Training Workshop for Scientific Staff under ICAR-HRM Programme 2024-25

On

Advances in Simulation Modelling and Climate Change Research towards Knowledge Based Agriculture

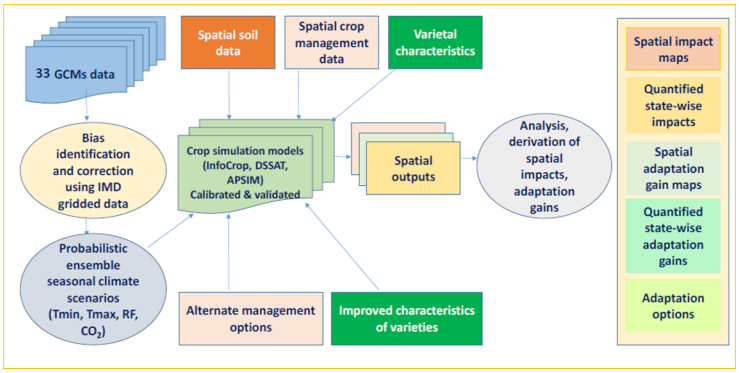
(19th November– 9th December, 2024)

Background

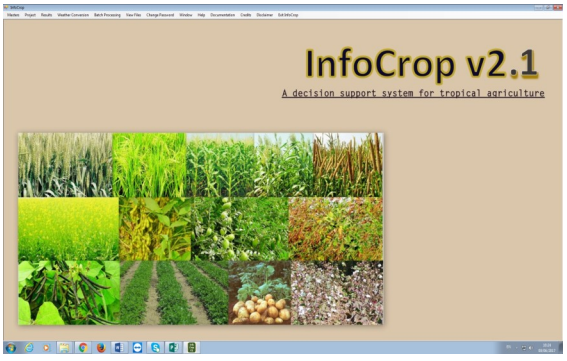
Climate change science is rapidly expanding with the advent of new and improved understanding on causes, manifestations and impacts of climate change on wide-spectrum of troposphere and agriculture in particular. Agriculture across the globe is challenged by multiple factors including soil health, climatic stresses, resource constraints, market and socio-economic dynamics. Traditional agricultural management is falling short to meet these challenges, particularly in the changing climates. This necessitates a comprehensive agricultural management which is possible only with the aid of scientifically integrated decision support systems. Simulation modelling is one such scientific approach to not only study the integrated effects but also to de-segregate the effects of individual factors related to soil, climate, variety and management. The crop models are increasingly used for several applications including yield gap analysis, yield forecast, climate change studies on impacts, adaptation gains and vulnerability assessment, greenhouse gas emission studies, optimization of management practices, crop zonation studies, genotype designing and so on. In view of the indispensable role of simulation modelling in climate change research and the potential use of crop simulation models as decision support systems for developing 'Knowledge Based Agriculture', it is important to develop trained manpower for scientific use of simulation models for above mentioned applications to improve the resilience of agriculture in current and future climates. Under the ICAR-HRM Programme, this workshop was first held in 2017 and then in subsequent years of 2018, 2019 and 2022. This is the fifth in the series. We thank the participants for their support and ICAR for bestowing continued confidence in us.

"If we tried to produce all the food needed in 2050 using today's production systems, the world would have to convert most of its remaining forest, and agriculture alone would produce almost twice the emissions allowable from all human activities'

Tim Searchinger, WRI , 2018



Source: Naresh Kumar et al., 2019



Division of Environment Science

(Centre for Environment Science and Climate Resilient Agriculture)

ICAR-Indian Agricultural Research Institute

New Delhi 110012, INDIA

INDIAN AGRICULTURAL RESEARCH INSTITUTE

Sought after information by farmers

Objectives

To impart knowledge on

1) Advances in climate change research
2) Approaches for modeling agroecosystems
3) Basics of processes involved in crop simulation modelling
4) Hands-on training on major simulation models
5) Application of simulation models in climate change research for impact assessment, adaptation and mitigation

Duration

21 days
Dates of commencement: 19th November– 9th December, 2024

Venue

Division of Environmental Sciences, NRL Building, ICAR-IARI

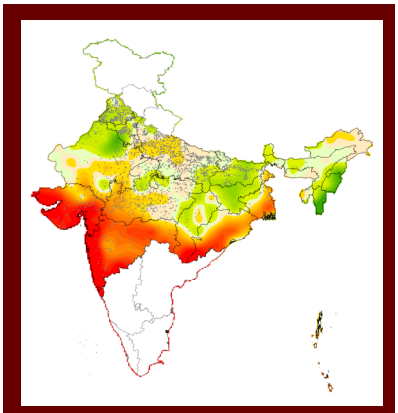
Participation eligibility

25 participants

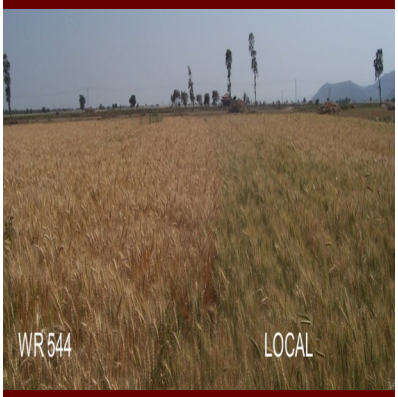
1) Scientist or higher grade in any ICAR Institute, SAU, CAU, National/ State Institutes, Ministries/ International Institutes/ Pvt sector professionals
2) M.Sc or PhD in Ag. / Science with basic knowledge on agriculture

Desirable: Basic computer skills with working knowledge on MS Office, Programming skills

Applicant from SAU, CAU, National/State Institutes, Ministries required to pay a nominal course fee of Rs 10000 only & For International and Pvt sector professionals, fee is Rs 15,000 only in the form of Demand Draft in favour of the Director, ICAR - Indian Agricultural Research Institute, New Delhi, payable at Canara Bank (IFSC code CNRB0019029), Pusa, New Delhi-110012



Assessments on regional impacts and adaptation gains



Experiments in research fields and in farmers' fields for adaptation gain evidences

Monitoring crop growth and GHG emissions

Quantification of crop response

Facilities

Seminar rooms

Modelling lab

T-FACE, FATE. OTC, TGT, ROS, Phenomics, Controlled Environment Facility, Satellite data reception facility, etc.

you should bring…….

Laptop (with Windows 7 and above Professional version….

Please note that versions other than Professional may not fully support the simulation software)

If you want to work with your own data then bring….

experimental data, soil data, daily weather data …. If available

Field facilities for climate change research at IARI

Topics to be covered

- Introduction to system, model & simulation modelling
- Modelling plant growth, development and yield-basics; Crop growth parameterization,
- Modelling soil nitrogen & carbon balance and C sequestration
- Modelling methane, carbon-di-oxide & nitrous oxide emission
- Modelling crop-environment (soil, weather, pest) interactions
- Modelling soil-water balance
- Data requirement for running a simulation model, data collection and minimum datasets
- Crop model application steps–model calibration, evaluation & sensitivity analysis
- Recent developments in simulation modelling, use AI, ML, DL and Hybrid modelling
- Climate change and simulation models- recent concepts
- Approaches for spatial modelling
- Climate change scenarios-concepts, data utilization methods
- Simulating climate change impacts, adaptation strategies and gains and vulnerability
- GHG emissions from agriculture and mitigation strategies for climate change
- Ecological Niche modelling-concepts
- Basics of simulating air pollutant dispersion
- Application of simulation models for crop and agricultural management,
- Yield forecast techniques using simulation models and linking remote sensing technology
- Application of crop models for environmental risk analysis

Hands-on sessions

- Data and input file preparation for crop models
- Assessing crop growth and yield using crop simulation models (InfoCrop, DSSAT and other models): Experiment setup and running simulations
- Work with your data (weather, soil, variety and management)
- Climate scenario data use methods/ steps
- Simulating climate change impacts, simulating adaptation strategies and interpretation
- Soil carbon balance model and C sequestration
- Hydrological modelling
- Pest and disease modelling
- Ecological Niche modelling (Diva GIS)
- Air pollutant dispersion model (AERMOD)
- Simulating GHG mitigation options
- Yield forecast using simulation models
- Field visits (T-FACE, O3-FACE, FATE, OTC, TGT, Phenomics, SDRC, Eddy Flux tower)
- Flip-classes for cross learning
- Image-processing for applications in agricultural research

Registration and logistics

Send your application though proper channel to the Course Director by e-mail on or before 31st October, 2024

A two page application should contain….

- Name, Designation, Official Address, email, Mobile no., Gender
- Educational qualifications, Specialization,
- Trainings undergone
- Research areas, current projects
- Future research interests
- Specify experience in modeling, if any and why you are interested in this training, expected use of training
- Signatures of applicant and forwarding authority

Also must

Indicate accommodation preference: Hotel/ Guest house

IARI has limited Guest House facility on first-come-first service and payment basis

If you wish to stay outside, hotels are available nearby campus with Rs 2500-3500 range, please let us know for blocking rooms for you on payment basis

Tea and working lunch will be provided. Guest houses provide breakfast and dinners on payment basis

TA and DA should be borne by the sponsoring Institute of the trainee Participants should make arrangement to reach to ICAR-IARI

Send scanned copy of completed application to the Course Director

About Environmental Sciences Division, IARI and New Delhi

Established in 1993, Environmental Sciences Division was renamed as Centre for Environment Science and Climate Resilient Agriculture in 2011 and again renamed to present name in 2018. The Division has pioneering contributions in the field of simulation modeling development and application (InfoCrop versions, CocoSim, DRAKSHA, InfoRCT, etc) and climate change. Scientists of the Division have contributed to IPCC, UNFCCC reports as well as to National Communications to UNFCCC, National and State Actions Plans on Climate Change. Scientists are involved in several International and National projects of importance.

ICAR-Indian Agricultural Research, established in 1906 is the 'Seat of Green Revolution' and is striving to bring the 'Evergreen Revolution' in Indian agriculture. The Institute is recognized globally and has several state of art facilities.

New Delhi, the National Capital is the one of the oldest and historical cities of India. With about 2 billion population, Delhi is one of the happening cities in the world. Weather during your stay period is generally pleasant with minimum and maximum temperatures ranging from 20-27/8-13°C. You are advised to carry winter wear.

Seminar halls

Contact

Course Director

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