Workshops

WS1 - FAO Workshop: Experiences from the Global South on Climate and Water Management

Moderators:

Melvin Medina Navarro – FAO Sub-Regional Office for the Caribbean
Nazim Gruda – University of Bonn, Germany

Modality: Expert Keynotes and Roundtable Discussion
Date: Monday 23 June
Time: 19:30–20:30
Location: Salón de Grados of *Paraninfo* building (**B**)

Workshop objectives:

This workshop focuses on practical, sustainable strategies to improve the efficiency and resilience of horticultural systems for small-scale farmers. It emphasizes making research more useful, inclusive, and directly applicable, ensuring that small-scale farmers can access affordable innovations that enhance food security, climate resilience, and increase income. The workshop has the following objectives:

- Showcase low-cost, effective technologies that optimize water use, improve soil health, and enhance pest and disease management.
- Present the experience of climate-smart innovations implemented at small-scale farming conditions.
- Highlight the opportunities and challenges of bridging research and practice on greenhouse technology.

Workshop description:

A panel of experts from diverse regions and backgrounds shares insights from their experience applying protected cultivation technology to small-scale farmers' high-value vegetable production. They demonstrate ways to improve smallholder livelihoods while minimizing investment and operating costs. An interactive discussion follows, fostering idea exchange and actionable takeaways.

Program: Presentations (8–10 minutes each) + 10-minute roundtable discussion

19:30 – 19:35 Welcome and Introduction – Melvin Medina Navarro & Prof. Dr. Nazim Gruda.

19:35 – 19:45 Jervis Rowe (Jamaica) – “Evolution of greenhouse sector in Jamaica to address climate change effects and achieve food security”.

19:45 – 19:55 Gaius Eudoxie & Oral Daley (Trinidad & Tobago) – “Challenges and opportunities for research on greenhouse technologies in the context of the Caribbean region”.

19:55 – 20:05 Theodore Francis (Antigua & Barbuda) – “The use of new covering materials in low-cost structures for hydroponics to address water scarcity in the Caribbean”.

20:05 – 20:15 MSC Staff (Spain) – “Results on the use of anti-thermic plastic films to reduce temperature and increase the quality of vegetables under greenhouses in different locations”.

20:15 – 20:25 Leone Magliochetti Lombi (FAO) – “Adapted technology for efficient hydroponic vegetable production in Son La Province, Vietnam”.

20:25 – 20:30 Interactive Roundtable Discussion & Q&A – Moderated by Medina Navarro & Prof. Gruda.

WS2 - Automation and AI in Agriculture: Realistic Pathways to Industry?

Moderators:

José Luis Guzmán Sánchez and Jorge Antonio Sánchez Molina – University of Almeria, Spain

Modality: Debate
Date: Monday 23 June
Time: 19:30–20:30
Location: Salón de Grados of *Economicas* building (**C**)

Workshop objectives:

The main objectives of the Workshop are to explore some of the following questions:

- What are the current technological capabilities and limitations of process automation in agriculture?
- How far can existing tools go in automating complex agricultural tasks?
- In what ways can artificial intelligence enhance agricultural efficiency, decision-making, and sustainability?
- What types of AI models are most applicable to agricultural challenges?
- What are the primary barriers—technical, economic, or social—to adopting AI-driven automation in farming?
- How do these barriers vary between regions or types of agricultural systems?
- What were the critical factors for success or failure in those cases?
- How can we ensure that AI solutions are accessible and beneficial to small and medium-sized farms, not just large-scale operations?
- What ethical considerations arise when deploying AI and automation in agricultural settings?
- What stakeholders must be involved from the start?

Workshop description:

This workshop explores the current landscape of process automation in agriculture, with a particular focus on the integration of artificial intelligence (AI)-based solutions. Participants will engage in a critical analysis of the technical, economic, and social challenges faced in implementing automation technologies in agricultural settings. The session will also showcase real-world applications, examine the readiness of existing infrastructures, and foster discussion around the opportunities and limitations of AI in transforming agricultural practices. Designed for researchers, practitioners, and students, this workshop aims to bridge the gap between theoretical potential and practical deployment.

WS3 - How can the integration of Artificial Intelligence with Computational Fluid Dynamic modelling advance microclimate analysis in agricultural production systems?

Moderators:

Hicham Fatnassi – PSH-INRAE Avignon, Avignon, France

Modality: Debate

Date: Tuesday 24 June

Time: 19:30–20:30

Location: Salón de Grados of *Paraninfo* building (**B**)

Workshop objectives:

The main objectives of the Workshop are to explore some of the following questions:

- Examine how AI-driven approaches can improve the precision and computational efficiency of CFD-based simulations in agricultural production systems.
- Analyze how the integration of AI and CFD can contribute to more sustainable and efficient agricultural management practices.
- Establish a working group of researchers and practitioners interested in this topic to exchange experiences, share knowledge, and collaborate on overcoming challenges.

Workshop description:

This workshop explores the integration of Computational Fluid Dynamics (CFD) and Artificial Intelligence (AI) to enhance the accuracy, efficiency, and predictive capabilities of microclimate simulations in agricultural production systems. While CFD models are well-established, their application, particularly in three-dimensional simulations with high mesh resolution, remains computationally demanding and time-intensive. AI techniques, including machine learning algorithms, offer transformative potential by identifying complex patterns, improving data assimilation, and significantly accelerating computational processes.

Through contributions from specialists in CFD modelling, this session will highlight key areas where AI can enhance CFD applications, such as optimizing boundary condition settings, refining turbulence modelling, and developing real-time predictive models. Ultimately, the workshop will explore how the synergy between AI and CFD can contribute to more sustainable and efficient agricultural management practices.

Endorsement by ISHS Working groups:

Working Group Computational Fluid Dynamics.

WS4 - How to establish the right metrics to quantify the environmental sustainability of greenhouse systems?

Moderators:

Esteban José Baeza Romero – CIT COEXPHAL Almería, Spain

Modality: Debate
Date: Tuesday 24 June
Time: 19:30–20:30
Location: Salón de Grados of *Economicas* building (**C**)

Workshop objectives:

The main objectives of the Workshop are to explore some of the following questions:

- Identify and define key sustainability metrics for greenhouse systems.
- Critically examine existing sustainability assessment frameworks.
- Debate metric applicability across greenhouse types and regions.
- Identify gaps in current metrics (e.g. circularity and biodiversity) and their limitations.
- Propose refinements or hybrid approaches for better sustainability metrics.

Workshop description:

Defining robust, practical metrics to evaluate the environmental sustainability of greenhouse systems is an urgent priority for researchers, growers, and policymakers worldwide. Greenhouse systems vary enormously — from passive structures in Mediterranean climates to fully automated high-tech facilities in northern regions — yet sustainability assessments often rely on partial or inconsistent indicators. This interactive workshop will bring together an international community of greenhouse researchers to address a fundamental question: How can we agree on the right metrics to comprehensively measure and compare the environmental performance of greenhouse production systems across diverse contexts?

Participants will:

- Identify and define key sustainability dimensions — including energy use, water footprint, carbon emissions, resource circularity, and biodiversity impacts — and discuss suitable quantitative indicators for each.
- Critically examine the strengths and limitations of existing assessment frameworks, such as Life Cycle Assessment and carbon footprint protocols, in capturing the full range of environmental impacts.
- Explore how these metrics apply across different greenhouse technologies, climates, and regions, recognizing the trade-offs and variability in sustainability outcomes.
- Highlight gaps in current metrics, especially for aspects like circular resource use and biodiversity, and consider how to address them with better data and methodologies.
- Collaboratively discuss potential refinements or hybrid approaches that combine complementary tools and indicators, aiming to develop more holistic, adaptable sustainability benchmarks for greenhouse horticulture.

This workshop offers an open forum to share experiences, debate current practices, and sketch a path toward harmonized, scientifically sound sustainability metrics that support the greenhouse industry's transition toward more climate-resilient and environmentally responsible food production.

WS5 - How can we create sustainable and climate resilient CEA systems?

Moderators:

Leo Marcelis, Silke Hemming and Ep Heuvelink –Wageningen University and Research, The Netherlands

Modality: Debate
Date: Tuesday 24 June
Time: 19:30–20:30
Location: *Aula 9 of CC. de la Salud* building (**D**)

Workshop objectives:

Creating awareness of systems thinking about sustainable and climate resilient CEA production systems, aiming to secure the production of healthy fruit and vegetables.

This workshop focuses on young minds and strives to stimulate lively discussion among people of different backgrounds (expertise, culture, experience level, regional climates, etc).

Workshop description:

The workshop starts with two invited pitches:

- Environmental sustainability of CEA (high tech greenhouse, low tech greenhouse, vertical farm).
- Socio-economic viability of CEA (high tech greenhouse, low tech greenhouse, vertical farm).

Thereafter there will be lively discussion, starting with a debate on some provocative propositions.

Endorsement by ISHS Working groups:

Division of Precision Horticulture and Engineering
Division protected cultivation and soilless cultivation