



ICAR Sponsored Winter School

Advances in Soil Health Management Strategies Under Climate Change Scenarios for Improved Input Use Efficiency, Crop Productivity and Produce Quality

 **5 - 25 January, 2027**



Patron

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ICAR-Indian Institute of Soil Science

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Background

Indian agriculture has made remarkable progress in food production since the second half of the twentieth century; however, this achievement has placed increasing pressure on soil, water and other natural resources. Intensive cultivation, imbalanced fertilizer use, declining soil organic carbon, nutrient mining, excessive tillage, residue burning, inappropriate irrigation and soil contamination are emerging challenges to sustaining soil health and agricultural productivity. These challenges are further aggravated by climate change through rising temperatures, changing rainfall patterns, frequent droughts and floods, and other extreme climatic events, which influence soil processes, nutrient cycling, soil moisture, carbon dynamics, microbial activity and crop productivity. In this context, soil health management is central to sustainable and climate-resilient agriculture. Healthy soils support plant growth, regulate water and nutrient cycles, sustain biological diversity and provide important ecosystem services. Effective soil health management requires an integrated understanding of physical, chemical and biological indicators and their interactions with crop, nutrient, water and climatic management. Regular assessment and monitoring of these indicators provide the basis for developing location-specific strategies to improve soil quality and sustain productivity. Increasing demand for agricultural production, coupled with limited land and water resources, necessitates efficient use of fertilizers, irrigation water, energy and other inputs. Low nutrient-use efficiency, particularly of nitrogen and phosphorus, can result in substantial nutrient losses through leaching, volatilization and runoff. To mitigate these problems, integrated nutrient management, soil-test-based fertilizer recommendations, site-specific nutrient management, balanced macro- and micronutrient management, and precision irrigation and fertigation offer opportunities to synchronize input application with crop requirements and improve resource-use efficiency. Conservation agriculture and other sustainable soil management practices provide an important foundation for improving soil health and resource-use efficiency under changing climatic conditions. Minimum soil disturbance, continuous soil cover, residue management and diversified cropping can improve soil aggregation, water infiltration, moisture retention, soil organic carbon and biological activity while reducing erosion and energy requirements. Integration of these practices with appropriate agronomic and nutrient management strategies can enhance productivity and climate resilience. Recent advances in precision agriculture, sensors, GIS and remote sensing, digital soil mapping, drones, spectroscopy, data analytics and decision-support systems have created new opportunities for site-specific soil and crop management. Similarly, biofertilizers, microbial resource management, organic amendments, biochar, nano-based nutrient approaches and agronomic biofortification offer potential for improving nutrient-use efficiency, soil health and produce quality. Soil carbon management is also critical for climate-change mitigation and adaptation. Conservation agriculture, organic amendments, biochar, residue recycling and diversified cropping can contribute to soil carbon sequestration and improved soil functions. Understanding soil carbon fractions and greenhouse gas emissions through advanced analytical and experimental approaches is essential for evaluating the climate benefits of different management practices. Sustainable soil health management must also address soil and water quality constraints such as heavy metal contamination, agrochemical impacts, poor irrigation-water quality and inappropriate waste disposal. Safe recycling of suitable wastes, vermicomposting, bioremediation and phytoremediation can contribute to resource recovery and restoration of degraded soils while safeguarding environmental and produce quality.

The ICAR–Indian Institute of Soil Science (ICAR-IISS), Bhopal, with its expertise and research infrastructure pertaining to soil health, nutrient management, conservation agriculture, soil carbon, soil biology, precision agriculture and climate-change research, provides an appropriate platform for capacity building in these emerging areas. Against this background, the proposed training programme

aims to provide comprehensive and hands-on knowledge regarding advances in soil health management under climate change scenarios, with emphasis on improving input-use efficiency, sustaining crop productivity, enhancing produce quality and strengthening the resilience and sustainability of agricultural systems.

Objectives

1. To understand soil health and its physical, chemical and biological indicators under scenarios of climate change.
2. To promote sustainable and climate-resilient soil management practices for maintaining soil quality.
3. To improve nutrient- and water-use efficiency through integrated and precision management approaches.
4. To enhance crop productivity and produce quality through advanced technologies and improved soil management.

Core training content

- Soil Health Management and Assessment Indicators, Soil Testing and Policy Framework
- Integrated and Precision Nutrient Management viz., IPNS, STCR, SSNM and Nutrient-Use Efficiency
- Conservation Agriculture and Sustainable Cropping Systems Tillage, Residue Management and Crop Diversification
- Precision Water and Resource Management Sensors, GIS/RS, Drones and Decision-Support Tools
- Soil Carbon, Climate Change and Soil Biology Carbon Sequestration, GHGs, Biochar and Biofertilizers
- Soil, Water and Environmental Quality Management Agrochemicals, Contamination, Waste recycling and Remediation
- Soil Health, Crop Productivity and Produce Quality Biofortification, Organic/Natural Farming and Balanced Nutrition

Who can apply

Researchers and academicians holding permanent positions as Scientists, Subject Matter Specialists, Assistant Professors, or equivalent positions in recognized Universities, Research and Development (R&D) organizations, and related institutions are eligible to attend the Winter School. Applicants should be actively engaged in research, teaching, extension or demonstration activities in areas including Soil Science, Agronomy, Soil and Water Conservation Engineering, Plant Physiology, Soil Microbiology, Environmental Sciences, and other relevant disciplines of Agriculture and Horticulture.

How to apply

Take a printout of filled and duly signed copy of the registration form and send it through proper channel to the Course Director (Dr. Sanjib Kumar Behera, Principal Scientist & Head, Division of Soil Chemistry and fertility, ICAR-Indian Institute of Soil Science, Nabi Bagh, Berasia Road, Bhopal-462 038, M.P.) by post along with registration fee on or before 20 December 2026. Advance copy of the duly signed registration form may be sent by email.

Note: Selected participants must pay a non-refundable registration fee of ₹50 alongside their application form. Payment can be made via IPO or Demand Draft in favour of "Director, ICAR-Indian Institute of Soil Science, Bhopal, Madhya Pradesh" or by scanning the QR code below.



Scan and Pay
Registration fee: Rs. 50 /-

Merchant name: MS II SOIL SCINCE
UPI ID: directoriiss@sbi

Scan using your UPI payment app and enter Rs. 50 /- as the registration fee.

Travelling Allowance

The selected participants are restricted to travel AC II by train/ Bus depending on availability by shortest route. The TA will be paid on the submission of reserved tickets (original) by participants.

Note: *In case participant travelled by Air, the re-imbursement will be restricted to economy class only and it is mandatory to book train/air ticket from IRCTC, Balmer Lawrie, and Ashoka Travels & Tour only.*

Boarding and Lodging

Participants will receive shared boarding and lodging at the institute guest house; due to limited availability, accompanying family members or guests cannot be accommodated under any circumstances. Meals will be provided by the organizers following ICAR norms. While local candidates are not eligible for accommodation, they will be provided local hospitality, including lunch and tea/coffee.

Number of Participants

Total intake for the Winter School is limited to 25 participants. The participants are advised to start journey only after receipt of selection letter. The selected candidates will be intimated about their selection through email.

About the Institute

The ICAR-IISS was established on 16th April, 1988 at Bhopal with a mandate of providing scientific base for “Enhancing and Sustaining Productivity of Soil Resources with Minimal 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. ICAR-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. The institute has to take up the emerging challenges of increasing food-grain production and ensuring food and nutritional security from shrinking land resources, characterizing and conserving large soil-biodiversity for appropriate deployment in agriculture, achieving self-reliance in crop fertilization through indigenous mineral and by-product sources, developing efficient technologies for waste recycling, maintaining soil quality and ecological balance, and developing energy efficient agriculture and sequestering carbon by reorienting its research pursuits addressing the emerging issues viz., enhancing nutrient and water use efficiency; sustaining soil and produce quality; soil biodiversity and genomics, climate change and carbon sequestration; minimizing soil pollution etc.

Location and climate

Bhopal, a sprawling and picturesque capital city of Madhya Pradesh, is well connected by air, rail and roadways to different parts of country. Participants travelling by train/bus should arrive at Bhopal Jn/ Rani Kamalapati Railway station/ ISBT Bhopal or Nadra bus stand from where taxi/ auto-rickshaws can be hired to reach ICAR-IISS Campus located on Berasia Road (Karond Chowraha) at a distance of 8-10 km from railway station and 7.5 km from bus stand. The Raja Bhoj airport, Bhopal is located at a distance of 10 km from the campus. The participants are advised to make their return journey reservations in advance before leaving for Bhopal. The climate is pleasant with warm days and chilling nights during the month of January with day time highs averaging 22 to 25 °C and night time lows dropping to 8 to 11 °C.

Direction



Scan the QR code through google lens and select your journey starting location (e.g., Raja Bhoj International airport in case of airport and Bhopal junction or Rani Kamalapati railway station for railway station). Destination is already selected for ICAR-IISS, Bhopal.

Important Dates

**Last date to receive
nomination**

20.12.2026

**Intimation of selection
of participants**

24.12.2026

**Commencement of
training**

05.01.2027

*All correspondence should be addressed to Dr. Sanjib Kumar Behera
Course Director*

ICAR-Indian Institute of Soil Science

Nabi Bagh, Berasia Road, Bhopal-462 038, Madhya Pradesh Mobile: 09981136727

Email: Sanjib.Behera@icar.org.in; sanjibkumarbehera123@gmail.com

or

The Director

ICAR-Indian Institute of Soil Science

Nabi Bagh, Berasia Road, Bhopal-462 038, Madhya Pradesh. Phone: 0755-2730946, 2730970

Fax: 0755-2733310 <https://iiss.res.in/>; Email: directoriiss25@gmail.com

Registration Form

APPLICATION FORM FOR PARTICIPATION IN WINTER SCHOOL

*Advances in Soil Health Management Strategies Under Climate Change
Scenarios for Improved Input Use Efficiency, Crop Productivity and
Produce Quality*

5-25 January, 2027

Organizing Institute: ICAR-Indian Institute of Soil Science, Bhopal

Affix recent passport-
size photograph
(3.5 cm × 4.5 cm)

1.	Full name (In block letters)	
2.	Designation	
3.	Present employer and address	
4.	Address to which reply should be sent	
	Postal address with PIN	
	Phone / Mobile No. & Fax No.	
	E-mail	
5.	Permanent address	
6.	Date of Birth	
7.	Gender: (Male / Female/Others)	
8.	Marital status (Married / Unmarried)	
9.	Teaching / research / professional experience (mention post held during last 5 years and number of publications)	
10.	Field of specialization and current area of research / teaching	
11.	Mention if you have participated in any Research seminar, Summer / Winter School / Short Course, etc. during the previous years under ICAR / Other organization	
12.	Postal order/DD No. /UPI transaction id with date & amount: Rs 50/- (non-refundable) in favour of ICAR unit IISS Bhopal for registration of application	Postal order/DD No.: _____ Bank/Post office: _____ UPI transaction id: _____ Dated: _____

13. Academic record:

Degree	Subjects	Year of passing	Class, ranks, distinction etc.	University / Institution	Other information
Ph.D.					
Post Graduation					
Graduation					

Date & Place: _____

Signature of the applicant

14. Recommendation of the Head of the Department / Institute

Signature & Seal

CERTIFICATE

It is certified that the information has been verified from the office record and is found correct.

Signature and Designation of competent authority