Training Course Technical Report

Salinity Management

15/ 01/ 2017 – 19/ 01/2017

Regional Center for Training and Water Studies (RCTWS), Egypt

Funded By:

Japan International Cooperation Agency (JICA)

Conducted By:

The International Center for Agriculture Research in the Dry Areas (ICARDA)

JICA

ICARDA

Science for Better Livelihoods in Dry Areas

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Executive summary:

Name of the project:

Capacity development for agriculture and water management for Iraq and regional Countries

Donors

Japan International Cooperation Agency; JICA (https://www.jica.go.jp/english/)

Arab Fund for Economic and Social Development; AFESD (http://www.arabfund.org/)

Local Partner

Regional Center for Training and Water Studies (http://rctws.org/en/DefaultEn.aspx)

Purpose:

To enhance capacity development of government officials and researchers who are engaged in irrigation projects and agricultural development mainly in Iraq

Specific objectives of the training course of the Training Course:

The objective of the course is to enhance capacity development of government officials and researchers who are engaged in agricultural development predominantly in Iraq. They will gain up-to-date knowledge and enhanced capacity in irrigated induced salinity and the design, implementation, management, analysis, and reporting of agricultural research outputs related to water-use efficiency, drought monitoring, and crop improvement for sustainable agricultural production.

Specific outputs:

Seventeen (11 male, 4 female) professionally-trained NARS partners from Iraq and other countries were trained on the design, implementation, management, analysis and reporting on research and development in salinity and acquire up-to-date information on research and practical activities in salinity management in each participating country. While nine Iraqis, one Sudanese, one Palestine and two Egyptian were funded by JICA, the remaining participants were sponsored by AFESD. Participant feedback was that they learnt a great deal and also expressed that such a course should be repeated in future with a much longer duration.

General overview:

Water is the major limiting factor of agricultural production in the dry areas of Central and West Asia and North Africa (CWANA) regions. Agriculture accounts for around 80-90% of freshwater consumption in the region. However, rapidly growing populations, industrialization, and urbanization will lead to reallocation of water away from agriculture to other sectors. On the other hand, high population growth rates require a continuous increase in agricultural production.

ICARDA's Water Program is actively operating in several regions with a focus to developing improved and fit-for-purpose agricultural technologies and innovations on integrated water, land and crop management and capacity strengthening of stakeholders.

Salinity management in agriculture is interpreted differently by different entities. This often creates misunderstandings about approaches towards managing salinity (or effects of salinity) in agriculture.

Most of the salinity-affected areas in Iraq, Egypt, Jordan, Sudan and Palestine are related to inappropriate irrigation water management. Irrigation water management can either be the cause, and/or the solution to salinity management in agriculture. In countries like Jordan and Palestine, solutions to reduce salinity in saline areas are highly limited, or not economically feasible. Therefore, we approach salinity management in terms of "fighting salinity", for areas where water management is a possible tool, and "living with salinity" where we are adjusting our agronomic practices to maximize agricultural production under saline conditions. Note that one approach does not exclude the other, and that in areas of the Mesopotamian plain, as well as in the Nile Delta, a mixture of solutions from the "fighting salinity" and "living with salinity" is needed.

The JICA-funded training course on Salinity Management was implemented in partnership with Regional Training Center for Water Resources, Ministry of Water Resources and Irrigation of Egypt. The training program targeted mainly trainees from Iraqi ministry of water in addition to others from the region. The training event aimed to enhance the capacity of project implementers on salinity control to empower and transform the livelihood of smallholder farmers and stakeholders though enhancing agricultural productivity and safeguarding the natural resources and providing resilience and adaptation to climate change.

General objectives:

The general objective of this training event was to communicate and promote the successful achievements and success stories of the various projects implemented in managing salinity from a soil, water, crop perspective and other technical information and knowledge to targeted project leaders from Iraq, Egypt Palestine, and Sudan. The overall objective was to build their capacity with new applicable technologies that can be adopted to their ecosystems to improve the land and water productivity with a specific focus on managing salinity associated with irrigated agriculture.

Target audience:

This training program was designed mainly for Iraqi professionals working in the field of land and water management in different areas in Iraq. Taking the advantage of the organization of the training in Egypt, we also invited trainees from the region; Sudan, Palestine and Egypt. The trainees were diversified in their specializations but all had an interest in soil management and increasing agricultural system productivity through their assignments. All trainees had a basic background on soil and water salinity in agricultural systems. All of them are officially involved in national agricultural projects in their countries, this was one of the selection criteria during nomination stage to ensure that the knowledge gained will be implemented and adopted in their own countries (See details Annex III).

Course structure:

The topics of this training course had a direct relevance to the overall theme of ICARDA's water program mandate and activities on soil management including salinity control in a research and technology development bases for sustainable land and water management as the course covered a wide range of technologies and techniques on how to address salinity problems in dry areas.

To allow interaction with other researchers from ICARDA and other institutions, ten lecturers were invited to provide case studies, and to provide a detailed example from other parts of the region.

The course was structured with four modules namely, 1) irrigation water management, 2) soil management, 3) salinity management, and 4) drainage management. These modules were established on a logic sequence to smoothly go through a learning process on salinity management.

Course implementation:

To understand the linkages between water management practices and salinity management, on the first day, the course started with lectures on water resources management at different scales as an introductory phase of the training to give the trainees a feel of the complexity of water scarcity and its associated problems (salinity build up). This was followed by field irrigation methods presented as the tool for managing salinity at different levels.

Training continued with the second module (Soil Management) highlighted on the second day, lectures on soil preparation and tillage techniques under different soil salinity levels. Soil fertility issues were addressed and the linkage between soil fertility and soil salinity was also presented and discussed.

On the third day, lectures were presented on the third module, which included lectures on salinity control at field level and also at system level. Interventions on soil amendments were presented as adaptation strategies with soil salinity at the farm level. Ten engineering aspects of soil salinity were discussed and modeling to manage salinity was introduced.

On the Fourth day, a field trip was conducted to the salt land area in north of Egypt where the largest project on salinity management in Egypt is being implemented. The trainees had opportunities to interact with different stakeholders (decision makers, farmers, private sectors) who were heavily involved in land reclamation and rehabilitation in this area. Trainees gained practical information and knowledge on how to improve the condition of marginal land to improve productivity.

The last module on the fifth day focused on land drainage as a practical option to control and mange salinity at field level. This included different topics on drainage such as surface drainage, subsurface drainage and mole drains. Trainees were provided the opportunity to present the work of their projects and exchanged knowledge with technical support from the course coordinator and trainers.

General Course Evaluation by Trainees:

Overall, the evaluation of the course by the participants was positive (details in annex IV). The list of the three most interesting ideas/concepts that the trainees learned in the course actually includes all course topics. This indicates the heterogeneity in the scientific and professional background of the trainees but also that all topics were relevant to trainees. They stressed that the main relevant topics were on how to manage and solve salinity, solutions at irrigation, river basin and drainage, soil mixture and properties.

The trainees also suggested to increase the duration of the course and time for experiments and laboratory work for quality issue.

Conclusion:

This course helped the trainees to: (i) raise the awareness of the trainees and enrich knowledge and on demand driven research activities in the region in general and in Iraq in particular. (ii) The trainees had multiple opportunities for sharing experiences and promoting improved technologies within active interventions with the trainers as well as among themselves. (iii) The audiences explored new partnership opportunities on the scaling out/up of knowledge gained during the training period.

Annex I: Course program

Day 1: Sunday 15 Jan – Overview, concepts and approaches		
9:00-9:15	Registration	CDU ICARDA
09:15 – 9:30	Opening ceremony, course overview, and zero assessment	Dr Atef Swelam and CDU
Module-I: irrigation water management		
9:30-10:30	Water management: across scale	Dr Biju George
10:30-11:30	Soil-water-plant relationships	Dr. M.H.Amer
11:30-12:45	*Break and group photo*	
12:45-13:45	Soil-water-plant relationships	Dr. M.H.Amer
13:45-14:30	*Lunch*	
14:30-15:30	Field irrigation methods: for salinity control	Dr. M. Bakr
15:30-16:30	Surface irrigation: design and management	Dr. Atef Nassar
Day 2: Monday 16 Jan: Module-II: Soil Management		
9:00-10:00	Laser land leveling techniques	Dr. Atef Nassar
10:00-11:00	Seedbed preparation & conservation tillage	Dr Mohamad Waseef
11:00-11:30	*Break*	
11:30-12:30	icarda	Dr Atef Swelam
12:30-13:30	Soil fertility management	Dr Ahmad Awad
13:30-14:30	*Lunch*	
14:30-15:30	General discussion	
Day 3: Tuesday 17 Jan: Module-III: Salinity Management		
9:00-10:00	Soil salinity and alkalinity	Dr. M. Bakr
10:00-11:00	Adapting to versus controlling salinity	Dr Usman Awan
11:00-11:30	*Break*	
11:30-12:30	Solutions at farm level, adapting to salinity	Dr Antar Shaban
12:30-13:30	Engineering approach to salt balances – long term estimates of soil salinity in water and soil	Dr Usman Awan
13:30-14:30	*Lunch*	
14:30-15:30	Calculation examples and exercises	Dr. Usman Awan
Day 4: Wednesday 18 Jan: Field Trip to Saltland		
7:00-10:00	Travel to Port-Said	Drs Mahmoud El-Kholy& Atef Swelam
10:00-10:30	Visit East Delta Development Project	
10:30-12:00	Visit farmers' fields	
12:00-13:30	Visit drainage trails plots	
14:30-16:00	Lunch at Port-Said and back to Cairo	
Day 5: Thursday 19 Jan: Module-IV: Drainage Management		
09:00 – 10:00	Drainage for salinity control	Dr. M.H.Amer
10:00-11:00	Re-use of drainage water	Dr. M.H.Amer
11:00-11:30	*Break*	
11:30-12:30	Re-use of drainage water (Case of Iraq)	Dr. M.H.Amer
12:30-13:30	Preparation of presentation on salinity management in Iraq, Sudan, Jordan and Egypt by participants	Facilitated by Dr Atef Swelam
13:30-14:30	*Lunch*	
14:30-15:30	Presentation of salinity management issues in Iraq, Palestine, Jordan and Egypt by participants	Facilitated by Dr Atef Swelam
15:30-16:00	Course evaluation	CDU
16:00-16:30	Closing ceremony and certificates	CDU and JICA

Annex II: General Course Evaluation

Item	Average score %
I. Contents of the course	
Relevance of the course to your job	4.5
Accomplishment of subject matter	4.7
Clarity of course objectives	4.7
Level of lectures	4.5
Time allocated for discussions	3.6
Interaction with participants enrolled in the course	4.1
Overall, how would you rate this course	4.5
II. Schedule and time allocation	
Percentage of Time allocated to lecturers	3.2
Usefulness of lectures	4.3
III. Teaching aids	
Effectiveness of teaching aids in general	4.6
Clarity of slides/overheads/PowerPoint	4.4
Handouts and material	4.1
IV. Administrative arrangement	
Pre-course communication	3.8
Travel arrangements	4.6
Quality of the accommodation	4.0
Payment of allowance on time	4.3
Transportation	4.3
Lecture rooms	4.2

Scale of performance: 1 (lowest) – 5 (highest)

V: Your comments and suggestions on the course

1. **Most important ideas/concepts found in the training course:**

- Raisedbed mechanization
- Soil water plant relationship
- Leaching water is good source of water fumigation
- How to classify soil according to pH, EC…and how to manage

- How to choose the appropriate irrigation system
- Reuse of drainage water
- Fixing the desert soil using drainage water
- Hydrus ID for beginner
- Modern methods of reclamation.
- Knowledge of various soils and optimal use of wastewater
- The best ways to treat and the reason of saltiness.
- Learning from mistakes and problems and how processed in irrigation.
- Methods of treating salinity in Cairo and Iraq
- Technical information about salinity management from other country.

2. **Suggestions for future improvement of the course:**

- Soil and Plant management
- More experiment in salinity management
- Increase the duration of the course
- Increase the time for laboratory and quality issue
- Other topics such as salinity management from fertilizer using and bio systems

3. **Do you recommend this course to be repeated in the future:**

Yes: 100 % No