

CSIR NEERI's 62nd Foundation Day: 8th April 2020

CSIR NEERI, founded in 1958, continues its progress through the use of science and technologies for societal application. The mandate of our Institute has been to lead from the front in the field of environmental science and engineering, providing solutions as per the Country's needs. We have been able to do so commendably, with the joint efforts of all our scientific and non-scientific staff. Any progress can not be achieved and sustained till we have participation of all who work in CSIR. At this juncture, where the whole world is struggling to deal with a virus pandemic, India, has shown leadership. CSIR institutions have also risen up and taken responsibility to alleviate the situation through their science and technology. We can proudly share that CSIR has few specialised Institutions who are fighting this war, upfront, doing frontiers research in the field and have immediately come forward in this fight against COVID19. Besides them, many CSIR Institutions are directly helping out in logistics, supply and personal care products and some are working with pharma/ chemicals that can be used for treatment. CSIR is working on different fronts with its unique combination of expertise and we are all very proud to be part of it.

CSIR NEERI on its own has been beacon of hope in the field of environment. Based on our past work and current dedicated endeavours, the whole country believes in us. This obviously is not due to a one-day effort that not only judiciaries, but also a common person, corporates, government etc all have faith in CSIR NEERI's technologies and knowledgebase. Our professionalism, combined with neutral and scientific views, has taken the Institute to this level. On the occasion of our 62nd Foundation Day, I would like to thank all our past leaders, scientists, technical and administrative staffs as well as our temporary staff, without whom the journey would be not as satisfying as it is now.

While we move forward, it's essential to recall our past and learn from it so that we move forward with more confidence and vigour. In this journey, it is equally important to acknowledge that there will be some who may not believe the current process, there will be differences of opinion, there could be tribulations of all kinds, however, it's equally pertinent to note that the purpose of CSIR NEERI is not individualistic but our mandate is to meet the aspirations of the country. I would, therefore, urge to excel and do what is needed. CSIR NEERI has become more relevant now and it is essential that we deliver in whatever conditions that we are in. Many of us do not possibly realise that our security of job is not meant to debate and discuss endlessly but to deliver and give more to the society than what we get from government. Some of the great countries who moved from past baggage quickly are those where all individuals worked together as a team for the country. I hope in coming years, we will not only have more challenges but more resolute thinking to take up those challenges. This hope is also hugely driven by many youngsters who join us and work as hard as anyone and give the outputs in line with our mandate. These students, project staffs, and trainees bring that hope and its them as a group, who are spread across 6 locations, who look forward to seniors to guide them in right direction.

The Institute has been able to move in right direction by working to improve scientific understanding and develop and deploy technologies. Deployment of technologies can be seen in terms of use of RENEU in Prayagraj, Green Firecrackers production, Green Highway design and Barren land rejuvenation etc to name a few. On the other hand we have also embarked upon, using our knowledge base, to undertake large and mega studies such as "stubble burning

and impacts; air-shed delineation; non-putrification study of Ganges, lakes studies of Bengaluru and Delhi regions etc.

I am very proud to share that the value of our externally funded projects, has risen from Rs 20-22 crores, ten years ago, to Rs 50-60 crores continuously in last two years. This performance parameter alone, confirms the faith the people of India, the private sector, the judiciary and the Government of India, have in NEERI, and it is indeed a great responsibility to all the staff to deliver as per the country's need. Our publication levels have also risen very commendably and demonstrates that NEERI scientist are doing globally significant work. Technologies transferred and its utilisations have also been many fold higher now with recent technology transfer fetching record value.

I would like to share a few glimpses of the progress of our various divisions. Listed below are the achievements of those who have delivered in the past year.....

Rakesh

Analytical Instruments Division

- Projects undertaken on Design and development of instruments and systems(04) and EIA projects on Noise n Vibration monitoring and mitigation(07)
- Noise Tracker, a noise app developed for social noise monitoring n storage of data on cloud. Creation of in-house facility for noise testing of Fire crackers.

Business Development Group

- Extensive Collaborations established with Industry, Government organisations and Academia with **183 MoUs and Agreements** (MoU=84, Project Specific Agreements=03, NDA=91 and Licensing Agreements=05)
- **Five Technology Transfers to MSMEs** including three 3 new technologies namely RENEU, HRTS and Bio-culture were commercialized. **RENEU was transferred for Highest licensee fee Rs. 2 Cr.** Three new technologies namely Additives for Green Cracker, Multiparameter Kit and MFBR is under process of commercialization. Licensee fee/Royalty collected is 86 lakhs.
- BDG collaborated, supported and participated in several events namely Innovators Meet at NEIST Jorhat, IIT Delhi, South Asian Cities Summit Goa, VED Nagpur, Innopreneurs Startup Contest (5th Edition) Nagpur and several others.

Climate Change and Skilling Divison

- More than 12 Programs (Training, Career Advancement, HR) conducted successfully wherein around 500 participants trained. And request received from International Agencies for conducting Training Programmes in their countries
- Geo-Climatic studies interlinking hydrological and biological impacts
- More than 150 PAs engaged and 125 Trainees deployed for all divisions of the Institute

Cleaner Technology and Modelling Division

- Demonstration of Risk-Pinet application for water supply network safety and management
- Hydrogen Storage and Delivery Prototype for 1 Nm³/h. Industrial interest for Technology
- Mining projects closure audits, Sustainability assessment and training

Director's Research Cell

- Licensing of RENEU technology at a cost of Rs 2 crore. After successful demonstration at Prayag Raj and receiving requests for various new implementations, the licensing was done successfully.
- Used a combination of expertise to contract a number of projects in the field of wastewater management, lake rejuvenation, waste-management, improved materials, damages cost assessment, new emerging contaminants, climate change, metagenomics of river Ganga, soil remediation and outreach programs. This includes two H2020 projects, one of which is coordinated by DRC. **Total ECF generated Rs 1223 lakhs.**
- The Environmental Status Report is a key project where DRC works with various divisions of NEERI. Each year, we take the level further by adding one key concept in detail. This year, extreme weather conditions analysis and mapping all wells in Nagpur (all ten zones) has been done as a novel addition to ESR.

Delhi Zonal Centre

- Assessment of Contribution of Stubble Burning in Haryana and Punjab States on the Air Quality of Delhi – (Draft Final Report submitted to CPCB) – Oct 2019
- Assessment of Heavy Metals and Pesticides in Vegetables Crops Grown on the Flood Plains of River Yamuna in Delhi during Winter Season (Report submitted to Yamuna Pollution Monitoring Committee appointed by NGT) – May 2019
- Launching of Indian Air Quality Studies Interactive Repository (IndAIR) Website on November 6, 2019
- Initiated Study for Evaluation & Upgradation of 13 Existing CETPs and Design for Treatment Plants for Remaining 11 Industrial Areas in Delhi (Stated in Dec 2019) for DSIIDC

Energy and Resource Management Division

- Dissemination of GreenDispo with more than 100 installations and NEERDHUR with more than 1000 units provided to needy households. Licensing of NEERDHUR to three entrepreneurs for wider dissemination and outreach.
- New important projects contracted in the areas of Retrofitment of in-use vehicles; Bamboo Pyrolysis etc. worth more than 3.5 crores of project budget

- High IF of 9.0 publication and design of decentralised Biomedical waste incinerator.

Environmental Biotechnology and Genomics Division

- Eco-rejuvenation of about 125 acre of area using 61600 bamboo plants at different sites of Mahagenco; and in Pandurana, Bhidoni and Goshikhurd villages
- Designed "Green Corridor" plantation along 10km of National Highway comprising of 20000 plants of 65 species for "Ecological Performance Analysis and pollution abatement"
- Licencing of High Rate transpiration Systems for "Green Belt" preparation at industrial sites to M/s SMS Envocare Limited, Nagpur

Environmental Impact and Sustainability Division

- 13 major EIA and Risk Assessment projects in 2019-2020 costing Rs. 1633.49 Lakhs
- Based on our study, mitigating measures suggested and proper Environmental Management Plan, Paradip Port Trust got the Environmental Clearance from MoEFCC for the expansion even after located in the critically polluted Area.
- Carrying capacity Studies for 5 cities in Maharashtra

Environment Materials Division

- **Pyrotechnic formulations developed (30-80% emission reduction) for green crackers (sound and light emitting crackers) :** Emission test facility, RACE project on PPP mode with MOEFCC
- **Solar energy applications (SEA)**
 - Broad Band absorption cell Project funded by NOCIL
 - Multi functional materials and systems for disinfection: silk and MIP and graphene composites and upconversion materials
 - Hybrid Broad Band Absorption PV Cell based Water Electrolysis
- **Waste to Value (WAlUE):** Process for Cenosphere extraction from flyash developed for implementation as PAN India project by NTPC

Environment Virology Cell

- Understanding the non-putrefying properties of River Ganga in both sediment and water
- Biocleaning of Heritage structure. A novel bacterial isolate has been discovered in a natural habitat of the sediment of Indian river, which has the property to reduce Nitrate three times more efficiently than the standard European bacterial isolate for reducing nitrate.
- Geotagging of all water bodies (lake, ponds and tanks) of Puducherry. Total 580 water bodies have been geotagged by CSIR-NEERI. A Jal Abhilekh App has been deployed and given to Puducherry government for monitoring water bodies, finding lost water bodies, and for undertaking desilting work. Almost 200 waterbodies have been successfully desilted and some significant encroachments have been removed, all this has been facilitated by Jal Abhilekh App developed jointly with CTMD.

Health and Toxicity Cell

- Conducted an 15th International Symposium on " Metal ions & Organic Pollutants in Biology, Medicine and Environment" during October 30-31, 2019 which was inaugurated by the Honorable Vice President of India.
- Signed an MoU with VIT, Vellore on 19th March 2020 (VIT officials have signed on dated 19th march 2020 and sent the original to NEERI, witness signatures have been affixed and your approval is pending due to Corona lock down)

Hyderabad Zonal Centre

- Study initiated on the order of Honourable High Court of Karnataka for assessing the pollution status of all Bengaluru lakes
- Study for carrying out the environmental studies of the most prestigious Polavaram Irrigation Project by Government of Andhra Pradesh

Kolkata Zonal Centre

- Emission inventory and SA study of Kolkata and Howrah in Dec., 2019 and based on NEERI's assessments over last 1 year, Govt. of West Bengal has taken several steps in recent past that have led to improvement of air quality in Kolkata and Howrah
- We Assessment and grading of The State laboratory, 5 District laboratories, 5 Sub-District Laboratories of PHED and 5 Sub-District Laboratories (managed by NGOs) of Govt. of West Bengal. KZC has also trained District Consultant, chemists and microbiologists of PHED, Govt. of West Bengal(total number of participants 128 across 5 districts of West Bengal)
- KZC has organized Heath Camps in Arsenic affected villages of Nadia District for identification of Arsenic affected patients. Also given hands-on training to ASHA workers to identify the patients and to create awareness on Arsenic related exposure and health effects among the affected populations (part of DBT project work of KZC)

Mumbai Zonal Centre

- Technology Transfer - Know-how related to Bio-Culture is transferred to Wotastic Solutions Pvt Ltd, Pune. The know how is transferred to All women entrepreneurs start up...!!
- First time designed Decentralized Shallow Sewerage System and Sewage Treatment Plants of Arvi town, Dist. Wardha, Maharashtra- 100% gravity based sewage collection system
- Rejuvenation and Restoration of Lakes using sustainable treatment technology in Raipur, Delhi, Solapur, Thane, Mumbai
- Outreach activities of Jigyasa / conference/ workshop / brainstorming in Mumbai with Government of Maharashtra, Mumbai First, Indian Association of Environment, Nehru Science Centre, Cathedral School etc.

Research and Development Planning Division

- Outreach programmes (S&T interventions for the society, exhibitions, IISF Outreach programme)

- Jigyasa (3 residential programmes and 3 other programmes including student-scientist interactions) for Kendriya Vidyalayas, Navodaya Vidyalayas, Govt. Schools etc
- 18,256 students visited CSIR-NEERI, Nagpur and its Zonal Centres

Solid and Hazardous Waste Management Division.

- National Status of Implementation of Hazardous and Other Waste-Management and Handling Rules 2016
 - As an expert member of NGT-CPCB constituted committee, Surveyed status through all State Pollution Control Boards and suggested modifications with respect to Reuse, Recycle, Treatment and the issue of contaminated sites.
- Training modules for use of Non-POP Alternatives to DDT under the UNEP
 - Development of four training modules for the proposed use of Non-POP alternatives of DDT in vector control. This includes neem based alternatives as well as chemical based alternatives
- Inventory of mercury in waste sector in India under MEFCC-UNIDO initiative as part of compliance to MINAMATA Convention
 - Inventory of mercury in MSW, Hazardous waste , Biomedical Waste, Wastewater, Metal Recycle, Crematorium and Cemeteries, etc. based on actual sampling and analysis.
 - Environmental releases of mercury
 - Mitigation measures and strategic interventions in policies

Technology Development Cell

- carried out a study on Bio-HCNG production from agricultural waste and also determined specific heat of MSW in landfills to understand landfill fire
- Optimised process for utilization of fly ash as bio-compost enhancer and designed plant-mediated MSW landfill closure

Water Technology and Management Division

- Extensive review of about 60 water testing laboratories of UP Jal Nigam for their suitability and upgradation, and initiated operationalization of 61 laboratories. Analysed 12000 water samples
- Applied ASSURED matrix in evaluating various water treatment technologies on request from Ministry of Drinking Water and Sanitation. ASSURED matrix was later applied to benchmarking of select deflouridation technologies and CSIR processes.
- Measurement of sap flow in orange orchards in the N-P Critical Zone Observatory watershed. This is the very first attempt of sap flow measurements for the estimation of water requirement on any tree in India. This will lead to better practice of precision farming to optimise the use of water in watershed characterised by intensive agriculture.
- Government of Jharkhand implementing 300 EDF plants based on NEERI's technology

Wastewater Water Technology Division

- Development and implementation of full-scale salt stream treatment & management and DAF slurry separation systems in slaughterhouse industry.

- Detailed engineering studies for implementation of sewerage system and two STPs for the staff quarters at NHDC Narmada Nagar, Distt. Khandwa, M.P.
- Development of Analytical Methodologies for Determining High and Low Concentration of COD in High Chloride Containing Wastewater. Developed and validated using simulated as well as real world conditions.
- Assessment of Pollution Status of Yenamadurru Drain and Feasibility Study for Establishment of Common Effluent Treatment Plant for Industrial Clusters in Bhimavaram Distt.