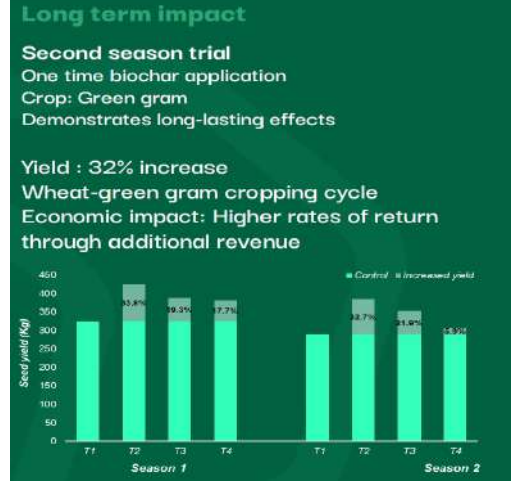
- Transforming waste:** Utilising agricultural residues to produce renewable biofuel, biochar and CDR credits
- Gigatonne potential:** Our technology has the potential to achieve gigaton level impact on GHG before 2040. A monumental task that requires technological & operational excellence and scalable solutions.
- Scalable solutions:** MASH Makes' proprietary technology enables us to develop our core business by expanding operations in India and entering new geographical regions. We will leverage our strengths, knowledge, and easily (re-)deployable pyrolysis technology to commission and operate production plants in both familiar and complex new markets paving the way for MASH Makes' gigaton potential.
- Environmental impact:** Reducing waste, lowering carbon emissions, and contributing to a circular economy.



Biochar benefits

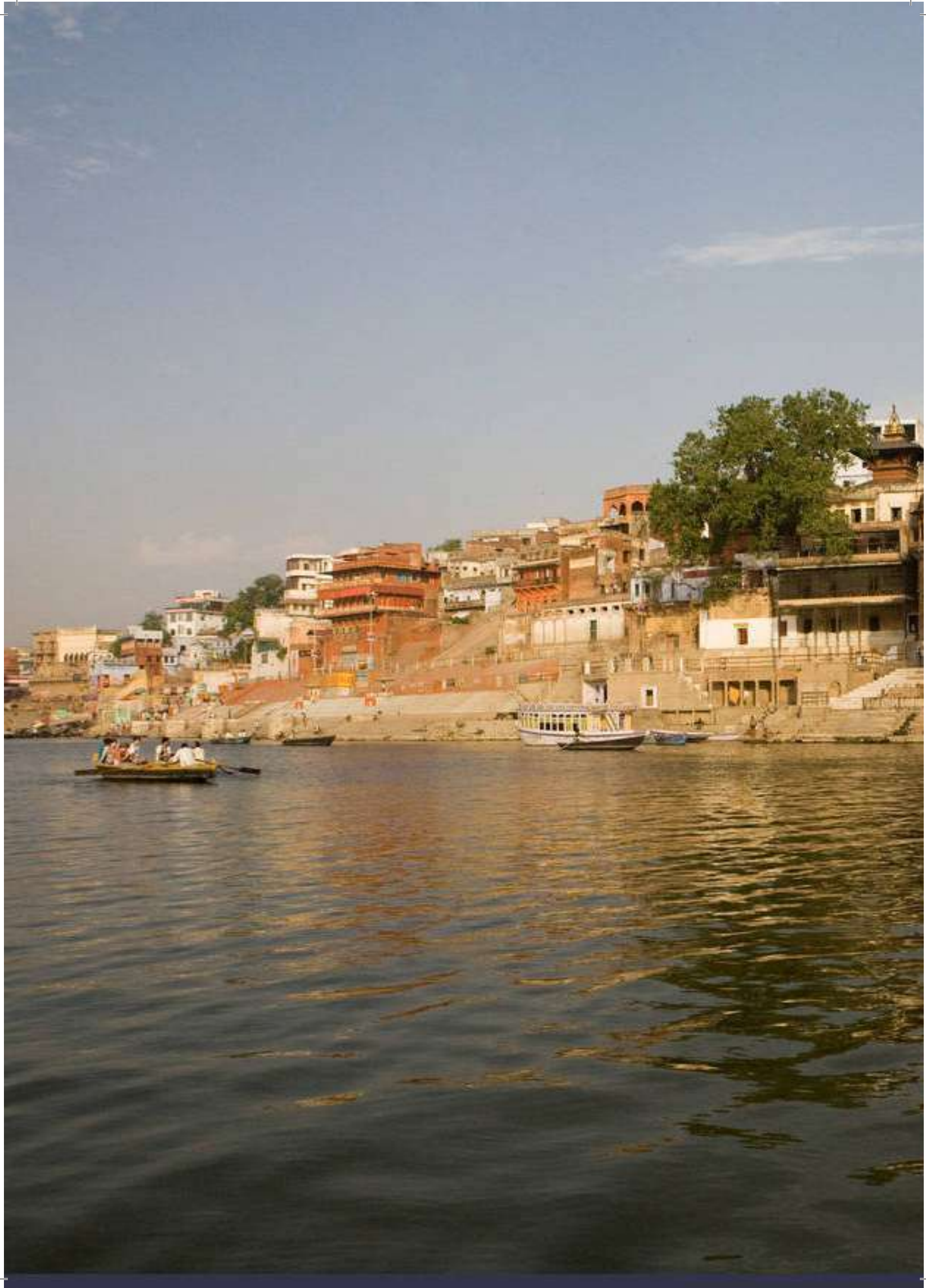
Biochar is a carbon-rich substance created by pyrolyzing biomass in oxygen free conditions

- Improves soil health
- Boosts crop yields
- Enhances microbial activity
- Carbon sequestration
- Reduces fertilizer needs
- Promotes soil fertility











CLIMATE INVESTMENT AND TECHNOLOGY IMPACT SUMMIT (CITIS)

CITIS Plenary Session

3rd Climate Investment and Technology Impact Summit (CITIS)

Theme : **Grounding Climate Investment and Technology Innovation at District Level in India**

Date : 11 December 2025

Time : 6:00–17:00 h

Venue : Auditorium, FITT, IIT Delhi

Moderator : **Dr Vinod Tare** (Founder and Advisor, cGanga, IIT Kanpur)
Mr Sanmit Ahuja (Founding Director, Climate and Energy Transition Finance Initiative (CETFI) and MD & CEO, Bharatia)
Mr Subhash Kumar (Former Chairman, ONGC)
H.E. Mr Benedikt Höskuldsson (Ambassador of Iceland to India)
Mr Sunil Dattatray Tatkare (Member of Parliament - Loksabha)
H.E. Mr Tomaž Mencin (Ambassador of the Republic of Slovenia to India)

The CITIS Plenary Session marked the formal opening of the 3rd Climate Investment and Technology Impact Summit, held alongside the 10th India Water Impact Summit (IWIS). The session set the strategic direction for CITIS by clearly articulating its role as the technology and investment arm complementing IWIS's science and policy foundations, with a strong emphasis on district-level deployment, commercial scalability, and global partnerships.

POSITIONING OF CITIS WITHIN THE IWIS ECOSYSTEM

Opening the session, Mr Sanmit Ahuja contextualised CITIS as an outcome of a decade-long evolution of IWIS. While

IWIS continues to serve as a national and global platform for river science, policy, and governance, CITIS was carved out to specifically address the commercialisation, financing, and deployment of climate-relevant technologies. Together, the two summits represent a unified continuum—from diagnostics and policy frameworks to investable, implementable solutions.

Mr Ahuja highlighted the institutional foundation of these efforts in cGanga, headquartered at IIT Kanpur which functions as the Government of India's leading think tank, innovation agency, and master planner for river basin management. He noted that the cGanga model has now been



extended to other major river systems across the country, reflecting a deliberate national strategy to institutionalise basin-scale science and planning.

The overarching theme of the plenary was articulated as the translation of leadership, science, and policy into ground-level solutions, drawing directly from the Hon'ble Prime Minister's vision of Arth Ganga. Arth Ganga was framed not merely as an economic concept, but as a means of transforming the essence of rivers into sustainable livelihood systems, thereby aligning ecological regeneration with economic value creation.

ENERGY TRANSITION, INVESTMENT SCALE, AND INDIA'S GLOBAL ROLE

In his opening remarks, Mr Subhash Kumar, former Chairman of ONGC, situated the discussions within the larger context of India's energy transition and growth trajectory. He emphasised India's unique position as both a densely populated and rapidly growing economy, making it an ideal testing ground for new technologies that must operate at scale.

Mr Kumar distinguished India's pathway from that of developed economies by characterising it as one of "energy addition and transition" rather than simple replacement of

legacy systems. With India aspiring to grow into a USD 25 trillion economy by 2047, he underscored the inevitability of a massive increase in energy demand—even after accounting for efficiency gains. This reality, he argued, positions India as a global laboratory for clean energy, water–energy integration, and climate technologies, where successful solutions can be rapidly scaled.

He particularly appreciated the CITIS approach of viewing water, energy, technology, and investment as an integrated ecosystem, rather than as isolated sectors. This integrated framing, he noted, is essential for creating viable business models that simultaneously address environmental challenges and economic growth.

ARTH GANGA, SAMARTH GANGA, AND THE RIVER-SOIL-ECONOMY NEXUS

Setting the conceptual anchor for the plenary, Dr Vinod Tare elaborated on the Samarth Ganga framework, which seeks to restore the inherent capability of river systems to perform their ecological, hydrological, and societal functions. He linked this framework explicitly to Arth Ganga, describing Arth as both the essence of the river and the economy derived from it.

Dr Tare articulated a trinity underpinning India's approach:





ancient traditions, spirituality, and modern science and technology. He emphasised that sustainable development requires not just innovation, but relearning how to align human systems with natural processes.

A central theme of his remarks was the inseparable relationship between soil and rivers. He noted that many riverine problems originate in degraded soils and unsustainable agricultural practices, while river degradation, in turn, undermines soil health. By closing loops between water, nutrients, biomass, and soil at appropriate scales, environmental challenges—such as eutrophication—can be transformed into economic opportunities, particularly through resource recovery and biomass-based livelihoods.

He recalled the Prime Minister’s challenge that effective implementation of Arth Ganga could contribute at least an additional 3% to national GDP growth, reinforcing the economic significance of river rejuvenation when approached systemically.

INTERNATIONAL PERSPECTIVES: ICELAND AND SLOVENIA

The plenary featured strong international engagement, reinforcing CITIS as a global platform grounded in district-level action.

The Ambassador of Iceland highlighted the convergence between Iceland’s development philosophy and the Arth Ganga approach. Drawing from Iceland’s experience in

geothermal energy, sustainable fisheries, circular economy, and soil restoration, he demonstrated how environmental stewardship can directly enhance economic prosperity.

He presented geothermal energy not merely as a clean power source, but as a platform technology that enables greenhouses, aquaculture, food processing, and biogas systems. He outlined clear opportunities for India—ranging from energy security in high-altitude regions to low-cost heat for agri-processing—and stressed that the technologies are already proven. The key challenge, he noted, lies in building investment bridges from first-of-a-kind demonstrations to widespread deployment, precisely the gap that CITIS seeks to address.

The Ambassador of Slovenia placed water at the centre of Slovenia’s domestic and foreign policy, introducing the concept of Water Diplomacy. He highlighted Slovenia’s constitutional recognition of access to drinking water as a fundamental human right, managed as a public good rather than a market commodity.

He emphasised Slovenia’s long-standing collaboration with India through science, satellite-based water monitoring, and river basin management, particularly through the Slovenia–India Regional Hub (SITE/SITA Network). Projects such as Ganga-SAT and the Global Command Centre at IIT Kanpur were cited as globally relevant models that India can export to other regions.







Looking ahead, he identified opportunities in precision agriculture, flood management, nature-based solutions, and satellite-enabled decision support, while also highlighting the strong people-to-people linkages formed through decades of academic exchange.

POLICY LEADERSHIP AND DISTRICT-CENTRIC IMPLEMENTATION

The plenary reached its policy apex with the address by Hon'ble Member of Parliament Shri Sunil Tatkare, Chairperson of the Standing Committee on Petroleum and Natural Gas. Despite ongoing parliamentary proceedings, his participation was presented as a strong endorsement of the summit's relevance to India's long-term development trajectory.

Shri Tatkare reviewed the progress under Namami Gange and the National River Conservation Plan, highlighting the scale of investment, the diversification of interventions beyond sewage infrastructure, and measurable ecological outcomes such as the revival of the Ganga dolphin population. He emphasised that rivers are not only ecological assets but also economic lifelines, underpinning agriculture, fisheries, navigation, renewable energy, and emerging industrial systems.

He strongly reinforced the district as the core unit of implementation under the Arth Ganga framework, noting that rivers are "made or unmade locally." Citing examples such as district-level water budgeting and remote-sensing-based monitoring, he argued that cumulative local actions can generate basin-scale benefits.

Shri Tatkare elaborated on the economic instruments embedded in Arth Ganga—water reuse, sludge valorisation, soil restoration, and bioenergy—supported by innovative

financing mechanisms such as impact bonds, pooled vehicles, guarantees, and insurance instruments. He stressed that Arth Ganga is not a charity model but a self-sustaining economic framework.

Equally, he emphasised governance and people-centricity, highlighting Jan Ganga as a critical pillar. Community participation, transparency, grievance redressal, and the integration of modern science with local wisdom were identified as essential for durable outcomes.

CLOSING REFLECTIONS AND WAY FORWARD

In concluding the plenary, Mr Sanmit Ahuja reiterated that CITIS functions as a bridge between innovation and implementation, connecting global technology providers, investors, and policymakers with India's district-level needs. He emphasised that partnerships with countries such as Iceland and Slovenia extend beyond bilateral cooperation, opening corridors to other developed and developing regions.

The session concluded with an outline of the forthcoming technical tracks, reinforcing the summit's intent to move rapidly from strategic dialogue to technical depth and project structuring.

OVERALL SIGNIFICANCE OF THE CITIS PLENARY

The CITIS Plenary Session established:

- Arth Ganga as a unifying economic–ecological framework.
- Districts as the primary locus for implementation.
- Technology verification, investment structuring, and global partnerships as essential enablers; and
- CITIS as a platform that converts climate ambition into deployable, investable, and scalable solutions.

CITIS SESSION I

Session Title : **Managing Wastewater: From Treatment to Value Creation**

Date : 9 December 2025

Time : 10:00–13:00 h

Venue : Board Room, FITT, IIT Delhi

Moderator : **Mr Sanmit Ahuja** (Founding Director, Climate and Energy Transition Finance Initiative (CETFI) and MD & CEO, Bharatia)

Panelist

Mr Abijith, Barthur (Director, Scogen)

Mr Rajeev, Pandey (Office Manager, IRMRI)

Ms Lise, Leblanc (President, CEO & Founder, LP Consulting)

Mr Diptes Basu (Partner, Innicca Capital)

Mr Abhinav Johari (Founder & CEO, ELEVATES)

Mr Rajneesh Mehra (CEO, Ingeo)

Mr Mudit Jain (Head, Strategy & Climate Partnerships, Tata Capital)

Mr Ajit Salvi (Director, RCUES)

Mr Kevin Andrews (President & CEO, CFI International)

Mr Rob Sampson (Managing Director, Ceres Biosystems)

Mr Kartikey Chaturvedi (Programme Associate,

Council on Energy Environment and Water (CEEW))

Ms Saumya D Tewari (Director, Ewisdomsphere Pvt. Ltd.)

Mr Kamran Hasan (DGM, Sales and Marketing, Bioxgreen Technology Pvt. Ltd.)

Mr Bhushan, Salunkhe (Managing Director, Abhiraj Infra solutions India Pvt. Ltd.)

Mr Kumar PK Senthil (Vice President, Sales & Execution, Bioxcent Sludge Solutions Pvt. Ltd.)

Mr Salahuddin Saiphy (Principal, Lead-Water Management, SM Sehgal Foundation)

Dr Indra Mitra (Director (Technical), Cambi, India)

Dr Vijaya Lakshmi Koneru (Chief Advisor (Former VP), Development Alternatives)

Miss Pallavi Sharma (Volunteer/Consultant Independent)

Mr Anil Pillai (Chief Technology Officer (CTO), Bioxgreen Technology Pvt. Ltd.)

Mr Gautam Patankar (Manager, Auric Techno Services Pvt. Ltd.)

Mr Kumar Chandan (Sr. Sustainability Lead IDP Education)

Mr Tony Davies (CEO, Bio2Pure)

Mr Meetpal Singh (Director, Sustainacore)

Mr Rishu Garg (Executive Director, Council for Sustainability Development Environment Livelihood (CSDEL))

Ms Piyusha Tiwari (Co- Founder and Director, CSDEL)

Mr MG Patankar (MD, Auric Techno Services Pvt. Ltd.)

Mr Kunal Patankar (Director, Auric Techno Services Pvt. Ltd.)

Mr Manu Bansal (GM, Ingeo)

This session focused on re-conceptualising wastewater not as a liability requiring disposal, but as a strategic resource with economic, environmental, and climate value. The session was framed around the central question of how policy, technology, and finance can converge to enable large-scale wastewater reuse, while addressing long-standing institutional and market barriers.

SESSION FRAMING AND CORE PREMISE

In his opening remarks, Mr Sanmit Ahuja emphasised the need to establish the intrinsic value of water, distinct from its cost or tariff. He argued that India lacks a national benchmark for the value of water, which in turn weakens incentives for wastewater treatment and reuse. He proposed a tiered valuation framework that reflects regional water stress, thereby enabling differentiated pricing, cross-subsidisation, and the creation of local and area-specific water markets.

A key institutional proposition advanced during the session was the idea of a national or sectoral off taker for treated wastewater, analogous to arrangements in the renewable energy sector. Such an off taker, it was argued, could insulate investors and lenders from market and payment risks, thereby unlocking private capital for decentralised and distributed wastewater infrastructure.

INFRASTRUCTURE GAPS AND URBAN REALITIES

Drawing from extensive municipal experience, Dr Ajit Salvi highlighted that the most critical bottleneck in wastewater management is incomplete sewage collection, over and above choice of technology for STPs and their performance. Using large metropolitan examples, he noted that a significant fraction of urban wastewater never reaches treatment plants due to informal settlements and missing network infrastructure. This “uncollected sewage” ultimately flows into drains and rivers, eliminating any possibility of treatment or reuse.

Dr Salvi emphasised that centralised sewerage systems alone cannot address this gap, and that decentralised and hybrid solutions must be systematically planned and implemented. He underscored the need for long-range sewage infrastructure planning, integrated with land-use realities, and cautioned against neglecting operation and maintenance, which directly affects the reliability and safety of treated wastewater reuse.

REUSE MARKETS, QUALITY ASSURANCE, AND ENFORCEMENT

Several interventions highlighted that despite regulatory provisions mandating reuse, actual demand for treated wastewater remains weak, largely due to trust deficits around



quality and the absence of enforceable reuse mandates. Experiences from metropolitan pilots showed that even where treated water is available, buyers remain reluctant in the absence of credible monitoring systems, especially for parameters relevant to human contact.

The session stressed the importance of decentralised, reliable water quality testing infrastructure, particularly for microbiological parameters. Without such systems, enforcement of reuse—especially in construction, industry, and urban landscaping—remains difficult.

DECENTRALISATION, AGGREGATION, AND FINANCING MODELS

Participants broadly agreed that decentralised wastewater treatment is indispensable for addressing the last 20–30% of urban sewage generation. However, concerns were raised regarding the financial viability of small projects under prevailing procurement models. In response, aggregation-based approaches were discussed, wherein multiple decentralised units are bundled under a single financial and operational framework to achieve scale, reduce transaction costs, and improve bankability.

KEY TAKEAWAYS

The session concluded with a consensus that wastewater management in India must shift from a compliance-driven paradigm to a value-driven framework, anchored in:

- clear valuation of water,
- decentralised yet aggregated infrastructure,
- enforceable reuse markets, and
- credible quality assurance systems.

CITIS Session I thus laid the foundation for treating wastewater as a core pillar of urban water security and climate resilience.







CITIS SESSION II

Session Title : **Sludge Management: Closing the Nutrient Loop**

Date : 10 December 2025

Time : 10:00–13:00 h

Venue : Board Room, FITT, IIT Delhi

Moderator : **Mr Sanmit Ahuja** (Founding Director, Climate and Energy Transition Finance Initiative (CETFI) and MD & CEO, Bharatia)

Panelist

Mr Arvind Sharma (Managing Director, Bioxgreen Technology Pvt. Ltd.)

Mr Tony Davies (CEO, Bio2Pure)

Ms Lise Leblanc (President, CEO & Founder, LP Consulting)

Mr. Rajneesh Mehra (CEO, Ingeo)

Mr Sanjay Kulkarni (City Engineer, Pimpri Chichward Municipal Corporation)

Mr Rob Sampson (Managing Director, Ceres Biosystems)

Mr Ajit Salvi (Director, RCUES)

Mr Kamran Hasan (DGM, Sales and Marketing, Bioxgreen Technology Pvt. Ltd.)

Mr Kumar PK Senthil (Vice President, Sales & Execution, Bioxcent Sludge Solutions Pvt. Ltd.)

Dr Nandula Raghuram (Professor and Head, Guru Gobind Singh Indraprastha University, Dwarka, New Delhi)

Dr Indra Mitra (Director (Technical), Cambi, India)

Dr Vijaya Lakshmi Koneru (Chief Advisor (Former VP), Development Alternatives)

Mr Makarand Patankar (Managing Director, Auric Techno Services Pvt. Ltd.)

Mr Anil Pillai (Chief Technology Officer (CTO), Bioxgreen Technology Pvt. Ltd.)

Mr Gautam Patankar (Manager, Auric Techno Services Pvt. Ltd.)

Dr Pawan Jha (Director, Marc India, New Delhi)

Mr Manu Bansal (Managing Director, Ingeo)

Mr Kunal Patankar (Director, Auric Techno Services Pvt. Ltd.)

Miss Pallavi Sharma (Consultant, TERI)

Mr Abhishek Sawhany (CFO, Bioxgreen Technology Pvt. Ltd.)

Mr Abijith, Barthur (Director, Scogen)

Dr PV Rao (Professor, NIT Warangal)

Dr Susmita Sharma (Asst. Professor, NIT Meghalaya)

Dr Debraj B. (Professor, IIT Hyderabad)

Dr AA Kazmi (Professor, IIT Roorkee)

Mr Bhushan Salunkhe (Managing Director, Abhiraj Infra Solutions India Pvt. Ltd.)



This addressed one of the most complex and under-resolved components of urban sanitation systems—sewage sludge—with a focus on its safe management, beneficial use, and role in soil and nutrient cycle restoration.

FRAMING THE CHALLENGE

In setting the context, Mr Sanmit Ahuja emphasised that sludge management is fundamentally a cross-sectoral challenge, cutting across water, agriculture, energy, urban development, and transport. He cautioned against inconsistent terminology and narratives, noting that imprecise use of terms such as “fertilizer” or “Class A product” often creates confusion and resistance among regulators and end users.

A central concern articulated during the session was that sludge pathways are frequently evaluated in isolation, without sufficient consideration of market acceptance, pricing, and institutional ownership.

SCIENTIFIC CHARACTERISATION AND INDIAN CONTEXT

Prof AA Kazmi presented findings from extensive assessments of sludge quality across Indian sewage treatment plants. He noted that a significant proportion of Indian sludge already



meets stringent international standards for heavy metals and stabilisation, largely due to climatic conditions, longer retention times, and digestion practices.

However, he highlighted that moisture content, logistics, and perception issues remain major constraints to utilisation. The session emphasised that scientific evidence must be clearly communicated to counter misinformation and to distinguish between sewage, industrial effluents use as well as use of STP sludge and sludge produced from STPs receiving mixture of sewage and industrial effluents, which are often incorrectly conflated.

TECHNOLOGY PATHWAYS AND TRADE-OFFS

Multiple post-treatment pathways were discussed, including composting, thermal drying, greenhouse drying, energy recovery, and use in construction materials. The discussion highlighted that each option involves distinct trade-offs between land requirement, energy input, operating cost, and product value.

Participants stressed the need for transparent, comparative techno-economic assessments, enabling policymakers and utilities to select context-appropriate solutions rather than defaulting to disposal-oriented approaches.

INTERNATIONAL EXPERIENCE AND RISK PERCEPTION

Drawing from international experience, Ms Lise LeBlanc underscored that the primary barriers to sludge reuse are often perceived risks rather than actual risks. She highlighted that metals, pathogens, and emerging contaminants must be addressed through science-based thresholds, comparative risk assessments, and continuous monitoring, rather than precautionary bans that undermine circular economy objectives.

The importance of farmer engagement, long-term field trials, and agronomic validation was repeatedly emphasised as essential for building confidence and acceptance.

KEY TAKEAWAYS

The session converged on the need to reposition sludge as a managed resource, supported by:

- uniform national standards and terminology,
- scientifically validated treatment pathways,
- cross-ministerial coordination, and
- market-oriented product definitions.

CITIS Session II reinforced sludge management as a strategic lever for soil health, fertilizer security, and circular economy transition.





CITIS SESSION III

Session Title : **Topsoil Rejuvenation and Soil Health**

Date : 10 December 2025

Time : 14:00–17:30 h

Venue : Board Room, FITT, IIT Delhi

Moderator : **Mr Sanmit Ahuja** (Founding Director, Climate and Energy Transition Finance Initiative (CETFI) and MD & CEO, Bharatia)

Panelist

Dr Pawan Jha (Director, Marc India, New Delhi)

Mr Arvind Sharma (Managing Director, Bioxgreen Technology Pvt. Ltd.)

Mr Rajneesh Mehra (CEO, Ingeo)

Mr Ajit Salvi (Director, RCUES)

Mr Sanjay Kulkarni (City Engineer, Pimpri Chichward Municipal Corporation)

Mr Rishu Garg (Executive Director, Council for Sustainability Development Environment Livelihood (CSEDL))

Mr Kumar PK Senthil (Vice President, Sales & Execution, Bioxcent Sludge Solutions Pvt. Ltd.)

Dr Indra Mitra (Director (Technical), Cambi, India)

Mr Ganesh Kulkarni (Director, Hindustan Agri Business Pvt. Ltd.)

Mr Sunny Vaish (CEO, Prithu-Earth)

Mr Manu Bansal (Managing Director, Ingeo)

Mr Makarand Patankar (Managing Director, Auric Techno Services Pvt. Ltd.)

Mr Gautam Patankar (Manager, Auric Techno Services Pvt. Ltd.)

Mr Kunal Patankar (Director, Auric Techno Services Pvt. Ltd.)

Mr Abhishek Sawhany (CFO, Bioxgreen Technology Pvt. Ltd.)

Dr Kshitij Upadhyay (Project Scientist, NIT Raipur)

Ms Mansi Warshney (PhD Scholar, CSIR-NEERI)

Dr Rajesh Biniwale (Scientist, CSIR-NEERI)

Dr AA Kazmi (Professor, IIT Roorkee)

Dr Susmita Sharma (Asst. Professor, NIT Meghalaya)

Dr Debraj B. (Professor, IIT Hyderabad)

Dr PV Rao (Professor, NIT Warangal)

Mr Salahuddin Saiphy (Principal, Lead-Water Management, SM Sehgal Foundation)

Ms Lise Leblanc (President, CEO & Founder, LP Consulting)

Mr Rob Sampson (Managing Director, Ceres Biosystems)

This session shifted the focus from urban systems to the foundational role of soils in food security, water retention, climate resilience, and nutrient cycling.

SOIL HEALTH AS A NATIONAL PRIORITY

The session opened with a strong assertion that soil degradation is not merely an agricultural issue but a national economic and climate risk. Depleted organic matter, declining biological activity, and nutrient imbalance were presented as systemic challenges that undermine productivity and resilience.

CLIMATE-SOIL INTERACTIONS

Speakers highlighted how climate change is intensifying soil degradation through higher temperatures, erratic rainfall, salinity build-up, erosion, and nutrient losses. These processes were shown to increase dependence on irrigation and chemical fertilizers, thereby reinforcing a negative feedback loop affecting water quality and greenhouse gas emissions.

ORGANIC MATTER, BIOLOGY, AND NUTRIENT EFFICIENCY

A central theme of the session was the critical role of soil organic matter and microbial activity in restoring soil function. Participants emphasised that chemical fertilizers alone cannot rebuild soil structure or resilience, and that organic inputs are essential for improving water-holding capacity, nutrient efficiency, and yield stability.

The discussion highlighted that restoring soil health requires long-term, repeated interventions, supported by farmer-friendly diagnostics, demonstrations, and economic incentives.

LINKAGES WITH URBAN RESIDUALS

The session explicitly linked soil rejuvenation to outputs from urban systems, including treated biosolids, composted organic waste, and digestate. These materials were framed not as waste streams but as strategic inputs for soil regeneration, provided they are treated, standardised, and applied under managed programs.

KEY TAKEAWAYS

CITIS Session III concluded that soil rejuvenation is a cross-cutting enabler for water security, climate adaptation, and agricultural sustainability. The session underscored the need for:

- integrated soil health strategies,
- validated organic amendments,
- farmer-centric outreach, and
- alignment with national climate and resource security objectives.







CITIS SESSION IV

Session Title : Biogas and Bioeconomy: From Waste to Energy and Materials

Date : 10 December 2025

Time : 10:00–13:00 h

Venue : Board Room, FITT, IIT Delhi

Moderator : **Mr Sanmit Ahuja** (Founding Director, Climate and Energy Transition Finance Initiative (CETFI) and MD & CEO, Bharatia)

Panelist

Dr Vikas Shinde (GM- Technical, Ampyr Energy)

Mr Shivam Sharma (Project Associate, IIT Delhi)

Mr Ashish Tripathi (Head of Strategy, Biofics Pvt. Ltd.)

Mr Nikhil Rishi (Director, BioSarathi Technologies Pvt. Ltd.)

Mr Apoorv Garg (CEO, altM)

Mr Dhruv Sharma (Manager, Reliance Industries Limited)

Mr ML Dhiman (Director, Gaskon Engineers Pvt. Ltd.)

Mr Souvik Dhar (Program Manager, ISAP India Foundation)

Ms Pratiksha Baingane (PhD Scholar, CRDT, IIT Delhi)

Dr Pawan Jha (Director, Marc India, New Delhi)

Ms Kezia Shah (Senior Programme Coordinator, Garbage Free India)

Mr Saswat Panda (Program Manager, India Climate Group)

Mr Abhishek Bhadoriya (Executive Assistant, Quality Bio Green)

Mr Arvind Sharma (Managing Director, Bioxgreen Technology Pvt. Ltd.)

Mr Rajeev Pandey (Office Manager, IRMRI)

Mr Naveen Mogha (Director, Grassroots Energy Technologies Pvt. Ltd.)

Mr Anthony Davies (CEO, BIO2PURE)

Mr Diptes Basu (Partner, Innicca Capital)

Mr Rajneesh Mehra (CEO, Ingeo)

Mr Rob Sampson (Managing Director, Ceres Biosystems)

Mr Rohit Vedhara (Director, Aum Energy)

Dr Indra Mitra (Director (Technical), Cambi, India)

Mr Makarand Patankar (Managing Director, Auric Techno Services Pvt. Ltd.)

Mr Gautam Patankar (Manager, Auric Techno Services Pvt. Ltd.)

Mr Kunal Patankar (Director, Auric Techno Services Pvt. Ltd.)

Mr Anil Pillai (Chief Technology Officer (CTO), Bioxgreen Technology Pvt. Ltd.)

Mr Mateen Abdul (CEO, Grassroots Energy)

Mr Kailash S (VP, Bharatia)

Ms Pragya Shukla (PhD Scholar, IIT Kanpur)

Ms Kritika Tripathi (PhD Scholar, IIT Kanpur)

Dr Dipendu Saha (CEO, Eco Carbon)

Dr Susmita Sharma (Asst. Professor, NIT Meghalaya)

Dr Debraj B. (Professor, IIT Hyderabad)

Dr Kshitij Upadhyay (Project Scientist, NIT Raipur)

Dr PV Rao (Professor, NIT Warangal)

Dr Vijaya Lakshmi Koneru (Chief Advisor (Former VP), Development Alternatives)

Mr Rajesh S. Kumar (Member, Ladakh Pollution Control Committee)

Mr Sundeep Singh Chauhan (Founder, Acorn TLC)

Dr Parveen Dhamija (Advisor, MSDE)



This session examined the evolving biogas and bioeconomy landscape in India, positioning it as a cornerstone of rural development, climate mitigation, and circular resource use.

INDUSTRY EVOLUTION AND TIMING

The session framed biogas as an industry at a critical inflection point, requiring alignment of policy, feedstock supply, technology, finance, and markets. Speakers noted that while India has made significant progress in project deployment, the sector remains fragmented and faces challenges related to performance consistency and bankability.

SYSTEMS PERSPECTIVE AND BIOLOGICAL FOUNDATIONS

A recurring theme was the need to treat biogas not as a purely mechanical process but as a biological system requiring careful optimisation of feedstocks, microbial processes, and operating conditions. The importance of pretreatment, feedstock quality, and process stability was highlighted as central to improving yields and reliability.



VALUE CHAIN INTEGRATION AND CO-PRODUCTS

Participants emphasised that the economic viability of biogas projects improves significantly when co-products and by-products—such as digestate, captured CO₂, and bio-based materials—are integrated into the business model. Discussions highlighted emerging opportunities to move beyond energy alone and towards bio-based chemicals, materials, and soil amendments.

REGULATION, INFRASTRUCTURE, AND FINANCING

The session highlighted the need for quasi-regulatory frameworks, shared infrastructure planning, and transparent best-practice guidelines. Participants noted that mismatches between feedstock availability, gas grid infrastructure, and offtake arrangements remain major constraints.

The absence of a widely accessible industry playbook was

identified as a barrier, leading to repeated mistakes and suboptimal project design.

KEY TAKEAWAYS

CITIS Session IV concluded that biogas must be viewed as a strategic bioeconomy platform, not merely an energy solution. Key enablers identified include:

- integrated value-chain planning,
- standardised best practices,
- supportive regulatory mechanisms, and
- recognition of climate and rural development co-benefits.

OVERALL INTEGRATION

Together, CITIS Sessions I–IV established a coherent narrative linking urban water systems, residual management, soil health, and bioenergy into a unified framework for district-level climate action, investment, and technology deployment—fully aligned with the broader IWIS–CITIS vision.





IWIS-CITIS Joint Valedictory Session

Theme : **From Mission to Action**
Date : 11 December 2025
Time : 14:30–16:00 h
Venue : Auditorium, FITT, IIT Delhi

Moderator : **Dr Vinod Tare** (Founder and Advisor, cGanga, IIT Kanpur)
Dr Purnendu Bose (Present Head, cGanga, IIT Kanpur)
Dr Manoj Tiwari (Associate Professor; Co-Principal Investigator, cGanga, IIT Kanpur)
Dr M Jawed (Professor, IIT Guwahati)
Mr Sanmit Ahuja (Founding Director, Climate and Energy Transition Finance Initiative (CETFI) and MD & CEO, Bharatia)



1. INSTITUTIONAL CONTEXT AND ORGANISATION

The 10th India Water Impact Summit (IWIS 2025) and the 3rd Climate Investment & Technology Innovation Summit (CITIS 2025) were organised by the Centre for Ganga River Basin Management and Studies (cGanga), IIT Kanpur, under the leadership of IIT Kanpur, with IWIS and CITIS functioning as complementary and integrated platforms.

IWIS 2025 provided the strategic, scientific, and governance framework for river basin and water systems management, while CITIS 2025 focused on technology innovation, climate-resilient investments, and scalable solutions, including ETV and technology presentations, as integral components of both IWIS and CITIS.

A key pillar underpinning IWIS 2025 was the involvement of group of twelve Institutions engaged by National River Conservation

Directorate, Do WR, RD & GR, Ministry of Jal Shakti for CAMP Project being implemented across six major river basins of India—Mahanadi, Narmada, Godavari, Krishna, Cauvery, and Periyar.

IITs: Indore, Gandhinagar, Hyderabad, Palakkad, NITs: Rourkela, Raipur, Warangal, Surathkal, Tiruchirappalli, Calicut, CSIR–NEERI, Nagpur, Indian Institute of Science (IISc), Bengaluru, Together, IWIS and CITIS served as knowledge-to-action platforms, integrating river basin science, district and city-scale planning, governance reform, and technology innovation. of group of twelve Institutions engaged by National River Conservation Directorate, Do WR, RD & GR, Ministry of Jal Shakti for CAMP Project being implemented across six major river basins of India—Mahanadi, Narmada, Godavari, Krishna, Cauvery, and Periyar.

- IITs: Indore, Gandhinagar, Hyderabad, Palakkad
- NITs: Rourkela, Raipur, Warangal, Surathkal, Tiruchirappalli, Calicut



- CSIR–NEERI, Nagpur
- Indian Institute of Science (IISc), Bengaluru

Together, IWIS and CITIS served as knowledge-to-action platforms, integrating river basin science, district and city-scale planning, governance reform, and technology innovation.

2. PURPOSE AND POSITIONING OF THE VALEDICTORY SESSION

The Joint Valedictory Session was conceived as a synthesis and reflection forum, intended to:

- Consolidate insights from IWIS thematic sessions, CITIS deliberations, and technology/ETV presentations.
- Reflect on what has been achieved conceptually over the decade of IWIS.
- Identify institutional, programme, and implementation gaps.
- Articulate a forward pathway for translating frameworks into sustained action.

Rather than functioning as a ceremonial closure, the session emphasised continuity, learning, and institutionalisation, consistent with the Summit theme “From Mission to Action”.

3. DAIS COMPOSITION AND ROLES

The following were present on the dais with defined roles:

- Dr Purnendu Bose, Present Head, cGanga, IIT Kanpur
Welcomed participants and formally opened the Valedictory Session.
- Dr Vinod Tare, Former Professor, IIT Kanpur; Founder & Advisor, cGanga; Lead, CAMP Project
Presented synthesis of IWIS deliberations and the evolution of basin planning frameworks.

- Mr Sanmit Ahuja, Expert Member, Management Board of cGanga; CEO–MD, Bhartiya
Presented synthesis of CITIS deliberations and reflections on technology and climate investment

- Dr M Jawed, Professor, IIT Guwahati
Summarised Technology and ETV presentations; Chair of technology sessions at IWIS and earlier Summits

- Dr Manoj Tiwari, Associate Professor; Co-Principal Investigator, cGanga, IIT Kanpur & Co-Chair of Technology Presentations; delivered Vote of Thanks

4. WELCOME ADDRESS BY DR PURNENDU BOSE

Dr Purnendu Bose welcomed the gathering on behalf of cGanga, IIT Kanpur, highlighting:

- The evolution of IWIS over ten editions as a trusted national platform.
- The importance of integrating IWIS with technology and investment-focused platforms such as CITIS.
- The growing role of CAMP projects in extending basin planning to multiple river systems.

He emphasised that the success of IWIS lies in its ability to bring together science, governance, programmes, and technology within a single, coherent dialogue.

5. IWIS SYNTHESIS AND REFLECTIONS

Dr Vinod Tare provided a structured synthesis of IWIS deliberations as given in Appendix A to the proceedings of this session. Highlights are as follows.

5.1 Ten Years of IWIS: Evolution of Thinking

He highlighted that over a decade, IWIS has evolved:

- From issue identification to framework development.
- From sectoral discussions to integrated basin-scale thinking.
- From mission articulation to implementation-focused discourse.

5.2 Core Messages from IWIS 2025

Key messages emerging from IWIS sessions, as presented, included:

- Rivers are self-organising, capable systems; management is about enabling natural processes.
- Fragmented, project-driven interventions have limited impact on river health.
- Basin-scale science must be translated into district-level action through DRMPs.
- Programme cycles must explicitly align with Planning cycles.
- Monitoring, learning, and course correction are essential, not optional.

GRBMP 2.0 and CAMP were presented as action-oriented frameworks, bridging science, governance, and implementation.

5.3 District and Sub-basin as the Unit of Action

Dr Tare emphasised that:

- While river basins are natural planning units, districts are the most effective administrative units.
- DRMPs provide the missing operational link.
- Small streams, drains, floodplains, and groundwater systems determine river health.

6. CITIS SYNTHESIS AND REFLECTIONS

Mr Sanmit Ahuja presented the CITIS synthesis, drawing from the Summit presentations and discussions as given in Appendix B proceedings of this session. Highlights are as follows.

6.1 CITIS as a Technology and Investment Platform

He explained that CITIS focuses on:

- Climate-resilient investments.
- Technology innovation and validation.
- Bridging the gap between solutions and scalable deployment.









ETV and technology presentations were highlighted as integral components of both IWIS and CITIS, enabling informed decision-making by cities, utilities, and governments.

6.2 Linking Technology, Cities, and River Health

Mr Ahuja emphasised:

- Technologies must be embedded within planning and governance frameworks.
- Cities are key nodes influencing river basin outcomes.
- Investment decisions must be guided by long-term system performance, not short-term outputs.

He underscored the importance of credible validation, institutional confidence, and market readiness.

7. TECHNOLOGY & ETV SYNTHESIS - PRESENTATION BY DR M JAWED

Dr M Jawed summarised key insights from Technology and ETV presentations, noting:

- Strong innovation potential exists, but adoption remains uneven.
- Contextual suitability and operational capacity are critical.
- Technology alone cannot substitute for governance and institutional readiness.

He highlighted the continuity of technology sessions across IWIS editions and the importance of sustained platforms for evaluation and learning.

8. AUDIENCE SENTIMENTS AND ACKNOWLEDGEMENTS

Participants from the audience expressed:

- Appreciation for the integrated framing of IWIS, CITIS, and CAMP.
- Recognition of the value of long-term, framework-based approaches.
- Concern over weak outcome monitoring and institutional follow-through.





Special acknowledgement was made of the contributions of Mr Siddharth Desai, Dr Shweta Lokhande, and Mr Rahul Ramchandran, who prepared and coordinated the IWIS and CITIS synthesis presentations.

9. VOTE OF THANKS BY DR MANOJ TIWARI

Dr Manoj Tiwari delivered the Vote of Thanks on behalf of cGanga, IIT Kanpur, acknowledging:

- Speakers, chairs, and contributors across IWIS and CITIS.
- Consortium institutions executing CAMP projects.
- Organising, technical, and support teams.

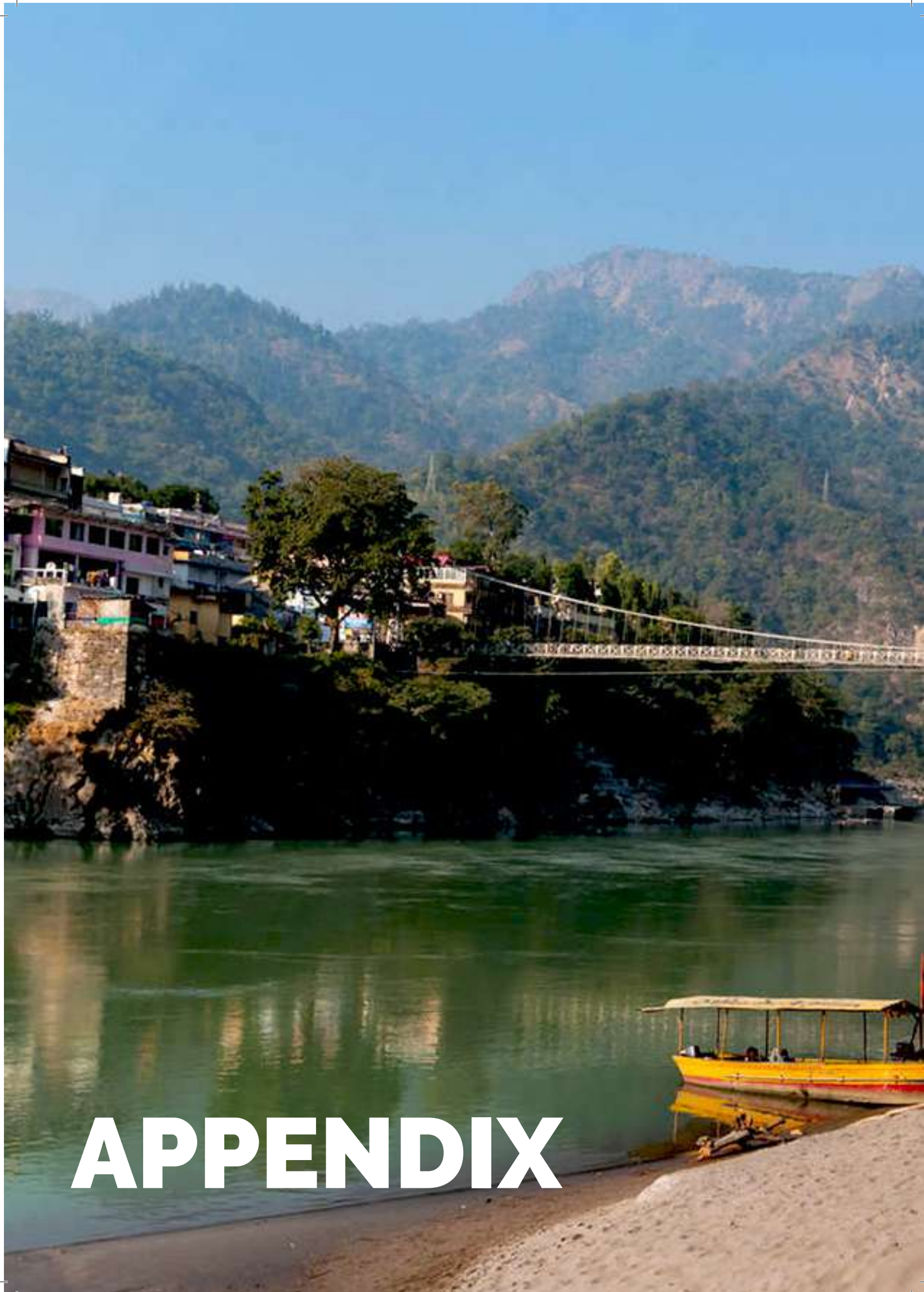
He reiterated cGanga's commitment to sustaining the momentum generated through IWIS and translating deliberations into actionable outcomes.

10. CONCLUDING OBSERVATIONS AND WAY FORWARD

The Joint Valedictory Session concluded with shared recognition that:

- India now has robust conceptual, planning, and technology frameworks.
- The key challenge lies in institutionalisation and execution.
- Districts, cities, and basin institutions must work in convergence.
- Learning, transparency, and adaptive management are central to success.

The session reaffirmed IWIS and CITIS as continuing national platforms for advancing river rejuvenation, water security, and climate-resilient development.



APPENDIX



Appendix A to the Proceedings of the Valedictory Session

IWIS: From Vision to Framework – GRBMP 2.0 and DRMP Architecture

IWIS Sessions deliberated on conceptual and policy foundation for the evolution of river management in India, particularly under the framework of GRBMP 2.0 and the proposed District River Management Plans (DRMPs).

The discussion began with a macro-level national consensus that water scarcity in most parts of India is not primarily due to absolute hydrological limitation, but rather due to systemic governance and management failures. Fragmented planning, overlapping institutional mandates, weak coordination between agencies, and the absence of a structured monitoring cycle have led to inefficient use and degradation of water resources. Addressing this challenge requires convergence of plans, projects, people, programmes, and policies, supported by a governance architecture that avoids institutional multiplicity and ensures accountability.

Against this backdrop, the transition from GRBMP 1.0 (2015) to GRBMP 2.0 is presented as a decisive paradigm shift. While GRBMP 1.0 was largely strategic and top-down, GRBMP 2.0 emphasizes bottom-up, action-oriented implementation, grounded at the district level and responsive to local ecological, hydrological, and socio-economic realities. This transition marks the movement from vision statements to executable frameworks.

A central feature of GRBMP 2.0 is the redefinition of governance and digital backbone. Planning responsibility is anchored at the Divisional level, led by the Divisional Commissioner, while execution authority is clearly vested with the District Magistrate. Importantly, real-time monitoring, artificial intelligence, and digital platforms are not treated as optional add-ons but as core structural components of river governance. The deliberations underscored that institutional capacity must be explicitly built to manage, interpret, and act upon these digital assets.

The framework further elevates climate resilience and Arth Ganga (economic regeneration) as structural pillars rather than peripheral concerns. River rejuvenation is positioned not only as an environmental objective but as a driver of livelihoods, local economies, and sustainable development. Existing institutional mechanisms—such as District Environment Committees—are proposed to be leveraged and repurposed, rather than replaced, ensuring administrative continuity while strengthening effectiveness.

On the technical front, the presentation argues strongly for flexible, ecosystem-specific standards instead of rigid national norms. While district plans will necessarily differ due to ecological and hydrological diversity, the process of plan preparation, data collection templates, and analytical frameworks must remain common to ensure comparability and coherence. Rigid regulatory prescriptions—such as uniform standards emerging from judicial or regulatory orders—are highlighted as often unscientific and impractical when applied indiscriminately.

A significant conceptual shift is proposed in river health assessment. Rather than relying on conventional BOD-centric classification and designated-use based river classes (A–E), the presentation recommends Dissolved Oxygen (DO) and saprobic index as primary indicators, as these better reflect ecological functioning. High-resolution Digital Elevation Models (DEMs) are identified as a prerequisite for scientific planning, along with accurate and periodic measurement of non-monsoon wastewater flows, which dominate river stress for most of the year.

The DRMP architecture further distinguishes between non-monsoon (300–330 days) and monsoon (30–35 days) management strategies. A major philosophical shift is articulated—from attempting to “eliminate” eutrophication to actively managing it. Treated wastewater is reframed as Ecological Treated Flow (ETF), essential for maintaining riverine ecology during lean periods. The recovery of nutrients through aquatic biomass harvesting and their return to agricultural soils closes the water–nutrient loop.

Infrastructure strategies emphasize decentralised wastewater treatment, particularly small STPs at sewer outfalls into natural drains, to avoid expensive, land-intensive, and often unviable long sewer networks. Where land is required, acquiring it directly is presented as more cost-effective than investing in large interceptor systems. A hybrid treatment philosophy, combining electro-mechanical and nature-based systems, is advocated, along with differential nutrient removal standards based on receiving environment sensitivity.

Overall, DRMPs are advocated as science-based, governance-embedded, digitally enabled, climate-resilient, and economically aligned instruments, capable of translating national river rejuvenation vision into district-level action.

Appendix B to the Proceedings of the Valedictory Session

CITIS, ETV, Technology Acceleration and Global Scaling Framework

Deliberations in CITIS focus on river basin planning to technology, finance, and policy integration, as articulated through the Climate Investment and Technology Impact Summit (CITIS) and the Environment & Technology Verification (ETV) Programme, led by cGanga, IIT Kanpur and Bhartia in collaboration with national and international partners.

The genesis of this framework lies in the recognition that large systemic challenges—water, climate, energy, waste, food, and mobility—cannot be solved by technology alone. Instead, solutions must emerge from the convergence of three levers: Technology, Finance, and Policy. cGanga and Bhartia’s approach explicitly positions itself as a market-making and acceleration platform rather than a technology development programme.

A recurring challenge highlighted is the failure of advanced technologies to scale in emerging markets. Three major barriers are identified: technologies not being emerging-market ready, the absence of in-country commercial reference sites, and lack of scalable investment structures. Many technologies fail because they are not adapted to local regulations, cost structures, supply chains, or institutional capacities, and because first commercial deployments are difficult to finance and approve within existing procurement systems.

The ETV Programme is presented as a comprehensive solution to these barriers. It systematically evaluates technologies through Technology Readiness Level (TRL), Commercialisation Readiness Level (CRL), and Impact Readiness Level (IRL) assessments, specifically from an emerging-market perspective. Identified gaps are addressed through indigenisation, local supply-chain development, regulatory alignment, and partnership with Indian delivery entities.

A cornerstone of the ETV framework is the establishment of First-of-a-Kind (FOAK) commercial demonstration projects in India. These FOAK projects de-risk technologies, create confidence among regulators, clients, investors, and lenders, and establish real-world performance benchmarks. Once validated, technologies are scaled through Nth-of-a-Kind (NOAK) platforms using structured financing mechanisms such as PPPs, leasing models, bonds, and special purpose vehicles.

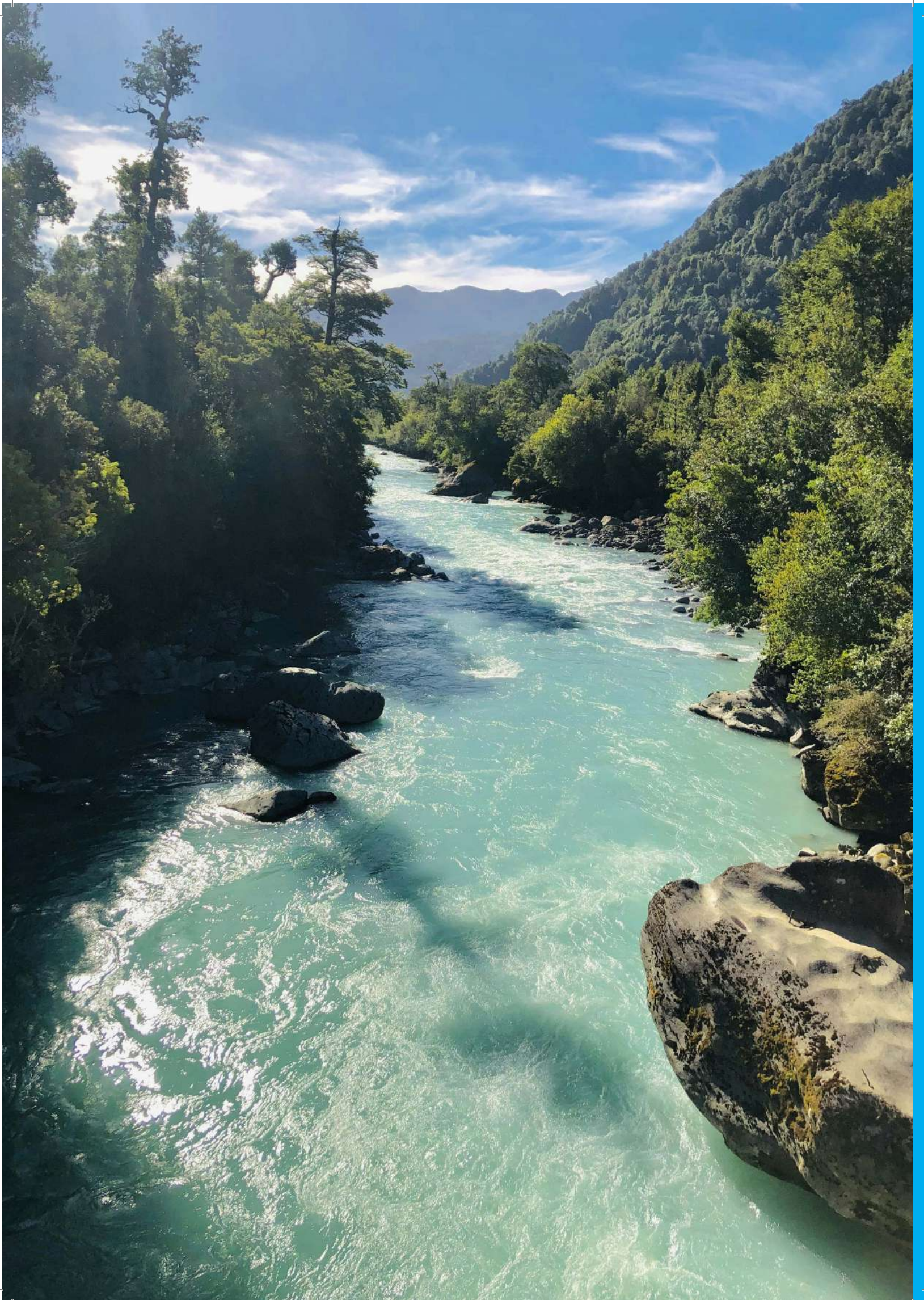
The deliberations illustrate this approach through high-impact solution areas, including soil-less farming systems, decentralised wastewater treatment technologies, satellite remote sensing for water and land management, sludge treatment and soil rejuvenation, EV charging ecosystems, and integrated climate solutions across water, energy, waste, agriculture, and mobility sectors. Each solution is framed not merely as a technical intervention, but as a combined technology–commercial–finance model with measurable environmental and socio-economic impact.

A significant emphasis is placed on satellite remote sensing and digital intelligence, where partnerships with international agencies and IIT Kanpur have enabled cloud-penetrating water body mapping, historical change analysis, and early warning systems—recognised globally, including by the United Nations, as transformational for river basin management.

The presentations and discussions also introduced SITE Networks (Science, Innovation, Technology, and Economics) as bidirectional international corridors to promote technology commercialisation through bilateral collaboration. Active SITE networks with countries such as Norway, Slovenia, Denmark, Sweden, Japan, and others demonstrate the scale and maturity of this model, with projects running into hundreds of millions of euros.

Building on this international experience, the Global South Technology Acceleration Consortium (GSTAC) is proposed as a unifying platform to hyper-accelerate proven technologies across the Global South. Its mission is grounded in technology sourcing and indigenisation, FOAK demonstration in India, and rapid NOAK scaling across partner nations. cGanga and Bharatia urged leading Indian technical institutions to participate as founding partners, positioning them as hubs for technology validation, deployment, and global dissemination.

The concluding narrative positions India as a global epicentre of technology commercialisation, capable of sourcing proven technologies globally, indigenising them cost-effectively, and scaling them worldwide. This vision aligns directly with national priorities on climate action, water security, Atmanirbhar Bharat, and South–South cooperation.





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