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BIOSALINITY NEWS

Barley:

A Salt Tolerant Cereal Crop

Over the past 13 years, ICBA has conducted an extensive research on barley

FROM THE DIRECTOR GENERAL OF ICBA

As I reflect on my first six months here in ICBA as the Director General, I can quite confidently say that my journey at ICBA has been great and enriching. Over this period, I have had the chance to get to know ICBA people more closely; ICBA the organization, and build bridges with ICBA main partners; donors and stakeholders. ICBA grows in you when you get to know it. It is an organization with a noble mission, great people, and even greater support.

There have been some real highlights for me over the past six months of which I am very pleased. Firstly was conducting a foresight exercise, in collaboration with about 50 stakeholders in November 2012. This forward-looking exercise was a great opportunity to engage with ICBA employees as well as ICBA stakeholders and donors in looking at where we want to be as an organization in 10 years and how we can have a deeper impact on agriculture in marginal environments. That was really a milestone for us, because we are using the knowledge gained from this to develop our new strategy for 2013-2023.

Another very exciting accomplishment in the past six months has been in hiring more experts and professionals. As ICBA is expanding, there was a need to get new blood in the organization and to develop a robust management team. Accordingly, we hired new people in new areas of research that we need to tackle such as soil microbiology and molecular biology, as well as we strengthened our communication and partnership division, in order to build critical capacity in the major programs that we are running.

The third thing I would say that has been significant is the examination of the organization's performance and reviewing of the internal processes. As a new Management Team, we took a hard look at our internal processes and business environment. We asked the question of 'Do we have an enabling environment for high performance within ICBA'? 'How can we perform better as an organization and as individual employees'?. According to our findings, we are developing / changing ICBA's business procedures or internal policies, wherever needed.

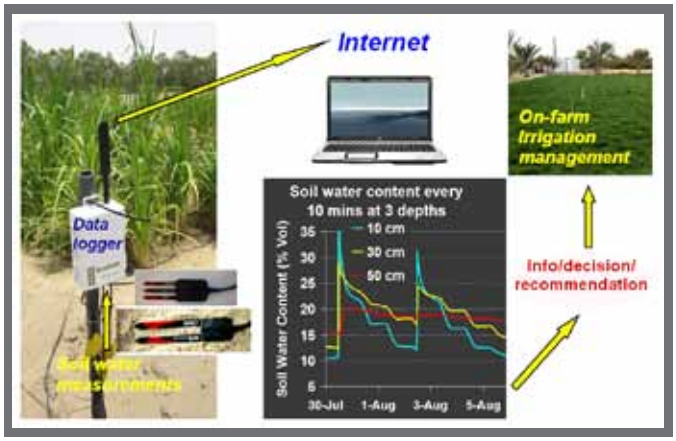
The fourth highlight of the past 6-months is ICBA's internal call-for-proposals. We are adopting a new direction towards empowering the right scientist to perform the right science. The idea is to invest in proof-of-concept type of projects, to provide ICBA scientists with sufficient data to approach other partners / donors to scale-up the project to a larger group/community/beneficiary. ICBA looks at this as a way to open up to a more dynamic work environment and an excellent opportunity for all ICBA scientists to be creative and initiate research projects in their areas of expertise. Certainly the Center is going through change. To their credit, I have found the ICBA staff to be supportive, open minded, and ready to embrace the changes.

We all appreciate that ICBA is growing and embarking on new areas of research, as was actually planned by its founders the Islamic Development Bank and the UAE Government. Strategic partnership and collaboration is at the heart of the new phase, as we are aiming for very high impact on agriculture in marginal environments. I sincerely believe that as long as we have the right empowerment and are working with the right people our work will have an impact. Our explicit intention to work with stakeholders, partners and directly with farmers will bear fruit. Partnership is necessary and, as a Research for Development organization, we cannot survive without it.

I welcome you all to read and enjoy the stories in the latest issue of Biosalinity News. This newsletter will be just one of the communication vehicles we will be using to share our information. We are looking to continuously enhance your experience with Biosalinity News and other outreach tools of ICBA. Please do not hesitate to provide us with your feedback.

- *Ismahane Elouafi, Director General*

SENSOR TECHNOLOGY FOR IRRIGATION MANAGEMENT



Good irrigation management requires balancing the water requirements of the crop with the water supply in the soil. Water requirements are driven to a large extent by the weather, with high temperatures, low humidity, high solar radiation and high wind speed all causing high water requirements. For many years, and in many countries, networks of agro meteorological stations have provided up-to-date estimates of daily water requirements as a public service for use in irrigation scheduling. At ICBA, the weather station located at the Center's research facility in Dubai has provided up-to-date information on various parameters.

ICBA has been using soil water sensors in its research to explore how they can be used to measure the rapid changes inherent with irrigating sandy soils with high infiltration and rapid drainage rates. These sensors depend on measuring the electrical properties of soil as they change with water content.

ICBA scientists, Dr. Ian McCann, Dr. Abdullah Dakheel and Dr. BelHaj Fraj presented a well-received paper on this subject at the 10th Gulf Water Conference in Doha, Qatar.

LAUNCH OF THE NATIONAL STRATEGY TO COMBAT SALINITY AND PROTECTION OF WATER RESOURCES FROM POLLUTION AND SALINITY IN THE SULTANATE OF OMAN

The National Strategy to combat salinity and protect water resources from pollution and salinity in Oman was launched on 2 October 2012 in Oman by Sheikh Fadl bin Mohammed Al Harthy, Secretary-General of the Council of Ministers.

Dr Ahmed bin Nasser Al Bakri, Director-General of Agricultural and Livestock Research, outlined the rigorous process of the two-year program which included five technical teams working on different aspects: water resources and modeling, agricultural status and salinity impact, socio-economic assessment, governance, legal/regulatory frameworks and policies, and capacity development.

ICBA played a major role in leading the formulation of the strategy in collaboration with the Directorate General of Agriculture and Livestock Research of the Ministry of Agriculture and Fisheries in Oman. Continuous consultation with key ministries, government agencies and local and international specialists ensured that the Strategy incorporated the best expert assessment and synthesis in order to deliver high-quality outcomes.

The study indicated that excessive water use is the prime cause of salinization of agricultural soils. In many areas water demand exceeded supply resulting in the intrusion of saline water into the aquifers. Even when the groundwater was considered good quality, poor on-farm management complicated the problems by causing salinization of the soil. The study recommended alternative strategies to improve water use and monitoring, soil management and agricultural production on the different types of soil and water conditions, strategic options to reduce seawater intrusion, and tactics (in the short-, medium- and long-term) to implement solutions across the Sultanate of Oman.

BIOSALINITY NEWS

RESEARCH UPDATES

BARLEY: A SALT TOLERANT CEREAL CROP

Long and stiff barley awns fend off birds and insects

A barley field experiment at ICBA

Barley (*Hordeum vulgare L.*) is the fourth most important cereal crop after wheat, rice and maize. It is believed to be the first cereal crop that was domesticated by humans nearly 10,500 years ago in the Middle East. It is one of the most salt tolerant major crops and is highly adaptable to varied growing conditions and consequently planted in a wide range of areas including the marginal lands. The barley crop has a short growing season and is relatively drought-tolerant.

The major use of barley grain (60 percent) is as feed for different domestic animals including poultry, sheep, cattle and camels. A sizeable amount of barley grain is used for malting, for which it is most suited. Barley malt provides the raw material for the industries engaged in brewing and distilling. Both alcoholic and non-alcoholic beverages are produced from the malt. The rest of barley grain is consumed as food in different forms like soups, stews and bread. Barley is being promoted as health food for its high contents of beta glucans, which help in lowering blood cholesterol. The use of the whole grain regulates blood sugar for up to 10 hours, which makes it even healthier than wheat.

Over the past 13 years, ICBA has conducted an extensive research on barley. In 2012, ICBA embarked on a research project with the collaboration of the University of Montana in the United States to screen their international barley core collection of 2,750 accessions against salinity to select genotypes for breeding of salt tolerant barley at the center and other research institutes around the world with the same interests.

A barley spike may contain up to 60 grains

The Plant Genetic Resource Laboratory of ICBA carried out a thorough study on barley from the Arabian Peninsula. Around 3,200 accessions of barley landrace were collected from farmers' fields in the Batinah region of Oman. They were characterized for different spike and seed morphological traits to explore major variation in the characteristics for future selection and breeding programs. Local landraces usually out-yield the exotic material under the low input conditions that predominate in subsistence farming systems. In such conditions, native germplasm should be exploited to improve productivity.

Large variation exists among different barley cultivars

Barley plant height ranges from 70-120 cm

About 2,300 accessions of the Omani Batini barley landrace were also studied for salinity tolerance, genetic variation in germination and early seedling growth to establish the forage yield-salinity response for them. A high level of diversity for salt tolerance, within and among sub-populations of the Batini landrace, was demonstrated at the germination, seedling, and tillering growth stages. A large proportion of variance in seed germination attributes was accounted for by genetic differences among subpopulations. Positive associations were identified between germination attributes under stress and non-stress conditions. The salt-tolerant barley germplasm evaluated in this study should contribute to increasing barley production in arid regions under saline irrigation. The study led to the publication of five articles in peer reviewed journals.

Barley grain is rich in soluble polysaccharide β-glucan

By Mohammad Shahid and Abdullah A Jaradat

BIOSALINITY NEWS

RESEARCH UPDATES

SESBANIA: A PROMISING FORAGE LEGUME FOR THE ARABIAN PENINSULA

Water scarcity and salinity are two of the biggest constraints to forage production in the Arabian Peninsula. The two main forages alfalfa (*Medicago sativa*) and Rhodes grass (*Chloris gayana*) grown in the region have high water demand. Large-scale cultivation of these species to meet the increased demand for forages has resulted in drastic reduction in the groundwater levels, as well as increased aquifer salinization due to intrusion of seawater, especially in the coastal areas. Urgent measures are needed to reduce the water demand for the forage production.

One way to tackle the challenge is to look at other forage crops that need less water to grow and are also salt-tolerant. ICBA's genetic resources program has been studying a range of salt-tolerant and water-use efficient crops for their ability to grow and produce economic yields under the local growing conditions with the intention to introduce these to farmers in the region. Among the few forage legumes studied, sesbania (*Sesbania sesban*) was found to be a promising alternative crop for the forage production systems in the region (Figure 1).

Sesbania is a short-lived perennial, widely distributed throughout tropical Africa and Asia. It is a tall shrub or small tree growing up to 4 m high, cultivated primarily as a green manure and source of forage for small ruminants. ICBA acquired 76 accessions from the International Livestock Research Institute (ILRI), Ethiopia, which were studied for local adaptation and biomass productivity using low-salinity water during the period 2007-08. In the following year, five accessions selected on the basis of superior performance were further evaluated for biomass yield potential. The fresh matter yield after six months of

Figure 1. Sesbania (10-months old) in profuse growth

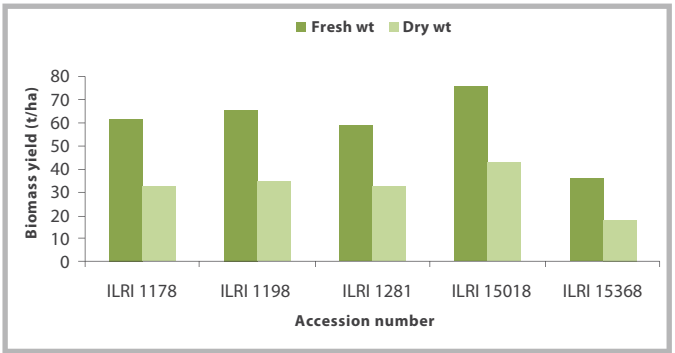


Figure 2. Fresh and dry biomass yields of five elite sesbania accessions

growth ranged between 35.5 t ha^{-1} (ILRI 15368) and 74.9 t ha^{-1} (ILRI 15081) among the accessions, with an overall mean of 58.9 t ha^{-1}. The dry matter yield among accessions varied between 18.0 t ha^{-1} and 42.6 t ha^{-1}, with a mean of 32.2 t ha^{-1} over the accessions (Figure 2).

Since reports show that sesbania thrives under repeated cutting management, the biomass productivity of the five accessions under cutting management was also studied. The trial was laid out in a Randomized Complete Block Design (RCBD) with three replications and two cutting regimes: uncut or cut three times at 4 months intervals/year (Figure 3). With low-salinity water for irrigation (~2 dS m^{-1}) and 3-cuts per year, a mean dry matter yield of 44.6 t ha^{-1} was obtained, which was 40% more compared to the uncut treatments, demonstrating that cutting management can significantly improve the biomass yields (see Table 1).

ICBA studies showed that sesbania is a fast growing legume compared to alfalfa. Thus, water quality being similar, the dry matter yields of up to 45 t ha^{-1} year-1 obtained in sesbania were considerably higher than the maximum yields of alfalfa (30 t ha^{-1} in 336 days) reported from the UAE (Sattar et al., 2002). In terms of salinity tolerance, sesbania also appears to be far superior to alfalfa. Sesbania reportedly tolerates salinity (ECe) of up to 8-10 dS m^{-1}, with a 40% reduction in dry matter production at 15 dS m^{-1} (Karadge and Chavan, 1983), whereas the salinity threshold of alfalfa is only 2.0 dS m^{-1} (FAO, 2009). Furthermore, sesbania is also a good quality feed, the nutritive value and dry matter digestibility being comparable to that of alfalfa, and superior to most other tree and shrub legumes.

Although the water requirement of sesbania has not been studied systematically at ICBA, it is estimated to be about 580 mm, which is considerably lower than the reported demand for alfalfa which varies between 800 and 1600 mm/growing period (see FAO, 2009). Another major benefit of growing sesbania would be the improvement in soil fertility due to symbiotic nitrogen fixation and the addition of huge amount of organic matter to the desert soils. Sesbania nodulates readily with the free-living rhizobia *Sinorhizobium meliloti* and *S. arboris*, native to the UAE soils (Rao et. al. 2012).

In summary, studies at ICBA show that sesbania has excellent potential as an alternative to alfalfa, the commonly cultivated forage legume in the Arabian Peninsula. However, further investigations are warranted to assess the growth performance at varying levels of salinity and for optimization of agronomic practices to maximize productivity.

Figure 3. Sesbania cutting management trial

By NK Rao, Plant Genetic Resources Scientist, International Center for Biosaline Agriculture, PO Box 14660, Dubai, UAE

		Accession ID						
Trait	***Treatment***	***ILRI 1178***	***ILRI 1198***	***ILRI 1281***	***ILRI 15018***	***ILRI 15368***	***Mean***	***LSD (5%)***
Plant height (cm)	Cut	214.9	254.2	242	252.1	238.3	240.3	
	Uncut	300.1	348.7	309.9	310.3	367.6	327.3	65.1
No. of branches	Cut	21.9	26.4	23.2	24.1	23.9	23.9	
	Uncut	34.5	39.3	37.6	35.5	46.9	38.8	9.4
Fresh weight (g/plant)	Cut	1985	2564	2315	2144	2055	2212	
	Uncut	1163	1651	1561	1549	1858	1556	693.2
Dry weight (g/plant)	Cut	491	662	583	540	512	558	
	Uncut	293	413	390	383	456	387	176.9

Table 1. Sesbania biomass productivity under cut and un-cut management

Reference:

FAO (Food and Agriculture Organization of the United Nations). 2009. Crop Water Information: Alfalfa. Available at: http://www.fao.org/nr/water/cropinfo_alfalfa.html

Karadge BA and Chavan PD. 1983. Physiological studies in salinity tolerance of Sesbania aculeata Prior. Biologia Plantarum 25: 412–418.

Rao NK, Sood N, Gokhale T, Kumar J, Rajeswari S and Mishra S. 2012. Isolation of stress-tolerant rhizobia from the UAE soils. Biosalinity News 13 (1): 8–9.

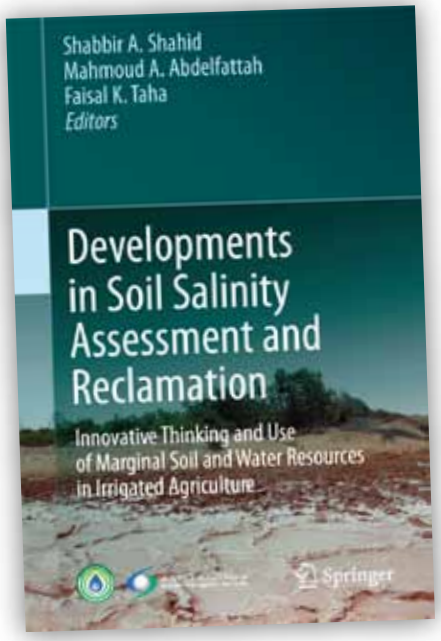
Sattar H, Mehrazi M, Awartani M and Awad AR. 2002. Alfalfa crop water requirement study in the United Arab Emirates. Emirates Journal of Agricultural Research 4: 12–24.

ICBA PARTICIPATION IN LIWA DATE FESTIVAL

The most recent Liwa Date Festival provided a well-attended forum for ICBA to demonstrate the success of its long-term research into elite date palm varieties to assess the impact of marginal quality irrigation on soil properties, date palm growth, productivity and fruit quality. One component of this research included the testing by ICBA of two date palm varieties (Khalas and Khenizi) with two mycorrhizae and two fertility treatments over four salinity levels of irrigated water. The importance of these findings was acknowledged by the scientific community when in 2012 ICBA received an award in the Research and Study category of the Khalifa International Date Palm Awards.

The Liwa Date Festival is organized by the Abu Dhabi Tourism and Culture Authority and under the patronage of HH Sheikh Mansour Bin Zayed Al Nahyan. The seven-day festival was attended by farmers, representatives from companies involved in date manufacturing, fertilizers, seeds, green fodder, the manufacture of high quality wood sheets from palm tree wastes suitable for use in building, furniture, and pre-fabricated houses, agricultural producers, and more than 300 UAE local families participating in the activities of the popular souk.

DEVELOPMENTS IN SOIL SALINITY ASSESSMENT AND RECLAMATION



Innovative Thinking and Use of Marginal Soil and Water Resources in Irrigated Agriculture

This book is an important addition to the technical literature of ecology. It is a store house of information on the recent technological advancements on salinity mapping, monitoring and soil reclamation, as well as sustainable use of saline soil and water for crop production.

PARTNERSHIP AND COLLABORATION

ICBA FORESIGHT SYMPOSIUM

Since its founding in 1999, ICBA has had a history of innovation, leading the way in research on the problems and solutions farmers face with saline environments. In preparing for the next strategic plan, ICBA decided that given the increasing rate of technological and social/political change, they needed to cast their net more widely to capture new ideas and to discern the likely consequences of today's actions and look to the future to solve today's problems.

"We decided to engage in a foresight process to explore alternative futures: possible and preferred visions for ICBA to 2023. Our intent is to farm these visions and select the best – most robust, most value – ideas forward. We did not wish to engage in a traditional strategic planning process and only focus on today's problems; rather, we wished to explore tomorrow's opportunities, to continue ICBA's tradition of innovation. Most significantly, we did not wish to travel alone in this journey but to include stakeholders in this process, creating a shared journey toward visions of what ICBA can become", said Dr Ismahane Elouafi, Director General of ICBA.

Following two days of deliberation on November 25-26th, participants in the symposium insisted that the business-as-usual trajectory was untenable. They suggested alternative technological and organizational visions for ICBA's future. Also, they strongly recommended that ICBA travels on this journey with others; seeing stakeholders as true partners.

At the Foresight Symposium Gala Dinner held on 25 November in Dubai, His Excellency Dr Rashid Ahmad bin Fahad, Minister of Environment and Water, stressed that the United Arab Emirates supports ICBA in its role as an international center of excellence in the areas of

integrated management of saline water and marginal degraded land in developing countries.

Further, His Excellency commended the participatory approach of the symposium involving so many representatives of research centers, academic and international institutions, regional and national donors and decision-makers in the development of a strategic plan which would strengthen the role of the center in alleviating water scarcity exacerbated by challenges such as climate change.

The creative results of the Symposium have helped identify strategic pathways including major initiatives for the next 5-10 years to frame a new research agenda and vision for ICBA to 2023.

ISLAMIC DEVELOPMENT BANK & ICBA ESTABLISH JOINT COLLABORATION PLANS FOR 2013

Dr Ismahane Elouafi, Director General of the International Center for Biosaline Agriculture (ICBA), along with Dr Ahmed Al Sharif, Deputy Director General of ICBA and Dr Abdullah Alshankiti, Senior Soil Scientist at ICBA, met on the 19th of January, in Jeddah, with H.E. Dr Ahmad Mohamed Ali, President of Islamic Development Bank (IDB) and other IDB colleagues, Mr. Birama Boubacar Sidibe, Vice President Operations; Mr. Mohammad Jamal Al-Saati, ICBA Board Member and Director of Country Department in IDB; and Mr. Demba Ba, Director of Agriculture and Rural Development.

Dr Elouafi briefed the IDB representatives of the latest activities of ICBA along with the current and planned researches, projects, and capacity building programs that the center is undergoing. The President of IDB expressed the continuous support of IDB for ICBA's initiatives and discussed various elements for enhancing the collaboration between the bank and ICBA.

As an immediate result to the meeting, three lines of cooperation were established:

1. **Collaboration on Global Dry Lands Alliance (GDLA)**
   Both IDB & ICBA, joined forces in the organization of the Expert Group Meeting (EGM) for the GDLA (Global Dry Lands Alliance) initiative of the Qatari Food Security Agency, which was held in Jeddah, K.S.A. 18-20 February 2013. Approximately 60 experts representing Multilateral Development Banks (MDBs), United Nations' Specialized Agencies, Dry Land Organizations, Private Sector and Academic and Research Institutions from developing and developed countries participated in the meeting.

2. **Collaboration on co-hosting a seminar on "Innovations in Agriculture and Food Security"**
   IDB and ICBA will co-host a Forum during the annual meeting of IDB in Dushanbe, Tajikistan on "Innovation in Agriculture and Food Security" on 20 May 2013.

3. **IDB-ICBA joint work program for 2013**
   IDB invited ICBA scientists and experts to assist in providing technical knowledge and supervision for the various IDB projects that are in the IDB pipeline, approved, or currently being implemented.

PARTNERSHIP AND COLLABORATION

IFAD AND ICBA: A LONG-TERM PARTNERSHIP

The President of the International Fund for Agricultural Development (IFAD), Dr Kanayo Nwanze, visited ICBA on Sunday 11 November, 2012, to discuss current and future collaboration with ICBA. Mr Fawzi Sultan, ICBA Board of Directors Chairman, also attended the meeting.

Dr Nwanze discussed the current ongoing project with ICBA "Adaptation to Climate Change in WANA Marginal Environments Through Sustainable Crop and Livestock Diversification", a regional four-year project, in partnership with the NARS in Egypt, Jordan, Oman, Palestine, Tunisia, Syria and Yemen.

ICBA and IFAD have agreed to explore further areas of partnerships including: irrigation technologies, agricultural policy, and food security.

ICBA HELPS IN THE PREPARATION OF SOMALIA'S WATER STRATEGY

Somalia is suffering from substantial water scarcity problems and addressing this is becoming one of the most important challenges that need to be addressed. To support the new government, the Islamic Development Bank (IDB) is exploring ways of helping Somalia to deal with their crisis.

In January 2013, ICBA hosted a meeting with the participation of different stakeholders including: IDB, Government of the Republic of Somalia, Intergovernmental Authority on Development (IGAD), Bushnak Group, Qatar Red Crescent, DIRECTAID (Kuwait), Islamic Relief, and Qatar Charity.

The objective of the meeting was to prepare the "Framework for Drought Resilience Agriculture, Livestock and Water Strategy for Food Security in Somalia". The meeting concluded with an agreement from the participants to move forward in three areas – a water master plan, a study on urban waters, and capacity development and knowledge transfer.

The next meeting is scheduled to take place in late April or early May 2013, to which donors will be invited and the strategy framework will be finalized.

ICBA INITIATES COLLABORATION WITH KAUST ON SEAWATER STUDIES

Dr Nina V. Fedorov (Distinguished Visiting Professor, King Abdullah University of Science and Technology - KAUST) followed up, on 14 November 2012, an earlier visit to ICBA to further collaborative opportunities on advanced greenhouse facilities and genetic engineering for salt-tolerance. As agreed in that meeting, ICBA commenced in mid-December 2012 the evaluation of 36 progenies of Salicornia in the ICBA research station in Dubai. The material will be used for breeding for further studies.

ICBA SHARES MODELING & SATELLITE DATA ASSIMILATION METHODS WITH TUNISIA

Mr Karim Bergaoui, ICBA Climate Modeling Scientist, represented the Center at the Utilization [de la télédétection pour l'amélioration de la gestion des resources en eau et adaptation aux changements climatiques] – LDAS Tunisie, held 18-19 November 2012 in Tunis, Tunisia. At the national workshop on the use of remote sensing observations in the management of water resources and climate change adaptation, Mr Bergaoui shared with delegates from national and international institutions the results of ICBA's MAWRED project that uses modeling and satellite data in order to monitor the groundwater changes in a regional scale (MENA region); monitor the amount of water used in irrigation; develop a high resolution land surface model for MENA countries (1km spatial grid); and develop atmospheric tools for adapting climate change scenarios from CMIP5 and assess the impact of climate change on water resources in the region.

ICBA SCIENTIST PRESENTS IN QATAR NATIONAL FOOD SECURITY PROGRAM INTERNATIONAL CONFERENCE ON FOOD SECURITY

ICBA scientist, Dr Rachael McDonnell, an expert in water governance and policy, was invited to speak at the Qatar National Food Security Program's International Conference on Food Security in the Drylands held in Doha, Qatar 14-15 November 2012. Dr McDonnell's paper presented details of the possibilities and challenges to dryland agriculture in harnessing knowledge and water-management technology from strategic planning through to on-farm activities.

PARTNERSHIP AND COLLABORATION

MOU BETWEEN ICBA AND THE CANADIAN UNIVERSITY OF DUBAI IS PUT INTO ACTION

Landscape is an important component in every city's architecture and urbanization due to its contribution to a healthy living environment. Developing green landscapes in UAE cities face challenges due to the climate characterizing of the region and mainly limited water availability/supply.

ICBA, in partnership with the Canadian University of Dubai, are working together to explorer the challenges and opportunities regarding landscaping UAE cities as well as share experiences and develop networks with stakeholders in the UAE through a national workshop "Landscaping UAE Cities: Landscape Architecture as Driving Force", held on 20th of February 2013.

This initiative was in line with the Memorandum of Understanding, signed between ICBA and CUD on the 9th of December 2012, and which covers collaboration on research, special lectures, students' internship, field visits, and national activities including forum, workshops, and conferences.

According to Dr. Ismahane Elouafi, Director General of ICBA, water scarcity is a core development issue in the UAE. "Right now, 11% of the total water use in the country is dedicated to landscaping and this rate is on the rise, as the urban population is growing" said Dr. Elouafi. She went on to say that "managing landscapes especially in arid and hyper-arid environments such as the UAE is a real challenge, and requires innovative approaches, such as using the right plants which are drought / heat / salt tolerant; using the right irrigation technologies, and safe use of treated waste water. Within this context, native plants have a great role to play in UAE cities landscaping"

ICBA WITH OTHER PARTNERS ORGANIZE INTERNATIONAL CONFERENCE GECS2012

GLOBAL ENVIRONMENTAL CHANGE AND HUMAN SECURITY (GECS-2012): THE NEED FOR A NEW VISION FOR SCIENCE, POLICY AND LEADERSHIP (CLIMATE CHANGE AS AN OPPORTUNITY)

Environmental change in general and climate change in particular, presents a major challenge for development and poverty eradication. Millions of poor people around the world are vulnerable to environmental change impacts on ecosystems, water and agriculture. Hence, the threats to human security are increasingly being considered both by research and development organizations. There is a relation between poverty in low-income countries and economies heavily dependent on weather-sensitive resources, such as agriculture. Given the importance to these issues the GECS2012 was organized in Marrakech.

MOEW UP-SKILLING AT ICBA

ICBA is collaborating with the UAE Ministry of Environment and Water (MOEW) in various capacity building initiatives. In that regards, ICBA hosted and organized several training seminars and has provided expert assistance to MOEW on several projects.

ICBA hosted a four-day workshop on "Integrated Management Technologies of Saline Water" 15-18 October, 2012, which brought together delegates from the Ministry of Environment and Water, Abu Dhabi Food Control Agency, municipalities and specialists from ICBA. The workshop outlined the challenges affecting the agricultural components of water, soil and crops and how biosaline agriculture is being developed to meet these challenges.

In addition, ICBA held a three-day training course for "Methods and Management Techniques for Integrated Marginal Water" on 18-20 December, 2012. Mr Abdullah AlShaer, Acting Undersecretary of the Ministry of Environment and Water for Technical Affairs, attended the final day and stressed the importance of ICBA's training course to enhance

Ministry objectives, especially the sustainability of water, food security and the environment by using new technologies to manage marginal treated water. "Use of this resource is one of the strategic choices that help countries with limited resources of water to increase the production of agricultural commodities, and reduce environmental damage", Mr. AlShaer added.

Dr Ahmed Abdul Ghaffar Al-Sharif, Deputy Director General of ICBA, concluded the program by expressing his appreciation to MOEW for their strategic vision in the development of the national human resources in the UAE, and the trust and honor given to ICBA to implement this integrated program. He added that the program had been developed in collaboration between MOEW and would be extended to all UAE government staff. He also thanked the participants and the scientific experts who contributed to the success of the program session.

Mr AlShaer emphasized that MOEW and ICBA will work together to execute the next stage of the development plan for the year 2013 by scheduling training courses run by ICBA experts.

REGIONAL TRAINING WORKSHOP "RECLAMATION OF LAND AFFECTED BY SALINITY IN AFRICA"

Dr Ismahane Elouafi, Director General of the International Center for Biosaline Agriculture (ICBA) launched on 13 January 2013 the regional training workshop on "Reclamation of Land Affected by Salinity in Africa". The 2-week training workshop was organized for African French-speaking countries at ICBA headquarters in Dubai and funded by the Arab Bank for Economic Development in Africa (BADEA). Participants came from Benin, Burundi, Cameroon, Cape Verde, the Democratic Republic of Congo, Madagascar, Mali, Chad, Niger and Guinea Equatorial.

REGIONAL WORKSHOP IN OMAN ON SOCIO-ECONOMIC ASSESSMENT

As part of the activities of the regional project on "Adaptation to Climate Change in WANA Marginal Environments Through Sustainable Crop and Livestock Diversification", ICBA organized a regional workshop on "Guidelines and Methods for Socioeconomic Assessment and Farm Surveys" in Muscat, Oman 6 to 8 January 2013. The workshop was followed by a farmers' field day on "Techniques for On-Farm Forage Processing, Handling and Utilization". The course was organized by ICBA in collaboration with the Directorate General of Agriculture and Livestock Research (DGALR) of Ministry of Agriculture and Fisheries in Oman and was attended by 30 participants from Oman, UAE, Saudi Arabia, Egypt and Yemen.

CAPACITY BUILDING AND TRAINING

FROM CLASSROOM TO REAL-LIFE SCIENCE: THE ICBA-BITS PILANI, DUBAI COLLABORATION

BITS Pilani, Dubai Campus (BPDC) is the offshore site of the top-ranking private Indian university, Birla Institute of Technology & Science, Pilani. Its location in Dubai International Academic City, which is adjacent to ICBA's research farm and headquarters, has proven a boon for research collaboration between the two institutions.

In 2009, BPDC signed a MoU with ICBA to collaborate in emerging areas of science such as biotechnology towards improving agricultural productivity. As part of the MoU, 13 undergraduate students from BPDC worked on Practice School projects under the supervision of ICBA scientists, applying their classroom knowledge to real-life situations to find solutions to problems in saline agriculture. The joint work has benefited both the institutions and resulted in some joint publications.

The MoU which expired on 9th October, 2012, has been renewed for a period of 3 years to pursue collaborative research in the areas of mutual interests.

REGIONAL PARTICIPANTS ATTEND ICBA WORKSHOP

As a component of a major regional project, "Adaptation to Climate Change in West Asia and North Africa (WANA) Marginal Environments Through Sustainable Crop and Livestock Diversification", a workshop was held 10-13 September at the ICBA headquarters in Dubai. The project, which ICBA is conducting in Jordan, Tunisia, Syria, Oman, Egypt, Palestine and Yemen, with funding from the International Fund for Agricultural Research (IFAD), the OPEC Fund for International Development (OFID), the Arab Fund for Economic and Social Development

(AFESD), and the Islamic Development Bank (IDB), is a four-year project (started in 2010) targeted to improve the livelihoods, resiliency to climate changes, and income of poor farmers relying on marginal water and land resources in the WANA region.

The workshop enabled participants to strengthen their knowledge about the principles of environmental impact assessment, particularly in relation to the use of saline and treated waste water (TWW) in agriculture; methodologies to assess the impact of irrigation with marginal quality water (both saline and TWW) on soil properties (profile and groundwater); the criteria to assess Milli-Q (MQ) purified water; water used in irrigation; risk assessment of MQ water; and the appropriate soil and irrigation practices to minimize the impact of the use of MQ water in irrigation.

ENVIRONMENTAL COST AND CHANGING FACE OF AGRICULTURE IN THE GULF STATES

ICBA played a leading role in planning and conducting the agriculture workshop of the 3rd Gulf Research Meeting, held 11-14 July 2012 at the University of Cambridge. The Gulf Research Center in Cambridge (GRCC) brought together 450 distinguished scientists and policy makers from 46 countries to participate in 19 workshops. The agriculture workshop chaired by Dr Shabbir A. Shahid (Senior Scientist at ICBA), was attended by participants from Australia, Bahrain, India, Kuwait, Oman, Saudi Arabia, Turkey, UAE, Australia, UK, and Morocco. The agriculture workshop covered the topics of food security, improved water-use efficiency, specific country case studies, and the changing role of agriculture in the Gulf countries.

On behalf of ICBA, Dr Shahid will continue to collaborate, wherever possible, with the GRCC to fulfill its role to advance education and research on political, economic, social and security issues relating to member countries of the Gulf Cooperation Council (GCC) and associated countries including Iran, Iraq and Yemen.

Workshop participants with Dr Abdul Aziz Sager Chairman Gulf Research Center

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ICBA INVESTS IN 20 NEW STRATEGIC AREAS OF RESEARCH

During September 2012, ICBA management conducted an internal call for proposals. This came in line with the management's decision that internal investment in research would contribute to ICBA having more impact in the agriculture sector locally and globally.

"ICBA's management is adopting a new direction towards empowering the right scientist for the right science with emphasis on the young generation of scientists. ICBA looks at this as a way to open up to a more dynamic work environment and an excellent opportunity for all ICBA scientists to be creative and initiate research projects in their areas of expertise", said Dr Ismahane Elouafi, Director General of ICBA.

Thirty-nine proposals were evaluated by a review committee headed by the Director General. The Review Committee evaluated all the presented proposals and selected 20 based on criteria that included strategic importance, originality, innovation, potential impact, clear objectives, and ability to deliver outputs. Science leadership, capacity and teamwork were also considered. An important factor in the evaluation was the possibility for the project to grow and expand and to attract other partners within a year or two..

"The idea is to invest in proof-of-concept type of projects, to provide the scientists with sufficient data to approach other partners and donors to scale-up their project to a larger group, community, beneficiary", said Dr Al Sharif.

The selected projects fell under the following six categories: salinity management projects, crop diversification projects, water policy and governance projects, water management and irrigation technology projects, reuse of treated wastewater projects, and soil management projects. These projects will extend over 2013 and 2014 with a total budget of approximately USD 3.3 million.

Dr Elouafi added that "as new management, our vision is to promote innovation and address issues that farmers in the region are facing today and in the near future; this competitive process has been implemented to enhance the quality of the projects undertaken by ICBA".

THE COMPLETE LIST OF THE APPROVED PROJECTS INCLUDES:

No	Project Title
1	Towards a Sustainable Food Production on Marginal Saline Lands in Aral and Caspian Sea Basin
2	On-Farm Demonstration of Seed Production and Adaptation to Biosaline Agriculture Production System
3	Sorghum and Pearl Millet for Crop Diversification Improved Crop-Livestock Productivity and Farmers Livelihood in Central Asia
4	Evaluating Changing Water Security in Arabian Gulf States with Particular Focus on the UAE: Science Informing Policy
5	Improving Agricultural Soil Properties Using Soil Amendments to Enhance Water and Nutrient Use Efficiency for Crop Production

THE COMPLETE LIST OF THE APPROVED PROJECTS INCLUDES:

No	Project Title
6	Maintenance and Upgrading of Central Analytical Laboratory (On-going activity)
7	Soil Museum of the United Arab Emirates (SMUAE) (On-going activity)
8	Reclamation of Degraded Agricultural Lands Through Integrated Approach to Enhance Resource Capacity for Crop Production in UAE
9	Determination of Crop Water Use Using Weighing Lysimeter (Current project number: IW7)
10	Evaluation of Sub-Surface Drip Irrigation Technology
11	Integrated Crop and Seed Production Systems Under Water / Irrigation Management in Sub-Saharan Africa
12	Assessment of Agricultural Drainage Water and its Reuse in Forage and Helophytic Grasses Production Systems
13	Assessment of Pathogens and Heavy Metals Contamination in Different Vegetable Crops Grown with Treated Municipal Wastewater
14	Evaluation of Castor (*Ricinus Communis*) and Colocynth (*Citrullus Colocynthis*) for Bioenergy Feedstock Production
15	Plant Genetic Resources for Marginal Environments: Identification, Multiplication and Dissemination
16	Protected Agricultural Production for Maximum Water and Energy Use Efficiency in Hot Arid Climates
17	Automated Sensor Based Control and Monitoring of Irrigation of Research, Demonstration and Capacity Building
18	Municipal Waste Compost in UAE: Importance, Feasibility and Need
19	The Genetics of Salinity Tolerance in Barley: Leveraging the US Barely CAP Project in Saline Enviroments
20	Evaluation of Salt-Tolerant Mixtures of Forage Drops for Enhanced Productivity (ICBA)

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ICBA BOARD MEETING

From left to right: Mr Mohammad Jamal Al-Saati (Director, Operations Policy and Services Department, Islamic Development Bank), Mr Abdelrahim Al Hammadi (Assistant Under Secretary, Support Services, Ministry of Environment and Water), Mr. Fawzi AlSultan (Chairman, International Center for Biosaline Agriculture, ICBA), Dr. Ismahane Elouafi (Director General, ICBA), HE Razan Khalifa Al Mubarak (Secretary General, Environment Agency – Abu Dhabi), Dr Mahmoud Solh (Director General, International Center for Agricultural Research in the Dry Areas) and Mr Adel Abdulla Alhosani (Director, Projects Department, Abu Dhabi Fund for Development)

Chaired by Mr Fawzi AlSultan, the ICBA Board of Directors met on 27 November 2012. During the meeting, the Board members discussed the strategic outcomes of the Foresight Symposium, whose results will identify strategic pathways including major initiatives for the next 10 years that will enable new vision for ICBA. As well, the Board reviewed and discussed, amongst other topics, corporate governance reforms, and ICBA's strategic achievements.

ICBA SCIENTISTS CELEBRATE WORLD SOIL DAY

The importance of soil as a critical component of good landscape management through its contribution to food, water and energy security and as a mitigator of biodiversity loss, competing demands for resources and climate change was stressed by Dr Ismahane Elouafi, ICBA Director General, at the ICBA celebrations for the inaugural World Soil Day on 5 December 2012.

APPOINTMENT OF NEW DIRECTOR GENERAL AT ICBA

Dr Ismahane Elouafi, a Moroccan/Canadian, took up the position of ICBA Director General in August 2012. Prior to her appointment to ICBA, Dr Elouafi held management positions within the Canadian federal system, including the position of Director of the Research Management and Partnerships Division at the Canadian Food Inspection Agency (CFIA) and the position of Senior-Advisor to the Assistant Deputy Minister - Research at Agriculture and Agri-Food Canada (AAFC).

Dr Elouafi holds a PhD in genetics from Cordoba University, Spain, and has over 15 years experience in agricultural research, including appointments in several international research organizations such as ICARDA (International Center for Agricultural Research and Dry Areas), CIMMYT (International Maize and Wheat Center), and JIRCAS (Japan International Research Center for Agricultural Sciences).

APPOINTMENT OF NEW DIRECTOR OF RESEARCH & INNOVATION AT ICBA

In November 2012, ICBA has retained the services of Dr Mohamed Amrani, as Director of Research and Innovation, who brings with him a wealth of experience in leading and developing agriculture and environment science programs and policy related to

science and technology in both developed and developing countries including the MENA region. Dr Amrani's 22 years of experience included working for Environment Canada, United Nations Compensation Commission, Alberta Agriculture, and Institut National de la Recherche Agronomique.

NEW DIRECTOR OF INTERNATIONAL COOPERATION & PARTNERSHIPS JOINS ICBA

Ms Fiona Chandler was appointed, in February 2013, as the new Director of International Cooperation and Partnerships at ICBA. Ms. Chandler has an established career in external relations and science and corporate communications in the private sector as well as in international and national agriculture and natural resource management research. She has worked extensively in the CGIAR at both the Center level (WorldFish, Center for International Forestry Research and the World Agroforestry Center) as well as with the CGIAR Consortium. Ms. Chandler has a Masters Degree in Environmental Management and Development from the Australian National University and has worked in Canada, Australia, Indonesia, Kenya, Malaysia, Papua New Guinea and led projects throughout Southeast Asia and Africa.

UP-SKILLING OF ICBA STAFF

As well as a commitment to developing the capacity of people targeted in ICBA's research and development programs, ICBA is keen to strengthen the competencies of staff within the organization. A recent graduate of the MBA program at Abu Dhabi University, Ms Baedaa Khalil, cited the support from ICBA management as a key driver in enabling her to undertake her studies part-time over two years.

ICBA WELCOMES ITS NEWEST STAFF MEMBERS:

Ms Nadia Al Amoudi
Administrative Assistant,
26 August 2012

Ms Nisreen Farfour
Administrative Assistant,
26 August 2012

Dr Abdullah Al Shankiti
Senior Soil Management
Scientist, 1 October 2012

Mr Mohy Eldin Mashael
Admin/Government Relations,
23 December 2012

Dr Khaled Masmoudi
Senior Molecular Biologist
Scientist, 6 January 2013

Mr Charbel El Khouri
Communications Coordinator,
20 January 2013

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