Executive Development Programme

on

Ecosystem Restoration, Eco-park Development in Mined-out Areas, Assessment of CarbonSequestration, Ecosystem Goods & Services, and Application of RS, GIS & Modelling

23 – 26 September, 2024

Venue:
Industry-Institute Interaction Facility
(IIIF), New Town, Kolkata, IIT (ISM) Dhanbad

Coordinator :
Prof. S. R. Samadder

Organized by

Co-Coordinator :
Prof. Subodh Kumar Maiti

Department of Environmental Science and Engineering &
Centre for Water Resource Management (CWRM)
Indian Institute of Technology (Indian School of Mines)
Dhanbad-826 004, Jharkhand (INDIA)

Background of the Course

Current decade (2021-2030) has been declared as "Ecosystem Restoration Decade" by the UN General Assembly, which commensurate with the Sustainable Development Goals (SDGs – 8, 13 & 15). Out of the 17 SDGs, at least 3 goals can be achieved through restoration of coal mine degraded lands. It is axiomatic that one of the easiest ways to combat global warming is to enhance CO_2 sequestration (SDG 13) in terrestrial ecosystem developed during ecological restoration of degraded land. In India, most of the mineral deposits are locked under the forest cover, which is completely destroyed during surface mining operation. Currently, large mechanized opencast mines with high-stripping ratios and greater quarry depth inevitably causing massive land degradation, complete destruction of forest cover, total loss of biodiversity, complete loss of topsoil cover, habitat fragmentation, alteration of drainage pattern, and deterioration of aesthetics due to creation of huge external overburden dumps. More importantly, it completely eradicates the permanent sink of CO_2. Fortunately, mining is very temporary occupier of land, and scientific restoration efforts will return far better post-mining land use with greater carbon sequestration potential. Therefore, during ecological restoration and carbon sequestration may be enhanced by selecting suitable tree species, which have higher biomass production, accelerate soil organic matter accumulation, ameliorate temperature and conserve moisture (SDGs 8 & 15). At the same time, to combat global warming, carbon sequestration potential in the same area could be enhanced more than its previous capacity, by developing a 6-tier canopy during ecological restoration of the degraded site, against conventional 3-tier canopy development. Monitoring of ecorestoration success is very important to meet the goal of combating global warming (SDG 13) by enhancing CO_2 sequestration. In addition, concept of mine closure planning and sustainable mining are also integral part of restoration. Topsoil management, Eco-parks development in mined out areas/ restored sites and their ecological implications, and selection of suitable tree species are also very important in Indian mining context to meet the SDGs. Remote sensing and Geographical Information System (RS & GIS) play a very crucial role in monitoring the success of ecorestoration for large area. This training programme will also cover the role of RS & GIS and modelling in monitoring the land-use change, estimation of above ground biomass and restoration success in mining areas. After completion of the 4-days training, participants will learn and develop the confidence to execute ecological restoration programmes to achieve the SDGs using RS & GIS.

Experts for the training programme

Faculties of IIT(ISM), Experts from Industries and Regulatory Bodies (SPCB, CPCB, MoEF& CC etc.)

Course Contents

- Modern environmental management in Coal Industries.
- Ecorestoration Version 1 Vs 2.
- Tools & techniques of Ecological assessment of Eco-parks development in mined out areas/ restored sites
- Topsoil management in large opencast coal mines.
- Assessment of Carbon sequestration, NPV calculation, and Steps of ecorestoration
- Aboveground biomass estimation using Sentinel-2 images.
- Concepts of RS & GIS for Environmental Management.
- Assessment of ecological foot prints.
- Application of RS & GIS in Monitoring Ecorestoration Success.
- Steps in development of 6-tier canopy system during ecorestoration process.
- Aquatic diversity Assessment.
- Integration of mine closure planning with ecological restoration & carbon sequestration.
- Ecological restoration of large open cast coal mining project: Planning and Execution–case studies.
- Assessment of Forest and Ecosystem services.
- Presentation on ecological restoration and other related activities by participants if any.

About Indian Institute of Technology (ISM), Dhanbad

Government of India in 1920 decided to establish a mining institution for meeting the requirements of mineral industry of the Nation. Lord Erwin, the then Viceroy formally inaugurated the Indian School of Mines on 9th December 1926 on the pattern of Royal School of Mines, UK offering courses in Mining and Geology. Later in 1957, courses in Petroleum Engineering and Geophysics were started to cater the manpower requirement in oil & gas sector. On 6th September, 2016 it has been formally upgraded as Indian Institute of Technology (Indian School of Mines) by Gazette Notification, although the Institute was offering B. Tech. courses in different disciplines through IIT-JEE since 1997. IIT (ISM) also offers courses in M. Tech., M.Sc. Tech., M.Phil., Ph. D, D.Sc. and MBA (through CAT) to the Indian as well as foreign nationals. Currently, the Institute has 17 Departments and 17 Centers to educate more than 6000 students and hundreds of executives along with foreign nationals every year. The Institute today is making foray into the newer areas of academic endeavors in tune with the changing times.

About the Department of Environmental Science and Engineering

The Department of Environmental Science & Engineering is created out of the existing Centre of Mining Environment (established in 1987 as a Centre of excellence in the field of mine environment by the then Ministry of Environment and Forests, Govt. of India) at Indian Institute of Technology (ISM), Dhanbad in June 2007 with the commencement of a regular B. Tech. program in Environmental Engineering under IIT-JEE (first of its kind offered by any national institute). Apart from B.Tech in Environmental Engineering, the Department also offers M.Tech in Environmental Science & Engineering from 1991 and Ph.D in Environmental Science and Environmental Science & Engineering from inception in 1987.The students of the Department have been well received by the leading industries in the field of Mining & Environment related companies along with regulatory authorities like MoEF& CC, CPCB, SPCBs, Research Organizations (CSIR Labs, CIMFR, RRLs), Academic Institutes (IITs, NITs, etc.), Consultancy Organizations & NGOs. The Department is equipped with sophisticated equipment to cater the needs of research, like AAS, HPLC, GC, Microwave digester, GC-MS, Spectrophotometer, Universal Trinocular Research Microscope, PCR etc.

About the Centre for Water Resource Management (CWRM)

The Centre for Water Resource Management (CWRM) was formally established in April, 2021 at IIT(ISM) Dhanbad. Presently, the main objective of the CWRM is the conservation and restoration of both surface water and groundwater resources in terms of quantity and quality through research and planning initiatives. This Center is comprised of a team of scientists from various disciplines at IIT (ISM) Dhanbad such as geology, geophysics, civil engineering, mining and mineralogy, and environmental engineering to conduct research and development in specific areas of water resources management. The center aims to achieve the following objectives:

- Serve as a Centre of Excellence for enhancing knowledge and capabilities in water resource management.
- Devise new and refine existing methodologies aligned with techno-economic viability for water resources extraction, restoration, conservation, and management practices. The research in these areas in close collaboration with relevant stakeholders in both governmental and private sectors will strive for sustainability of water resources with minimum environmental impacts.
- Embrace a multi-disciplinary approach to formulate the most effective development strategies for water resources.
- Foster collaboration with other institutions, universities, and industries within India and abroad to facilitate research on crucial issues of water resource management.
- Conduct training programmes for the professionals/engineers of various organizations involved in utilization of water resources, policy makers related to water resources, and other stakeholders. Through these training programmes, the research knowledge will be disseminated for practical applications and the contemporary skills of the participants will be enhanced for the management of surface water and groundwater resources.

Target Participants

Official engaged in Ecological Restoration (ER) of mine degraded sites and assessment of Ecosystem Goods & Services (EGS) and Carbon Sequestration (CS) and development of eco-parks and assessment of environmental benefits. Officers engaged in monitoring and planning of ER, EGS and CS, estimation of ABG biomass by application of RS & GIS, Regulatory bodies; Consultancy organizations. This 4-days Training Programmehas been designed for the officers/ executives of CIL & CMPDIL, Tata Steel, SAIL, NTPC, JSPL, NMDC, MOIL and other organizations dealing with ecological restoration of mine degraded lands such as Coal mines, Iron Ore Mines, and Lime Stone Mines.

Date, Venue and Duration

The Training Programme will be organized at the Industry-Institute Interaction Facility (IIIF) of IIT (ISM) Dhanbad located at Kolkata, from 23rd September 2024 to 26thSeptember 2024 (The Training Programme includes visits to CPCB/SPCB labs/ National Botanical Garden etc.).

Boarding and Lodging

Participants will have to arrange their own accommodation however, working lunch will be provided for the duration of the Training Programme.

Registration Fees

Rs 35,000/ per participant + GST [includes working lunch, course volume and training kits etc.]

Bank Account details

Name of Account Holder : Registrar, Indian School of Mines, Dhanbad

Name of Bank : Canara Bank **RTGS Code:** CNRB0000986

Branch : Saraidhela, Dhanbad **IFSC Code:** CNRB0000986

Bank Account No. : 0986101024892 **MICR Code:** 826015003

A copy of the e-payment details is to be sent to the Course Coordinator, IIT(ISM), Dhanbad. Being an educational Institute, IIT (ISM) Dhanbad is exempted from Income Tax. **PAN No.** of IIT ISM): AAAAI0686D; GST No. is **GSTIN:** 20AAAAI0686D1ZA

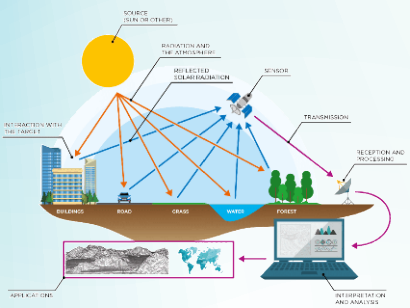
How to Reach

Industry-Institute Interaction Facility (IIIF) of IIT (ISM) Dhanbad located at Kolkata: The IIIF Kolkata is located in the New Town Area of Kolkata, West Bengal. The Centre is 28 km away from the NH-19 and 12 km away from Kolkata International Airport. The railway stations near the Centre are Kolkata Railway Station (11 km), Sealdah Railway Station (12 km) and Howrah Railway Station (24 km). The Centre is just 2.5 km away from the Landmark location 'Biswa Bangla Gate'.

About the Course Coordinator & Course Co-Coordinator

Course Co-Coordinator : Dr. Subodh Kumar Maiti, Professor (HAG) received National Geo-Science award -2019 in the area of "Sustainable Mineral Development & Ecological restoration" from Ministry of Mines, GOI in 2022. Currently, working in the Department of Environmental Science and Engineering, IIT (ISM), Dhanbad, since 1988. He did a B.Sc (Hons) and M.Sc in Botany from Calcutta University (1981), an M.Tech (Envt Sc & Engg) from IIT, Mumbai (1986), and did Ph.D in "Ecological aspects of reclamation of coal mine degraded lands" under Prof. S. P. Banerjee (1995). Since last three decades Prof. Maiti is continuing research on ecological restoration of mine degraded lands, assessment of carbon sequestration, roles of grass-legume seeding, CO_2flux, phytoremediation, selection of tree species, topsoil management, biodiversity conservation, metal pollution, etc. He published over 300technical papers in international and national journals and has presented over 120 papers in international and national seminars on various aspects of Land reclamation & Ecological restoration of mine degraded lands. His publications on Ecological restoration related research has been widely cited (Google Scholar citations ~7500, h-index 41, i_{10}103; Scopus citations ~ 4723, h index 41, i_{10} 103; Web of Science citation ~ 3435; h index – 34, i_{10} 81).He is currently teaching Ecology, Environmental microbiology, and Restoration ecology at B.Tech and M.Tech levels and has guided more than 24 Ph.D and 50 M.Tech scholars mostly in the area of Restoration ecology. He authored only textbook in India on "Ecorestoration of the Coalmine Degraded Lands(Springer 2012), co-authored"Bio-geotechnologies for Mine Site Rehabilitation" (Elsevier), and widely popular lab books "Handbook of Methods in Environmental Analysis (vols. 1 & 2; Oxford). He is the Coordinating Editor of "Restoration Ecology" (Wiley; Q2) published under The Society for Ecological Restoration, USA since 2020. Recognized as one of the top 2% of scientist worldwide in the field of Environmental Science and Engineering by Stanford University and Elsevier's Database for 2021, 2022 & 2023. Recently completed one R&D project on "Monitoring of Ecological changes due to large opencast coal mining (Ananta OCP, MCL).

Course Coordinator : Dr. S. R. Samadder (Professor) is currently working in the Department of Environmental Science and Engineering, IIT (ISM), Dhanbad, since 2012. He did B. Tech in Civil Engineering from NIT Surat in 1999, an M.Tech (Environmental Engg.) from IIT, Roorkee (2001), and Ph.D in Environmental Engineering from IIT Kharagpur (2005). Since last two decades, Prof. Samadder is continuing research using RS & GIS and Life Cycle Assessment (LCA) techniques for environmental planning and management including monitoring of ecological restoration of mine degraded lands, assessment of groundwater & surface water vulnerability, solid waste management, modelling for environmental applications etc. He published over 72 technical papers in international and national journals and has presented more than30 papers in international and national seminars on various aspects of environmental management. His publications have been widely cited (Google Scholar citations ~4753, h-index 29, i10-index46). He is currently teaching RS & GIS and Drinking Water Supply and Treatment at B.Tech and M.Tech levels and has guided more than 9 Ph.D and 40 M.Tech scholars. Recognized as one of the top 2% of scientists worldwide in the field of Environmental Science and Engineering by Stanford University and Elsevier's Database for 2021 and 2022. Recently, he completed one R&D project as Co-Principal Investigator on "Monitoring of Ecological changes due to large opencast coal mining (Ananta OCP, MCL).



An eco-park created at the Piparwar opencast mining site in Jharkhand

Correspondence Details

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Registration Form

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23 – 26 September, 2024

Venue: Industry-Institute Interaction Facility, (IIIF) Kolkata, IIT (ISM) Dhanbad

1. Name (in block letters): .....

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2. Affiliation:.....

3. Postal Address: .....

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4. Tel:..... Fax: .....

5. Email: .....

7.Details of Registration Fees

Demand Draft No. ..... Date: .....

Amount: .....

8. Additional information, if any: .....

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Place:

Date: Signature