# Going beyond the limits: future food security is about exploring non-traditional crops and breakthrough technologies

## Non-traditional crops, technologies can contribute to future food security in UAE

Dubai, UAE, April 9, 2018 – Alternative, non-traditional crops and technologies can play an important role in contributing to future food security in the United Arab Emirates (UAE).

This was one of the main points made during an open day and round-table discussions attended by H.E. Mariam Bint Mohammed Almheiri, Minister of State for Future Food Security, at International Center for Biosaline Agriculture, the winner of the Best Arab Research Center at the Best Arab Awards in 2017.

During the meeting, H.E. Mariam Bint Mohammed Almheiri said: "The UAE is characterised by its extremely challenging conditions for agriculture, it is a fact that the country's terrain, topography and climate ranks as among the most difficult in the world for crop growing. Fresh water access is a particular issue here – something that is compounded by the fact that agriculture is the UAE's most consuming industry, accounting for approximately 72% of the country's total freshwater consumption. This demand is further impacted by depleting the water resources, which are reducing at a rate of 0.5 cm per year."

Her Excellency added: "Our freshwater needs are currently being met by energy-intensive desalination methods, which produce 60% of the country's supplies, but this figure is certain to increase as the country's population grows. It all adds up to us needing to find new methods of horticulture that are less energy intensive and reduce the stress on our water resources. Fortunately, over the years, the UAE has developed as a hub of innovation and has become renowned as a 'can do' country that utilises the latest technology to bring about societal advances. The agricultural sector is no different and we are currently in the process of developing new energy and water-saving solutions that will optimize crop growing, thus strengthening our future food security resilience."

Over nearly two decades the International Center for Biosaline Agriculture (ICBA) has been identifying, testing and introducing alternative, non-traditional crops and technologies that help to produce more food, save more resources and protect the environment. The center has developed and piloted a wide range of solutions suited to highly saline and arid conditions in different regions around the world.

ICBA has, for example, been leading since 2007 a global program on quinoa to make it a crop of choice in areas affected by salinity, drought and water scarcity. The program is so far under way in Egypt, Jordan, Kyrgyzstan, Morocco, Oman, Tajikistan, the UAE, Uzbekistan and Yemen. Today the center has four tested lines that do well under highly dry and saline conditions. Multi-year trials have shown that ICBA's lines produce, on average, up to 5.41 tonnes of seed per hectare under highly saline, sandy and arid conditions in the UAE.

Dr. Ismahane Elouafi said: "At ICBA, we look at a broad set of solutions for soil, water and crop productivity. Our main focus is on finding solutions which are best suited to local conditions and are low-cost and efficient. Reducing the water footprint of crops under production in the UAE, such as date palms and vegetables, is vital for UAE food and water security. Thanks to the UAE Government's ongoing support, we have been able to pilot many agricultural solutions and share best practices identified in the UAE with our partners in other countries."

The center also implements research programs on treated wastewater, saline water and seawater irrigation in agriculture and landscaping. In the UAE, for example, scientists have been assessing since 2013 the pros and cons of treated wastewater use. This initiative has major implications for water management as treated wastewater accounts for 12 percent of the total water supply in the country and undergoes tertiary treatment. Long-term experiments have investigated the effect of irrigating vegetables such as carrots, lettuce, eggplant and tomato, as well as landscaping plants and date palms, with treated wastewater. The

results indicate that treated wastewater is a good alternative to freshwater when it comes to agriculture and landscaping under arid conditions.

ICBA also considers reject brine and seawater as alternative sources for irrigation. The center has operated for several years inland and coastal modular farms jointly with the Ministry of Climate Change and Environment of the UAE to study the use of reject brine and seawater for aquaculture. The inland modular farm uses desalinated water for vegetables, reject brine for fish, and aquaculture effluents for halophytic plants, while the coastal modular farm uses seawater for fish and aquaculture effluents for halophytic plants.

Researchers have also worked since 2015 on a low-cost technology to make biochar from green waste. Biochar is a charcoal used as a soil amendment and produced from plant matter and stored in the soil as a means of removing carbon dioxide from the atmosphere. In the UAE, for example, 0.6 million tonnes of green waste is generated from some 40 million date palm trees every year. If left to decompose on the surface or dumped in landfills, this biomass can produce 880 million tonnes of carbon dioxide annually.

The center has tested its low-cost technology in field trials for soil improvement and crop production. The trials have demonstrated that biochar significantly improves soil fertility, helps to save 30-35 percent of water and soil nutrients, and mitigates carbon dioxide emissions.

To improve water and energy use efficiency of horticultural production in local conditions, ICBA has also completed a long-term comparative study of growing cucumber, tomato, sweet pepper and other vegetables in a widely-used high-tech greenhouse and a traditional net-house. The research showed that greenhouse cooling is the most water-intensive process as it consumed 1.6 times more water than the amount required to irrigate cucumber. In contrast, the misting system in the net-house required about 20 percent of the water used to irrigate cucumber. Data also showed that the greenhouse consumed 62 times more energy than the net-house.

Over the years, ICBA's research has shown that there are several alternative, non-traditional crops and technologies that are well-suited to the conditions of the UAE. And these crops and technologies can become part of a wider range of solutions aimed at ensuring future food security in the country.

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## About ICBA

The International Center for Biosaline Agriculture (ICBA) is an international, non-profit research-for-development organization that aims to strengthen agricultural productivity in marginal and saline environments through identifying, testing and facilitating access to sustainable solutions for food, nutrition and income security.
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