



## **Workshop Report**

**National Institute of Hydrology (NIH), Roorkee  
Uttarakhand, India**

**8-9 August 2019**

## About this Report

The report summarises the discussions and conclusions from the first Inception cum Need Assessment Workshop for the project '*Innovation Centre for Eco-prudent Wastewater Solutions (IC-EcoWS)*'. The workshop held from 8-9 August 2019 was organized by National Institute of Hydrology (NIH) Roorkee, in collaboration with the project partners from Indian Institute of Technology Bombay (IITB), Malaviya National Institute of Technology (MNIT), Jaipur and Institute of Rural Management Anand (IRMA), Ahmedabad. The workshop took place at NIH Roorkee, Uttarakhand, India.



NIH Roorkee



IIT Bombay



MNIT Jaipur



IRMA Ahmedabad

## Funding Organization

The IC-EcoWS project is supported by the Department of Science and Technology (DST), which plays a pivotal role as a nodal department for organizing, coordinating and promoting the Science and Technology (S&T) activities in India.

## Disclaimer

This report summarises the opinions, suggestions and discussions held during the two-day workshop at NIH Roorkee. The views expressed are those of the individual workshop participants, and do not necessarily reflect those of their respective organizations or their funders.

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## **Background of the Workshop**

The Inception cum Need Assessment Workshop under the project, “Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)”, convened on 8-9 August 2019 at National Institute of Technology (NIH), Roorkee. The event was led by NIH Roorkee along with its project implementing partners Indian Institute of Technology Bombay (IITB), Malaviya National Institute of Technology (MNIT), Jaipur and Institute of Rural Management Anand (IRMA). The schedule of the workshop is given in Annexure - 1. A total of 50 participants from 17 organisations took part in the workshop, including two representatives from the Department of Science and Technology (DST) (Annexure-2). The workshop was structured in a way to spend more time on brainstorming the ideas and discussing the gaps and need associated with the Natural Treatment System (NTS) technologies in India. As anticipated, the workshop was highly participative owing to the several interactive sessions between the stakeholders with a range of experience and expertise (i.e., administrative authorities, research institutes, universities, water utilities, NGOs, and Gram Panchayat). The successful completion of the event enlightened the future actions plan for the IC-EcoWS project.

The focus of the two-day workshop was primarily on the NTS and their role in addressing wastewater management in India. The workshop provided a unique opportunity for an in-depth multi-stakeholder dialogue on developing a sustainable NTS-based business model to improve the livelihood opportunities and income generation for the local users. The event strived to sensitize the stakeholders and also seeks to foster cooperation and coordination amongst stakeholders.

## **Objectives of the Workshop**

The aim of the workshop was to synthesize the gaps and the needs associated with the wastewater treatment technologies for rejuvenation of water bodies and their implementation under different Indian scenarios (i.e., urban, peri-urban and rural settings). The specific objectives were to:

- 1) Identify the needs and gaps in the development, application and management of the appropriate NTS technologies for wastewater treatment in India.
- 2) Need Assessment for the sustainable NTS-based business model for wastewater treatment in India.
- 3) Need Assessment for capacity building/awareness programs at all levels for NTS technologies. Additionally, sensitizing the stakeholders and seeks to foster cooperation and coordination amongst stakeholders.

## Workshop Proceedings for Day-1 (8<sup>th</sup> August 2019)

### Session-I: Opening Session

The workshop proceeded with the opening session led by), Er. Omkar Singh, Scientist-F in the Research Management and Outreach Division (RMOD) at NIH Roorkee, gave opening remarks and welcomed the participants. In his remarks, he gave a brief overview of the Project “Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)” which is in line with the several government schemes such as Jal Shakti Abhiyan for rejuvenating the water bodies. Er. Singh also stressed the importance of the Natural Treatment System (NTS) for the wastewater treatment in India where the treatment capacity of conventional treatment system is inadequate and untreated sewage remains the largest source of water pollution. He also stated that the Inception cum Need Assessment workshop aid in the advancement of the strategic future action plan in the development of the appropriate NTS technologies and its successful implementation in various Indian scenarios.

### Session-II: Technical Session on Wastewater treatment

Er. Omkar Singh continued as the next speaker giving the detailed overview of the pond rejuvenation work by NIH Roorkee at the village level. In his presentation, he gave the general facts of the wastewater generation in India. He also shared the detailed information of several successful pond rejuvenation work done by NIH Roorkee using NTS technology (mainly constructed wetland (CW) system) in different villages of North Indian states of Uttarakhand and Uttar Pradesh. In addition, the impact of the pond rejuvenation activity on the overall water availability, surface water quality and green house gas (GHG) emission was also assessed systematically. In his presentation, the village level water budgeting was precisely discussed along with the details of the capacity building and awareness programs in which NIH Roorkee is extensively involved.



In left Er Omkar Singh and in the right IC-EcoWS project partners.

Dr. Pradip Kalbar, Assistant Professor at the Centre for Urban Science and Engineering, IIT Bombay, presented the key concepts and approaches for wastewater management, treatment and technology assessment for promoting NTS technologies. He highlighted the fact that wastewater is an untapped resource in India, which could be utilized using different wastewater management approaches essentially, i) preventive/conservative approach and ii)

treatment/recycling/reuse approach. The new approaches of wastewater resource recovery such as low energy mainline (LEM), mainline adsorptive Phosphorus recovery and circular economy were discussed. In his presentation, he also called for the circular economy for the water cycle. Interesting case studies showcased the application of constructed wetland (CW) approach for wastewater treatment at building scale, which also supports the decentralized wastewater treatment at small scale. For an effective wastewater treatment and reuse it is quintessential to have appropriate, affordable and accessible technologies, for the same, selection of technologies is important. At the end of the presentation, Dr. Kalbar gave a detailed overview of the wastewater treatment technologies selection approaches mainly, i) life cycle assessment approach (LCA) and ii) multiple attribute decision making (MADM), based on the predefined criteria and indicators (eg., global warming and eutrophication).

The next speaker of the session was Dr. Indranil De, Associate Professor at the Institute of Rural Management Anand (IRMA), Ahmedabad. Dr. De presented the detailed background of different social, societal, and economical concepts and approaches in order to move forward with a project, technology and business model. In his presentation, he explained the process of estimating the cost-benefit analysis for NTS technology package and NTS-based business model. A successful technology package must be cost-effective, need-based and acceptable to users. He also outlined the crucial component to be taken into account for a sustainable business model in terms of C-B analysis that is, i) private benefit and cost, ii) social cost iii) social benefits and iv) distribution of benefits. Particular emphasis was given to the distribution of net benefits for acceptable business model by the community. Method for estimating the financial cost-benefit was described in terms of net present value (NPV) and internal rate of return (IRR) to decide the appropriate technology and project. Any business model should have a financial, technical, and institutional support along with the skill development and communication. He also stated that a sustainable business model should benefit low-income and 'base of the pyramid' communities.



Dr. Indranil De on Cost and Banefit (C-B) analysis of NTS technologies.

Dr. A. B. Gupta, Professor at Department of Civil Engineering, MNIT, Jaipur, presented detailed case studies of application and monitoring of the wastewater treatment using the NTS technologies in Jaipur. Pollutant removal mechanisms of constructed wetlands were discussed. Dr. Gupta gave a detailed description of the case study evaluating the performance and limitations of the CW used for the tertiary treatment for a STP plant in Jaipur, on the

basis of pollutant removal capacity. The regular monitoring of the study site indicated a medium level performance owing to the limited resources such as land and improper harvesting which led to the addition of BOD and other nutrients to the wastewater thus, reducing the efficiency of CW. The performance of the variety of CW's with different design configurations in terms of the media, the flora species (with and without) and scale of the setup was further compared and discussed in his presentation. The result from the case study suggests that incorporating the sand layer as media is more important in comparison to flora species. In addition, higher TKN removal observed for the *Cana Indica* as flora specie in the CW setup. In the third case study, the Nitrogen removal capacity of CWs was briefly discussed for the residential area in the Jaipur city located in the western state of India. He also introduced the concept of ANNAMOX Stoichiometry (i.e., anaerobic ammonium oxidation) process to the participants for nitrogen cycle.

### Session-III: Introduction & Inaugural Session

The session began with the formal self-introduction of all the participants, followed by the detailed introduction of the IC-EcoWS project by NIH Roorkee.



Dr. V.C. Goyal Introducing IC-EcoWS project to the participants

To give the detailed overview of the IC-EcoWS project, Dr. V.C. Goyal, Scientist G and Head of the Research Management and Outreach Division (RMOD) NIH Roorkee was invited as the next speaker in the workshop session. Being a Principal Investigator of the project from NIH Roorkee, Dr. Goyal took a lead in introducing the key project partners from the renowned institutes of India such as IIT Bombay, MNIT Jaipur and IRMA Ahmedabad.. In his presentation, he outlined the key objectives of the DST funded project IC-EcoWS, which is to establish a state-of-art centre to harness the sustainable NTS and other important eco-prudent resource recovery technologies for wastewater treatment contributing to the water security in India. The project encompasses several important tasks such as development of decision support tool (DST) and establishment of pilot study sites (Live laboratories) for assessment of NTS technologies. The emphasis was on the development of sustainable NTS-based business model to improve the livelihood opportunities and income generation for the local users. Also, mentioned capacity building and outreach activities as an important component of the project for promoting the use of the NTS technologies for wastewater treatment in India. The time line and deliverables of the project were briefly discussed. He informed that the projects objective are in-line with the several government of India schemes

such as Swachh Bharat Mission, National Mission on Clean Ganga (NMCG), Nal Se Jal, and recently launched Jal Shakti Abhiyan (JSA), for water conservation and rejuvenation of water bodies. At the end, he briefly introduced case study of successful application of NTS technology by NIH Roorkee in the rural setting of Ibrahimpur village in Haridwar district of Uttarakhand



Dr. Neelima Alam (third from the right) introducing DST programs.

Following the project introduction, Dr. Neelima Alam, Scientist E from Department of Science and Technology (DST) briefed about the programs in which DST is involved. Dr. Alam, introduced several promising water and environment related themes on which DST is currently working, both nationally and internationally. However, she particularly highlighted the Water Technology Initiative Programme (WTI) under DST which is dedicated to provide safe drinking water at affordable cost and in adequate quantity using appropriate Science and Technology interventions. She informed that the department's endeavours aims to strengthen the R&D capacity to develop the technological solutions for existing and emerging water challenges in the country. To address the challenges, the department promote the national and collaborative developmental research, capacity building of research professionals and water managers; develop synergy with line departments at Central/State level and conduct techno-economic-social analysis of technologies. At the end, Dr. Alam also appreciated the efforts of NIH Roorkee for organising the multi-stakeholder Inception cum Need Assessment workshop along with the project partners, which is in line with the DST themes and also supports decentralized NTS based technologies an alternative for conventional wastewater treatment technologies in India.





A need assessment session was organized to identify the needs and expectations from the administrative authority regarding wastewater treatment and suitability and application of NTS technologies in India at all the levels (eg. DST, Irrigation Department and UK Peyjal Nigam, District authorities etc.). The session was coordinated by Dr. Rajesh Singh, Scientist C in Environmental Hydrology Division (EHD) at NIH Roorkee. The questions flagged and inputs received from the concerned stakeholders under different themes of the workshop are given below:

*Wastewater Treatment-*

- 1) Encouraging decentralised system approach for wastewater treatment (WWT) in India
- 2) Proposition for the single stage plant at localised level or household level.
- 3) Involvement of municipalities and district level authorities to jointly take up for rejuvenation of water bodies.
- 4) A need for managing wastewater in the coastal urban areas.

*NTS Technologies-*

- 1) The WWT solutions should also cater to small needs of the communities.
- 2) Pilot structures to be constructed so that people get to see how it can benefit on a larger scale and in long run.
- 3) Scaling up of the NTS based solutions.
- 4) Site-specific solution must be used in conjunction with NTS technologies.

*Business-Model for NTS Technologies-*

- 1) The overall cost should be lower such that it can be managed through the allocated district development funds.
- 2) Such solutions are sustainable when there is revenue generation benefitting the society.
- 3) Livelihood activity generation through NTS-based business models at all the levels.

*Capacity Building and Awareness of NTS-*

- 1) Connecting with the Swachh Bharat Gramin Scheme or other government schemes to generate awareness on the application of the NTS technologies

- 2) Formation of Water User Groups
  - a. To create awareness
  - b. To involve people by giving more responsibility in the management and operation part

The session ended with the inaugural address given by Dr. Sharad Kumar Jain, Director of National Institute of Technology (NIH), Roorkee. In his speech, he appreciated the initiative of the Project workshop and expressed his gratitude for the extended support by DST and concerned stakeholders. Dr. Jain pressed the need of the decentralized wastewater treatment in India, where most people in semi-urban and rural areas does not have the access to conventional wastewater treatment facilities. He also voiced for the strong communication and collaborations at all the levels for promoting and supporting the nature-based wastewater treatment technologies. At the end, he declared the opening of IC-EcoWS for development and application of NTS technologies.



Dr. Sharad Kumar Jain (in the center) during the inaugural session.

#### **Session-IV: Stakeholders Experiences on Use of NTS Technologies**

The session provided an opportunity to the stakeholders who were the academicians, developers or practitioners of NTS technologies and the beneficiaries through the application of NTS technologies at different levels, to come forward and share their diverse experiences.

Dr. Nadeem Khalil, Professor at the Department of Civil Engineering in Aligarh Muslim University (AMU), shared his research and in-field experiences on eco-friendly and sustainable technologies for domestic wastewater treatment in India. He introduced the work of SWING programme in India supported by DST and European Union, which aims to develop the low-cost sustainable technologies for municipal wastewater technologies and reuse in the country. Professor Khalil gave the elaborate explanation of the successful case study of wastewater treatment using the combination of up-flow anaerobic sludge blanket (UASB), French type CW, vertical flow CW, horizontal flow constructed wetland and the solar-driven disinfection technique, which significantly improved the quality of effluent.

Mr Ganges Reddy, Chairman & Managing Director of Bluedrop Enviro Pvt. Ltd. shared his rich experience of using natural treatment methods as an alternate to conventional treatment methods at small and large scale. He explained the complex environmental interactions of the mechanically simple CW system for the treatment of the wastewater. He introduced the successful case studies of lake restoration and treatment of variety of wastewater by the applying the CW method including the floating treatment system in several parts of India. The technology is proven and tested is efficient in treating the domestic wastewater, oil and gas, pharmaceuticals, chemical products, mining and wastewater from food & beverages. With low life-cycle cost and the use of local man-power and materials, the CW treatment system, which is also environmental friendly, has a huge advantage over the conventional wastewater treatment system in India at different scale.



Mr Ganges Reddy introducing his work on constructed wetland

Mr. Raman Kant, Director of Natural Environmental Education and Research (NEER) Foundation and an environmental expert, shared his range of experiences towards developing a sustainable environment through grassroot level activities such as mass awareness, community action, policy advocacy and information dissemination. In his talk, he states that public awareness in many ways plays a vital role in defining the policy issues at various levels. The grassroots level initiative encourages the communities for an active participation in environmental activities and policy making. He shared a remarkable work by NEER foundation on restoring the 15 km stretch of Hindon River a tributary of Yamuna River in Saharanpur district of Uttar Pradesh, through the active participation of communities and capacity building /awareness programs. Getting involved with the community at their level further encourages the locals for active participation in the environmental activities.

To share the local experiences as the beneficiary of the NTS technologies, Mrs. Reeta Saini, Gram Pradhan of Ibrahimpur Masahi Village and representatives of Jhabrera Village from Haridwar district of Uttar Pradesh were invited in the session. In their talk, they informed that initially the villagers were reluctant to the NTS technologies but through proper capacity

building and awareness programs by NIH Roorkee, they were acceptable to the technologies for rejuvenating the village ponds. Through active community participation and cooperation from all the levels such as from government authorities and administrative bodies at village levels the rejuvenation of village pond at the Ibrahimpur Masahi village was successful. They thanked the scientists and experts from NIH Roorkee for their effort in rejuvenating the village ponds using the CW approach which is an environmental friendly approach and easy to manage at village level. At the end, they also requested for effective measure and recommendations to tackle the excess rainwater inflow to the constructed wetland which in rainy season inundates the village pond and reduces the efficiency of CW for the treatment of wastewater.



Representative of Ibrahimpur Masahi Village (left) sharing his experience on village pond rejuvenation activity by NIH Roorkee

### **Session-V: Need Assessment and Discussion Session**

The aim of the session was to assess the needs and gaps associated with the development and application of NTS technologies for wastewater treatment in India. The representatives of concerned government bodies, institutes and organizations shared their views, innovative ideas, and experiences and also provided appropriate suggestions and recommendations during the session. All participants took active participation in the session and were engaged in the meaningful discussion over multitude workshop themes as given below.

Session 1: Wastewater Management in India- The entire session was coordinated by Dr. Urmila Brighu, Professor, MNIT Jaipur. Professor raised interesting issues on the water policies, which need to explicitly take into account the exploitation of the surface and groundwater and appropriate treatment of wastewater at all levels. The key points raised during the session are:

- 1) Appropriate policies for water supply and groundwater abstraction so to focus on the use of surface water and prohibit wastewater release to surface water bodies.

- 2) Accessibility of the treated water for households – getting the treated water to the users
- 3) Reusability of treated wastewater and meeting required standards for designated uses.
- 4) Operation and Management charges of the wastewater treatment facilities should be stricter for urban areas which largely contribute to the wastewater generation in India than the rural areas.
- 5) Understanding the topographical aspects is very important – slope in case of the draining of the water.

Session 2: NTS Technologies – The session was coordinated by Dr. Pradip Kalbar, IIT Bombay and also shared his experiences and ideas on the design and application of NTS technologies under different Indian scenarios (urban, peri-urban and rural settings). The key points discussed are given below.

- 1) Cost effective technologies – operation and maintenance cost should be low for a sustainable solution to wastewater treatment using NTS.
- 2) Suggestion on diverting the first rainwater flow away from the CW or FW site for efficient use of the NTS technology.
- 3) Recommended easy applications of the technology for local users.
- 4) Identify the quantity and quality of water that has to be treated and then design the CW and FW -Understanding the quantum is important prior to designing of the structures.
- 5) Generation of Livelihood Opportunities through NTS technologies to make it sustainable.
- 6) Life cycle assessment for the selection of appropriate technologies.

Session 3: Business Model for NTS Technologies – The session was coordinated by Dr. Indranil De, IRMA Ahmedabad and shared his experiences on cost and benefits analysis of technology and project. The suggestions and ideas given in his session are given below.

- 1) Appropriate technology solution should be provided on the basis of the end use required – domestic purposes or irrigation purposes.
- 2) Private and Social cost benefit must be considered before a technology is adopted in particular location.
- 3) Social viability and social acceptability to NTS technology is essential.
- 4) Need to cater to small needs as well.
- 5) Sustainable revenue generation – Using the constructed wetland site for recreational activities and which attract tourists and help generate the revenue.

Session 4: Capacity Building / Awareness Programs – The session was coordinated by Er. Omkar Singh and Dr. N.G. Srivastava, Scientists from NIH Roorkee. The important points raised during the session are given below.

- 1) Sharing of design structures, budget of the technology with the district level authorities.
- 2) Train villagers or the end users to monitor the effluent from CW.
- 3) Informing the end users regarding the benefits associated with the NTS technologies.

- 4) Training courses for Operators, Engineers/ Technicians/ Contractors, Masons, NGO Partners.
- 5) Organising practitioner's workshops.
- 6) Hands-on Training programme
- 7) Organising of the Training of trainers programs

The open discussion session was coordinated by Dr. Jyoti Patel, Scientist C, (RMOD), NIH Roorkee. The open discussion included a range of topics related to wastewater treatment, which were discussed with the stakeholders. The key issues raised during the session are given below.

- 1) Need for site-specific interventions for wastewater treatment using NTS.
- 2) Initiative to be taken in the forestry sectors – Use of partial or completely treated water for watering trees in forestry sector and for irrigation purposes in agriculture.
- 3) Study on POPs, pharmaceutical/ hospital waste on water quality (Emerging Pollutants)
- 4) Why do we recommend a low cost solution in rural settings while high cost solution in urban settings?
- 5) Use of PIPP approach (Public Institute Private Partnership) instead of PPP approach (Public Private Partnership) to include the research component in development and application of appropriate NTS technologies.

### **Session-VI: Concluding Session for Day-1**

Dr. Shweta Yadav, Research Associate, RMOD atNIH Roorkee concluded the workshop sessions for the Day-1. She summarizes the key outcomes, recommendations, innovative ideas and issues discussed and raised during the sessions of the day-1 workshop on the following themes:

- 1) Development and application of NTS Technologies for wastewater treatment,
- 2) Sustainable NTS-based business models at urban, peri-urban and rural settings of India
- 3) And capacity building/awareness programs.

At the end, Ms. Yadav thanked the participants of the workshop for giving their constructive inputs, sharing their vast experiences with the stakeholders and for their meaningful discussions, which added the value to the need assessment workshop.

### **Workshop Proceedings for Day-2 (9<sup>th</sup> August 2019)**

#### **Field Visit: CW at Ibrahimpur Village Haridwar**

A field visit was conducted on the second day of the workshop. The participants were taken to the constructed wetland (CW) site located in the Ibrahimpur village of Haridwar, Uttarakhand. The aim of the visit was to show the pond rejuvenation activity at the village level using the NTS technology (i.e., CW) led by NIH Roorkee (2017-2018). Before the pond rejuvenation, the pond was in poor condition in terms of water quality (i.e., eutrophication, loaded with the contaminants and along with the proliferation of invasive flora species),

odour and water availability. For rejuvenation, the pond underwent the harvesting of invasive species and desilting activity followed by the construction of surface wetland system as part of the natural treatment system for the wastewater treatment by NIH Roorkee. The activity also reflects the capacity building and awareness of NTS technology for wastewater treatment at the village level.



Field Visit to the Constructed Wetland at Ibrahimpur Village in Haridwar, Uttarakhand

**Session VII: Interactive Session and Open Discussion**

In the last workshop session, the overview of the treatment technologies for domestic wastewater was shared by Dr. Rajesh Singh, Scientist C, NIH Roorkee. Giving the basic concepts of wastewater treatment, he also explained the advantages and disadvantages of using particular existing techniques for primary, secondary and tertiary techniques in India. Furthermore, he explained the details of using advanced technologies such as membrane technology and shared the in-field experiences for treating the grey water.

Following the presentation, an interactive session was held which involved range of topics discussed by the participants and active interaction of the stakeholders. Er. Rohit Sambare Scientist B (RMOD) in NIH Roorkee moderated the session Post the session, Dr. Y.R.S.Rao, Scientist G and Head at Deltaic Regional Centre (DRC) of NIH Kakinada, shared his work on High Performance Advanced Septic System (HPAS) for the wastewater treatment in villages and roadside restaurants. The HPAS technology uses the soil mixture blocks (MSL) made up of soil, iron, sawdust and charcoal and zeolite as the permeable layer for the constructed wetland system required zero energy.

Dr. A.B. Gupta, Professor from MNIT Jaipur, suggested the use of hybrid disinfection (chlorine and UV/Ozone) as an attempt to reduce the chlorine dosage and optimize the disinfection process. He further emphasised on the development of cost effective methods for screening of potential disease causing bacteria and pathogens for wastewater reuse. Also, suggested for a biological N removal from wastewater, which is more environmental friendly such as Anammox.

Dr. Indranil de, Associate Professor, IRMA Ahmedabad, recommended for a cost-effective, site-specific and need-based business model for NTS technologies at all levels.

Dr. Dinesh Kumar, Scientist G, FRI Dehradun raised the possibility of using CW system in conjunction with the forest for wastewater treatment.

### **Concluding Remarks**

At the end of the session, Dr. V.C. Goyal, , concluded the workshop. In his concluding remarks, he thanked all the participants for giving their valuable inputs to the Inception cum Need Assessment Workshop for IC-EcoWS. With the growing water crisis, it's the time to siege the opportunities provided by the wastewater as a resource for sustainable development. In order to develop and apply the sustainable business model for NTS technologies, he hoped for the continued communication with the stakeholders for developing the innovative ideas and extended future collaborations at all the levels. He also thanked DST for being the part of the workshop and supporting the IC-EcoWS project initiatives.

A press note was circulated among the media representatives for creating awareness on the project deliverables. Press note is placed at Annexure-III. The news of the workshop was published in regional newspapers.



**Department of Science and Technology funded  
Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)  
Workshop on “Inception cum Need Assessment”  
Date(s): 8 and 9 August 2019  
Venue: National Institute of Hydrology, Roorkee**

**SCHEDULE**

<b>Day 1 : 8<sup>th</sup> August 2019, Thursday</b>		
<b>Time</b>	<b>Agenda</b>	<b>Speaker/Presenter</b>
1000 hrs – 1030 hrs	Registration	
1030 hrs – 1045 hrs	Overview of the work by NIH, Roorkee	Er. Omkar Singh, NIH
1045 hrs – 1100 hrs	Technology Assessment for Promoting Eco-prudent Solutions	Dr. Pradeep Kalbar, IIT Bombay
1100 hrs – 1115 hrs	Overview of the work by IRMA, Gujarat	Dr. Indranil De, IRMA
1115 hrs – 1130 hrs	Constructed wetlands for sewage treatment: relevance under Indian environmental conditions	Dr. A. B. Gupta, MNIT Jaipur
<b>High Tea</b>		
1150 hrs – 1200 hrs	Introduction of Participants	
1200 hrs – 1215 hrs	Overview about the Project IC-EcoWS	Dr. V. C. Goyal, NIH
1215 hrs – 1230 hrs	About R&D Program of DST	Dr. Neelima Alam, DST
1230 hrs – 1315 hrs	Needs and Expectations from the Administrative Authorities	Coordinated By :Dr. Rajesh Singh, NIH
1315 hrs – 1330 hrs	Inaugural Address	Director, NIH
<b>Lunch Break</b>		
1430 hrs – 1445 hrs	Eco-friendly and Sustainable Technologies for Domestic Wastewater Treatment from Indian Perspective	Prof. Nadeem Khalil, AMU
1445 hrs – 1500 hrs	Overview of the work by Blue Drop Enviro. Pvt. Ltd.	Mr. Ganges Reddy, Blue Drop Enviro. Pvt. Ltd.
1500 hrs - 1515 hrs	Overview of the work by Neer Foundation	Mr. Raman Kant, Neer Foundation
1515 hrs – 1530 hrs	Local Experiences – Ibrahimpur Masahi & Jhabrera Villages	Gram Pradhan Ibrahimpur Masahi / Chairman, Nagar Panchayat, Jhabrera
<b>Session Tea</b>		
1545 hrs – 1600 hrs	Session 1 : Wastewater Management in India	Coordinated By: Dr. U. Brighu, MNIT Jaipur
1600 hrs – 1615 hrs	Session 2 : NTS Technologies	Coordinated By: Dr. P. Kalbar, IIT Bombay
1615 hrs – 1630 hrs	Session 3 : Business Model for NTS Technologies	Coordinated By: Dr. Indranil De, IRMA
1630 hrs – 1645 hrs	Session 4 : Capacity Building / Awareness Programs	Coordinated By: Er. Omkar Singh & Dr. N.G. Srivastava, NIH
<b>Session Tea</b>		
1700 hrs – 1730 hrs	Needs Assessment / Open Discussion	Moderated By: Dr. Jyoti P. Patil, NIH
1730 hrs – 1800 hrs	Concluding Session for Day 1	Dr. Shweta Yadav, NIH

<b>Day 2 : 9<sup>th</sup> August 2019, Friday</b>		
<b>Time</b>	<b>Agenda</b>	<b>Speaker/Presenter</b>
0900 hrs – 1300 hrs	Field Visit - Ibrahimpur Masahi, CW NTS	Coordinated by: Dr. Rajesh Singh, NIH
1300 hrs – 1400 hrs	Lunch Break	
1400 hrs – 1420 hrs	Treatment techniques for domestic wastewater	Dr. Rajesh Singh, NIH
1420 hrs – 1500 hrs	Interactive Session– Suggestions/ Learning Outcomes from the participants	Moderated By: Er. Rohit Sambare, NIH
1500 hrs – 1530 hrs	Concluding Session	Dr. V.C. Goyal, NIH
1530 hrs – 1600 hrs	High Tea	
1600 hrs – 1800 hrs	Meeting/Discussion with Project Partners	

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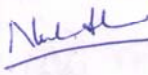
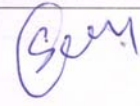




**Department of Science and Technology funded  
Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)  
Workshop on "Inception cum Need Assessment"  
Date(s): 8 and 9 August 2019  
Venue: National Institute of Hydrology, Roorkee**

**List of Participants**

8-9<sup>th</sup> August 2019

**Attendance Sheet**  
**Participants for IC-EcoWS (DST) Workshop 8-9 August, 2019**  
**NIH Roorkee**

**Sponsors/ Partners**

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8-9<sup>th</sup> August 2019**Attendance Sheet****Participants for IC-EcoWS (DST) Workshop 8-9 August, 2019****NIH Roorkee****Participants**

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8-9<sup>th</sup> August 2019

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**Attendance Sheet**  
**Participants for IC-EcoWS (DST) Workshop 8-9 August, 2019**  
**NIH Roorkee**

**NIH Participants**

Sr. No.	Name	Designation and Organization	Email	Mobile No.	Signature
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Department of Science and Technology funded  
 Innovation Centre for Eco-Prudent Wastewater Solutions (IC-EcoWS)  
 Workshop on “Inception cum Need Assessment”  
 Date(s): 8 and 9 August 2019  
 Venue: National Institute of Hydrology, Roorkee

Press Note

**अपशिष्ट जल समाधान पर दिया जोर**

जागरण संवाददाता, रुड़की: राष्ट्रीय जलविज्ञान संस्थान (एनआइएच) रुड़की में गुरुवार को इको-प्रुडेंट अपशिष्ट जल समाधान विषय पर दो दिवसीय कार्यशाला शुरू हो गई है। इसमें विभिन्न प्रदेशों के संस्थानों से 50 विशेषज्ञों एवं अभियंताओं ने प्रतिभाग किया।

कार्यशाला का उद्घाटन एनआइएच के निदेशक डॉ. शरद कुमार जैन ने किया। कार्यशाला में ग्राम इब्राहिमपुर मसाही व ग्राम पंचायत झबरेड़ा की जल समस्याओं के लिए मुख्य रूप से एक सत्र चर्चा-परिचर्चा का रखा गया। जबकि कार्यशाला में एमएनआइटी जयपुर से डॉ. एबी गुप्ता, आइआइटी मुंबई से डॉ. प्रदीप पी कलबर, ईरमा हैदराबाद से डॉ. इन्द्रानिल डे, डीएसटी से डॉ. नीलिमा, एनआइएच से डॉ. राजेश सिंह, डॉ. नदीम खलील, गंगेज रेड्डी, रमन कांत, डॉ. ब्रिघु, ओमकार सिंह आदि ने व्याख्यान दिए। वहीं कार्यशाला के दूसरे दिन संस्थान की ओर से ग्राम इब्राहिमपुर मसाही में नेचुरल ट्रीटमेंट प्लांट तंत्र विधि से विकसित किए गए तालाब के भ्रमण को प्रतिभागियों के लिए विशेष कार्यक्रम रखा गया है। कार्यशाला का आयोजन एनआइएच रुड़की के अलावा



एनआइएच रुड़की में आयोजित कार्यशाला में उपस्थित वैज्ञानिक एवं विशेषज्ञ • जागरण

एमएनआइटी जयपुर, आइआइटी मुंबई और आइआरएमए अहमदाबाद की ओर से किया गया है। संस्थान के अनुसंधान प्रबंधन एवं प्रसार प्रभाग के प्रभागाध्यक्ष एवं परियोजना के समन्वयक डॉ. वीसी गोयल ने बताया कि कार्यशाला में ब्ल्यू ड्रॉप सर्विस प्राइवेट लिमिटेड हैदराबाद, कलेवर ऑर्गेनिक्स देहरादून, आइटीसी लिमिटेड सहारनपुर, पीएसआइ देहरादून, नीर फाउंडेशन, ग्राम पंचायत प्रतिनिधि झबरेड़ा एवं इब्राहिमपुर मसाही, उत्तराखंड पेयजल निगम, उत्तराखंड सिंचाई विभाग, जल संस्थान, प्रदूषण नियंत्रण बोर्ड, जल शक्ति मंत्रालय भारत सरकार के जल संसाधन, नदी विकास एवं गंगा संरक्षण विभाग नई दिल्ली, अलीगढ़ मुस्लिम विवि, एफआरआइ देहरादून, स्थानीय प्रशासन, बुरसईआरसी देहरादून, डब्ल्यूडीटीसी नई दिल्ली आदि के प्रतिनिधि उपस्थित रहे। इस मौके पर डॉ. ज्योति पाटिल, रोहित सांबरे, राजेश अग्रवाल, सुभाष किचलू, राम कुमार, श्वेता यादव, मीता गुप्ता, धर्मनाथ आदि उपस्थित रहे।