Journey of CPHERI-NEERI

YEARS CELEBRATIONS
From CPHERI to NEERI, the opening of new vistas

The activities of the Central Public Health Engineering Research Institute (CPHERI) which were confined somewhat to the limited field of Public Health Engineering have now moved to the national sphere covering broader aspects of Environmental Engineering. The Institute has already made its mark in many of the metropolitan cities in Indian aspects of Environmental Engineering like the Water Pollution problems, Air Pollution problems, Treatment of Industrial Wastes, Analysis of Water Sample etc.

The Prime Minister of India Hon’ble Smt. Indira Gandhi visited the Institute on 3rd January, 1974.
An extract from the speech given by the Prime Minister is given below:-

“This Institute is doing valuable work and its present name is a bit limiting in the sense that people think that it is concerned only with certain some small problems. Now that it is branching out and taking into the range of its activities much larger problems, it should now be called 'National Environmental Engineering Research Institute (NEERI)' . I think, as also the Minister and Dr. Nayudamma too, that the new name is more in keeping with their activities and the position which they now hold in this work not only in India but, as we were told, all over the world.”

In the light of the directive contained in the speech the name of the Central Public Health Engineering Research Institute will henceforth be National Environmental Engineering Research Institute.

62nd Governing Body Meeting : 2nd May 1974
Foreword

Dr Rakesh Kumar  Director, CSIR-NEERI

CSIR-NEERI has completed 60 year glorious service to the society as leading national research institution and has significant contributed to the growth of the industries and transforming lives of common man. As one of CSIR’s premier Institute focussing on the environment, NEERI plays a very important role in defining Leadership in Environmental Science and Engineering for Sustainable Development. I have always believed that sustainable environment practices make a positive contribution to the environmental, social and economic sustainability of the communities they serve.

The journey started in 1958 when serious water pollution episode confronted Delhi, which led to creation of Central Public Health Research Institute (CPHERI) on April 08, 1958, to assess and counter issue in public health domain under the umbrella of Council of Scientific and Industrial Research CSIR, by the then Prime Minister Pandit Jawaharlal Nehru. Initially the environmental concerns were limited to human health with focus on water supply, sewage disposal and communicable diseases. Later, world-wide public awareness on the environmental degradation started getting attention and CPHERI was renamed as National Environmental Engineering Research Institute (NEERI) in 1974, by the then Prime Minister and President CSIR, Smt. Indira Gandhi, to encompassed the entire vistas of R&D in the field of Environmental Science and Engineering. While the institute started its journey primarily to address issues related to water pollution control, later entries into the air and land environment made it encompass all the major domains of environment.
Currently, the Institute, in-line with the vision, mission and policy of CSIR, delineated trust areas for R&D comprising of Air Pollution Monitoring and Control, Water Technology and Management, Climate Change, Cleaner Technology and Modelling, Energy and Resource Management, Environmental Biotechnology and Genomics, Environmental Health, Environmental Virology, Environmental Impact and Risk Assessment, Environmental Materials, Solid & Hazardous Waste Management, Strategic Urban Management, Wastewater Treatment Technology. Presently, CSIR-NEERI is functioning with Headquarters at Nagpur and five Zonal Laboratories located at Mumbai, Kolkata, Delhi, Chennai and Hyderabad.

We believe it is our responsibility to continue be involved in providing sustainable solution to the challenging environmental pollutions problems and develop robust environmental solutions that target productive and sustainable use of natural resources. Our Honourable Prime Minister and Chairman, Shri Narendra Modi, said on the occasion of the CSIR Platinum Jubilee celebrations that, “History bears witness to the fact that no nation can develop, unless it has the benefit of science and technology” and CSIR-NEERI has always been a front-runner in developing cost-effective and need based and bio-inspired technological innovations suitable to socio-economic conditions prevailing in the country in a sustainable, inclusive and people centred manner. NEERI significantly contributes to policy making, environmental regulations, and implementation through active participation in various National and State level expert committees constituted by Ministries and Regulatory agencies.

The Institute will continue to reap even more fruitful achievements in coming year through untiring efforts of its dedicated team to promote government and private sector initiatives and strengthen local, regional and national capabilities to address urban and industrial pollution, and implement pollution prevention and waste minimization programmes. CSIR-NEERI would continue to advance innovations in environmental science and engineering.

The compendium being brought out on the occasion of Diamond Jubilee Celebration of the Institute gives a decade wise details of significant achievements with contributions made by the institute in the last sixty year and aims to display the expertise and technologies developed at the institute that can be used as ready solutions to address environmental issues plaguing the country. I am confident that this compendium will serve as a suitable vehicle for disseminating wide knowledge of the contributions and capabilities of the Institute. I hope that with the support of Government of India, State Government, CSIR, Industries, CPCB, SPCBs, valued Stakeholders and our society, the Institute will rise in defining the path to address emerging environmental challenges. The focus of the Institute will be for developing end to end environmental solutions and keep the focus of CSIR NEERI as a place for “Society driven Solution through use of Science and Engineering.”
VISION
Leadership in Environmental Science and Engineering for Sustainable Development

MISSION
NEERI would continue to strive for providing innovative and effective solutions for environmentally sustainable development and to help government, industry and the society, especially the 800 million underprivileged people of India.

Core R&D Areas
- Air Pollution Control
- Water Technology and Management
- Climate Change
- Cleaner Technology and Modelling
- Energy and Resource Management
- Environmental Biotechnology and Genomics
- Environmental Health & Toxicity
- Environmental Virology
- Environmental Impact and Risk Assessment
- Environmental Materials
- Solid & Hazardous Waste Management
- Strategic Urban Management
- Water & Wastewater Treatment
A journey of invention, conservation, and nation building

Over the past 60 years, CSIR-National Environmental Engineering Research Institute (NEERI) has pioneered innovation to provide effective solutions to increasingly hazardous environmental and natural resource problems. Its R&D activities, that developed a host of technologies strive, to check environmental degradation for the ultimate goal of sustainable development. In this endeavour, NEERI dedicates itself to mankind and the nation.
Green Area: 75%*
Built-up Area: 25%*
Significant Achievements

1. Project
   Completed: 2400 +

2. Publications
   : 1895 +

3. Patents
   - National
     a. Filed: 135 +
     b. Granted: 84 +
   - International
     c. Filed: 74 +
     d. Granted: 53 +

4. Design Registrations
   a. Filed: 19 +
   b. Granted: 10 +

5. Technology
   a. Developed: 20 +
   b. Transferred/Commercialised: 7 +
   * Last five years

6. Active MoU
   a. Government/PSU: 25 +
   b. Private Industry/ Organisation: 192 +
   c. Academic: 29 +
   d. NGOs: 5 +

7. Scientist-Students Connect*
   a. Students Benefited: 65,000 +
   b. Ph.D. produced: 50 +
   * Last five years

8. Outreach and Training Programme*
   a. Outreach programme beneficiaries: 10 Lakhs +
   b. Training programme: 20 +
   c. Workshops & seminars: 80 +
   d. Industry persons trained: 650 +
   * Last five years
International Partnerships

1. Austria
2. Switzerland
3. Japan
4. Australia
5. Saudi Arabia
6. France
7. USA
8. Czech Republic
9. Italy
10. UK
11. Spain
12. Denmark
13. Singapore
14. Netherlands
15. Israel
16. Ireland
17. Cyprus
18. Ethiopia
19. South Africa
20. Germany
21. Canada
22. Republic of Korea
23. Hong Kong
24. China
25. Brazil
26. Sweden
27. Nepal
28. Bangladesh
29. Thailand
30. Estonia
31. Portugal
32. Finland
Contributing to India’s National Missions

**Namami Gange**
- Special properties of river Ganga
- Monitoring of river water quality
- River rejuvenation through natural treatment systems

**Swasth Bharat**
- Phytored for sewage treatment
- Air pollution control and health benefits
- Solar water disinfection
- Electrolytic
- Defluoridation
- Iron removal plants
- Chemo-Defluoridation
- Improved multi-fuel cookstove

**Smart Cities**
- Water safety plans
- Lake restorations
- Wastewater recycle reuse
- Plantation for degraded lands

**National Green Highway Mission**
- Strategically designed green belt development
Decadal inclusions in theme

Objectives Pursued 1958 to 2018

1958...
Water and wastewater treatment, potable water disinfection, public health engineering and removal of heavy metals

1968...
Air monitoring and development of sampling devices, waste disposal, industrial wastewater treatment, international networking and Nalgonda Technique

1978...
Solid waste management, epidemiological studies, fugitive emissions monitoring, resource recovery based water treatment systems design, environmental materials

1988...
Environmental impact and risk assessment, hazardous waste management, catalytic converters, cleaner technology and systems modelling

1998...
Carrying capacity based studies and planning, river rejuvenation, genotoxicity and health, indoor air pollution, ground water studies, phytoremediation, waste to energy, remote sensing and GIS, source apportionment studies

2008...
Clean energy, chemo-bio-remediation, bio-mitigation, frugal and need based technologies and environmental solutions for society, noise monitoring, waste to value, skill development

2018...
Strategic urban planning, environmental damage cost assessment, big data analysis, in situ-nallah treatment, climate sustainability, technology incubation and entrepreneurship development
It is heartening to learn that the Council of Scientific and Industrial Research (CSIR) is organising a brainstorming session - Closing the Loop: Sustainable Environmental Challenges to celebrate the 61st Foundation Day of CSIR-National Environment Engineering Research Institute on April 8, 2019.

The socio-economic growth and progress of the nation depend upon research and development in the field of science and technology. Our scientist must reorient science and technology in a manner that its benefits reach the poor and the disadvantaged sections. CSIR-NEERI have been serving the society and the nation over the last six decades and it’s scientists have been contributing their mite on issues such as enhancing energy efficiency, water security, management of solid waste and working with other organisation to control air pollution.

The international conference being held on the occasion will provide the gathering of experts to share with each other the best practices as well as recent advancement and experiences in science and technology. I am sure that the session will come up with practical suggestions to optimise the benefits of science and technology. Best wishes for the celebration of 61st Foundation Day of CSIR-NEERI. I am sure that the brainstorming will be a singular success.

Narendra Modi
I am very happy to hear that CSIR-NEERI has completed 60 years of service to the nation and is bringing to the fore, a subject that I strongly believe in. “Closing the Loop”. A sustainable society can only function when we close this loop. The challenges that face us today are to develop solutions that minimize waste and mitigate the environmental damage.

This one day brainstorming will bring together experts in different domains to understand bottlenecks in the existing policies and develop theme areas to focus research on. The brainstorming would highlight the grand challenges w.r.t. River Rejuvenation, Solid Waste Management, Biodiversity losses and Climate Change. I have always believed that development of end to end environmental solutions is necessary to bring forward indigenous low-cost technological innovations and to guide policy and regulatory frameworks to cope with challenges of environmental management in India.

I understand that this brainstorming aims to develop environmental solutions depending on the Nation’s need. This is a great initiative. Sharing perspective and current practices will go a long way in defining the path to address emerging environmental and ecological challenges including implementation of sustainable technologies & interventions. I personally support and look forward to this conference. I wish the conference a grand success.

(Dr. Harsh Vardhan)
I am happy to know that CSIR-NEERI is celebrating its 61st Foundation Day on 8th April 2019 at Nagpur and on this occasion, CSIR-NEERI is organizing one-day Brainstorming Session on “Closing the Loop”. CSIR-NEERI has been striving to develop itself into an institution of excellence in R&D in the area of environmental science and engineering in consonance with the contemporary and future needs of India. The institute has always been making special efforts to provide effective technological solutions to various environmental problems of the country.

I have learnt about many cost-effective and resource recovery based technologies developed by CSIR-NEERI, which are suitable to boost socio-economic development in the country. The institute has also made immense contribution to the grand challenges of India including the Wastewater Treatment, Ganga River Rejuvenation and Air Pollution Control. I am sure that the discussions during the brainstorming session will help us in defining the path to address emerging environmental challenges and their end-to-end solutions to guide policy and regulatory frameworks in India.

I extend my best wishes to TEAM-NEERI.

[ Shekhar C. Mande]  
New Delhi
Sustainable environment practices make a positive contribution to the environmental, social and economic sustainability of the communities they serve. During my association with CSIR as Director General (Additional Charge), I have learnt about the CSIR-NEERI's contribution towards developing need based and bio-inspired technological innovations in a sustainable, inclusive and people centred manner. CSIR-NEERI has also aligned several of their programmes with the Government of India's ambitious national missions such as Swachh Bharat, Swasth Bharat, Startup India, Make in India, Skill India etc.

The R&D works at NEERI has addressed many of the problems the progress in the field of science and technology society is facing now and developed cost-effective and resource recovery based technologies, which are suitable to boost socio-economic development in the country. I was very happy to hear that CSIR-NEERI has completed 60 year of service and look forward to the event on “Closing the Loop”. I am sure that the discussions during the event will help us in defining the more synergy in scientific and technological developments to touch the lives of common people.

Best wishes on CSIR-NEERI’s 60 years journey

Ashutosh Sharma
I am very happy to learn that CSIR-NEERI is celebrating its 61st Foundation Day this year. CSIR-NEERI has come a long way since its inception and has been contributing towards providing solutions to various scientific challenges facing the country. Being an Apex level Institution, it is leading research on new and emerging challenges, especially in the field of air and water quality.

I wish CSIR-NEERI success in its endeavour to meet environmental challenges. My best wishes to CSIR-NEERI on its Foundation Day.

Warm regards.

S. P. Singh Parihar
CSIR-NEERI is a unique and premier institution entirely focussed on the issues related to environment. It has enriched our understanding of these issues through pioneering studies and has provided invaluable support in framing our environmental policies and practices, so that we can sustainably pursue development goals.

CSIR-NEERI and Maharashtra Pollution Control Board (MPCB) have a long partnership in tackling environmental issues in Maharashtra. NEERI has helped MPCB in improving pollution measurement technologies and in devising pollution abatement programs. Recently NEERI has provided reports on river rejuvenation, on improving the air quality in 10 non-attainment cities, in noise mapping and in several other areas.

On the occasion of diamond jubilee of this premier institution, I take this opportunity to congratulate and thank all those who have worked to create and nurture this institution. We also look back with satisfaction and pride on the work we have done together with CSIR-NEERI and look forward to a continuing and fulfilling association in the cause of environment and sustainable development.

Sudhir Shrivastava
Chairman
I am very happy to note that the CSIR-National Environmental Engineering Research Institute is organizing a one day Brainstorming Session on “Closing the Loop : Sustainable Environmental Challenges” on April 8, 2019 to celebrate its 61st Foundation Day. My greetings to you and your colleagues for providing innovative environmental solutions during the last sixty years.

CSIR - NEERI has been on the forefront in developing technologies for managing solid and hazardous waste, wastewater treatment, air pollution as well as environmental impact assessment. The recent thrust on “Sustainability” has focused attention on the end-to-end approach. CSIR-NEERI is an acknowledged leader in the field of environmental science and engineering.

This century is witnessing major environmental changes because of various anthropogenic activities, mainly due to use of fossil fuel for energy and land use changes. It is necessary to focus our attention on these challenges to ensure sustainable development.

I think it is the right time to develop our strategy for the next decade so that we can achieve ‘Sustainable Development Goals’ by 2030. I am sure this brainstorming session will provide a platform to discuss such environmental challenges and provide direction to undertake a transformation towards solution-oriented science.

I wish all success to this Session.

With warm regards,

Shailesh Nayak
I am pleased to learn that CSIR – NEERI is organizing one day brainstorming, “Closing the Loop: Sustainable Environmental Challenges” on 8th April 2018, to celebrate its 61st Foundation Day and to commemorate its contribution to the society.

With growing stress on environment, there is always ever increasing expectation on CSIR-NEERI for its contribution to environment protection. Therefore, the future is to evaluate all its activities from sustainable development perspectives. I am pleased to note that most of CSIR-NEERI activities cover the Sustainable Development Goals set by the Government of India.

I am extremely pleased to state that CSIR-NEERI continues to contribute (as it was being done since its inception more than six decades ago) to the national policies through its active participation in various national and state level committees and activities. It has also played and continues to play a significant role in India’s development in a sustainable way, particularly through its research and technical services for air, and land environment protection and carrying out Environment Impact Assessment for a variety of projects, both Brownfield and Greenfield projects diligently.

Best wishes to CSIR-NEERI and its staff on its 61st Foundation Day.
Dr. S. R. Wate
Ex-Director, CSIR-NEERI

It is a great achievement for any organization to complete glorious 60" years in the service of Nation especially in the area of Environment and ecology. Institute has evolved into a great organization providing dynamic R&D and technological solutions to environmental problems, the country has faced and will continue to do so through its sustained and effective contributions through need based R&D and policy interventions.

Industry, Government and the judiciary have been major beneficiaries of R&D solutions delivered by NEERI almost in every component of the environment viz. atmosphere, biosphere, lithosphere, Hydrosphere or geoscience. Technologies of NEERI either preventive, control or remediation, have been well received by Industry as well society for Air (prevention and control of pollution) water including drinking water and wastewater, Solid and hazardous waste and ecology. Focus on Recover, Reduce, Reuse and Recycle is evident in Technology solutions generated by NEERI.

Current environmental challenge is restoration of environmental and ecological degradation through preventive and remediation technologies. I am sure, NEERI through its R&D program will showcase its strength to the environmental Science and engineering professionals and the society during this International conference.

Best wishes to CSIR-NEERI
It is indeed a pleasure to note that CSIR-NEERI is organizing one day brainstorming, titled “Closing the Loop: Sustainable Environmental Challenges” on April 08, 2018, to celebrate its 61st Foundation Day of CSIR-NEERI.

The core issue in sustainable development is carrying capacity based planning process which encompasses assessment of supportive and assimilative capacities considering grand environmental challenges (Conservation and Protection of Water and Supply of Safe Drinking Water to All, Clean Air, Recycle and Reuse of Solid and Hazardous Waste and Residue Management, Biodiversity Conservation and Protection and Adaptation to Climate Change and Its Mitigation wherever applicable). These are sine qua non for meeting environmental challenges leading to sustainable development.

CSIR-NEERI’s contribution towards industries and society for last few decades is considerable and data mining from the Institute’s EIA and other reports will reveal that the Institute has sufficient information to share with the regulatory agencies of the country and policy makers to guide them in the right direction.

Best wishes
60 years journey of CSIR-NEERI
Key Highlights
CPHERI

1958-1963

- Clarification of river derived waters
- Rheological survey of the Yamuna river between Wazirabad and Okhla at Delhi
- Quantitative signification of plankton growth in relation to water quantity
- Signification and value of biological indices of water pollution in Yamuna river
- Sewage farming
- Technical Corporation Mission, USA for training young scientists in public health engineering
- Activated carbon from saw dust for removal of fluorides in water
- Laboratory scale studies for treatment of liquid industrial waste
- Development of clariflocculators to reduce detention period of the clarification
- Activated sludge process – Air diffuser for sewage purification
- Portable water demineralizing unit
- Removal of E. histolytica cyst (Amoebic Cysts) from water
- Development of high capacity deflouridating substance by sulphonating saw dust
- Oxidation ditch for community level sewage treatment
- Assistance in Industrial hygiene equipment development
- Study of smokeless chullahs
- Disinfection of drinking water wells
- Study of pilot cow dung gas plant
- Estimation of sulphate ion in water
- Estimation of hexavalent chromium in water
- Pilot plant design for treatment of tannery waste
1963-1968

- Dairy waste treatment by oxidation pond method
- Chlorination of well waters
- Economical dome gobar gas plant in family size
- Development of cartridge decontaminator
- Tile plate diffusor pilot plant
- Removal of hydrogen sulphide from sludge gas
- Pilot plant for higher rate digestor of sludge
- Detection of virus in drinking water
- Treatment of viscose rayon waste for zinc recovery
- Evaluation of bacteriophages as possible indicator of virus pollution
- Characterisation and treatment of distillery waste
- Pilot plant design for night soil digestion
- Development of automatic sampling devices and Mercury thermoregulatory
- Mono – tube and Twin – tube electronic relay circuit
- Development of design for water treatment plant
- Solar still design criteria and development
- Urinary excretion of manganese as a probable measure of exposure to manganese
- Design criteria and economics of vertical flow sedimentation tank of pulsator type
- Design of hydro cyclone for the removal of turbidity of river water and fabrication of solid chemicaldozers
- Brush aeration oxidation ditch studies on contact stabilization of sewage and industrial wastes
- Production of hydrogen sulphide from sulphate enriched sewage sludge
- Treatment of high explosive factory waste
- Removal of lignin from paper mill effluents
- Microbiological studies on aviation turbine fuels
- Development of a dynamic constant concentration gas chamber
- Portable grab sampling kit for collection of gaseous pollutants
1968-1973

- Development of indigenous coagulant aids from natural products
- Cartridge, drip and syringe chlorinators for disinfecting wells and small water supplies
- Stabilization ponds design for sewage treatment
- Air pollution monitoring and assessment in big industrial cities including Delhi and Bombay
- Multi-gas sampling kit for simultaneously four or more gases
- WHO regional reference on air pollution for five years
- Zonal centres at Bombay and Madras
- Pilot plant for defluoridation of drinking water at Nalgonda (AP)
- Pilot Plants: Pasveer type oxidation ditch and mechanically aerated ditch for treating domestic sewage
- Design, construction and operation of waste stabilization ponds in India
- Survey of air pollutants in eight major cities in the country
- Development of tablets for on-the-spot disinfection of drinking water
- Industrial waste treatment for fertilizers and phenolic/chemical refinery waste
- Development of membrane Filters CPHERI chloroscope for quick estimation of residual chlorine in water
- Cultivation of essential oil bearing plants using sewage influent
- Composting and disposal of city refuse
- Nomination by WHO as collaborating institute in community water supply and waste disposal
- Transfer of know-how on Defluoridation of water to Tanzania
- Iron and manganese removal from water
- Health status of sewage farm workers
- Development of Synthetic medium for bacteriological analyses
- National air sampling network to formulate emission standards under Indian condition

- Industrial air pollution survey
- Development of flow sheet for treatment of pulp and paper mill wastes
- Denitrification of nitrate bearing wastes
- Carbon chloroform extraction (CCE) unit for estimation of low concentration of organics
CPHERI/CSIR-NEERI

1973-1978

- Development of air pollution monitoring instruments for suspended particulate matter to substitute imported higher volume air sampler
- Low cost waste treatment (pilot) plants
- Determination of toxicity potential of plastic pipes
- Development of field flush latrine
- Use of soil culture for the biological treatment of cyanide bearing wastes
- Development of media to replace the imported dehydrated media

As CSIR-NEERI

- Designed of rural water supply & solid waste management schemes
- Rural sanitation programme to evaluate rural latrines
- Feasibility study on mechanical composting of city refuse along with sewage sludge
- Development of Nalgonda Technique for removal of fluoride from water
- Development of a method for concentration of viruses from large volumes of water
- Poison removal kit for removal of heavy metals & TDS
- Development of biological disc for COD reduction
- Pilot water supply scheme with slow sand filtration under integrated water rural water supply & sanitation project
- Colour removal studies on pulp and paper mill wastes at Tulu, Nagaland
- Treatment of slaughter house wastes by anaerobic filter
- Development of temperature humidity index meter
- Development of rapid test for detection and enumeration of faecal coliforms in polluted waters
- Scale up of chlorine ampoules to pilot plant level & transfer of know how
- Production of disinfection tablets on pilot scale & transfer of know how.
CSIR-NEERI

1978-1983

- Studies on working of hammer mills for size reduction of city refuse
- Designed of multi-chamber incinerator to burn solid waste
- Biogas generation from cow dung and other organic materials
- Standardization of tracer measurement techniques and evaluation of interference from oxidizing and reducing agents, turbidity, algae and other particulate matters
- Monitoring of residual pesticide in water, air and non-vegetarian foodstuff
- Designed & Development of multi-gas sampling kit for ambient air monitoring, high volume sampler for SPM & that sampling gadget for dust collection
- Development of small cake filters (porous cake pressure filters)
- Studies on cellulose degradation and mineralization of nitrogen during aerobic composting
- Biogas production from cow dung: Acceleration or increase through additives
- Treatment of urea and ammonia bearing wastewater from fertilizer industry
- Mercury monitoring from a chlor-alkali plant
- Quantitative biological assessment of pollution biotic index
- Toxicity studies on certain heavy metals to aquatic food chain organisms
- Estimation of copper, cadmium, lead and zinc by anodic stripping voltammetry technique
- Evaluation of rural water schemes in India
- Analysis, assessment and treatment of toxic discharges from phosphatic fertilizer and basic organic chemical industries
- Detoxification of phenol and cyanide bearing industrial wastes by biological methods for pollution abatement
- Waste water reclamation through aqua-culture and agriculture
- Development of ion selective electrode techniques
- Epidemiological and engineering investigation of the incidence and prevalence of human centric parasites
1983-1988

- Studies on synthetic membranes of environmental engineering utility other than reverse osmosis
- Impact of fugitive and stack emissions from selected industries on neighbourhood air quality
- Biological treatment plant for low temperature carbonization (L.T.C.) waste at Naspur (A.P)
- Performance evaluation of water treatment plants in India
- Anaerobic digestion of municipal solid waste
- Use of algae in abating pesticide pollution
- Treatment of wastewaters from the explosive factory
- Biophysical techniques for the removal of total organic carbon from industrial wastewaters
- Analytical techniques development for continuous monitoring of water quality
- Waste water engineering to study treatment of dairy waste
- Sulphur hexafluoride tracer technique development for validating diffusion models in India
- Reuse of Sewage effluent for general industrial use
- Development of method for quantitative estimation of sulphur compound in air.
- Treatment of wastewater from major dye manufacturing processes
- Studies on fish breeding in sewage fed ponds
- Development of instruments for environmental monitoring including automatic liquid sampler for collecting water and waste water sample
- Development of portable kits for water quality analysis
- Establishment of central water laboratory
- Assessment of ambient air quality and stack emission
- Impact assessment of Ganga action plan on public health
- Technology mission on drinking water for problem areas and water management
- Baseline air & water quality studies and environmental impact assessment studies
- Community intervention kit for insects/rodent control, expansion, and revision
- Selection of appropriate non-regenerating and regenerating type of desulphurisation process for controlling SOx emissions
- Comprehensive environmental impact assessment study for the refineries and power plants.
1988-1993

- Design and development of auto-exhaust smoke meter prototype
- Two stage size fractionator (respirable dust sampler) for ambient air monitoring
- Development of low cost/alternative pollution abatement system
- Field testing of rapid faecal coliform analysis kit for water analysis
- Biomethanation studies based on fixed film reactor technology for treatment of waste water
- Development of automatic sequential air sampler
- Development of two stage size – fractionator dust sampler
- Audit of global environment monitoring stations in South Asian countries
- Application of Natural recombinant microorganism to bio-surfactant production, oil spill degradation and pollution control.
- Clean-up of sediments from solar evaporation pond and UCIL Bhopal, waste sludge from aluminium smelter
- Development of indigenous catalytic converter technology and environmental system modelling software.
- Environmental impact and risk assessment of offsite emergency preparedness plan, environmental management plan and environmental audit of industry projects.
- Environmental policy analysis for cleaner technology
- Design and development of monostatic SODAR for atmospheric layer study.
- Portable instruments for monitoring water quality parameters
- Recombinant DNA application through anaerobic fix film systems for methane biosynthesis.
- Toxic waste management of industrial chemicals and oily waste
- Evaluation of polyaluminium as a coagulant in water treatment, fuzzy description of river water quality and agreement index for water consumption
- Air pollution studies to redefine Taj trapezium, risk assessment studies
• National ambient air quality monitoring of ambient air in ten Indian cities
• Multiplex PCR technique for environmental monitoring, rapid risk assessment of chemicals and waste
• Guidelines for treatment and disposal of hazardous waste generation, treatment, assessment and disposal practices at UCIL Bhopal and Kanpur
• Oceanographic and water quality modelling at Bombay and development of knowledge based system for environmental impact assessment to industrial project
• Environmental impact studies in oil exploration and petroleum industry, chemical industry and mining sector
• Development of framework of World Bank and MEF assisted network of clean technologies for industrial production
• Environmental impact studies at Antarctica
• Surveillance of aerobic pollutants and development of national protocol for evaluation of toxicity in industrial effluvia
• Carrying capacity based development planning studies in NCR, Tapi estuary and Damodar basin, natural resource accounting in Yamuna sub basin
• Design and installation of CETP at Pali
• Duplex reverse transcription PCR (RT-PCR) for simultaneous detection of Hepatitis A and E-viruses from drinking water samples in Mumbai
• Toxic waste management at refinery and environmental assessment of toxic waste
• Development of flyash based zeolite, reclamation and vegetation of mine spoil and flyash dumbs through integrated bio-technological approach
• Environmental audit for textile, steel, aluminium industries and iron and coal mines
• Natural resource accounting in Yamuna sub basin, lifecycle assessment of steel sector, examination of sustainability and environmental viability.

• Development of chemical, biochemical process for treatment of industrial emissions containing sulphur dioxide and oxides of nitrogen
• Design and development of integrated module for pH, DO, temperature conductivity and TDS measurement
• Monitoring of volatile organic compounds in urban air
• Genotoxic risk assessment of industrial hazardous waste
• Leachability studies of industrial solid waste
• Evaluation of environmental management system (EMS) in different industries.
• Assessment of impact of wastewater discharge on river water quality
• Carrying capacity based developmental planning.
• Study of the quantum of particulate dispersion from mining activity and its impact on crops
• Environmental management plan for Rejuvenation of the stretch of river Yamuna in NCT
• Use of tracers and environmental isotopes in surface water pollution studies
• Study on the effects of high solids and nutrients on the treatment of Abattoir waste.
• Rapid Genotoxic & Carcinogenic Risk Assessment of Hazardous Chemicals & Wastes.
• Chemo biological desulphurization system for SRU tail gas.
• Restoration of bio-diversity on overburden dumps and backfilled areas using integrated bio-technological approach
• Turnkey implementation off water supply, waste water and solid waste management systems for resettlement scheme
• Surveillance of drinking water quality in selected cities & impact of on-site sanitation systems on quality of ground water and surface water sources.
• Solidification & Stabilization of Electroplating waste.
• Control technologies for indoor air pollutants and volatile organic carbon emissions
• Uncertainty reduction in methane emission factor for preparation of initial greenhouse gas emission inventory from MSW landfills
• Use of tracers and environmental isotopes in surface water pollution studies
• Investigation into the occurrence of microbiological problems in water supply system & evaluation of water treatment plant
• Solar photocatalytic treatment for colour removal from textile wastewater
• Phytorid technology: A natural technique for wastewater treatment
CSIR-NEERI

2003-2008

- Biomethanation of municipal solid waste: a two phase approach
- Study of surveillance of drinking water quality in twenty five selected cities/towns in India
- Study on environmental contamination with Polychlorinated Dioxins viz. TCDDs
- Design and development of on-line water quality monitoring system
- Studies on selective alum recovery from clarifier sludge utilizing solid-liquid ion exchange techniques
- Development and validation of water quality index in India
- Decolorization, biodegradation and detoxification of benzidine-based azo dyes in a biological treatment system
- Biological deodorization of industrial emission containing pyridine on pilot scale
- An integrated green chemistry approach for the treatment of high organic containing wastewater
- Optimization of bins location and size (based on solid waste generated): a GIS-based approach
- Development of catalytic material for diesel exhaust emission control
- Air quality monitoring and emission source apportionment studies
- USEPA and NEERI collaboration on joint drinking water laboratory strengthening work: Preparation of guidance manual
- Technical strengthening of PHED- MP/CH UNICEF Bhopal/NEERI collaboration of effective delivery of TSC/SD
- Development of novel photocatalytic materials for water splitting reaction
- Development of techniques, exploration, assessment and management of groundwater in hard rock areas
- Environmental impact assessment for proposed sector specific special economic zone
- Study of post-clearance environmental impacts and cost-benefit analysis of power generation in India
• National ambient air quality monitoring for six Indian cities, viz. Chennai, Delhi, Hyderabad, Kolkata, Mumbai and Nagpur
• National level monitoring of pesticide residue in ground water
• Catchment Area Treatment (CAT) plan for mining projects
• Soil CO2 efflux study for varied land use type/pattern for developing ecological compatible design
• Effluent Treatment through High Rate Transpiration System (HRTS)
• Biodegradable plastics production from wastewater using activated sludge
• Chemo / Bioremediation: An oxidative pre-treatment and metagenomic / metaproteomic approach
• Composition (RCUD) for protecting and/or repairing DNA from oxidative damages
• Bio-mitigation of CO2 calcite formation and simultaneous biodiesel precursors production using Chlorella species
• Design, development and field testing of solar energy based electrolytic de-fluoridation unit for portable water supply
• Hand pump (HP) attachable iron removal (IR) plant
• “NEERI-Zar” domestic iron removal unit
• Two stage bio-oxidation (TSB) process for enhanced treatment of effluent from an agrochemical industry
• Development of electronic nose for monitoring of obnoxious odorous constituents generated from pulp and paper industries
• Production and recovery of bio-flavours from damaged cull fruits and biomass – A Rural technology
• Review of emission standards and preparation of comprehensive industry document (COINDS) on manmade fibre industry
• Development of GIS Based noise simulation software: N-GNOIS
• Zero liquid discharge system based on two stage SBR process for effluent treatment in agrochemical industry and full scale implementation
• Improved Phytorid systems developed through studies on nitrogen and carbon dynamic in a wetland ecosystem and varied applicability of a constructed wetland system

• A mechanical automatic urinal-toilet flusher, and its mechanism thereof
• Tourist impact assessment and carrying capacity study for environment protection of world heritage sites
• Development of improved oxygen carriers for cleaner energy generation through Chemical Looping Combustion (CLC)
• Geo-spatial web application for zone and site selection of groundwater recharge: N-GWAR
• Environment-friendly strategy for waste management in India, utilizing cement and concrete production technology
• Pilot and full scale implementation of electro-oxidation pre-treatment of segregated wastewater at CETP
• Development of Bamboo Diversity on Degraded Land for Sustainability in rural areas through the Microbe Assisted Green Technology (MAGT)
• Technology demonstration and scale up of improved circular secondary clarifier (Hydroplumner) for domestic wastewater treatment
• Natural water system and treatment technologies (NaWaTech) to cope with water shortage in urbanised areas in India
• Remediation of heavy metal contaminated soil and sludge using biosurfactants
• Development of improved multi-fuel cookstove
• Advanced oxidation processes for treatment of membrane rejects
• Evaluation / development of recovery and recycling processes / practices for the recovery of valuable material from E-waste
• Mass scale Spirulina protein production and food supplementation for common man
• Bio engineering – A phytoremediation option for the mitigation of landslide and slope stability problems in the hilly regions
• Molecular Environmental Science and Engineering Research
• Development of real time wireless embedded multi-sensor systems for monitoring and analysing water quality parameters
• Assessment of water quality and sediment Analysis to understand the special property of Ganga River
• Landfill Fire Control Mechanism through integrated approach
• Development of pollution abatement strategies for rejuvenation of the river system
• Management plan for restoration & protection of lakes and other water bodies
Scientific and Technological Voyage of CSIR-NEERI

In service of the society with effective and affordable solution since 1958
Building India – Accelerating Innovations
PHYTORID for Wastewater Treatment

**Salient Features**
- Decentralized, cost-effective wastewater treatment system, using constructed wetland process applied for lake and nallah rejuvenation
- Currently being used in remediation and restoration via natural and sustainable system of the identified 83 water bodies in Delhi

RENEU: Restoration of Nallahs Using Ecological Units

**Salient Features**
- In-situ nallah treatment by natural attention based engineering treatment technology
- Cost effective decentralized treatment for in-Situ treatment of flowing drains ensures removal of floating garbage and suspended solids, bio-degradation of organics and removal of excessive nutrients like Nitrogen and Phosphorus
- Applied at 6 drains in Jhansi, Prayagraj, before the Kumbh Mela
Improved Firecrackers for Reduced Emissions

Salient Features
- Safe water and air releaser: SWAS
- Safe thermite cracker: STAR
- Safe minimal Aluminum cracker: Safal
- More than 200 MOUs signed with firework manufactures

Solar Energy Based Electrolytic Defluoridation

Salient Features
- Suitable for treatment of raw water with fluoride concentration up to 10 mg/L
- Quantity of sludge produced is 60-70% lesser than conventional treatment methods
- Capacity: 2000 L per batch in 3-3.5 hours
- Know how transferred to 11 private agencies
- More than 100 plants installed in fluoride affected areas
NEERDHUR: Domestic Multi-fuel Cook Stove

Salient Features
- Improved adjustable fuel grate for multi-fuel applications
- Improved combustion chamber designs
- Thermal efficiency: 30% - 42%
- More than 60% reductions in PM2.5 & CO emissions
  fuel reduction > 50%
- Know how transferred to 3 private agencies
  More than 1000 units have been installed in over 10 villages across 4 states

Wind Augmentation Purifying Unit (WAYU)

Salient Features
- WAYU ensures filtration of particulate matter, removal of active filtration the clean air discharged further dilutes the polluted air in vicinity installed and operationalized for clean-up of air at various traffic junctions in Delhi
- Demonstration of 54 air pollution control devices (WAYU) at 5 selected locations in New Delhi
Strategically designed Greenbelt development along highways and its performance evaluation towards eco-capital buildup

**Salient Features**
- Model plantation along highways for green corridor development
- Performance mapping and recommendation for pan-India implementation
- Air purification, temperature amelioration, biodiversity build up, ecosystem services etc.
- Implemented at NH7 (Jamb)

GreenDispo: Improved Eco-friendly & Energy Efficient Electric Sanitary Pad Incinerator

**Salient Features**
- Incinerates used sanitary pads at a temperature more than 800 °C for instant disposal in a scientific and hygienic way
- Post combustion treatment to control toxic emissions
- Handling capacity of 30-60 soiled pads/hr and design can easily to up-scaled for higher loads
CSIR-NEERI
Pan India Presence
Major Studies

1. Study carrying out flood mapping and modeling in Vasai-Virar Region
2. Bombay sewerage disposal project - oceanographic & water quality monitoring studies
3. Environmental monitoring of MSW processing and disposal facility at Kanjur, Mumbai
4. Air quality assessment, emission inventory and source apportionment studies in Mumbai city
5. Noise mapping in 27 Municipal Corporations in the state of Maharashtra
6. Carrying capacity study for expansion of plant capacity from 5 to 10 MTPA at JSW Steel Ltd., Dolvi
7. Study to assess air quality & health impacts in Mahul, Ambapada & Chembur area, Mumbai
8. Comprehensive EI&RA for proposed thermal power station at Dhopawa, Parli, Bhusawal, Paras Koradi, Chandrapur in Maharashtra
9. Tourist impact assessment and carrying capacity study for environmental protection of World Heritage site of Ajanta Caves, Aurangabad
10. Terrestrial environmental impact assessment associated with the proposed reclamation in sea for development of garden/park at Cuffe Parade (Between Nariman Point and Geeta Nagar, Western Coast of Mumbai South City)
11. Assessment of impacts of the Kalpasar project on the existing and proposed ports in the vicinity of project area
12. REI and RA for the proposed oil export pipeline from Mangala Terminal in Rajasthan to Jamnagar/Viramgram in Gujarat
13. Macro level EIA study for clusters of iron ore mines in the state of Goa
15. Comprehensive EIRA study for proposed 10MMTPA LNG Terminal at Chhara village in Kodinar Taluka, Gir, Somnath (Junagadh) Dist. Of Gujarat
16. Environmental related studies for existing and planned projects in refinery complex at Motihavdi, Gujarat
17. EIRA for proposed combined Cycle Power Plant (CCPP), Nagothane
18. Comprehensive environmental impact and risk assessment studies for proposed petroleum, chemicals and petrochemical investment region, Dahej Vagra, Dist. Bharuch
19. Laboratory/pilot plant probe studies for upgradation of performance of final effluent treatment plant at Ankleshwar, Gujarat
20. EIA for proposed expansion of LNG terminal (10MMTPA) at Hazira (Surat), Gujarat
• Project Locations
☐ State Boundaries
( ) No. of Projects
Major Studies

1. Environmental Assessment (EA)/ Environmental Management Plan (EMP) Compliance/Monitoring (WP 14A) for project Varsha at Visakhapatnam
2. Carrying capacity study for greater Kochi region
3. Wastewater management in cluster of tanneries in Tamil Nadu
4. EIRA for proposed project of Mehsana-Bhatinda, Bhatinda-Jammu-Srinagar and Mallavaram-Bhopal Bhiwara-Vijapur pipelines for transportation of natural gas
5. Wastewater management in Tamil Nadu distilleries
6. Environmental impact assessment for strengthening/reconstruction of jetties at Eastern Naval Command, Visakhapatnam
7. Pollution status assessment of Yanamadurru drain and feasibility study for establishment of common Effluent treatment plant(s) (CETPs) for industrial clusters to meet statutory norms for marine discharge
8. EIRA study for BS-VI auto fuel quality compliance and associated project facilities at Mangalore Refinery and Petrochemicals Ltd., Mangalore
9. EIA for Pre-seismic survey proposed in six NELP VIII Andaman offshore blocks
10. Installation of Defluoridation plants in three pilot blocks of Andhra Pradesh
11. EIRA studies of LNG import, storage and regasification terminal at Ennore in Tamil Nadu
12. Studies on rejuvenation of river Godavari and integrated action plan for improvement of environmental status for Nasik region, Maharashtra
13. Comprehensive EIA of Manganese Mines of Sandur Manganese and Iron Ores Ltd., Sandur
15. EIA for proposed floating LNG terminal at Kakinada Deep Water Port, East Godavari District (Andhra Pradesh)
16. EIA for proposed all weather multi-cargo sea port at Tadadi, Karwar, Karnataka
17. Terrestrial environmental impact assessment study for expansion of 2 x 800 mw (phase ii) Udipi Thermal Power Project, Yelluru Dist: Udupi, Karnataka
18. Monitoring of air, water and atmospheric pollution of BPCL Kochi Refinery, Ambalamugal in connection with Kerala High Court judgement
19. Environmental quality assessment study of M/s CPCL, Manali Refinery Complex, Tamil Nadu
20. Feasibility studies on wastewater management for textile sector in Tirupur and tannery and textile sectors in Erode in Tamil Nadu
Major Studies

1. Detailed engineering, procurement, and construction of chemo-biochemical system for desulphurization of sru tails gas at Mathura refinery
2. EIRA for proposed project of Mehsana-Bhatinda, Bhatinda-Jammu-Srinagar and Mallavaram-Bhopal Bhilwara-Vijaipur pipelines for transportation of natural gas
3. Tourist impact assessment and carrying capacity study for environmental protection of World Heritage Taj Mahal, Agra
4. EIA study and preparartion of EMP for proposed Multi-Product Special Economic Zone/Industrial Park at Sausar Tehsil, Chhindwara, M.P.
5. Water and environmental sanitation interventions in Madhya Pradesh
6. Environmental impact assessment study for proposed iron ore mining and infrastructural facilities at Rowghat, Bastar District, Chhattisgarh
7. Comprehensive groundwater quality assessment and pollution source identifiication using stable isotopic and groundwater modeling studies in and around chemical division, GIL, Nagda
8. Estimation of fugitive emissions and source apportionment studies to assess the impact of various operations on ambient air quality at Bhilai Steel Plant (BSP), Bhilai
9. EIA study for proposed 2 MTPA Bardwar Dolomite mine in Jangir-Champa, Chhattisgarh
10. Comprehensive environmental impact and risk assessment studies for proposed petroleum, chemicals and petrochemical investment region, DahejVagra, Dist. Bharuch
11. Assessment and remediation of hazardous waste contaminated areas in and around M/s Union Carbide India Ltd., Bhopal
12. EIA and EC for Madhya Pradesh Atomic Power Project (2x700 Mwe PHWRs), Chutka, Dist-Mandla, M.P.
13. Study of Flora and Fauna and Ash Characterization for Backfilling of Ash from NTPC Vidyachal STPs in Mine Voids of Gorbi Mines of Northern Coalfields Ltd.,
15. Interventions to improve water and environmental sanitation status in Madhya Pradesh
16. Preparation of Environmental Sustainability report for four VSF units of M/s. Grasim Industries at Nagda, Harihar, Kharach & Vilayat
17. Environmental assessment study before and after the proposed urban conservation and tourism development project of area around the World Heritage site, Taj Mahal, Agra proposed by UP Tourism Department, Lucknow
18. Wastewater management plan for Malanjkhand Copper Project
19. Assessment of air pollution and source apportionment study in Firozabad
20. Rapid and comprehensive EIA study for proposed additional units at Mathura Refinery
Major Studies

1. Turnkey contract for design, supply, construction, erection and commissioning of two Common Effluent Treatment Plants (CETPs) at Pali, Rajasthan
2. Turnkey contract for design, supply construction, erection, and commissioning of wastewater management system (WWMS) at Balotra, District Barmer, Rajasthan
3. Deployment and evaluation of air purification units for traffic junction pollution abatement in Delhi
4. EIRA for proposed project of Mehsana-Bhatinda, Bhatinda-Jammu-Srinagar and Mallavaram-Bhopal Bhilwara-Vijaipur pipelines for transportation of natural gas
5. Delineation of airshed for air quality management in Delhi
6. Engineering package for Common Effluent Treatment Plants (CETPs) for industrial estates in national capital territory of Delhi
7. Assessment of contribution of stubble burning in Haryana and Punjab states on air quality of Delhi
8. Studies on solid waste management in Municipal Corporation of Delhi
9. Air quality assessment, emission inventory and source apportionment studies in Delhi
10. Air quality monitoring and emission source apportionment studies for Delhi
11. Environmental management plan for Katra-Qazigund Rail Link project, Jammu & Kashmir
12. REI and RA for the proposed oil export pipeline from Mangala Terminal in Rajasthan to Jamnagar/Viramgam in Gujarat
13. Management plan for restoration & protection of Sambhar Lake, Rajasthan
14. Comprehensive EIRA for proposed Zircaloy and Pressurized Heavy Water Reactor (PHWR) fuel fabrication facilities and township development at Rawatbhata, Kota, Rajasthan
15. EIA & RRA study for HPCL proposed 9 MMTPA grass-root refinery project in Rajasthan state
16. EIA Studies for exploration/development of Coal Bed Methane in Bokaro, North Karanpura, Jharia and Ranigunj, Wardha CBM-2003 and Satpura Block
17. Surveillance of treated water quality from treatment plants and ground water in Delhi with health related parameters
18. Monitoring and assessment of soil, groundwater and air quality at construction site of the DDA Housing project, Dwarka, New Delhi
19. EIA & RRA study for proposed grass-root refinery with petrochemical complex at Pachpadra, Barmer, Rajasthan
20. Environmental assessment studies at Rampura - Agucha mines of Hindustan Zinc Limited
Not to scale

- Project Locations
- State Boundaries
( ) No. of Projects
Major Studies

1. Development of Smart Industrial Port City (SIPC) & Mechanization of existing operational Berth at Paradip Port, Odisha
2. Carrying capacity based planning for proposed development in Sambalpur-Jharsuguda Region, Orissa
3. PM10 and PM2.5 source apportionment study and development of emission inventory of twin cities Kolkata & Howrah of West Bengal
4. Source Apportionment of Ambient Air Particulate Matter in Jharia Coalfields Region, Jharkhand
5. Development of pollution abatement strategies for Damodar River System
6. EIA for proposed development of Western dock at Paradip Port, Odisha
7. EIA Studies for exploration/development of Coal Bed Methane in Bokaro, North Karanpura, Jharia and Ranigunj, Wardha CBM-2003 and Satpura Block
8. Risk Assessment & Environmental Impact Assessment Studies for the Proposed Underground Rock Cavern Storage of Crude Oil at Chandikhol, Odisha under Phase II SPRs Projects
9. Studies on upgradation of effluent treatment plant for environmental compliance including feasibility assessment for effluent recycle/ reuse at IOCL Refinery, Assam Oil Division, Digboi, Assam
10. Regional EIA & carrying capacity studies in Jamshedpur region
11. Hydro Geological study, ash characterization, trace metal leachability, mine water analysis, bio accumulation and bio magnification, surface and groundwater monitoring in 10 KM area from the mine void of Jagannath OCP of MCL, Bhushan Steel Ltd., Dhenkanal
12. Assessment of suitable discharge location of treated effluent disposal system of Brahmaputra Petrochemical Complex project of M/s BCPL (Brahmaputra Cracker and Polymers Ltd.) in river Brahmaputra, Dibrugarh, Assam
13. Integrated Hydrogeological, geophysical, hydrochemical and groundwater flow and solute transport modeling studies around the ash filled South Balanda mine voids in Angul District, Odisha
14. Marine monitoring off Kantiyagal in and around outfall location identified for discharge of treated wastewater generated from Ankleshwar, Panoli and Jhagadia industrial estates
15. Study of Current Status of Pollution (Water, Sound and Soil) in Patna
16. Monitoring of groundwater, surface water and soil in the vicinity of South Balanda Mine and Old ash pond
17. Carrying capacity based developmental planning for Damodar river basin
18. Comprehensive EIA studies at Numaligarh Refinery
19. Development of baseline data with respect to air, water, soil quality as well as noise up to block level in four districts of the State of Tripura
20. Study of flyash characterization such as its reactivity and movement of ash fill sites of Talcher Thermal Power plant at South Balanda area and leaching characteristics of mine pit water at South Balanda mine pit
Sectoral Presence
* Last five years

No of Projects

State and Municipal Agencies
Central Public Sector Agencies
State Public Sector
Private Sector Industries
Foreign
Central Government Agencies
Court/NGT Cases Handled

Air Pollution Control
Water
Env Impact Assmt
Solid & Hazardous Waste
Wastewater
Materials
Biotech
Analysis
Biotech
Cleaner Technology

No of Projects

State and Municipal Agencies
Central Public Sector Agencies
State Public Sector
Private Sector Industries
Foreign
Central Government Agencies
Court/NGT Cases Handled

Air Pollution Control
Water
Env Impact Assmt
Solid & Hazardous Waste
Wastewater
Materials
Biotech
Analysis
Biotech
Cleaner Technology
"A sustainable society can only function when we close the loop. The challenges that face us today are to develop solutions that minimize waste and mitigate the environmental damages."

"Closing the Loop: Sustainable Environmental Challenges"

To take stock of the new emerging environmental threats, to address the bottlenecks in environmental challenges facing us and the possible solutions that can be developed.
Challenges and Gaps in Water Sector

A brainstorming event on "Start-ups and Business Opportunities in Water and Wastewater Sector" was held at CSIR-NEERI on February 11-12, 2019. In addition to academicians, researchers, officials from government and non-government organisations; a group of enterprises including established industries and budding entrepreneurs/start-ups joined the event. Almost 70 organisations gathered for the same from about 10 states across the country. Following are the major challenges identified by the panellists/participants:

**Water management**
- Adoption of age-old technologies such as rapid sand filtration in conventional treatment plants which are not suitable for currently degraded quality of water sources
- Non-existent coherent nationwide water quality database particularly of emerging contaminants based on common protocol to plan appropriate preventive and treatment interventions
- Degraded and dilapidated water supply assets due to inefficient operation and maintenance
- Lack of coordination among various government departments related to water
- Ever-increasing imbalance between demand and supply of water primarily due to inappropriate and rampant use of water for agriculture
- Poor succession planning and training to improve trained manpower for operation and maintenance of water supply system
- Recalcitrant planning of ambitious projects such as initiating continuous (24x7) water supply schemes without establishing sustainable water source and allocating appropriate quantity to various stakeholders
- Breaking the behavioural and psychological perception of the masses for implementing sanitation programmes
- Inadequate emphasis on faecal sludge and sewage (greywater) treatment to prevent water contamination after having constructed millions of toilets in rural areas
- No framed fresh water management policy
**Wastewater management**
- Diverse wastewater quality due to variation in industrial operations
- Industry’s perspective to accept wastewater treatment plants (WWTPs) as an integral part of the Industry
- Lack of understanding and absence of any Regulatory Norms about deployment of skilled manpower for O & M of WWTPs
- Cost intensive zero liquid discharge systems (ZLD) including reject management, thereby increasing production cost and reducing global competitiveness
- Management of reject salts from ZLD systems and hazardous sludge from CETPs
- Absence of guidelines on reuse and recycle of treated wastewater; lack of availability of cost effective technological interventions vis-à-vis policy implementation
- Absence of standardisation of analytical methods for certain parameters

**Challenges**
- Lack of information among locals about water/wastewater management particularly in rural areas which fail to enable them to appreciate importance of treatment technologies
- Uneven access to facilities and resources, lower margin for entrepreneurs in rural areas, unavailability of adequate infrastructure and ambiguous distribution systems
- Absence of facilitators and knowledge providers to verify products developed for water and wastewater treatment
- Poor access to government funding due to lack of credibility/recognition of start-ups/industries

**Positioning CSIR-NEERI in meeting the challenges**

**Water Management**
- Mapping fresh water sources across the country
- System to be developed to monitor un-accounted water (for example in leaks through pipes / transport etc)
- Developing treatment technologies keeping in view gradually degrading water quality as source
- Standardising water quality monitoring and surveillance along with statutory agencies such as CPCB
- Updating governing manuals/codes such as CPHEEO’s Manual on “Water Supply and Treatment System”
- Strategic partnership with Ministries and Statutory Agencies in benchmarking technologies and providing technical assistance to Start-ups and industries
- Providing robust unbiased monitoring mechanism for assessing water supply schemes
- Promoting application of IT, AI and IoT in improving operation, maintenance and monitoring of water assets
- Training, capacity building and incubating for providing manpower to manage water supply system
- Integrating water resource management needs with frameworks that consider short and long term implementations

**Wastewater management**
- Developing techno-economic and environmentally sustainable industry specific solutions
- Conducting training across the wastewater sectors to make the stakeholders understand about the importance of WWTPs
- Formulating guidelines for deployment of skilled manpower in association with regulatory agencies for efficient functioning of WWTPs
- Exploring cost effective ZLD solutions to make the production cost of finished goods competitive in the global market
- Exploration of potential reuse of hazardous sludge and reject salts
- Drafting guidelines for reuse and recycle of treated wastewater and standardisation of analytical methods for certain parameters
- Striking a balance between availability of technological interventions and their future prospects vis-à-vis policy implementation Including economic and environmental reality status in all projects
Municipal Solid Waste Management (MSWM) Status, Challenges and the Way Forward

The Ministry of Environment, Forest and Climate Change (MoEF&CC) has been enforcing various regulations and policies for MSW management in India over past two decades. This started with “Municipal Solid Waste-Handling and Management Rules” in year 2000, which were made more robust and stringent and enforced as “Solid Waste Management Rules 2016” recently. In addition the Ministry of Urban Development (MoUD) has published a manual on MSWM to support cities and towns on planning and implementing a proper MSWM system in line with the SWM Rules published in 2016. Also, Central Pollution Control Board (CPCB) has published a “National Action Plan for Municipal Solid Waste Management” in 2015 as per the directive of National Green Tribunal (NGT).

Funding support was envisaged through various schemes like Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat Mission and various other schemes, not only for urban areas, but also for rural areas.

Challenges
Despite these efforts and supporting policies, the scenario of MSW management in India is not up to the mark. One of the many reasons for this scenario may be attributed to certain loopholes in the policies, financial arrangements, technologies
available and implementation infrastructure. In this context, a pre-conference was organized at CSIR-NEERI on March 13, 2019. The principal objective of this pre-event was to have brainstorming by experts, academicians, technology professionals, bureaucrats and policy makers, which would lead to identification of probable loopholes in the current policies as also way forward to close these loopholes in order take MSW management in India ahead efficiently. Day long deliberations brought to fore major issues and gaps as well as highlighted the key role CSIR-NEERI has to play in near future.

**Identifying the Gaps**

The major issues were identified on the background of various regulations, schemes, and documents referred earlier and specifically pertaining to policies, technical aspects, implementation, and finance. These are as follows:

**A. Policy issues**
- Lack of simplicity considering the average competency of MSW implementing human resource.
- Lack of accountability, time frames etc.
- Lack of technology benchmarking, product utilization, and environment friendly use of MSW.
- Guidelines on tendering procedures

**B. Technical issues**
- Scientific data base with respect to inventory, characteristics, quantification, per capita generation etc. There is a need to update old database on National level, which was by NEERI in 2005.
- Detailing of human health impacts
- MSW processing technologies are not selected on the basis of product utility and local conditions
- Technology assessment and vetting is not done properly and many a times vendor driven.

**C. Implementation Issues**
- Lack of public awareness for segregation at source, different categories of segregation, and overall public participation
- Competence levels of Urban Local bodies, and officials such as Sanitary inspectors involved in MSW management
- Lack of expertise in planning, tendering, and execution

**D. Financial Issues**
- Lack of information on minimum cost of different MSW processing options
- Need for product based payments rather that payments based on MSW received
- No quantification/ economic equivalency of environmental benefits
- Lack of realistic economic models for MSW management

**Positioning CSIR-NEERI in meeting the challenges**
- To publish a detailed white paper on the issues, way forward, and Capability of CSIR-NEERI to serve the purpose
- Wide circulation of white paper to different ministries, ULBs, and regulatory agencies.
- Proposals for Data base updating with respect to inventory including domestic hazardous waste, characterization, dump site emissions, and health impacts etc.
- Training programmes to be undertaken for bureaucrats, ULBs, and concerned officials on various aspects of MSW management and implementation
- Technology benchmarking and guidelines for technology selection based on product utility, local conditions, and financial requirements
- Vetting of the critical tenders, documents, and policies on MSW management.
Conservation of biodiversity in the age of Anthropocene is one of the important challenges of the present and forthcoming generations. Biodiversity being a cross cutting topic has been part of all important deliberation, negotiations, plans and decisions. The pre-event on “Biodiversity Loss: Gaps and Challenges” organized on 4th Feb 2019 was divided in three sessions where more than 120 participants belonging multidisciplinary stakeholder group discussed on challenges being faced and solutions available to reduce biodiversity loss and how in long run this can help in closing the loop of sustainability. Following are the deliberations being shared under following heads:

**Challenges**

1. No due consideration to the role of Biodiversity and ecosystems in developmental projects results in fragmented habitats, unconnected patches of biodiversity, loss of corridors.
2. More focus on biodiversity conservation planning in Protected areas (PAs) and ignoring the role and importance of Biodiversity and ecosystems outside PAs (urban areas, wastelands, wetlands, campus, marine areas, mangroves etc).
3. Poor understanding of many species, populations and their socio-ecological, and functional attributes is a major shortfall.
4. Restoration and rehabilitation is a challenge due to faulty selection of species leading to more plantations and monocultures than diverse ecosystems.
5. Implementing and emphasizing more on western models of conservation of species and ecosystems that ignores indigenous and local knowledge systems.
6. In such a diverse country like India loss of biodiversity (having millions of varied species and components) requires customized site-specific solutions for specific conditions.
7. Insufficient knowledge about bio-geo-chemical processes, lack of integrated monitoring program and comprehensive information on the impacts of pollutant load on populations and species.
8. Emerging pollutants in air, water and soil are huge challenge for biodiversity.
9. A much-sophisticated understanding of contemporary trends of the subject is extremely important that involves a multidisciplinary approach.
10. Need to refine our tools and approaches used for analysis of gaps to provide appropriate mitigation measures. It is extremely important that a large number of factors (drivers) that influence the system to be considered for producing more accurate and inclusive models.
11. Reduction in number of field based and trained taxonomists is affecting knowledge and database available.
12. Lack of coordination among various government line departments related to conservation and management of natural resources. Convergence can play a big role.
13. Last but not the least unawareness about the benefits of biodiversity exists among many locals, youth and upcoming generations. Unless they know what it is and why it is getting lost they will never understand why and how to protect.

**Identifying the Gaps**

1. Mainstreaming biodiversity in developmental planning be it industry, or city or a high rise coming in the city. Implementing 20-25% area of the proposed development under green cover as important compliance might make difference.
2. Time to shift some focus and funds from Umbrella, Flagship and Charismatic species to species that are affected due to increasing pollution load, introduced invasive due to improper plantation plans and lower invertebrate groups many of them are important pollinators.
3. Natural scientists have always been interested in structural and biophysical attributes of species. Now is time to start looking to their socio-ecological linkages to help understanding the social perspectives of loss and how it can be minimized.
4. Instead of planting any species anywhere (as the focus has been more on fast growing high biomass yielding species) to more ecological approach of following the succession pattern of that agro-climatic zone.
5. Developing local and regional pilots of restoration and success stories that can be up scaled both horizontally and vertically wherever, similar situations are available.
6. More research on impacts of pollutants on ecosystems and species that lead to biodiversity loss.
7. Revisiting our tools and approaches to understand the impacts. Introducing novel tools and approaches such as valuation, modelling etc.

**Positioning CSIR-NEERI in meeting the challenges**

1. Integrating biodiversity in urban planning
2. Documentation of biodiversity-dependent ecosystem services
3. Research to address conflict between development and conservation – The ‘Go to’ vs ‘No-Go’ areas, for example, finding a path towards restoring target natural habitats and establishing ecological corridors in cases of habitat loss due to development
4. Moving ahead with REDD+ biodiversity conservation and environmental services
5. R&D for developing ecosystem assessment tools specific for a target region
7. Including valuation and modelling as new age tools in predicting value being lost.
8. Promoting research on impact of key soil, air and water pollutants and how they affect biodiversity and lead to loss of ecosystem services in long run.
9. Rules to manage biodiversity hotspots
10. Providing training to corporates, urban planners, NGOs and GOs on appropriate restoration strategies.
Air & Energy

Balancing Energy Security, Environmental Impacts & Economic Considerations

The rapidly changing Energy Mix scenario for India and its current and projected energy demand need critical and periodic review of its Energy Policies to attain the targeted goal of providing energy to all, while also complying to both Climate Change and Air Pollution related commitments. Both strategic and practical issues related to energy generation, environmental impacts and economic aspects must be considered together, while promoting cleaner energy options. There is also a need to critically study the Life Cycle Assessment of these energy generation and energy use options under Indian conditions, to have a more realistic knowledge on their green potential before their widespread applications. With the impressive growth of Solar energy, India is a front runner in this renewable endeavour; however, the rapidly increasing energy demand will require efficient use of other energy sources including large amount of domestic dirty coal and other fossil fuels. Further improvement in PV efficiency is likely to prove a boon for even faster spread of solar energy in near future.
Challenges and Gaps

- The decentralized advantage of solar energy generation needs to be exploited further for several applications in addition to electricity generation. Solar thermal based energy technologies are showing good future potential in Indian context, while they can also be exploited through innovative approaches like thermo chemical water splitting in a Solar-to-Chemical approach.
- It will be necessary to develop and implement Clean Coal Technologies including those gasification based options, while also promoting innovations for CO2 utilization and sequestration following an India centric approach to achieve Closing-the-Loop concept for sustainable energy generation. The coal plant load factor, ageing power generation and distribution infrastructure and cleaner technology migration related challenges need to be handled properly as coal is expected to contribute a major share in short and medium term energy demand of India.
- Biomass present yet another potential resource for renewable energy generation including that for decentralized energy. While ambitious scientific breakthroughs for technoeconomically feasible Bio-refinery is a need of hour, frequently available agri-residues can be more effectively used for local demand including that for cooking energy and small boilers. The benefits of these energy generation options should be considered in a wider perspective including the prevention of air pollution through their otherwise burning practices. The abundantly available biomass can be easily used in rural areas to provide cooking energy needs through its local conversion to pellets and briquettes and by promoting improved cook stoves. Skill development of rural youths under Government promoted programmes and careful development of a business model can make such decentralized options sustainable with significant socio-economic and environmental returns.
- India's nuclear capabilities must also be utilized to our advantage as Nuclear energy presents another low-carbon energy option. This is a very large energy source and with careful implementation, offers as a much cleaner and safer energy option in both environment and health impacts point of view. India should capitalize the advantage of recent innovations related to nuclear thermal based hydrogen generation to have widespread applications of nuclear energy.
- Similarly India has potential to utilize other forms of renewables including wind, geothermal, while another huge option is to scientifically and properly utilize the mammoth amount of waste through waste-to-energy technologies. So much of wisdom and technological breakthroughs are available in this area, there is a need to systematically explore and transform these Waste-to-Energy options to feasible business models. If these cannot compete with other energy generation options in economic terms, it is high time, we should assess quantified economic estimations of environmental and health gains and that should be considered for promotion of waste-to-energy technologies.

Energy Use Reforms:

- Much needs to be done on Energy Use side. As we are joining late the foray of economic development and higher per capita energy consumption, we can take advantages of innovations in the areas of Energy Efficiency, Green Building and other scientific advances.
- The massive ongoing and proposed building/housing constructions should be the immediate target for green building codes implementation to have a long term impact making intervention towards energy efficiency. Both urban and rural constructions must have environmental and energy efficiency related considerations as mandatory specifications. A lot of efforts should go in IEC and behavioural aspects to achieve much better energy efficiency and judicious use of precious energy resources.
- The informal sectors including cookstoves, tandoor, small scale food industry also contribute significantly to air pollution and emission exposures, mainly due to the use of very inefficient and unscientifically designed combustion devices and dirty fuels. These can be replaced with tailor-made improved combustion devices using renewable fuels, while exposure can also be reduced through proper ventilation.
- Like any other energy sector, mobility will also require Energy Mix approach at least in short and medium terms, before the fast developing e-mobility becomes an economically and environmentally viable reality. The critical aspects where we failed so far are related to emissions from in-use or old vehicles that is mainly due to the absence of regulated Inspection & Maintenance programme, while another probably more important ignorance was towards reducing public mobility through proper developmental planning in urban settlements.
including town planning aspects to reduce mobility demand. Retrofitment of in-use vehicles with advanced after-exhaust technologies offers promise for significant reduction in automobile pollution.

The above reforms can be very well achieved provided a comprehensive, multi-sectoral approach is developed and implemented with proper coordination among all the stakeholders. Closing the Loop of technology gaps/selection as well as that of stakeholders coordination will be an important mantra to achieve a headway towards sustainable Energy generation and use.

**Positioning CSIR-NEERI in meeting the challenges**

- CO2 capture and sequestration including Chemical Looping Combustion and CO2 reforming related R&D, policies to close the GHG related loop
- Control of emissions from in-use/old vehicles and transportation energy related policy issues to address the gaps identified
- Waste-to-Energy options; policy development
- Development of clean combustion devices for some of the informal sectors
- Mapping Best Available Technologies (BATs) in various sectors depending on their Life Cycles
- To address Cleaner rural cooking energy related challenges and use of waste biomass as a resource for promoting circular economy.

**Review & discussion on National Clean Air Program, its current form & way forward**

One of the target of SDG 11 is: by 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

Our commitment and obligations to conservation and protection of environment within the ambit of targeted goals on environmental sustainability under the Sustainable Development Goals (SDGs) is manifested in our National Clean Air Program (NCAP). One of the target is to meet the prescribed annual average ambient air quality standards at all locations in the country in a stipulated timeframe. The SDG target is being met within the provisions of Air Act 1981 under Article 253 of the Indian Constitution to implement decision taken in UN conference on Human Environment June 1972. The objectives of Air Act (1981) reads:

1. To augment and evolve effective and proficient ambient air quality monitoring network across the country for ensuring comprehensive and reliable database

2. To have efficient data dissemination and public outreach mechanism for timely measures for prevention and mitigation of air pollution and for inclusive public participation in both planning and implementation of the programmes and policies of government on air pollution

3. To have feasible management plan for prevention, control and abatement of air pollution.

**Besides Air Act (1981) some of the steps taken by the Government of India as claimed in NCAP are:**

- Notification of Ambient air quality standards,
- Sector specific emission standard for industries,
- Setting up of monitoring network for assessment of ambient air quality; 691 manual stations in 303 cities. SO2, Nox, PM10 and PM2.5 are to be monitored at all manual stations. 101 real time CAAQMS in 57 cities 08 pollutants viz. Pm10, PM2.5, SO2, NOx, ammonia (NH3), CO, ozone (O3) and benzene.
• Introduction of cleaner gaseous fuels like CNG, LPG etc. and ethanol blending;
• Launching of National Air Quality Index (AQI);
• Universalization of BS-iv for vehicles by 2017;
• Leapfrogging from BS-iv to BS-vi standards for vehicles by 1st April, 2020;
• Banning of burning of biomass;
• Promotion of public transport network;
• Pollution Under Control Certificate;
• Issuance of directions under Air (Prevention and Control of Pollution) Act, 1981;
• Installation of on-line continuous (24x7) monitoring devices by 17 highly polluting industrial sectors;
• Ban on bursting of sound emitting crackers between 10 PM to 6 AM;
• Notification of graded response action plan for Delhi and NCR identifying
• Source wise actions for various levels of air pollution, etc.

Distinction of non-technical Measures from long term direct source control options.
• Attract commuters to public transport instead of private transport;
• Accelerate the transformation of the vehicle fleet to more eco-friendly options;
• Transform the physical structure of the city to reduce human exposure to pollutants by increasing the distance between road traffic and citizens (such as green and pedestrian areas, cycle lanes, controlling the traffic around schools, hospitals, medical care centers, playgrounds, etc.), and decreasing the areas used by road traffic;
• Remediation measures, such as road sweeping and washing, application of dust suppressants to abate resuspension, Graded action plan for air pollution control are temporary and need to be separated from the long-term action plan. Claims can be made on these non-technical and graded action plans to achieve SDG targets, which may not always be sustainable.

As a result of implementation air quality has purportedly shown some minor improvement in some major cities in recent time which as of now cannot be called as trend. This makes us revisit, rethink on our actions and pose some questions like:

• Are we trying to tow a line which is far away from desired Goal?
• Are the tools, technique, insufficient or inappropriate in taking us to desired goal?
• Are we merely emulating the air quality monitoring practice of the Developed country?
• Can we analyse the efficacy of applied tools by trying to solve an existing problem, for example cause of air pollution during winter in northern belt?
• The problem of stubble burning can be understood by creating a special NAMP network spread across Indo-Gangetic plain with specific pollutant parameters. Every year
• Study in project mode for understanding the stubble burning is not sufficient.
Climate Change and Sustainability

With the recently concluded, COP 24 in Katowice Poland, one thing can be understood that climate change is global phenomena but its mitigation and adaptation response must be at the local level. With India being one of the fast-growing economies in the 21st century, she must look into balancing her global commitments on climate change and fulfilling her national aspirations for development and economic growth. Development and eradication of poverty are key issues that should be included in the debate for global climate change, especially in terms of developing/growing economies like India. To fuel the development of the nation and to pull people from poverty, India faces the challenge of making adequate energy available viz. Energy Security. With India’s energy generation, still dependent on fossil fuels, the question of understanding the energy and climate change nexus arises.

- The National Action Plan for Climate Change and National Energy Policy- NitiAayog does provide some answers but a combined understanding of Climate Change – Energy nexus on India context is lacking. A coupling of Climate Change, Meteorology and Energy Efficiency is necessary, going past 2020.

- The fight against climate change must be at the local level hence we have to develop India centric mitigation & adaption strategies. These strategies must include local stakeholders like consumers who must be made aware of the impact of the reduction of demand on climate change and energy security. We can look at other nations strategies as well and formulate a policy for us like Low Emission Capacity Building; Low Carbon Economy (LEC)/ Low Fossil Fuel Economy (LFFE)

- Energy generation must move towards low carbon-centric fuels (Coal – Oil – Natural Gas – Renewables) if not the efficiency of energy generation must improve by incorporating technological innovations (like CCT or CCS).

- Policy makers also should understand the importance of sufficiency going hand in hand efficiency.

- To understand the impacts of Climate Change, India specific framework for climate change and data analysis must be established. These models should incorporate region specific geochemical cycles for better accuracy.
• There is a need for the inclusion of economic models whenever we discuss/implement any climate change action. Therefore, it is important to develop an economic model for the impact of climate change on the India economy post-2020. Without understanding the economics of climate change, any action plan on climate change would be an unproductive process.

• As India is still an agro-based rural economy, the focus of mitigation/adaptation must be rural communities, as they will have to face the brunt of the effect of climate change. Any rural community-based mitigation/adaptation projects like diversification of crops, preservation of natural forests and wetlands must be in the forefront.

• Another important aspect would be the successful implementation of existing projects related to climate change rather than the formulation of new ones. The successful implementation of current development policies like afforestation, cleaner energy to the poor, fuel switching and energy diversification could improve the synergies between development and climate change.

• With any projects, the issue of implementation hinges on money. Without the influx of funds, executing my projects would be virtually impossible. Currently, the financing for climate change action is limited government budgetary support. The inclusion of climate/carbon tax could be an option but to sustain and promote the programs for climate change, the advent of private players is very much necessary. The CSR activities of private players must include climate change action. Government subsidies for emission reduction or negative carbon balance could be implemented to promote better action on climate change.

CSIR-NEERI can actively contribute in the following areas:
• Formulating frameworks for Low Emission Capacity Building and Low Carbon Economy
• Developing the field of climate change economics in order to formulate the policies
• Awareness outreach programs rural and sub-rural areas focusing on climate change mitigation / adaptation
• Training of Key Government officials and policy makers on the aspects of climate action
• Bridging the gap between Private and Public entities
• Work towards coupling meteorology, climate change and energy generation Development of India centric economic cost model for Climate Change mitigation/ adaptation strategies
Sharing Experiences & Perspective - A Long Legacy.....

My journey in CSIR-NEERI has been a learning experience since joining in 1981. During my brief tenure as Acting Director, steps were initiated to orient the focus of the Institute to translational research in its mandated field for gradual self-sustenance to align with the policies of the CSIR/ Government based on our country’s essential needs of providing solutions for the society. I appreciate the CSIR-NEERI fraternity for standing by me in my efforts. Under the present dynamic leadership of Dr. Rakesh Kumar, Director, this Institute has set forth new milestones in achieving the goals of sustainable development. I wish Dr. Rakesh Kumar and the entire NEERI family the very best on its Diamond Jubilee Foundation Day!

-Dr. Tapas Nandy
Former Acting Director, CSIR-NEERI

I am privileged to witness and participate in the Diamond Jubilee Celebrations of our Institute (CSIR - NEERI). I am indeed indebted to my past Directors for my learning and the sense of independence their association in the field of Environmental Engineering bestowed me. I want to thank my erstwhile scientific and administrative colleagues for their unflinching support and cooperation during my active life in the Institute. Our Institute is second to none and has contributed significantly to the service of India. My best wishes to all scientists and staff of our Institute so that they grow more organically and in turn help CSIR - NEERI to achieve its full potential. LONG LIVE CSIR-NEERI

-Dr. S. N. Kaul
Former Acting Director, CSIR-NEERI

The initial reason to join NEERI was to do experiments on Dry filtration and work more on Field Engineering to bring Lab to Land transformations. I owe my competence to my mentors and with the present leadership. I hope NEERI would achieve greater heights. Best wishes to CSIR-NEERI on its 61st Foundation Day.

-Dr. S. D. Badrinath
Former Scientist, CSIR-NEERI

I am glad to have been a part of several NEERI projects on national and international level. These projects have far reaching consequences and it is pertinent to point out that I had the privilege of being given a freehand as well as guidance of Prof PKhanna to carry out many outstanding R&D projects addressing a broader concept of Environmental Sustainability. I am very happy to see that NEERI is in good hands that share a national vision on Environmental Sustainability and a scientific approach. I wish NEERI and Dr Rakesh very best for all future endeavors.

-Prof. A. L. Aggarwal
Former Scientist, CSIR-NEERI

As I recall many frontline NEERI projects in which I took part as a member of the team, many extraordinary situations crowd my mind. But, on the occasion of the Diamond Jubilee of CSIR-NEERI, I would only say that without NEERI it would have been impossible for me to produce any crucial work on sustainable development. I am indebted to its philosophy, environment, and the colleagues who are now great friends.

-Dr. Arindam Ghosh
Former Scientist, CSIR-NEERI

Over a period of 37 years of my working in NEERI, many things changed. CPHERI became NEERI and multiple new dimensions were added in the ever-widening scope of the institute’s ambit. Nonetheless, its credibility is unquestionable and its outstanding research on the environment has paved the way for many sustainable developments in the country. I congratulate NEERI on its 60th year of foundation and wish many more years of success.

-Dr. Madan Nanoti
Former Scientist, CSIR-NEERI
I congratulate the entire CSIR NEERI family on the occasion of its 60th year of foundation. If I must define my stay at NEERI, then I would have to say that those different time intervals and challenging projects which I worked on marked an era of change. And the highest satisfaction I derive from it relates to delivering the promise as and when it was demanded. Best wishes to NEERI family on this momentous occasion.

-Dr. B K Handa
Former Scientist, CSIR-NEERI

Getting a job in NEERI proved to be a turning point in my life. It paved way for new heights. My long journey with NEERI is filled with moments of happiness, pleasure, challenges and achievements. Life at NEERI was filled with peace, a sense of discipline and belonging. My job at NEERI was indeed a very enriching experience which when I look back now, really makes my head bow unconsciously and fills my eyes with tears. The time I spent in NEERI elevated me academically, financially and gave me the opportunity to serve the Nation environmentally, striving to make it a better place to live. NEERI tujhe mera shat shat pranam.

-Mr. N. G. Swarnakar
Former Scientist, CSIR-NEERI

NEERI provides an impeccable environment for research and development. Over the years, it has been upgrading its capabilities and making great strides in the scientific world. Its body of work in harmony with the environment is a milestone in the history of the country’s development. On the occasion of its 60th year of foundation, I wish for the institution and its entire family nothing but an overwhelming success.

-Dr. Y. S. Murty
Former Scientist, CSIR-NEERI

It is indeed an honor for me to receive an invitation from Dr. Rakesh Kumar, Director, CSIR-NEERI, to express my views pertaining to my career in this prestigious Institute for the Diamond Jubilee Celebrations. It was my privilege and great experience for which I wholeheartedly express high regards to the Institute leadership. I was professionally enriched through these learning processes that have facilitated me throughout service life in NEERI, as well as during post-retirement phase.

-Dr. T. K. Ghosh
Former Scientist, CSIR-NEERI

My journey in CSIR-NEERI started way back in June 1982 as Scientist B during the tenure of Director Dr. B.B Sundaresan who was a fatherly figure to me. With the support of my colleagues and seniors, I thankfully achieved many achievements which were recognized by the industries and scientific society. 60th year of foundation is a momentous occasion and an opportunity for me to express my humblest gratitude to the entire NEERI family.

-Dr. Asha. A. Juwarkar
Former Scientist, CSIR-NEERI

It is quite well known that CSIR – NEERI has contributed immensely in the field of environmental science and engineering. Several R&D projects carried out in the institute have generated a vast knowledge base. The institute in my view has progressed very well since its inception and has earned a very good reputation in the field of environmental science and engineering. I am sure the current group of scientists and engineers will be able to generate new ideas and avenues to tackle different environmental problems being faced by the society.

-Dr. N. Shivaraman
Former Scientist, CSIR-NEERI
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