

ICAR SPONSORED CENTRE OF ADVANCED FACULTY TRAINING IN
**MICROBIOLOGICAL PROCESSES IN SOIL CARBON
DYNAMICS AND SEQUESTRATION VIS-À-VIS
ANTICIPATORY CLIMATE CHANGES**

(1ST - 21ST FEB, 2013)



Department of Agricultural Microbiology
Tamil Nadu Agricultural University
Coimbatore - 641 003, Tamil Nadu

(www.tnau.ac.in)

(<http://agmicrotnau.webnode.com>)



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Introduction

Atmospheric concentration of CO₂ has increased by 39% from 280 ppm in the preindustrial era to 391 ppm in 2012 thus increasing the global mean temperature by 0.76±0.19°C over the twentieth century. Soils have been a major source of atmospheric CO₂ and other GHGs ever since the dawn of settled agriculture. The magnitude of CO₂-C emission from soil to the atmosphere is estimated at 78±12 Pg. Most soils under agriculture contain lower SOC pool than under natural/undisturbed ecosystems because of lower biomass returned, higher decomposition rate, more leaching losses of DOC and losses by accelerated wind and water erosion. Indeed, there is a large flux of CO₂ from the oxidation of SOM from agricultural soils. Thus, most cropland soils have lost 25–75% of their original SOC pool.

Responses in microbial communities induced by elevated CO₂ can cause alterations in the whole soil ecosystem. For instance, fungi might come to dominate over bacteria, bacterial nutritional groups may change, and mycorrhizal fungi can be altered. Structural changes, in turn, may have significant effects on the functioning (including emission of greenhouse gases and nutrient cycling) of the microbial community and its interaction with the plant community.

Soil health in managed ecosystems is strongly impacted by the magnitude of SOC loss. Soil health is adversely affected when the SOC level declines below the critical/threshold range. Good soil health can moderate climatic disruptions through reducing emission of CO₂ and other GHGs, and sequestering CO₂ and oxidizing CH₄. The strategy is to convert agriculturally marginal soils to a restorative land use, and adopt recommended management practices on good soils to create a positive C budget such that $C_{input} > C_{output}$. Because of the severe depletion of the SOC pool, degraded soils have the highest sink capacity for sequestering atmospheric CO₂. In addition to off-setting CO₂ emissions by sequestering C, soils of a good health may also cause greater oxidation of CH₄.

Technical potential of SOC sequestration in world soils is 3–4 Pg/year over ~50 years, which has a drawdown capacity of reducing atmospheric CO₂ concentration by 50 ppm by 2150 AD. Hence in the light of these, an advanced training on the role of soil microorganisms to the improvement in soil health through SOC sequestration under anticipatory climate change would be critical to increasing agronomic production and advancing food security.

Trainees

Teachers and researchers working in this area in SAUs, ICAR and other institutes are eligible. The number of participants will be limited to twenty.

Course Outline

Soil organic carbon dynamics and C flux in rice paddies - Microbial processes pertaining to C dynamics in agricultural ecosystem - Biochemistry of soil microbial processes and C sequestration - Soil organic carbon dynamics in forest ecosystems - Soil microbial response to elevated CO₂ and GHGs – Rhizosphere engineering for C sequestration - Dynamics of soil organic carbon under elevated CO₂ levels - Soil physico-chemical changes in relation to elevated CO₂ under varied cropping systems - Biofixation of CO₂ and C sequestration using algae - Mycorrhizal systems as potential C sequestering agents - Methanogenesis and methane oxidation in rice ecosystem - Methanotrophs and their role in C sequestration – Impact of land use and nutrient management on C sequestration - Geological perspectives in C sequestration -Strategies of enhancing C sequestration in agricultural soils.

Duration

TWENTY ONE DAYS (1ST TO 21ST FEB, 2013)

Venue

Department of Agricultural Microbiology, Directorate of Natural Resource Management, Tamil Nadu Agricultural University, Coimbatore – 641 003, Tamil Nadu.

Travel

Travelling allowance will be met by the organizers. Depending on the availability of funds, reimbursement will be restricted to III tier AC / Sleeper class fares. No DA will be paid for the journey period.

Food & Accommodation

Boarding and lodging allowances for the stay at Coimbatore during the training period will be paid as per the recently revised rates of ICAR. Food and accommodation will be arranged at the University campus, only for the participants.

Last Date

Completed application form in the prescribed format through proper channel should reach the **Director** on or before **31.12.2012**.



Course Directors

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For Details and Application, Please Visit
<http://agmicrotnau.webnode.com>

**MICROBIOLOGICAL PROCESSES IN SOIL CARBON DYNAMICS AND SEQUESTRATION
VIS-À-VIS ANTICIPATORY CLIMATE CHANGES**

(1st – 21st Feb, 2013)

APPLICATION

1. Name
2. Designation
3. Age & Sex
4. Total service
5. Experience
 - a) Teaching
 - i. U. G
 - ii. P.G
 - b) Research
6. Field of specialization
7. Address for communication with e-mail
8. Accommodation
9. Academic record
10. Address of the sponsoring institute
11. Phone / Fax No
12. Signature of the candidate
13. Recommendation of the sponsoring authority
14. Signature and designation of the sponsoring authority

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