

Insights on Water Pollution and Wastewater Management for Peri-Urban Areas

with special emphasis on Design and Operation



The Centre of Excellence in Urban Planning and Design (CoEUPD), IIT Kharagpur hosted an influential workshop titled, “*Insights on Water Pollution and Wastewater Management for Peri-Urban Areas with Special Emphasis on Design and Operation*” – not once, but twice. The first session was held on 20th of January 2025 at the IIT Kharagpur Kolkata Extension Centre, Salt Lake, Kolkata. The Centre graciously conducted the workshop again on 28th of April 2025 at the same location, in recognition of the excitement surrounding the subject and to make accommodation for individuals who were unable to attend the first session. This dual offering ensured that no voice eager to learn was left unheard, reaffirming the Centre’s commitment to knowledge accessible and environmental stewardship.

This event brought together a diverse and dedicated group of government officials from eight districts across West Bengal – Alipurduar, Jhargram, Nadia, Birbhum, Malda, Uttar Dinajpur, Dakshin Dinajpur and Coach Behar. Their presence proved the increasing urgency and teamwork needed to address the intricate water issues that peri-urban areas face.



The programme commenced with a warm welcome address delivered by Dr. Partha Sarathi Ghosal, Assistant Professor at the School of Water Resources, IIT Kharagpur. He welcomed the Chief Guest, Mr. Santosh G. R., IFoS, Additional Secretary, Govt. of West Bengal, Mission Director–SBM(G) & FPO; the Guest of Honour, Dr. Tapas Kumar Gupta, Former Chief Engineer & Chief Technical Adviser, West Bengal Pollution Control Board and all other dignitaries & participants.



In his opening remarks, Dr. Ghosal outlined the framework of the workshop and emphasized its relevance in the current environmental context. He explained that the day's sessions would cover aspects of water pollution as well as physical, chemical and biological parameters. Important topics would include wastewater production, the assessment of pollution levels and their environmental impacts, and the characterisation and treatment techniques meant to promote sustainability. His thoughtful insights set the tone for an engaging, informative and solution-oriented day ahead.



Following the inaugural session, the floor was handed over to the esteemed Chief Guest, Mr. Santosh G. R., who addressed the gathering with an insightful speech. In his speech, he underlined the growing importance of setting up such knowledge - sharing platforms, especially in context of peri-urban areas where environmental issues are rapidly emerging and demand prompt, well-informed attention. He pointed out how these sessions give participants the skills and information they need to comprehend and deal with the urgent problems of wastewater treatment and water pollution. The chief guest concluded by stating that collective awareness and informed action are key to sustainable environmental management and lauded the organisers for initiating such a relevant workshop.

Soon after, the gatherings broke for a short tea break, giving participants an opportunity to network and informally discuss their expectations from the day ahead.

After the tea break, the first technical session began with a presentation by Dr. Tapas Kumar Gupta, the Guest of Honour. He eloquently emphasised in his speech the vital role that resource conversion plays in the quest for development, pointing to natural resources like air, land, water, energy and minerals. He went on to explain the idea of sustainable development, invoking an important 1987 report of the World Commission on Environment and Development. Further, he referenced the 1992 Indian interpretation of sustainable development found in the National Conservation Strategy and Policy Statement on Environment and Development— which framed sustainable development as a process of social and economic enhancement.

He then talked about the important parts of the constitution that protect the environment: Article 21 gives people the right to clean environment; Article 47 asks the government to improve living conditions and public health; Article 48A requires the government to protect and improve the environment and Article 51A (g) explains the responsibility of citizens to take care of the environment. After that, he discussed the National Environmental Policy, articulating its main objectives – conserving vital environmental resources, ensuring environmental governance, environmental concerns in economic and social planning, etc.

As he neared the end of his presentation, he shared insights about environmental legislation in India. He then shifted to an important topic: faecal sludge management, explaining that proper faecal sludge management is key to keeping water sources clean, protecting aquatic life and reducing waterborne diseases, minimizing soil pollution and helps stop the spread of infectious diseases.

Following that, Assistant Professor Partha Sarathi Ghosal brought a touch of geekery to the session. He talked all about the field-specific advanced technologies for faecal sludge treatment. First, he got into why it's super important to figure out what kind of sludge we're dealing with – like, why do we even need to “qualify” faecal sludge? He then talked on the characterisation of faecal sludge, including how it is categorised and how per capita generation and service demand may be used to calculate the quantity of faecal sludge generated in a city. Why is characterisation so important? Furthermore, how may faecal sludge be described?

Then, Dr. Ghosal discussed the five main obstacles for setting up faecal sludge treatment plants (FSTPs): weather, desludging vehicles, administration, reliance on on-site sanitary systems and technological interventions.



Then came the cool part — the treatment tech! He covered the Enhanced Digestion and Multi Stage Bioreactor (EDMSB) for Faecal Sludge Treatment (FSTP) and the Bio-Digester-Aided constructed Wetland Treatment System for Faecal Sludge and Septage Treatment (BAC FSTP) by using the schematic representation. He went into great detail about the technologies, explaining them with descriptions and drawings/illustrations. He emphasised important aspects of both technologies, such as cost effectiveness, compact design, improved treatment efficiency, effluent quality, and modular design.

After the enriching morning sessions, participants headed for the lunch break, where discussions from earlier in the day naturally continued, creating a lively and thoughtful atmosphere. The informal interaction added depth to the day's learning and helped strengthen professional bonds among participants.

Post-lunch, the workshop resumed with a presentation by Dr. Amit Shaw, Professor of the Department of Civil Engineering at IIT Kharagpur, who spoke on “Various Aspects in Structural Design and Construction.” Prof. Shaw took the stage to discuss the three main requirements for structural design: affordability, serviceability, and safety. He explained that design is basically a balancing act — an optimization game. Then he walked everyone through the main design philosophies: the working stress method, the local factor method, and the limit state method. Diving deeper, he shed light on characteristic loads—what they are, how many types exist and how they fit into the framework of IS codes.

He smoothly moved into the world of materials, introducing the characteristic strength of concrete and steel and then introduced the concept of design load and design strength using a simple equation. He explained how both design load and design strength depend on characteristic strength, but while design load increases with a safety factor, design strength decreases due to it. Prof. Shaw did not stop there. He discussed the design strength of concrete and steel, how concrete behaves under stress. Then he went into force moments, sign conventions, and how beams act when bent. Finally, he mentioned about the water-retaining structure and there was the end of his talk.



Following this, Associate Professor Arup Das from the Department of Architecture and Regional Planning and a member of CoEUPD, IIT Kharagpur delivered a presentation on “Solid and Liquid Waste Management in Rural India.” So, he began with something called typology of rural areas, he explained their typographic character as well as locational and functional character. Then, he moved on to the Rural Area Development Plan Formulation and Implementation Guidelines 2021, or RADPFI. Next came rural spatial planning and sanitation – clearly illustrated by him in his talk. He provided a thorough and understandable explanation of solid and liquid waste management.

He didn’t just skim the surface - he went deep, explaining various methods of waste disposal. He also talked clearly about the greywater management and faecal sludge management. One of the most engaging moments was his discussion on ODF Plus villages. Wrapping up, he shed light on rural governance and strategies for improving FSM services.

A second tea break offered attendees another opportunity to refresh and prepare for the final leg of the workshop.

Then, just as the session was about to wrap and the day was ready to call it quits, Dr. Ghosal popped back on stage to talk about “Advanced Technologies for Grey Water Management,” sharing some last-minute tech magic before the curtains closed.

The workshop brought together fresh ideas, hands – on experience and bold solutions. It wasn’t just about sharing knowledge – it stirred minds and motivated action towards a cleaner, more sustainable future.

