

Training Workshop

Improved land and water management practices and use of simulation models for increasing agricultural production in Sub-Sahara Africa



Date: 22-25 May 2023

Venue: Kampala, Uganda

HIGHLIGHTS

The African continent is the second largest in the world after Asia, with a total land area of about 3025.8 million hectares (ha). About 22% of Africa's total land area is under forests and woodlands, while 66% is covered by arid zones and deserts (IFAD, 2010), including the world's largest deserts, the Sahara and the Kalahari. Arable land constitutes about 630 million ha, representing about 50% of the world's arable land and supporting most people's livelihoods.

Most of Africa's land resources are experiencing increasing trends in degradation due to overexploitation and poor resource use. Over the last decade, SSA experienced the worst land degradation globally, accounting for 22% of the total global annual cost of land degradation, amounting to 300 billion US dollars (Nkonya et al., 2018). The most severe degradation has been encountered in Africa's grasslands, where 40% have been degraded, followed by 26% of the forestlands and 12% of croplands.

Increasing water demand and decreasing water quality has put enormous pressure on agriculture to reduce its share of water consumption by adopting improved water management practices. In the water-scarce environments, such as in SSA region, the challenge is to increase the productivity of agricultural water use without compromising on crop yields and developing soil salinization. Therefore, better management of land and water resources is a key to sustainable agricultural production and ensuring future food security for the rising population.

Applying a particular irrigation strategy depends on the local conditions, such as climate, soil, plants, water availability, and traditional irrigation management. Dynamic simulation models that can calculate soil water and solute transport originating from all water resources in combination with crop growth are the best tools to provide a rapid, flexible, and relatively inexpensive means of estimating the effects of various irrigation management practices on crop production under a variety of climatic and physical conditions.

LEARNING OBJECTIVES AND OUTCOMES

ICBA, with support from the Islamic Development Bank and in collaboration with the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), Uganda, is organizing a four-day training program on "Improved land and water management practices and use of simulation models for increasing agricultural production in Sub-Sahara Africa."

In this training, participants will learn about new ways of managing water in agriculture to control soil salinity and improve agricultural production. The training will help participants understand soil-water-plant relationships and their role in improving plant growth and soil salinization. By the end of the training, participants will be able to:

1. Understand the soil-water-plant relationship.
2. differentiate between irrigation management techniques.
3. Understand how salt-affected soils develop.
4. Understand the improved farming practices for increased crop production.
5. Use of simulation models for irrigation management.
6. Utilize improved practices for fertilizer, weeds, and pest management.
7. Calculate crop water requirements and irrigation schedules for different climatic conditions using field and global data sets.
8. Understand Irrigation management for salinity control.
9. Calculate leaching requirements for salinity management.

Organized by
International Center for Biosaline Agriculture (ICBA), Dubai, United Arab Emirates

In collaboration with
Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), Kampala, Uganda

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Trainers
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AGENDA

Monday 22 May 2023

08:30 - 09:00 Registration

09:00 - 10:30 **Opening Session**

- Welcome remarks, **Dr. Tarifa Alzaabi**, Director General, ICBA
- Welcome address. **Prof Patrick Okor**, RUFORUM Executive Secretary
- Speech by **Mr. Jemal Mahmud**, Team Leader, Islamic Development Bank - Regional Hub in Kampala
- Presentation on “*ICBA’s Research and Innovations*”, **Dr. Charbel Tarraf**, Chief Operations and Development, ICBA, UAE
- Introduction of trainers and participants
- Group photo

10:30 - 11:00 Coffee break

11:00 - 12:30 **Session 1: Importance of water management in agriculture, Dr. Asad Sarwar Qureshi**

12:30 - 14:00 Lunch break

14:00 - 15:30 **Session 2: Concepts of best farming practices, Dr. Zied Hammami**

15:30 - 16:00 Discussion on the day sessions

Tuesday 23 May 2023

09:00 - 10:30 **Session 3: Best farming practices for food and fodder crops, Dr. Zied Hammami**

10:30 - 11:00 Coffee break

11:00 - 12:30 **Session 4: Understanding soil-water-crop relationships, Dr. Asad Sarwar Qureshi**

12:30 - 14:00 Lunch break

14:00 - 15:30 **Session 5: Use of soil-water-crop model for irrigation management, Dr. Zied Hammami**

15:30 - 16:00 Discussion on the day sessions

Wednesday 24 May 2023

09:00 - 10:30 **Session 6: Irrigation management for salinity control, Dr. Asad Sarwar Qureshi**

10:30 - 11:00 Coffee break

11:00 - 12:30 **Session 7: Methods of characterizing pedoclimatic data for use in models, Dr. Zied Hammami**

12:30 - 14:00 Lunch break

14:00 - 15:30 **Session 8: Calculations of crop water requirements and irrigation schedule, Dr. Zied Hammami**

15:30 - 16:00 Discussion on the day sessions

Thursday 25 May 2023

09:00 - 10:30 **Session 9: Calculations of leaching requirements, Dr. Asad Sarwar Qureshi**

10:30 - 11:00 Coffee break

11:00 - 12:30 **Session 10: Smart farming for food and nutritional security in marginal environments, Dr. Asad Sarwar Qureshi**

12:30 - 14:00 Lunch break

14:00 - 14:30 Discussion on the day sessions

14:30 - 15:00 Evaluation of the training

15:00 - 16:00 Distribution of certificates and closing

TRAINERS

Dr. Asad Sarwar Qureshi, Senior Scientist - Water and Irrigation Management, ICBA

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Dr. Asad Sarwar Qureshi is Senior Scientist in Irrigation and Water Management at ICBA. Before joining the Center in 2014, he had worked at the International Water Management Institute (IWMI) and International Maize and Wheat Improvement Center (CIMMYT) in different scientific and management capacities in Pakistan, Iran, Iraq, Central Asia, and Bangladesh. He has served as country head of the IWMI offices in Pakistan, Iran and Central Asia. He was engaged with USAID, World Wildlife Fund, the International Union for Conservation of Nature and Water and Power Development Authority (WAPDA) of Pakistan as a consultant for different assignments related to water resources and environmental management.



He has about 30 years of experience in action research for finding agronomic and engineering solutions to mitigate incipient water logging and salinity problems of the irrigated areas and development of conservation strategies for the water-scarce regions of the Middle East, South Asia, Africa and Central Asia. He has managed projects covering irrigation and water management, drought coping strategies, conjunctive management of different quality waters, rehabilitation and management of salt-affected and waterlogged soils, groundwater management, climate change and adaptation, impact assessment of irrigation infrastructure development, water user associations and wastewater management.

He holds a Ph.D. degree in water resources management from Wageningen University, the Netherlands. He is author of more than 100 scientific publications.

Dr. Zied Hammami, Agronomist, ICBA

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Dr. Zied Hammami has been a research agronomist at ICBA since 2020. He worked on different research and development projects on water-saving technologies and improving agricultural resilience to salinity in the Middle East and sub-Saharan Africa.

He had previously worked as an agronomist and biostatistics teacher at the National Agronomic Institute of Tunisia (INAT). He also worked with the UMR-INRA-AgroParisTech on statistical analyses and modeling of agro-morphological and physiological data in order to model genotype-by-environment interactions. He had similar engagements with the International Maize and Wheat Improvement Center (CIMMYT) on a breeding management system and ICBA on the use of a state-of-the-art crop model. He was involved in the past in research projects by ICBA, CIMMYT, the International Center for Agricultural Research in the Dry Areas (ICARDA), the International Atomic Energy Agency, the Food and Agriculture Organization of the United Nations and the European Commission.



His research interests lie in crop production, modeling and forecasting, water, and abiotic stress. Since 2009 he has conducted numerous experiments on adaptability of different crops to diverse biophysical environments. He has published more than 65 research publications in peer-reviewed journals, book chapters and proceedings.

He holds an engineering diploma, a master's degree in plant genetic resources and biotechnology and a Ph.D. in Agronomy from INAT in collaboration with UMR-INRA-France-AgroParisTech.