Workshop on Protected Agriculture





Food and Agriculture Organization of the United Nations





Funder: Ministry of Environment and Water of the United Arab Emirates

Partners:

- Food and Agriculture Organization of the United Nations (FAO)
- International Center for Biosaline Agriculture (ICBA)
- International Center for Agricultural Research in the Dry Areas (ICARDA)
- Technical University of Berlin (TUB)

Project Lead at ICBA:

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"Unlocking the potential of Protected Agriculture in the GCC countries: cutting water consumption while supporting improved nutrition and food security"

Date: 14-15 September 2015

Venue: International Center for Biosaline Agriculutre (ICBA) head office, Dubai-Al Ain Road, Al Ruwayya 2, near Zayed University, Dubai, United Arab Emirates

Agenda

14 September – Monday 08:15-08:45 Transfer from hotel to ICBA 08:45-09:00 **Registration of participants** 09:00-10:00 **Opening session** Welcome address, Dr. Ismahane Elouafi, ICBA Director General Communication by the Ministry of Environment and Water of the UAE, H.E. Mr. Abdelrahim Mohamed Al Hammadi, Undersecretary of the Ministry of Environment and Water Statement by Dr. Azaiez Belgacem, Coordinator Arabian Peninsula Regional Program, ICARDA Setting the scene, background and rationale, Dr. Pasquale Steduto, FAO 10:00-10:30 **Tea break** 10:30-13:00 Technical Session – I (The Publication Project) 10:30-10:45 Introducing the Workshop objectives and discussion of the Reportoutline, Dr. Wilfred Baudoin, FAO 10:45-11:00 Overview of Protected Agriculture worldwide, Dr. Redouane Choukr-Allah, ICBA 11:00-11:15 Status and prospect of agricultural development in GCC, Dr. Ahmed Al-Massoum, United Arab Emirates University 11:15-11:30 Outlook of Protected Agriculture in GCC countries: constraints and opportunities for greenhouse production systems, Dr. Ahmed Moustafa, ICARDA 11:30-11:45 Greenhouses: the ultimate protected agricultural system, Dr. Ayman Abou Hadid, Ain Shams University (ASU) 11:45-12:00 Ecological footprint and bio-capacity, Dr. Shabbir A. Shahid, ICBA New generation greenhouse, Dr. Martin Buchholz, Technical 12:00 12:15 University of Berlin (TUB) 12:15-13:00 Discussion 13:00-14:00 Lunch 14:00-15:30 Technical Session – II (Country reports) 14:00-14:15 Bahrain, Isam Mustafa Abdulrazak

14:15- 14:30	Kuwait, Danah Fadel Al Ali
14:30-14:45	Oman, Muthir Saleh Said Al-Rawahy
14:45-15:00	Qatar, Ali El Kharbotly
15:00- 15:15	Saudi Arabia, Abdulmohsen Ibrahim vA. Binsulaiman
15:15- 15:30	United Arab Emirates, Shama Abdullah Rahma Al Shamsi
15:30-16:00	Discussion
16:00-16:30	Tea break
16:30-17:30	Technical Session – III (Way forward)
16:30-16:50	Road map, Dr. Wilfred Baudoin, FAO
16:50-17:10	Discussion and finalization of road map
17:10-17:30	Conclusions and recommendations, Dr. Pasquale Steduto, FAO
15 September – Tuesday – Field visit	
08:30-11:00	Field visit to Agricultural Innovation Center of AI Dhaid where the prototype of NGGH is being installed, as well as tour of ICBA facilities
11:00-11:30	Healthy break
11:30-13:30	Wrap-up and closure of workshop
13:30	Lunch

Background

New generation greenhouse will help save up to 90% of irrigation water

MOEW, FAO, ICBA, ICARDA, and the reserach group Watergy at TUB have joined forces to develop a prototype of a new generation of greenhouses (NGGH) at the Agricultural Innovation Center, Al Dhaid, Sharjah, the UAE. The new generation of greenhouses will help to save up to 90% of irrigation water and cut considerably on energy consumption. These benefits will serve to promote key protected agriculture solutions adapted to desert conditions and boost protected agriculture in the UAE and Gulf Cooperation Council countries.

The significant amount of water savings in this type of greenhouse can have additional advantages such as: productivity is five times higher than that in the open; pest, diseases and weed control considerably more effective than in the open; and zero pollution of groundwater compared with the open.

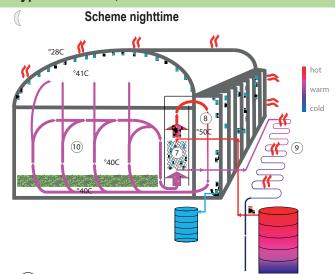
Considering that protected agriculture is a major source of food supply in the Middle East, new principles of evapo-condensation applied in this type of greenhouse will greatly boost productivity and water use efficiency across the region. This technology also offers excellent potential for using unconventional water sources like saline water and treated greywater. Thus, greenhouse production of both vegetable crops and fresh water is becoming a reality. This initiative is hoped to pave the way for much broader cooperation across the Middle East in this field.

The partnership between FAO, ICBA, ICARDA, and TUB will support the MOEW in unlocking the potential of protected agriculture using innovative technology and developing a complete business and environmental case on costs and benefits.

New generation greenhouse, scheme prototype at AI Dhaid, United Arab Emirates Scheme daytime °380 ²480 warm 3

(1.) Supply of dry air to the greenhouse

- (2.) Evaporative cooling by vegetation
- (3.) Zoning of hot air under roof, heat release through greenhouse cover
- (4.) Humid greenhouse air is dried and further heated by absorption into liquid desiccant within WATERGY Absorber Box
- (5.) Heat release through extended northern wall and return of air with reduced temperature and humidity to the greenhouse
- (6.) Transport of greenhouse thermal energy and greenhouse water by liquid desiccant, additionally heated in a solar-thermal collector to storage container



- (7.) Evaporation of water from liquid desiccant to greenhouse air within the absorber box (regeneration of desiccant for next day) under use of heat from storage
- (8.) Cooling of air and condensation/collection of water on extended northern wall
- Return of desiccant concentrate to storage, while passing the solar collector for further radiative cooling
- (10),Further condensation/collection of water on greenhouse cover surface

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