किरोड़ी मल कॉलेज

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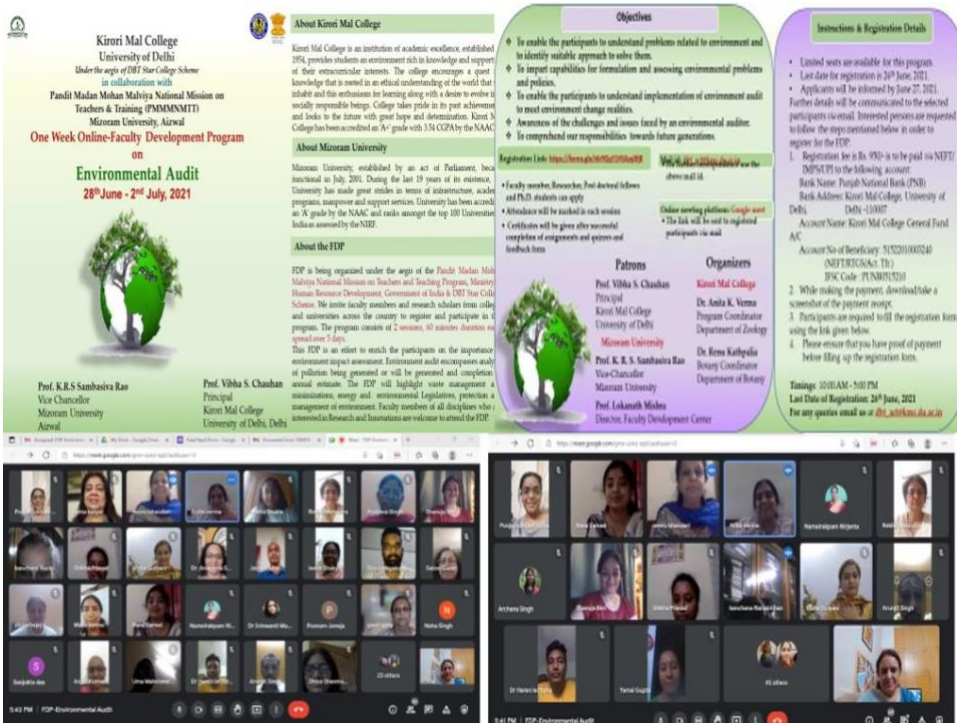
Report on One Week Online Faculty Development Program on "Environmental Audit" 28th June- 2nd July, 2021

One Week Online faculty development programme on "Environmental Audit" was organised by Kirori Mal College from 28th June 2021 to 2nd July, 2021 under the aegis of DBT Star College scheme in collaboration with Pandit Madan Mohan Malviya National Mission on Teachers and Training. Each day comprised of two sessions and in each session, there were lectures followed by assignments and quiz. Twenty-three speakers, academicians, scientists and people from industry, were invited who appraised all the participants with different aspects on environmental audit. The department of Botany and Zoology organized the program where 71 participants from different universities participated.



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I_n_a_u_g_u_r_a_l_ _s_e_s_s_i_o_n_ _

The program was inaugurated by Principal, Kirori Mal College, Prof. Vibha Singh Chauhan and Prof. Samabasiv Rao, Vice-Chancellor, Mizoram University. The inaugural lecture was addressed by Prof. Vibha Dhawan, DG, TERI. The Programme Coordinator Dr. Anita K. Verma introduced the speaker to the participants. Prof. Vibha Dhawan delivered a talk on **"A_i_r_ _P_o_l_l_u_t_i_o_n_:_ _C_a_u_s_e_s_,_ _P_r_e_v_e_n_t_i_o_n_ _a_n_d_ _W_a_y_ _F_o_r_w_a_r_d_".**_ _She started with the discussion on Primary and secondary pollutants accumulating in air. The sources and effects of these pollutants were also discussed. She mentioned about air pollution in India and trends of annual average PM_{10} concentrations (2001-2019). She also discussed air pollution episodes and its correlation with agricultural burning. Apart from local, the effects of urban

and regional pollution were also discussed. Dr. Dhawan mentioned the fact that air pollution can aggravate covid related impacts in patients. The speaker enriched our knowledge about sources of pollution in India, natural causes of pollution, the share of different sources contributing to pollution in India and also the impact of pollution. She also explained about key measures taken to control air pollution in India and key solutions to solve the problem of air pollution. The speaker also suggested individual responsibilities to solve the problem. The session was appreciated by all the participants and ignited queries in enthusiastic minds. All the queries were answered by Prof. Vibha Dhawan. The session ended with vote of thanks by Botany coordinator, Dr. Renu Kathpalia.

Prof. Mohanraj Rangaswamy, Head, Department of Environmental Management, Bharathidasan University gave an elaborative and informative lecture on **"L_i_f_e_ _C_y_c_l_e_ _A_s_s_e_s_s_m_e_n_t_ _a_n_d_ _E_n_v_i_r_o_n_m_e_n_t_a_l_ _A_u_d_i_t_".** The lecture emphasized the need for assessment of environment, life cycle analysis, its procedure, importance, limitation and the need for environment audit. The lecture elaborated on our responses to environmental issues, series of paradigms related to environment starting from no concern to pollution prevention to reuse and recycling of material to design of environment and sustainability. Talk also mentioned ecological footprint which is not limited to particular country, smart cities which can give input to better management of environment, impact of major industrial sectors. Besides habitat loss, pharmaceutical drugs, increase in particulate matter, microplastics is one of the major environmental concerns. He also elaborated technologies in which waste from one industry becomes input for other industry. Life cycle analysis attempts to measure cradle to grave impact on ecosystem. Important aspect of life cycle approach was briefed. Procedure of doing life cycle analysis, current uses, its importance and limitations were discussed. He emphasized environmental audit improves LCA. The lecture concluded with the change in transformation of personal mobility by 2040 which would include battery electric vehicle, range extender, hybrid electric vehicle. It was an interesting lecture and speaker answered the queries of the participants.

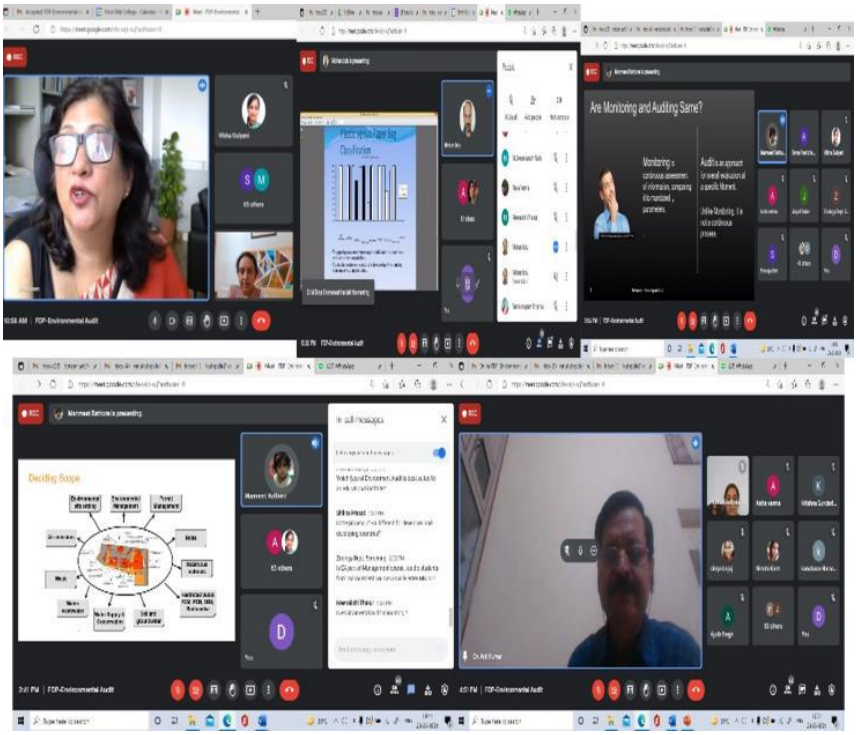
S_e_s_s_i_o_n_ _I_I_ _

A lecture was delivered on **'E_n_v_i_r_o_n_m_e_n_t_a_l_ _m_o_n_i_t_o_r_i_n_g_ _a_n_d_ _A_u_d_i_t_**" by Mr. Manmeet Rathore (ESG, Impact Investment). Dr. Vibha G. Checker welcomes and introduced Mr. Rathore. He described the types of Environmental monitoring and Environmental audit, need of audit, scope and its process. He greatly emphasized on that Environmental audit is needed to ensure the ecological impacts from the construction and operation of the project is kept within acceptable levels and the application and mitigation measures are practical and effective. The difference between environmental audit and environment impact assessment, types of environmental audits were also highlighted. Speaker mentioned that baseline monitoring is required to record baseline conditions of

the site, it should be conducted as a one – off site survey prior to commencement of any construction work. He stressed that these databases provide an early indication of any of the environmental control measures or practices fail to achieve the acceptable standards. The different steps involved in environmental audit by taking case studies were also mentioned. The lecture was very elaborative and included all the aspects involved in environment audit. The session ended with the questions taken by Dr. Maya, which were well answered by Mr. Manmeet Rathore. The vote of thanks was presented to him for sparing his valuable time to appraise all the participants with methods involved in environment auditing.

An **E_n_v_i_r_o_n_m_e_n_t_a_l_ _Q_u_i_z_ _**was hosted by Dr. Vibha G. Checker and Dr. Yamal Gupta after the lecture in which around 50 participants took part. The questions were related the environmental issues and all the participants participated with full zeal.

The last lecture of the second session on 28th June was by Dr. Anil Kumar, Ex-Director, Department of Environment, Govt. of Delhi. Dr. Vibha G. Checker introduced the speaker to the participants. The topic of the talk was **"E_n_v_i_r_o_n_m_e_n_t_a_l_ _L_e_g_i_s_l_a_t_i_o_n_s_" _**and it began with discussion on constitution provisions related to environment. The Government of India contains several environmental prescriptions. The speaker enriched our knowledge about various environmental pollution control laws, viz., The Water Act (1974), The Water (Prevention and Control of Pollution) Act (1974), The Air Act (1981), Environment Protection Act (1986) were discussed in detail. Major highlights of Noise pollution (Regulation and Control) Rules (2000) and Environmental Legislations applicable to Environmental Audit were also shared. The session was appreciated by all the attendees and ignited queries in enthusiastic minds. All the queries were answered by Dr. Anil Kumar. The session ended with vote of thanks by Programme coordinator Dr. Anita K Verma.



Day 2, 29th June 2021 Session I

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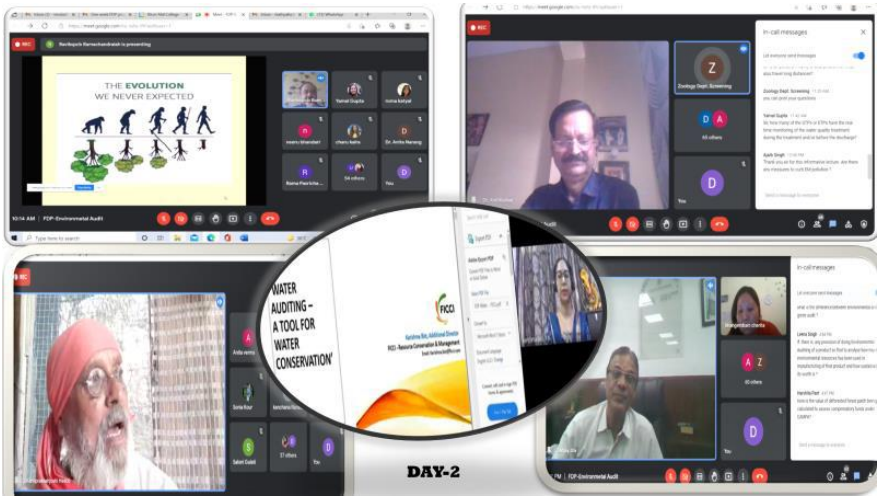
The second day began with talk on "**Economic Evaluation of Ecosystem Services: A Case Study**" Dr. D.R. Ravi, Environment officer, KSPCB. Dr. Yamal Gupta introduced the speaker to the participants. The lecture highlighted the renewable and non-renewable resources, services provided by the ecosystem and ecosystem and economics. The natural resources are available free and creates free rider problems and thus natural resources are misused and exploited. His talk also highlighted environment vs development, scarcity and economics, valuing natural resources and need to evaluate the environmental services. His lecture concluded with the techniques involved in environmental evaluation categorised into revealed preference approaches, stated preference approaches and combined approaches using example of calculation of total economic value of lakes. All the queries raised by the participants were clarified by Dr. Ravi.

The second lecture was on **"Pollution Control"** by **Dr. Anil Kumar**, Ex-Director Environment, GNCTD. After the brief introduction of the speaker by Dr. Sanjukta Das the speaker presented his talk highlighting different types of pollution. He elaborated air pollution by presenting the data of ambient air quality, different types of air pollutants, monitoring and action against violators of dust control measures, He informed the audiences about the comprehensive action plan (CAP), national clean air program (NCAP) and implementation of action plan finalized by high level task force (HLTF) being implemented as per the direction of supreme court. This was followed by details of water pollution and various agencies and department involved in implemented for controlling water pollution. The various steps implemented to control pollution of river Yamuna. Dr. Anil Kumar also presented the details of noise pollution and methods to measure noise level. The noise pollution is categorised on the basis of noise being created at community level as well as occupational noises. Next, he talked about soil pollution and its impact on environment and mitigation measures for soil pollution. This was followed by the question session and formal vote of thanks by Dr. Anita Kamra Verma where she profusely thanked him for the support.

Dr. Gauri Garg introduced **Ms. Karishma Bist**, Additional Director, FICCI, Delhi. The topic of the talk was **"Water Auditing- A Tool for Water Conservation"**. Ms. Karishma started her talk with the introduction of FICCI involvement in water audit studies and 10-15% reduction in water consumption has been achieved. She mentioned the details of water audit in which qualitative and quantitative analysis of water consumption is done. Why the water audit is conducted and the scope of work, water audit methodology was explained with elaborative data presentation. FICCI have procured all the latest equipment to collect the data and to verify the data submitted by the clients. Based on water audit studies water audit report is prepared and after discussion with the client the report is finalized. Most of the industry are advised to follow water conservation techniques and methods. She showed different method used



to minimize the water use at home as well in industry, hotels and multi-storeyed apartments. The efficient taps, shower system and flash tank were displayed. Wastewater segregation and treatment for recycle and reuse is also being checked by auditing team. Rain Water harvesting techniques are advised to the clients. She also highlighted the case study of Paper and pulp industry where water auditing has reduced water usage in the processing of paper. There was also reduction in the effluent generation and specific water use has been reduced as well the production increased because of using efficient techniques. Another case study of dairy unit was also shared by the speaker. The lecture was very informative and role water audit and FICCI actively preparing water audit report were informed to the participants. Dr. Cherita presented vote of thanks to Ms. Karishma Bist after the interjection session.

Session II

Dr. Anil P. Joshi, Founder, Himalayan Environmental studies Conservation Organization (HESCO**).**

"Environmental Product". An ecologist and botanist by training working on nature and natural resources was introduced by Dr. Amod. An excellent orator and dedicated environmentalist enlightened the audience with his vast experience. He mentioned the GDP of various countries and only 1-2% is contributed by agriculture. The agriculture the source of life and has been forgotten in the rat race of development. The industrial contribution has gone up in the past years all over world and the contribution of agriculture in India has also reduced from 40-60% to 16-20% recently. There is economic disparity and in every five year plans the difference is increasing. He started his organization in Uttarakhand where the industrial growth is tremendous and insisted that at the cost of GDP the ecosystems has been degraded and not been taken care. Human beings are dependent on the nature products and still we ignored the ecosystem growth. In the journey of hundred years, we have lost 60% of forest cover that ultimately goes to industrial growth. Talking about Amazon Forest fire and if it goes on the effect will be disastrous such as temperature rise, global warming due to development and so on so forth. The economic fight has taken front seat and ecology and environment has taken back seat. Water is nowhere contributing in the GDP of a nation. Water bodies in the country has reduced dramatically and most of the river are in crisis. Himalayan glacier has also reduced and glaciers are melting fast. The water is reducing at very fast pace and we are not concerned about it. He highlighted

that environment and ecosystem growth have been ignored in the GDP of the nation. He and his team raised the voice for ecosystem growth including water, air and soil quality. The state agreed to give equal status to environment growth and environment product with GDP. After every economic development we are losing environment and once the laws will be implemented the environment will also include in the growth of the nation. There is large gap between GDP and environment and if GEP is included the compensation will be given for loss of ecosystems. Prof Vibha Singh Chauhan joined to present vote of thanks to Dr. Anil P. Joshi and appreciated his initiatives of bringing indigenous methods in practise and protecting environment. Prof. Anita K. Verma thanked Dr. Anil P. Joshi for enlightening all of us and are very grateful for sharing his valuable time.

Dr. Anjali Prabhakar introduced **Mr. Sanjay Kumar Jha,** IA&AS, DG, Audit (Environment & Scientific Department), CAG office gave a very lucid talk on **"Environmental Audit: CAG's Perspective".** Comptroller & Auditor General (CAG) of India is the head of the Supreme Audit Institution (SAI) of India and is known as the Indian Audit and Accounts Department (IA&AD) Mandated by the Constitution of India as Auditors to the nation Articles 149-151 of the Constitution prescribe the unique role of the CAG. Designing an audit exercise, setting the audit objectives, scope, choosing the right audit approach and establishing suitable audit criteria, developing audit questions, determining the auditing skill levels and executing the audit. The objectives of the performance audit of renewable energy sector in India were to examine the progress made in increasing the contribution of RE resources in India's energy mix/electricity mix; increasing access to electricity/ lighting needs in remote and rural areas and promoting research, design, development and demonstration. Adequate knowledge in all aspects of auditing and capability to carry out financial, compliance the team should have a mix of different professional expertise viz., Comprehensive and adequate knowledge of environmental and climate change issues acquired through training followed by practical experience and an independent and unbiased approach, with aptitude for research. The major audit reports prepared for Conservation and Protection of Tigers in Tiger Reserves, Management of waste in India, Water Pollution in India, Compensatory Afforestation in India, Renewable Energy Sector in India, Environmental Clearance and Post Clearance Monitoring Rejuvenation of River Ganga were also highlighted. He mentioned that in India, environmental accounting is still in nascent stage. Ministry of Statistics and Programme Implementation, has consolidated the data on physical stock and quality of major natural resources in their publications titled Envi Stats 2018 and 2019. The participants were delighted with the expertise and knowledge of Mr. Jha and presentation of the auditing reports directly related to Union Environmental Ministries. He was given a hearty vote of thanks by Prof. Anita K. Verma. **T_h_i_r_d_ _D_a_y_,_ _3_0_t_h_ _J_u_n_e_ _2_0_2_1_ _S_e_s_s_i_o_n_ _1_ _**

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In continuation of online lecture series of FDP an elaborative and informative lecture was delivered by **M_r_._ _P_u_n_e_e_t_ _K_a_u_s_h_i_k_,_ _**the Founder Director, EHS Alliance Services on the topic **“E_n_v_i_r_o_n_m_e_n_t_a_l_ _A_u_d_i_t_ _f_o_r_ _t_h_e_ _E_d_u_c_a_t_i_o_n_a_l_ _I_n_s_t_i_t_u_t_i_o_n_s_”._ _**Dr. Leena welcomed and introduced the speaker to the participants. Mr. Kaushik emphasized on the proactive approach rather than reactive approach towards the environment. He described very well about the various services, the environmental compliance and management system implementation gaps, along with related corrective action, the environmental auditing and its origin. He elaborated the relationship between educational institutions and environment. He described the various stages of environment audit, the benefits of environmental auditing and how it fits with the environmental management responsibilities of an institution and elaborated the various activity of environment audit stages from the pre audit data collection till the submission of draft report. He explained about the environment audit considerations, the waste management system and the various methods making greening institutions like replantation, hedge plants and grasses along with that he emphasized strongly on the crucial role of institutions in biodiversity conservation. He strongly recommended the green consumerism and elaborated

wisely usage of the energy by adopting innovation and some parameters like use of electrical appliances based on star rating. In his concluding remarks he explained the various case study that highlighted the various practices regarding consciousness towards environment conservation like tree plantation, world nature conservation day. Dr. Renu Kathpalia presented formal vote of thanks to Mr. Puneet Kaushik for delivering a very informative talk.

The second lecture on the day was on **“Environment Impact Assessment”** by **Ms. Shweta Chahar**, Project Consultant, AECOM. She was introduced by Dr. Rana Samad. Ms. Shweta talked on the Environment impact assessment (EIA) history and its evolution, EIA core values, EIA mechanism, different Types of EIA and opportunities in EIA field. Talking on the protocols she mentioned that impact predications are done for air, noise, water and land pollution. The impact predication also includes Biological and socio-economic level. The environment management plan is done at three different phases, viz. pre-construction, construction and operation and maintenance phase. She also discussed plan implemented in different phases and gave their detailed account like different parameters to be monitored, location of the construction work, frequency of measurements at the site. At the end she discussed the opportunities in EIA field viz. freelancing and environment consultant in specific sectors, environment consultant in MNCs, setting up of testing laboratories and EIA research and education. It was indeed a

very lucid and interesting talk and raised many questions which were answered back by Ms. Shweta Chahar. She was profusely thanked and appreciated by the organizers and the participants.

The next lecture was on **"Ecosystem Restoration"** by **Mr. Sushil Kumar Sharma**, Former General Manager, Corporate Sustainable Development, NTPC Limited. Dr. Amod introduced the speaker. With plethora of colorful slides Mr. Sharma in very simple elaborative ways explained the different types of ecosystems, the causes of ecosystem degradation its causes effects and social impact. He discussed initiatives taken by UN decade on ecosystem restoration:2021-30. The different steps taken in the past are; UN General Assembly designated 5 June as World Environment Day (WED) in 1972. The first such day had the slogan "Only One Earth" and took place in 1974. World Environment Day was conceived to raise awareness on the problems facing our environment such as air pollution, plastic pollution, illegal wildlife trade, sustainable consumption, sea-level increase, and food security, among others. The purpose of WED is to spread awareness about the threat to the environment due to rising pollution levels and climate change. The theme for World Environment Day 2021 is "Ecosystem Restoration". UN Decade on Ecosystem Restoration is launched on WED 2021. He cited examples where initiative have been taken to restore the ecosystem. The Badarpur eco park developed by NTPC being built by fly ash and will be one of the largest man-made parks in India. Discussing the recent success stories, he further cited the example of Dharmraj Village Anand, Narmada Landscape restoration project. His talk also included the different innovative and creative ideas given by different people all over the country. Vertical forest in cities, roof top solar PV systems, solar PV water Pumps, solar PV cold storage, drip irrigation, organic balcony garden and adopting organic products are some of the ways by which ecosystem can be restored. It was a visual feast full of information and very interesting talk. He was profusely thanked by the organizers and appreciated by all the participants.

S_e_s_s_i_o_n_ _I_I_ _

Dr. Cherita introduce and welcome **P_r_o_f_._ _V_a_n_d_a_n_a_ _M_i_s_h_r_a_**, Environmental Studies, DU. gave an enlightening talk **"I_n_d_u_s_t_r_y_ _S_u_s_t_a_i_n_a_b_i_l_i_t_y_"**. She talked about the growing industry i.e., Fast Fashion Industry available to all classes of consumers resulting in grave human and environmental health risks associated with inexpensive clothing. The environmental cost of the industry is on water quality and quantity, carbon foot print, chemical use and textile waste. The primary concern of this industry is to reduced the cost and increased speed of delivery to the market and is not at all concerned for environmental pollution and volumes of waste being generated. She also highlighted the ways to sustain this industry by policy makers, retailers and the consumers. The common effluents treatment at Bhuj is taking care of pollutants however, many of the dyes

used in the industry are untreated or partially treated creating socio-economic and environmental challenges. These azo dyes used in the fashion industry are microbially degraded under saline condition of the effluents resulting in toxic and carcinogenic products which are affecting at the cellular level to plants as well as animals. Taking plant as bioassay system these products were tested and found to cause chromosomal abnormalities. The need of the hour is to develop cost-effective, environmentally safe and industrially acceptable biotechnologies methods. She reiterated that characterization and toxicity assessment of dye waste water before after the single stage treatment is must. It was an eye-opener for one and all. The interjection session was very long as her talked raised many queries, which were well answered by Prof. Mishra. Prof. Anita Kamra Verma praised her talk and gracious acceptance of the invitation. **"E_n_v_i_r_o_n_m_e_n_t_a_l_ _A_u_d_i_t_ _a_n_d_ _L_i_f_e_ _C_y_c_l_e_ _A_s_s_e_s_s_m_e_n_t_ _–A_ _C_a_s_e_ _S_t_u_d_y_ _o_f_ _C_o_f_f_e_e_ _P_r_o_c_e_s_s_i_n_g_ _I_n_d_u_s_t_r_y_"** _is topic of talk by Prof. A.K. Nema, IIT, New Delhi. Dr. Anjali introduced and welcome Prof. Nema. He started his lecture by showing two major types beans viz. arabica and indica, field of coffee with wonderful colors photos of the coffee plantation. Addition of chicory root is used as an adulterant where 3 parts of chicory are mixed with 1 part of coffee. The pure coffee is not commercially used as it is very difficult to keep in powder form as well as the cost will become too high therefore large amount of chicory root is added. While elaborating the processing of coffee the amount waste being generated was also presented. The processing involves many steps firstly, the pulp of coffee is isolated after drying the bean under sun. The ways by which drying of coffee cherry is done the fetch the price. He shared the details of coffee industry auditing done by his group. The auditor team included by team leader, key team members which are chemical or environmental engineers, operational personnel, budgeting personnel, manager all are well acquainted with the regulations. He highlighted the coffee processing in detail and the effluents released during the processing. The auditors carefully analyzed the water consumption at different stages of coffee processing and auditing has reduced the water consumption in the processing unit. Dr. Rana Samad conducted the interjection session. The formal vote of thanks was given by Dr. Renu Kathpalia.

At the end of the day 3, Dr. Bhuvan Chopra, Environmental studies, University of Delhi, conducted an environmental quiz on climate change which enthralled all the participants.

Day 4, 1st July, 2021

Session I

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The day started with the lecture on **"Benefits of Environmental Audit"** by **Dr. M. Dwarakanath**, Ex Director, Department of Science Technology and Environment, Govt. of Puducherry. Dr. Sanjukta Das Introduced Dr. M. Dwaraknath to the participants. Giving the background of environmental audit he described EA is a systematic, documented, periodic and objective review by a regulated entity of facility operations practices related to meeting environmental requirements. In India it was introduced in March 1992 and it is the first country in the world to make environmental audits compulsory. Environment audit cover waste management, waste minimization, emission to air, ground water protection, surface water management, energy and utility consumption, protecting of environmentally sensitive areas, control of visitors and addressing the local issues. The EA helps to avoid accidents and reduce risks, meet clients' requirements, green branding, helps to save the cost and resources. EA also helps to keep up better environment and lesser pollution, waste minimisation and cleaner technologies and protects occupational health as well as environmental health. It is management tools to mange environment and almost every detail of the EA using two case studies were clearly explained. He also highlighted the benefits of environment audit both in terms of cost reduction and predict future threats too. The interjection session was very interesting and very good learning experience of all the participants. Prof Anita Kamra Verma presented formal vote of thanks and appreciated all the guidance provided by Dr. M. Dwarakanath.

CA Amarjit Chopra, Ex-president, ICAI was introduced by Dr. Renu Kathpalia. The lecture was delivered on the topic **"Role of Chartered Accountants in Environmental Audit"**. He has described the connections between chartered accounting and auditing in numerous businesses quite well. He focused on the numerous legislations governing environmental auditing. Because of the multidisciplinary nature of environmental science, the group must have a team well versed in the subject and know the concept of sustainability and the Institute of Chartered Accountants has set up the standard board of environment sustainability. He also informed that none of the agency is

funding if the project is causing environmental damage and are not funded unless and until they submit the report of environmental audit report. The auditor has responsibility to see reports besides involving money and one of the most important information an auditor has to verify that project must ensure environment sustainability. The claims made by management are to be verified by an auditor. The Institute of chartered accountant has taken many initiatives to keep the standard of reporting and it has been greatly appreciated. He differentiated between Carbon neutral and carbon net zero on the basis of the carbon credits of the company. An auditor has to verify and ensure that the claim made by an organization regarding carbon credits are not fake. It is now business responsibility of an auditor not only to check financial matters but also controlling the damage of environment. During interjection he informed that as such there is no paper on environment in CA course but soon the CA will also be asked about the environment sustainability. Prof. Anita Kamra Verma conveyed her heartfelt gratitude to Mr. Chopra for enlightening everyone on various aspects of environmental audit and the responsibility of Chartered Accountant. The only country to have sustainability board and assurance certificate with different gradation means that chartered accountant is doing such a comprehensive job and for this she congratulated him and applauded for this initiative by the institute.

"E_n_v_i_r_o_n_m_e_n_t_ _A_u_d_i_t_ _o_f_ _A_i_r_ _P_o_l_l_u_t_i_o_n_ _C_o_n_t_r_o_l_ _S_y_s_t_e_m_s_" _Mr. M.A Patil, Sr. Director, FICCI.

Mr. Patil was introduced by Dr. Nidhi. Environment Audit for Performance Evaluation of APCD (Add-on Pollution Control Device)- A case study was presented by Mr. Patil. It was the auditing report of a steel factory presented with all technical details including plant description, field measurements to evaluate performance. The recommendation by the auditors were also discussed. The recommendation for APCD to industry were to provide new hood as per the design provided, Keep a stand-by (spare) hood arrangement to replace whenever one hood is damaged, Provide new smooth pivot arrangement, so that hood movement is smooth such that it can be pushed/pulled by one workman effortlessly, Increase filtration area, by adding one more module of bags by doubling the no of bags, Eliminate leakages in the bag filter by proper sealing of leakages, Ensure supply of compressed air at 4 kg/cm2 for 24 X 7, whenever furnace is running and design the most suitable hood for satisfactory extraction of fumes. Mr. Patil also shared the designing, installation and performance of APCD with the participants. Following the interjection session, the speaker received a formal vote of gratitude for painstakingly explaining the report's details.

Session II

After the lecture Mr Dr. Archana Singh introduced **D_r_._ _R_a_t_u_l_ _B_a_i_s_h_y_a_,_ _**Department of Botany, University of Delhi. Dr. Baishya gave an elaborative and informative lecture on **"C_a_r_b_o_n_**

_S_e_q_u_e_s_t_r_a_t_i_o_n_ _a_n_d_ _A_u_d_i_t_i_n_g_:_ _M_e_t_h_o_d_,_ _S_c_o_p_e_ _a_n_d_ _P_r_o_s_p_e_c_t_s_”. The lecture emphasized the need for carbon sequestration and explained the methodology of carbon audit by preparing carbon strategies. Carbon strategy is compulsory in certain designated industries like steel, car manufactures. As a corporate social responsibility, it is mandatory to reduce its carbon footprint. Carbon auditing for greenhouse gases became an important aspect due to the effect of CO_2 on climate change. The lecture highlighted Kyoto Protocol and its implications. CO_2 concentrations and its effect on net primary productivity, methodology for biomass and carbon audit. Mechanism of the REDD+ Programme for carbon auditing, its scope and prospects was also discussed along with four REDD+ projects in India with special mention of Khasi Hill REDD+ project. The lecture also highlighted carbon credit, Carbon Capture Storage (CCS) technology. Various CCS technology like coal to liquid plant in ERDOS (Magnolia), options for storing CO_2 in deep underground geological formations were discussed. Latest technology in CCS field like Direct Air Capture, Dastur International which is the only flagship project of Atma Nirbhar Bharat Initiative for CCS in India was also mentioned. The lecture concluded with the need for mechanism for long term storage of the carbon fixed through photosynthesis, proper channelling of the recalcitrant carbon, CO_2 mitigation strategies adopting CCS technology, exploring ways for implementation of REDD+ projects and reducing carbon footprint not only at individual but also at organizational, national and international level. Dr. Renu Kathpalia presented hearty vote of thanks for the time given by Dr. Ratul Baishya and enlightening the participants with every detail of carbon sequestration.

“***Environmental Audit programme in India: Role of Educational Institutes***” by **Dr. M. Dwarakanath**, Ex-Director, DST, Govt. of Puducherry. Dr. Cherita introduced the speaker to the participants. The presentation was divided into two parts- role of institutes in Eco-restoration and R&D. Ecosystem restoration relies on the concept of Reimagine, Recreate and Restore. The activities those can be conducted in the individual level as well as institutional level are growing trees, greening cities, recreating gardens, cleaning up rivers and coasts etc.

The speaker also spoke about relation between various religious writings about environment. In Christianity, many bibles verse was written on protection of environment and prevention of pollution, care of animals etc. In Hinduism, worshiping natural resources, depicting animals in the form of God, were all related with the protection and conservation of environment. As a role of institutes, the proverb “If you are thinking a century ahead; Educate people” is very much applied.

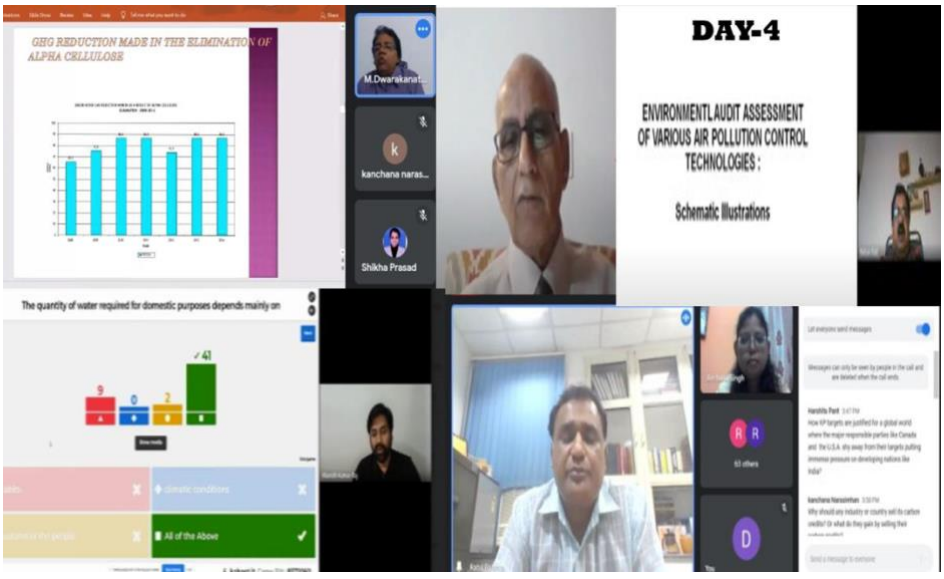
Academic institutes have green visions, green purchase policies, adopt green roofs and helped in increasing the diversity via conservation of biodiversity. Institutes should follow eight concepts of resource conservation on

Rethink, Refuse, Reduce, Reuse, Refurbish, Repair, Repurpose and Recycle. Institutes also can initiate the foundation of Eco-club, adoption of Renewable energy, Resource audit, Water treatment and Carbon Balance.

As an individual approach, one can stop using social media platforms unnecessarily, like stop sending unnecessary mails, usage of plastics etc. As a student, taking part in Eco-club, participating in various projects related to environmental conservation, and student must be aware of the chemical uses in daily commodities etc.

The second part of presentation described the role of institute in R&D. Research are basically carried out for various purposes: Survival, academic, basic, laboratory research, lab to land programmes and collaborative research with industries. R&D projects are taken up to satisfy various purposes like professional improvement, professional recognition, job satisfaction, carrier advancements, help institutes and needy students, finds the solution for society and communities.

The presentation also described the protocols of funding agency and a guide for preparation of effective proposals. Generally, funding agency announced the policy, formulated the program, evolved the scheme, defined the thrust area and time bound proposal is invited. Preparation of logistic proposal with proposal time frames inclusion of expert co-PI, finding social relevance, proper accounting etc are needed. There are certain points to be kept in mind is that proposals are never to be irrelevant to the thrust area, repetitive proposals, analysis commercially available products etc



The speaker also guided the participants looking for funding agencies. He informed that funding may be available from state/ central/ autonomous bodies under specific schemes. It may be national or international. Some of the notational agencies are DBT, DST, MOEF&CC, ISRO, UGC, S&T Councils, Ministry of water resources and defence etc. Whereas important international agencies are JICA, UNDP, UNEP, British High Commission etc.

Dr. Leena Shakya introduced the next speaker **Mr. J. S. Kamyotra**, Member Secretary, CPCB, New Delhi who delivered a very useful and informative talk regarding environmental impact assessment entitled ***"Environmental Clearances (EC) w.r.t. Megaprojects"***. He emphasized the proactive approach of environment impact assessment as

it is the only right tool to cope up with the development with respect to the environment. He elaborated the importance of environment clearance for various industries. He briefly told the historical aspects of EC in India and explained the various stages, categorization of the industries based on the types of the activity, monitoring, validity and timeline of environmental clearance. He explained the role of Supreme Court and localized people in getting EC. He also talked about the post monitoring, conditions of EC, validity and the applicability of it. He discussed about the various types of certificates issued by the concerned authority. At the end he cleared the common misconception about the environmental clearance to the participant in a very elaborative manner.

Dr. Yamal Gupta introduced and welcome Dr. S. Krishna Bharathi, TUV Rheineland Middle East office, Dubai who enlightened on the topic "***Environmental management***: ***A comprehensive study of Industrial sector***

Session II

In session II on the last day Dr. Anumita Roy Choudhary, Executive Director, CSE, enlightened the participants on the topic **"Leveraging resource audits for sustainability and climate resilience in cities"**. She was welcome and introduced by Dr. Gauri Garg Dhingra. Dr. Choudhary began by recapitulating the environmental imperative of resource audit and talked about the risk associated with sea level rise, heat mortality rate in India, cities drowning in their own waste. She went on explaining the cost of global climate change on Indian GDP, she also explains how cities collectively consumes 75% of world natural resources, generates 50% of the waste and emits 70% of greenhouse gases. The solution or the control measures for all these problems can be the building of sustainable environment. Madam highlighted 7 goals of sustainable development which are- good health and well-being, affordable and clean energy, economic growth, industry, innovation and infrastructure, sustainable cities and communities, responsible consumption and production, and climate action. The speaker highlighted the holistic energy management approach for material, energy efficiency and thermal comfort. She also suggested various techniques for this, for example building orientation for maximum energy efficiency, emphasized the importance of star rating on electric appliances.

Following this the speaker discussed about the depleting natural resources (water table) and their impacts. Multiple resource saving techniques for climate resilience were also explained in detail by Dr. Choudhary. She explained the rain water harvesting techniques, decentralized wastewater treatment technique adopted by Delhi Jal Board, soil biotechnology for wastewater treatment, pit composting. She highlighted the need to develop Net Zero Energy Building (NZEB) by giving example of Indira Paryavaran Bhawan, Supreme Court Annexe Building, IIT Jodhpur and many more.

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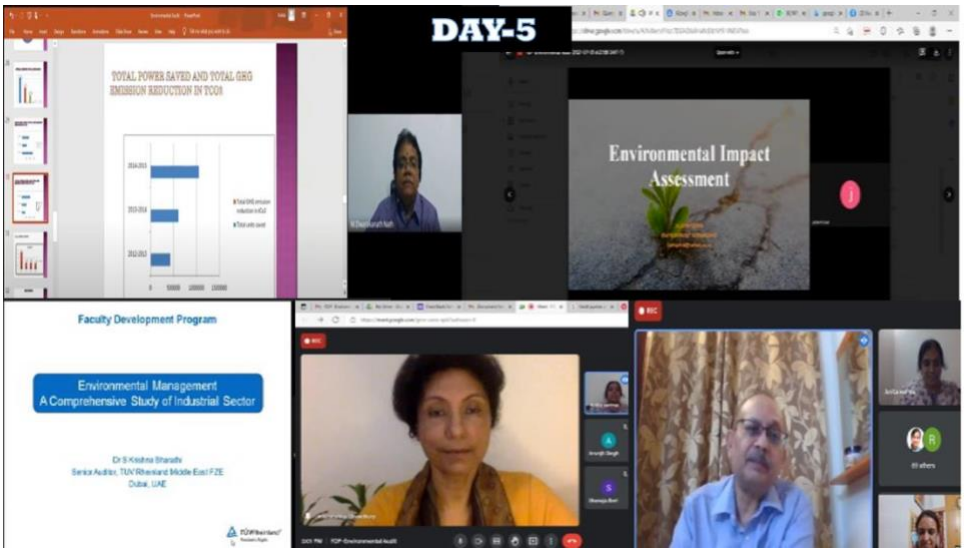
Finally, the speaker described the need of green audits and initiatives and also emphasize on the role of resource audit for sustainability. The session provided an in depth understanding of the resource audit management techniques. The speaker used numerous examples to clarify the concepts. The session ended with an enriching discussion where Dr. Anumita Roy Choudhary responded to questions posed by participants. She was presented with formal vote of thanks by Dr. Renu Kathpalia.

Mr. Rajiv Ranjan Mishra, DG, National Mission on Clean Ganga was welcome and introduced by Dr. Renu Kathpalia. Mr. Mishra enlightened the gathering with presenting wonderful slide and videos on **"Rejuvenation of Rivers and Related Ecosystems".** The emphasis of the talk was on the status of major rivers of India, encroachment of waterbodies, several river rejuvenation projects undertaken, biodiversity conservation along with sustainable agriculture in Ganga Basin. At first Sir talked about the major threats to Rivers like solid waste, open defecation, sewage and industrial pollution, chemical fertilizers etc. The lecture detailed ten principles of River Ganga rejuvenation, protection and management. Mr. Mishra explained in detail four pillars for River rejuvenation which are Nirmal Dhara, Aviral Dhara, Jan Dhara and Gyan Dhara. The need for river centric planning was highlighted in the talk that included planning for river basin, river sensitive urban planning and projects for river management. Sir also mentioned about the Ganga River basin management plan which starts in 1985 as GAP 1 (Ganga Action Plan) upto Namami Gange Mission in 2014. A beautiful video of River Ganga a_n_d_ _i_t_s_ _m_a_j_o_r_ _G_h_a_t_s_ _w_a_s_ _s_h_o_w_n_ _d_u_r_i_n_g_ _t_h_e_ _t_a_l_k_ _w_h_i_c_h_ _w_a_s_ _a_ _v_i_s_u_a_l_ _f_e_a_s_t_ _a_n_d_ _e_n_t_h_r_a_l_l_e_d_ _e_a_c_h_ _o_n_e_._ _T_h_e_ _a_u_d_i_e_n_c_e_ _a_l_s_o_ _g_o_t_ _t_o_ _k_n_o_w_ _t_h_e_ _f_o_u_r_ _b_a_s_i_c_ _r_i_g_h_t_s_ _o_f_ _a_ _r_i_v_e_r_ _(_i_)_ _r_i_g_h_t_ _t_o_ _f_l_o_w_,_ _(_i_i_)_ _r_i_g_h_t_ _t_o_ _i_t_s_ _l_a_n_d_ _(_i_i_i_)_ _r_i_g_h_t_ _t_o_ _m_a_i_n_t_a_i_n_ _i_t_s_ _e_c_o_s_y_s_t_e_m_ _a_n_d_,_ _(_i_v_)_ _r_i_g_h_t_ _t_o_ _f_l_o_w_ _u_n_p_o_l_l_u_t_e_d_._



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