

HIGH - END WORKSHOP (KARYASHALA)

on

"Advanced Instrumentation for Assessment of Soil Health Indicators,
Pollution and Greenhouse Gas Emission from Soil"
(Sponsored by SERB (DST), New Delhi)

7TH -20TH SEPTEMBER, 2022



Health impacts



Weather-related mortality
Infectious diseases
Air-quality respiratory illnesses

Agriculture impacts



Crop yields
Irrigation demands

Forest impacts



Forest composition
Geographic range of forest
Forest health and productivity

Water resources impacts



Water supply
Water quality
Competition for water

Impacts on coastal areas



Erosion of beaches
Inundation of coastal lands
Additional costs to protect coastal communities

Species and natural areas



Loss of habitat and species

Organized by

ICAR- Indian Institute of Soil Science

Nabibagh, Berasia Road,
Bhopal-462038, Madhya Pradesh

Event Organizer

Dr. Sangeeta Lenka

Course Coordinators:

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Organizing team:

Drs. Vassanda Coumar, Abhijit Sarkar, Rahul Mishra,
Nisha Sahu, Dinesh Yadav, Madumonti Saha



About the Institute

The Indian Institute of Soil Science (ICAR-IISS) is a research institute under the Indian Council of Agricultural Research (ICAR) under the Ministry of Agriculture and Farmers' Welfare, Government of India. The Institute was established on 16th April, 1988 at Bhopal with a mandate of “Enhancing Soil Productivity with Minimum Environmental Degradation”. To accomplish the mandate of the institute, it has given the priority to soil health related issues faced by farmers and other stakeholders (<https://iiss.icar.gov.in/#modal-one>).

IISS has emerged as a leader in basic and strategic research on soils in the country. It has achieved significant success in the areas of integrated nutrient management, impact on soil under long-term cropping, technology for preparation of enriched composts, soil test based nutrient prescriptions, generation of district-wise GIS based soil fertility maps, organic farming practices, carbon sequestration in soils, sink capacity of soils for heavy metal pollutants, recycling of wastes, soil microbial diversity and biofertilizers, quality standards for municipal solid waste composts etc.

About the Karyashala Scheme

KARYASHALA is an effort by the Science and Engineering Research Board (SERB), Government of India via Accelerate Vigyan to improve research productivity of promising PG and Ph.D. students from universities and colleges through high-end workshops on specific themes. This program aims to provide opportunities to acquire specialized research skills.

About the Program

The programme is proposed for duration of two weeks for twenty M.Sc. and Ph.D. students. This high end workshop cum training is aimed at capacity building of M.Sc. and Ph.D. students in agricultural science thus improving their efficiency and knowledge in basic and applied research. The exposure of students to advanced instrumentation for measuring soil health indicators, soil pollution and greenhouse gas emissions will build and strengthen their confidence in using high end equipment for their research work in M.Sc. and Ph.D. dissertation work. The proposed workshop will enhance their skills on importance of soil health assessment, soil environmental pollution and greenhouse gas emission and mitigation strategies.

This program contains not only theory but hands-on sessions in the use and applications of high end instruments for estimation of soil carbon, quality parameters, and greenhouse emissions and research oriented discussion.

Course Content/Deliverables

Days	Lecture
Day-1	Registration Inaugural Session Pre-training test Soil health and soil health card its importance and potential for better crop in India Soil pollution: sources and remedial measures Climate change and Greenhouse gases – overview and general principles Open top chambers for climate change studies-Practical
Day-2	Elevated atmospheric CO ₂ and temperature: indirect effects on soil processes Principles and methods of soil sampling for soil analysis-Theory and practical Assessment of soil carbon stocks and sequestration using elemental analyzer-Practical Greenhouse gas sampling and measurement in gas chromatograph-Practical
Day-3	Principals of heavy metal extraction and analysis from soil and plant. Heavy metal analysis using instrument ICP OES-Practical Use of geo statistics and GIS for delineation of heavy metal polluted area -Practical Waste water quality parameters and estimation for irrigation -Practical
Day-4	Soil organic pollutants sources and remediation in soils Biochar: property and use in agriculture for crop productivity Biofertilizer: potentials and application in different crops for enhancing crop productivity and soil health Free air carbon dioxide experiments and growth chambers for climate change studies



Day-5	<p>Climate smart agriculture and Carbon sequestration</p> <p>Soil physical indicators of soil health card</p> <p>Fractionation of Soil organic matter and its significance</p> <p>Physical fractionation of SOM- Practical</p>
Day-6	<p>Advance agricultural strategies for enhancing bioavailability and biofortification of micronutrients in economic yield</p> <p>Micronutrient extraction and analysis in soil and plant using Atomic absorption spectrometer</p> <p>Monitoring and Verification for soil carbon accounting in carbon trading projects</p> <p>Field procedures and sampling for soil carbon determination (Practical)</p>
Day-7	<p>Role of Farm machinery to reduce Green House Gas emissions</p> <p>Effect of conservation tillage and agroforestry systems on soil health and crop productivity</p> <p>Visit to CIAE for conservation agriculture implements (Practical)</p>
Day-8	<p>Impact of long term cropping and fertilization on soil carbon sequestration and soil quality: Lessons learnt from Long Term Fertilizer Experiments.</p> <p>Elevated atmospheric temperature and carbon dioxide: indirect effect on soil biota and microbial diversity</p> <p>Advance laboratory hands on training on isolation and characterization of soil microbes for prospecting microbial inoculants</p> <p>Evaluation of Glaucconite as source of Potassium for crops</p> <p>Enhancing the productivity of major crops through improving the natural resource base of tribal inhabited areas of central India</p>
Day-9	<p>Mineralogy of Vertisols in relation to K availability India</p> <p>Enhancement of Soil Health and Livelihood of Tribals in Central India</p> <p>Assessment of nutrient (N & P) use efficiency in wheat genotypes for improved crop productivity</p> <p>Organic Farming for soil health and crop productivity: Principles and potentials</p>
Day-10	<p>Reclamation and rehabilitation of coper mining affected land in Malanjkhanda area of Madhya Pradesh</p> <p>Precision agriculture using automated soil nutrient sensing system</p> <p>Impacts of conservation agriculture on runoff and soil loss under different cropping system in Vertisols</p> <p>Nano technology: potential and implication in agriculture</p>
Day-11	<p>Analytical procedure and methodology for measuring chemical fractionation of soil organic carbon pools (Practical)</p> <p>Enhancing decomposition rate and quality of bio-waste through microbial consortia</p> <p>Exploring soil microbial community and mechanism in soil carbon sequestration under long term land uses.</p> <p>Analysis of nutrients in plants for crop quality assessment</p>
Day-12	<p>Field Visit to state department agro-forestry models and organic farming – whole day</p> <p>Conservation agriculture practices in enhancing crop productivity</p> <p>Statistical analysis for design of experiments and on farm experiments</p> <p>Analysis of soil physical properties-practical for soil health card</p>
Day-13	<p>Use of crop growth simulation models in assessing effect of Climate Change-with special reference to APSIM-theory and practical.</p> <p>Solute transport modeling to assess the leaching loss of nutrients.</p> <p>Soil health and productivity improvement through soil test crop response (STCR) approaches</p> <p>Determination of soil microbial biomass carbon-Practical.</p>
Day-14	<p>Assessment of soil secondary nutrients for soil health –Practical.</p> <p>Methods for determination of amendment requirements of problem soils.</p> <p>Vermi composting and vermiwash for soil productivity and organic agriculture.</p> <p>Post-training test</p> <p>Valedictory function</p>

Faculty

National resource persons from ICAR-Indian Institute of Soil Science including guest lecturers from ICAR Institutes and SAU's.

Number and eligibility of participants

Twenty participants (M.Sc and Ph.D. students) will be selected for the training on first cum first serve and merit. The program is open to M.Sc and Ph.D. students' specialization in soil science/agronomy/soil physics/crop husbandry/environmental science from AICTE approved Central and State agricultural University. There is no registration fee for the applicants.

Boarding and Lodging

The participants will be provided travel, lodging and boarding as per SERB guidelines. Accommodation will be provided in ICAR-IISS/CIAE guest house by the organizers on room sharing basis. Participants are requested not to bring family members with them, as the Institute has limited hostel facilities. The participants will be provided with the necessary stationary and consumables items for the workshop. A certificate regarding successful completion of workshop shall be issued to the participants. More details can be found in Accelerate Vigyan website.

Submission of application

- Interested eligible candidates can register through google form link <https://docs.google.com/forms/d/1StpH3XYNkGIRCnc9MHZtjQ6nQKktPI4lwb0CUikigk8/edit> by uploading application form duly signed by the Recommending Authority/Head of the Department/ Institute so as to reach on or before 5th August 2022.
- Only selected candidates will be informed by email/phone, therefore the candidates must provide valid E-mail IDs and phone while doing the online registration.
- The selected candidates will have to acknowledge and accept the offer for participating in the workshop through return email, failing which the waitlisted candidates may be called for the workshop.

APPLICATION FORM FOR PARTICIPATION IN KARYASHALA

DST-SERB sponsored high end workshop

on

“Advanced instrumentation for assessment of soil health indicators, pollution and greenhouse gas emission from soil”

ICAR- Indian Institute of Soil Science, Bhopal-462038

1. Full Name (in block letters):
2. Highest degree pursuing with specialization:
3. Present Institute/University name and address:
4. Address to which reply should be sent:
(in block letters)
(Give phone, mobile, fax & email id)
5. Date of Birth:
6. Sex: Male/Female:
7. Mention if you have participated in any training course during the previous years under ICAR/other organizations:
8. Need for this training and how it will help in your research activities:
9. Academic record



Examination passed	Subjects main/subsidiary	Year of passing	Class ranks, distinctions etc.	University or Institution	Other information
Bachelor's degree two years three years/four years					
Master's degree					
Doctoral degree					
Other certificates, diploma, degree, if any					

Signature of the applicant

Date
Place

12. Recommendations of forwarding Institute:

Signature
Designation
Address

Date

Note: Application with above details may be typed on good quality A-4 size paper and uploaded in the google form/emailed/posted to the Event organizer of the program on or before 5th August 2022.

Important dates:

1. Last date for receipt of application: 5th August, 2022
2. Confirmation of participation: 10th August, 2022
3. Workshop Dates: 7th to 20th September, 2022

All correspondence should be addressed to

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