



ICAR Winter School

Advance Biofertilizer Technologies to Improve
Nutrient use Efficiency, Soil health and
Greenhouse gas mitigation

Feb 8 - 28, 2022

Course Directors : Drs S R Mohanty, K Bharati, A B Singh

ICAR - Indian Institute of Soil Science, Bhopal

Decreasing agricultural productivity, soil health deterioration and rise in global temperature imposes serious challenges to achieve sustainable development goals. Climate change has adversely affected agricultural production and is predicted to do so in the coming decades. Increase in the atmospheric concentrations of Greenhouse Gases (GHGs) is considered to be the main cause of climate change. The three major GHGs are CO₂, CH₄, and N₂O. However, CH₄ and N₂O are the more important greenhouse gases than CO₂ because of their greater global warming potential. Soil microorganisms like methanogens, methanotrophs, nitrifiers and denitrifiers play key role regulating flux and feedback of GHGs. Soil microbes also cycle macro and micro elements important for primary productivity. The intensive agricultural practices and climate change has altered the structure and function of soil microorganisms posing a serious threat to soil biodiversity key for agriculture and environment. At ICAR Indian Institute of Soil Science, we have developed potential biofertilizers which can be explored to resolve these challenges. This training program aims to decipher crucial information on the advanced biofertilizer techniques to enhance nutrient cycling and mitigation of GHG emission with the following objectives: (1) Microbial inoculants concepts and advance technologies, (2) Nutrient cycling processes to enhance NUE, (3) Fundamentals of C sequestration and Soil Biodiversity, and (4) Techniques to measure GHG flux and feedback response of soil. This 21 days training program is designed with cross disciplinary lectures and practical classes which will add a new dimension to the participants' professional experiences.

Course Outline

The course is divided into five modules, which are further divided into topics of study:

Module I : Microbial inoculants or biofertilizers- Fundamentals of production and application

Module II: Nutrient cycling processes and exploration of soil microorganisms improving nutrient use efficiency

Module III : Soil Biodiversity and Carbon sequestration, prospect of enhancing soil C by microbial resources

Module IV: Fundamentals of climate change, Greenhouse gas (GHG) source and sink

Module V : Microbiological approaches to improve nutrient use efficiency and mitigate GHG

Demonstration/hands-on-experience, visits and audio-visuals : Hands-on laboratory experience on advance microbiological technologies, molecular techniques, greenhouse gas sampling, analysis of GHG using analytical instruments, field visits and multimedia audio-video demonstration of agronomic practices to minimize GHG emission.



Who Can Apply : The Winter School is open for participants 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. Master degree holders in the discipline of Agriculture/ Soil science/ Agriculture Microbiology/ Microbiology/ Agronomy/ Environmental science/ Forestry/ Horticulture and related discipline are eligible to apply for this course. Participants will be selected on the basis of their ability to benefit from the program. As per the ICAR policy, a few participants from the basic sciences may also be selected. The total no. of seats in the Winter School will be 25 (Twenty five).



How To Apply : Eligible and interested participants are requested to apply through CBP portal (<https://cbp.icar.gov.in/>) as per the instruction. Email /send hard copy of approved application duly forwarded by the competent authority by post to the course director. The participants are required to pay a sum of Rs. 50/- (Rupees Fifty only) as registration fee (Non-refundable) along with the completed application in the form of Demand Draft/ Indian Postal Order drawn in favour of 'ICAR Unit - IISS Bhopal' payable at Bhopal. The participants will be selected on the basis of their qualification and interest relevant to the training course.

TA/DA, Boarding and Lodging : The costs of traveling, boarding and lodging etc. of the selected participants will be met out of the ICAR winter school grant by the organizing institute. All participants will be reimbursed to and fro travel fare for the journey to Bhopal as per the terms and conditions. The Payment will be made as per the entitlement class of travel, but restricted to the maximum AC-II tier train/bus fare. As regards Daily Allowance (DA), any participants refusing to avail of free board and lodging facilities will not be given any cash payment in lieu thereof. Participants are requested not to bring family members with them, as the institute has limited hostel facilities.

Important Dates : Last date for receipt of application Jan 20, 2022; Confirmation of participation – Jan 25, 2022. All correspondence should be addressed to the Course Director.

Course Director

Dr. S R Mohanty
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Course Co-Directors

Dr. K Bharati, Principal Scientist, IISS, Bhopal
Dr A B Singh, Principal scientist and Head Soil Biology Division, IISS, Bhopal

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