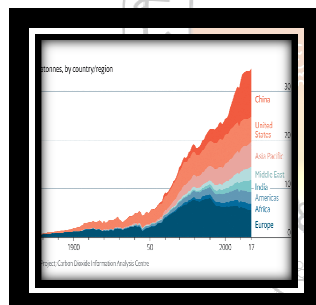
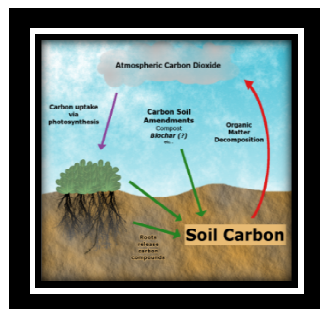


## ICAR-Short Course on

# Concepts and Mechanisms of Soil Carbon Sequestration and Stabilization for Soil Health Improvement and Climate Change Mitigation

02-11 March 2022



**Course Director**  
**Course Co-Directors**

**Dr. Brij Lal Lakaia**  
**Dr. Pramod Jha**  
**Dr. AK Vishwakarma**  
**Dr. AK Biswas**



**Organized by**  
**ICAR-Indian Institute of Soil Science**  
Nabibagh, Berasia Road, Bhopal – 462 038 (M.P.)  
Phone: 0755-2730946, 2730970 (O)  
Fax: 0755-2733310; Web: [www.iiss.gov.in](http://www.iiss.gov.in)



## Background

Soil carbon sequestration refers to capturing atmospheric carbon dioxide into lithosphere using vegetation. Carbon sequestration improves soil health through benefit to other ecosystem functions such as soil structure, water holding capacity, availability of substrate to microorganisms. It also results in an increase in food production, nutritional quality, microbial biodiversity etc. Soil organic carbon is influenced by land use, soil management and farming systems. Carbon sequestration in soils has the potential to mitigate rising concentration of carbon dioxide in the atmosphere. Carbon sequestration has the potential to reverse soil degradation and restore soil fertility through benefits achieved by positive effects on many ecosystem functions. Major cause of rapid loss of soil organic carbon are intensive tillage practices, reduction and disruption of carbon inputs to soil, and loss of high quality carbon having higher lignin content *i.e.* more resistant carbon fractions. Restoring soil quality necessitates increasing organic carbon concentration in soil by adopting best management practices. The impacts of increasing soil organic matter levels in soils through addition of manures, composts, and fertilizers have resulted in increased crop yields under long-term field experiments in many countries. The practices those sequester carbon in soil also promote nutrient cycling, contribute to stabilizing or enhancing food production and help minimize use of synthetic fertilizer inputs. These also help reduce emissions of nitrous oxides from agricultural fields. Among the green house gases, carbon dioxide is the dominant gas, compared to methane and nitrous oxide. It accounts for about 50 per cent of the warming effect of all climate-impact gases. A considerable amount of carbon dioxide has been released to the atmosphere from the combustion of fossil fuels, agricultural and forestry activities, deforestation, and other land use changes. It has already affected the environment in terms of increased

temperature that may enhance soil organic matter mineralization. In order to mitigate climate change, it is necessary to reduce or retard the accumulation of green house gases in the atmosphere by increasing soil carbon sequestration and storage. Adoption of best soil management practices will mitigate the effects of global warming through improved and permanent soil cover. Agricultural soil management practices and soil organic matter dynamics are intimately linked. Hence there is need to enhance soil organic carbon content in different pools through adoption of different agronomic measures such as residue retention, application of organics, adoption of conservation agriculture and practices to arrest soil erosion. It is pertinent to look into the mechanisms of soil carbon stabilization in soils as it has relevance in the global carbon cycle. There is huge opportunity of sequestering atmospheric carbon in the soil for a long period of time because already about one fourth of global soils and half of agricultural soils are degraded globally. The global soil organic carbon storage is 615 Gt C in the top 0.2 m depth and 2344 Gt carbon at depths of up to 3 m. It is much higher than the combined carbon content of biomass and atmospheric carbon dioxide. The Kyoto Protocol on climate change also demanded the fundamental understanding of the stabilization of carbon in soils. The difference between potential carbon storage and present carbon stock should be the priority tool for soil carbon sequestration strategy. The amount of carbon sequestered would be greater in soils that have lower carbon content and their stabilization efficiency would decrease with increase in their carbon content. ICAR-Indian Institute of Soil Science has made significant research on various aspects of soil carbon and climate change mitigation. It has an excellent faculty to train researchers on soil carbon sequestration and mitigation of climate change. The institute is well equipped with modern instruments.

## Objectives

- ✦ Concepts and mechanisms of soil carbon stabilization
- ✦ Mitigation of climate change through soil carbon sequestration
- ✦ Best soil management practices for soil carbon sequestration
- ✦ Hands on training on soil carbon pools and use of carbon simulation models

## Course Content

- Introduction and relevance of soil carbon research
- Factors affecting carbon buildup in soil
- Concepts of soil carbon stabilization mechanisms
- Soil carbon saturation and its practical implications
- Carbon pools and their retention in soil
- Carbon sequestration and mitigation of climatic change
- Conservation agriculture and carbon sequestration
- An overview of global carbon models
- Methods of computing carbon sequestration in soils & plants

## Eligibility

The scientist from ICAR Institutes/State AUs/CAU/ Agricultural faculty of AMU, BHU, Vishwa Bharti and Nagaland University in the cadre of Assistant Professors or equivalent and above who are actively engaged in research, teaching and extension in the areas of Soil Science, Agronomy, Soil Physics, Microbiology, Environmental Sciences and other relevant Agriculture subjects are eligible to attend the short course training. The total number of participants will be restricted to 25. For speedy disbursement of selection letters, participants are requested to apply online at CBP portal of ICAR and provide email ID and FAX number.

### Duration of short course

Duration of the Short Course Training is 10 days with effect from **02-11 March 2022** (both days inclusive). The participants are expected to arrive at ICAR-IISS, Bhopal latest by the evening of 01 March 2022 and can leave after 17:00 hrs on 11 March 2022.

### Application and Registration

Participants are requested to apply online at CBP vortal (<https://cbp.icar.gov.in/>)

**A. Create account on CBP vortal, if your account is not created on CBP vortal:**

1. Click on 'Create New Account' link on home page.
2. Fill the form.
3. Click on 'Create Account' button. User will get the message 'Successfully created account' after account is created on the CBP vortal.

**B. Login on CBP vortal:**

1. Enter the 'User Id' and 'Password' in the candidate login window on the home page.
2. Click on 'Login' button.

**C. Participate in training programme:**

1. After login, click on 'Participate in Training' button/menu, list of trainings will be displayed.
2. Click on 'Training Title - "Concepts and mechanisms of soil carbon sequestration and stabilization for soil health improvement and climate change mitigation".

3. Click on 'Apply' link.

4. A form will open with all your personal details filled in. In case, user want to change any of these information then click on 'Edit' button and do the desired changes.

5. Click on 'Save' button to save the information then click on 'Next' button.

6. Fill the 'Academic details' and 'Experience details' information. Click on 'Next' button.

7. Fill 'Draft/Postal' order for Rs. 50/- drawn in favour of ICAR unit IISS Bhopal and click on 'Next' button.

8. Advance Application form will be generated in system and click on 'print' link. Submit this print out copy in your office for approval of competent authority. Click on 'Submit' button, advance copy will be submitted to course director.

9. After approval from competent authority, upload the scanned copy of duly approved application form and click on 'Next' button.

10. Click on 'Upload Approved Application File' button to upload signed 'Advance Application form' (Approved Application Form) in pdf/ doc/ jpg/ jpeg/ docx and click on 'Submit' button for final submission.

Additionally, interested candidates may send their applications in the prescribed format duly nominated / forwarded by the competent authority to Dr. Brij Lal Lakaria, Course Director, ICAR- IISS Bhopal.

### Boarding, lodging and travelling allowance

The selected participants will be provided free boarding and lodging in the institute guest house. Food expenses will be borne by the



organizers as per ICAR norms. All participants will be reimbursed to and fro travel fare for the journey to Bhopal by rail/ bus by shortest route as per the entitled class of travel, but restricted to the maximum of AC-II tier train fare/bus fare (as per actual). Local participants are not eligible for boarding and lodging, however, they will be provided lunch and inter-session tea. Participants are requested to not to bring family members with them, as the institute has limited hostel facilities. No DA will be paid to participants.

### Location and climate

Bhopal, the city of lakes, Madhya Pradesh, is well connected by air, rail and roadways to different parts of country. Participants travelling by train/bus should alight at Bhopal or Rani Kamalapati (RKMP) railway station Bhopal bus stand from where taxi/ auto-rickshaws can be hired to reach ICAR-IISS Campus located near Karond Chowraha on Berasia Road at a distance of 10 km from railway station and 8 km from Bus Stand. The Raja Bhoj Bhopal airport is located at a distance of 11 km from the campus. The participants are advised to make their return journey reservations in advance. The climate is pleasant during the month of March, moderate ( $\sim 33^{\circ}\text{C}$ ) during day time and cool in the night ( $\sim 17^{\circ}\text{C}$ ).

### Important Dates

Last date for receipt of application : **10-02-2022**

Intimation of selection to participants: **12-02-2022**

### Sponsored by

**Education Division**  
**Indian Council of Agricultural Research**  
**New Delhi – 110 012**

### All Correspondence should be addressed to

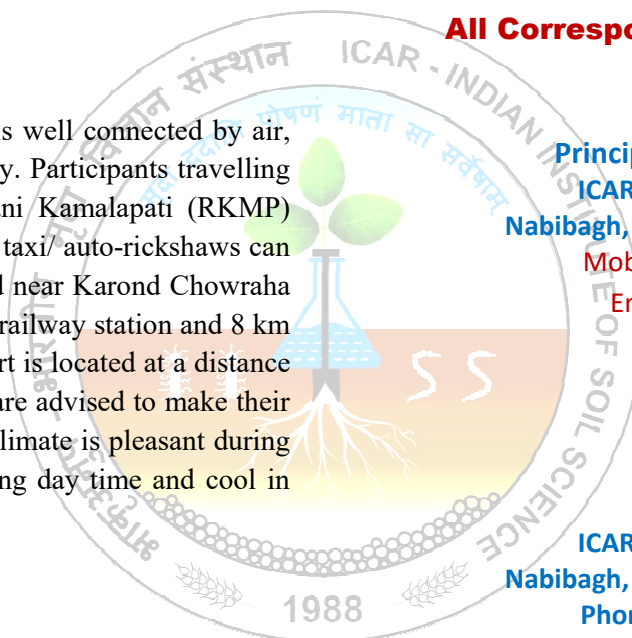
#### Dr. Brij Lal Lakaria

**Principal Scientist & Course Director**  
**ICAR-Indian Institute of Soil Science**  
**Nabibagh, Berasia Road, Bhopal – 462 038 (MP)**  
**Mobile – 9617931940, 9425784480**  
**Email: lakaria2001@gmail.com**

**Or**

#### Dr. Ashok K Patra

**Director**  
**ICAR-Indian Institute of Soil Science**  
**Nabibagh, Berasia Road, Bhopal – 462 038 (MP)**  
**Phone: 0755-2730946, 2730970 (O)**  
**Fax: 0755-2733310; Web: www.iiss.gov.in**



## APPLICATION FORM FOR PARTICIPATION IN SHORT COURSE TRAINING

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

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. Sex (Male/Female) :

8. Marital status (Married/Unmarried) :

9. Teaching/research/professional experience (mention post held during last 5 years and number of publication) :

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 No. ----- dated -----of Rs 50/- (Nonrefundable) in favour of ICAR unit IISS Bhopal for registration of application

13. Academic record

Degree	Subjects	Year of passing	Class , marks or distinction	University/ Institution	Any other
Ph.D.					
M.Sc.					
B.Sc.					

Signature of Candidate

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 sponsoring authority

Note: Application may be sent to the Course Director of the training or the Director, ICAR-IISS, Bhopal.