

**FAO Workshop within the Framework of the
of the
GreenSys 2023: International Symposium on New Technologies for
Sustainable Greenhouse Systems
Cancún, México, October 24th, 2023**

- Modality: Presentations and discussion of field experiences from FAO staff and international experts representing different regions
- Duration: 1.5 hours

“Sustainable Vegetable Production in Small-scale Farmer Greenhouses in Developing Countries”

Moderator: Nazim Gruda and Melvin Medina

Workshop description

This workshop aims to present different field cases and engage the audience in active discussion on sustainable approaches for technological adaptation to increase the efficiency and resilience of horticultural systems for small-scale farmers. For example, how can limiting factors such as decreasing crop yields and incomes due to extreme climate events, water scarcity, land degradation, pests and diseases, limited access to technical assistance, appropriate inputs, financial resources, and lack of infrastructure and markets be overcome more affordably, closer to the economic reach of smallholders?

The workshop is of interest to a diverse audience of practitioners such as farmers and extension agents, researchers and horticulturalists, NGOs and opinion leaders, funding agencies and policymakers, to develop and implement projects, programmes, and initiatives and to create an enabling environment for the adoption of context-specific and cost-effective technologies adapted to small-scale farmers. Field experiences and innovative approaches will be openly discussed to understand how adaptation has been achieved and what challenges were overcome to ensure sustainability: income generation, environmental protection, and social equity.

Panellists representing different geographic regions, climatic conditions, and cropping systems will share experiences and knowledge on producing vegetable crops in protected cultivation. The primary objective is to improve the livelihoods of communities through sustainable agricultural practices. Moreover, the panellists will discuss scaling approaches to achieve the SDGs for better production, nutrition, livelihoods, and a healthier environment, all while minimising investments and running costs. An open discussion with the participants will follow the presentations to explore these topics further and exchange ideas.

The workshop will provide an opportunity to highlight the necessity of making research more practical, effective, inclusive, and participatory, also targeting small-scale farmers developing technologies and practices that are efficient and affordable to overcome limiting factors and achieve food security.

Background

Limiting factors have compromised farmers' livelihoods. However, sustainable horticultural systems are essential for cultivating short-cycle vegetables. These systems allow for high and stable incomes

from relatively small land units, promote decent jobs, improve nutrition, and create appropriate business opportunities. Additionally, sustainable horticultural systems require monitoring climate data systems, seeds, seedling systems, pest and disease diagnostic and management systems, accurate water and nutrient delivery systems, and post-harvest services, including sorting, washing, storing, packaging, processing and market linkages.

There is a wide range of technologies and costs, from low-cost greenhouses and net houses to fully automated high-tech systems. These can extend harvesting seasons and grow crops year-round with increased productivity and more efficient use of soil, water, nutrients, and light while ensuring food produced is nutritious and safe through minimised use of pesticides. Additionally, protected cultivation systems offer the opportunity to include adapted technologies and practices such as covering materials, soilless culture as in the case of hydroponics or substrate based, the use of sensors for collecting data and management of climate, grafting techniques, the efficient use of biological control agents, pollinators, recycling of nutrient solutions, and drip irrigation among others.

FAO and partners have successfully adapted technical solutions to increase production efficiency by reducing investment costs. These solutions include low-cost structures for protected cultivation systems, such as locally-made greenhouses and net houses. They also involve installing low-cost sensors based on open-source platforms to obtain and use on-farm generated real-time data on-farm. This data is then used to support climate management, pest management, and irrigation decisions. Moreover, new adapted varieties, seedling production systems, soil management, soilless systems, bumblebees, efficient fertigation systems, and integrated pest and disease management have been adapted. Projects targeting small-scale farming systems are being implemented worldwide, and knowledge will be shared on addressing limiting factors such as seasonality and extreme climate events.

The panel will include:

1. Leone Magliocchetti Lombi. Horticulture Expert, FAO-HQ. *The use of affordable digital sensors and applications to collect temperature, humidity, soil moisture, and solar radiation for improved crop management in greenhouses*

2. Prof. Dr Nazim Gruda, University of Bonn, Germany. Division of Horticultural Sciences *Growing media used in greenhouses and their impact on climate change*

3. Thinh Nguyen. FAO-Vietnam. *Smart vegetable production systems using greenhouses and adapted technologies in Viet Nam*

4. Khayrulla Esonov. FAO-Uzbekistan. *Improving people's livelihoods through innovation and adaptation of greenhouse vegetable production in Uzbekistan*

5. Melvin Medina. FAO-Caribbean. *Adapting and promoting sustainable crop production intensification through efficient, protected cultivation systems in the Caribbean region*

During the symposium and after the workshop:

FAO will set up a booth at the event to ensure participants have continued access to information and support after the workshop. By installing the booth, we aim to facilitate ongoing communication and collaboration between participants and FAO, enabling us to continue to work together to promote sustainable horticultural systems and create long-lasting positive impacts on local communities for small-scale farmers. The booth will serve as a resource centre for attendees

to obtain additional information on the topics covered during the workshop, including technical solutions and innovations in sustainable horticultural systems. Moreover, the FAO booth will allow participants to network and further discuss the topics covered during the workshop. Representatives from FAO and their partners will be available at the booth to answer any questions and provide additional support to attendees.

Technical information for the organization:

- The potential number of participants to attend the workshop is 100 (depending on the number of parallel workshops), including farmers, trainers, researchers, and the private sector.