Technical Report

TRAINING COURSE
ON
Cereal Crops Breeding
18 – 29 April, 2016
Terbol, Lebanon

Organized by
International Center for Agricultural Research in the Dry Areas (ICARDA)
In cooperation with
Lebanese Agricultural Research Institute (LARI)

Under the support of
Japan International Cooperation Agency (JICA)
and
Arab Fund for Economic and Social Development (AFESD)

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EXECUTIVE SUMMARY

Name of the project

Capacity Development for Agriculture for Afghanistan and Regional countries

Partners

Japan International Cooperation Agency (JICA)

Arab Fund for Economic and Social Development (AFESD)

International Center for Agricultural Research in the Dry Areas (ICARDA)

Lebanese Agricultural Research Institute (LARI)

Purpose

To enhance Capacity Development of government officials and researchers who are engaged in agricultural development in Afghanistan and other countries.

Specific objectives of the training course on Seed Health Testing

Up-to-date knowledge and enhanced capacity on best practice for Cereal Crops Breeding.

Specific outputs

Nine professionally-trained National Agricultural Research Systems (NARS) partners from Afghanistan, 3 from Lebanon and 11 from other countries: 2 from Syria, 1 from Iraq, 3 from Egypt, 3 from Sudan, and 2 from Algeria on improving skills for Cereal Crops Breeding with emphasis on dry land agriculture. While 9 Afghanis, 1 Lebanese, 1 Syrian, 1 Sudanese and 1 Iraqi were funded by JICA, the other participants were sponsored by the Arab Fund for Economic and Social Development (AFESD).

Specific outcomes

Design, implement, manage, analyze and report on research and development in cereal crops breeding and acquire up-to-date information on research and practical activities in cereal crops breeding in each participating country.

GENERAL OVERVIEW

The training course on Cereal Crops Breeding was designed to improve capacity of scientists and technicians in National Agricultural Research Systems (NARS) in the partner countries to foster the transfer of technology on cereal crops breeding. The course covered a wide range of science and technology of breeding to adress both classical and molecular approaches of cereals breeding developed by ICARDA that included origin and distribution of cereals, production status of cereals, major production constrainst and challenges, breeding for wide adaptation, breeding for heat and drought tolerance, breeding for resistance to rusts and major insect pests, breeding for better quality and statistical analysis of breeding data.

COURSE METHODOLOGY

The course was implemented through lectures and practical sessions including field and laboratory activities as well as group working sessions and country presentations.

TARGETED AUDIENCE

A total of 23 participants from 7 National Agriculture Research Systems (NARS) countries: 9 from Afghanistan, 3 from Lebanon, 2 from Syria, 1 from Iraq, 3 from Egypt, 3 from Sudan, and 2 from Algeria. While 9 Afghanis, 1 Lebanese, 1 Syrian, 1 Sudanese and 1 Iraqi were funded by JICA, the remaining participants were sponsored through Arab Fund for Economic and Social Development (AFESD).

ORGANIZING COMMITTEE

Mr. Charles Kleinermann, Head, ICARDA Capacity Development Unit (CDU) - (c.kleinermann@cgiar.org)
Dr. Wuletaw Tadesse, Senior Scientist - Spring Bread Wheat Breeder (BIGM) - (w.tadesse@cgiar.org)
Mr. Masafumi Tamura, Technical Training Officer, ICARDA Capacity Development Unit (CDU) – (m.tamura@cgair.org)

COURSE STRUCTURE

The course covered the following topics through lectures and practical sessions. Topics covered included:
- Origin and distribution of Cereals
- Production status of Cereals
- Major production constrainst and challenges
- Cereal breeding objectives and appproaches at ICARDA
- Breeding for wide adaptation
- Breeding for heat and drought tolerance
- Breeding for resistance to rusts and major insect pests
- Breeding for better quality
- Statistical analysis of breeding data

COURSE IMPLEMENTATION

The first day began with a zero (initial) assessment test to examine the background knowledge of the trainees in order to ensure that the level of lecturing, practical sessions, and exercises were adapted to their level of knowledge. It was followed by introductory lectures on **bread wheat breeding** by Dr. Wuletaw Tadesse.

The second day was dedicated to a practical session on **germplasm evaluation and crossing** by Dr. Tadesse and Ms. Sawsan Tawkaz at Terbol station. Dr. Tadesse provided lectures on third day on **breeding for heat and drought stresses** in the morning, and Dr. Alaadin Hamwieh gave lectures on **wheat biotechnology** to introduce molecular markers and its application in plant breeding in general and wheat in particular.

During fourth and fifth day, practical sessions were given by Dr. Hamwieh on the role of **PCR based markers** as applied in **genetic diversity, genetic mapping and QTL analysis and association mapping studies** as well as laboratory activities on **DNA extraction, PCR, electrophoresis, documentation, data collection (scoring), tissue culture and doubled haploid activities**.

The sixth day, Dr. Miguel Sanchez-Garcia provided lectures on **data analysis using R Software and Breeding for adaptation** as a new, powerful, non-proprietary tool for field experiment design and analysis that hundreds of scientists around the world contribute to enlarging the capacities of it. The lessons consisted in basic theory about field experimental designs and selection and an introduction to R software programming and a theoretical and practical lesson on experiment design and analysis using the R software followed by a theoretical lesson on **breeding for adaptation** and a practical lesson on **using R software regarding Genotype by Environment interaction** analysis. Additionally, a new manual developed by ICARDA scientists was presented as a reference text to each trainee.

The 7th and 8th day offered a series of lectures by different ICARDA scientists on **wheat diseases and physiology.** On 9th day, Dr. Ahmed Amri and Dr. Martina Yazbek gave a lectures on **Agrobiodiversity and conservation strategies (in-situ and ex-situ)** that were given into two parts: the main definitions of Biodiversity and Agrobiodiversity and its importance and causes of agrobiodiversity loss and on ex-situ and in-situ conservation and how to complement them.

The last day of the course was dedicated to discussion followed by a final assessment test and general course evaluation.

ZERO - FINAL ASSESSMENT

The participants were given a zero assessment and a final assessment test in order to determine what they knew going into the training course and what they learned as a result of the training course. The results showed that the lowest individual score was 8/20, the highest score was 16/20 and the average group score was 12.5/20 at the zero assessment. The lowest score at the final assessment test was 10/20, the highest 20/20 and the average group score was 17.25/20. The group average gain in knowledge from the zero and final assessment increased by 38%, which is a significant improvement for 2 weeks of training (Please refer to Annex IV: Zero-Final Assessment).

GENERAL COURSE EVALUATION by TRAINEES

At the end of the training cource, each participant provided their feedback on their perception of the effectiveness of the training course format and content.

75% of the participants qualified the course as excellent and 25% qualified it as very good. Participants expressed their interest in giving more time for lectures by extending the course duration, which will also allow more time for discussion and group work.

With respect to the technical level of the topics covered in the training, 66% of the participants considered that the delivered material was very useful.

CONCLUSION

The course provided theoretical and practical guidance to the trainees in cereal breeding and variety development. The participants nominated for the course were of high quality and appeared eager to participate and the mix between lectures and discussions appeared to work well.

The course helped in establishing professional relationships among the participants and facilitating professional interaction and exchange of expertize among them.

The lecturers evaluated the course as successful. However, to improve skills and techniques on cereals breeding for higher agricultural production, more follow-up activities targeting the trainees should be considered. One suggestion was to establish a follow up mentoring program.

Annex I: Course Program

Date	Activity-Discussions-Demonstration	Responsibility
Sun, 17 April	Arrival of participants to Beirut and transportation by ICARDA to hotel in Zahle	ICARDA Terbol office
	WEEK 1	
Mon, 18April	**Venue: Khayyal hotel**	
09:30 – 10:00	Registration	CDU, ICARDA Terbol office
10:00 – 11:00	Opening Ceremony	CDU, ICARDA Terbol office
11:00 – 11:30	Coffee break and Group photo	
11:30 – 12:30	Training course Program Presentation	Dr Wuletaw Tadesse Mr. Charles Kleinermann
12:30 – 13:30	Lunch Break	
13:30 – 14:30	Zero Assessment	Mr. C. Kleinermann/ Dr. W. Tadesse
14:30-17:30	Lecture: Bread Wheat Breeding: Approaches and strategies	Dr. W. Tadesse
Tues, 19April	**Venue: Terbol Station**	
08:00	Bus departure to Terbol	
09:30 – 12:00	Practical: Germplasm evaluation	Dr. W. Tadesse, Ms. Sawsan Tawkaz
12:00 – 13:30	Lunch break	
13:30 – 16:30	Practical: Crossing/DH	Ms. S. Tawkaz
Wed, 20 April	**Venue: Khayyal hotel**	
08:30 – 12:00	Lecture: Breeding for heat and drought stresses	Dr. W. Tadesse
12:00 – 13:30	Lunch break	
13:30 – 15:30	Lecture: Wheat Biotechnology	Dr. Alaadin Hamwieh, Ms. S. Tawkaz
Thur, 21 April	**Venue:Terbol Station**	
08:15	Bus departure to Terbol	
09:30 – 12:00	Practical: Biotech lab	Dr. A. Hamwieh, Ms. S. Tawkaz
12:30 – 13:30	Lunch break	
13:30 – 16:30	Practical: Biotech lab	Dr. A. Hamwieh, Ms. S. Tawkaz
Frid, 22 April	**Venue: Terbol Station**	
08:00	Bus departure to Terbol	
09:30 – 12:00	Practical: Biotech lab	Dr. Hamwieh, Ms. S. Tawkaz
12:30 – 13:30	Lunch break	
13:30 – 16:30	Practical: MAS (marker assisted selection)	Dr. W. Tadesse, Dr. A. Hamwieh
Sat 23, April	Free:	CDU, Terbol office
Sun 24 April	Free :	CDU, Terbol office
	WEEK 2	
Mon 25 April	**Venue: Khayaal hotel**	

08:30 – 12:00	Data analysis using R	Dr. Miguel Sanchez-Garcia
12:00 – 13:30	Lunch break	
13:30 – 16:30	Data analysis using R	Dr. M. Garcia
Tue., 26April	**Venue: Khayyal hotel**	
08:30 – 12:00	Lecture: Wheat diseases	Dr. Kumarse Nazari / Dr. W.Tadesse
12:00 – 13:30	Lunch break	
13:30 – 16:30	lecture	Dr. Machel Baum
Wed., 27 April	**Venue: Khayyal hotel**	
08:30 – 12:00	Lecture/discussion /interaction	Dr. Machel Baum
12:00 – 13:30	Lunch break	
13:30 – 16:30	Wheat Physiology	Dr. Michel Ghanem
Thu, 28, April	**Venue: Khayyal hotel**	
08:30 – 12:00	Wheat genetic resources conservation and pre-breeding	Dr. Ahmed Amri / Dr. Martina Yazbek
12:00 – 13:30	Lunch break	
13:30 – 16:30	Field visit	Dr. A. Amri / Dr. M. Yazbek
Fri, 29 April	**Venue: Khayyal hotel**	
08:30 – 12:00	Wheat data base management	Dr. Mohamed Fawzy Nawar
12:00 – 13:30	Lunch break	
13:30 – 14:30	Participants for **Cereal Crop Breeding**: Evaluation and Closing of Cereal Crop Breeding	CDU Terbol office
13:30 – 16:00	Participants for **Wheat Breeding**: Practical	Dr. M. Nawar
Sat, 30 April	Free	

Annex II: Trainers

Trainers	Name & Surname	Institution	E-mail
1	Dr Wuletaw Tadesse	BIGM- ICARDA	W.tadesse@cgiar.org
2	Ms. Sawsan Tawkaz	BIGM- ICARDA	S.tawkaz@cgiar.org
3	Dr. Alaadin Hamwieh	BIGM- ICARDA	A.hamwieh@cgiar.org
4	Dr. Nourhan Fouad Mahmoud	BIGM- ICARDA	N.Mahmoud@cgiar.org
5	Dr. Miguel Sanchez-Garcia	BIGM- ICARDA	M.Sanchez-Garcia@cgiar.org
6	Dr. Kumarse Nazari	BIGM- ICARDA	K.Nazari@cgiar.org
7	Dr. Michael Baum	BIGM- ICARDA	M.Baum@cgiar.org
8	Dr. Michel Edmond Ghanem	BIGM- ICARDA	M.Ghanem@cgiar.org
9	Dr. Ahmed Amri	BIGM- ICARDA	A.Amri@cgiar.org
10	Dr. Martina Yazbek	BIGM- ICARDA	M.Yazbek@cgiar.org
11	Dr. Mohamed Fawzy Nawar	BIGM- ICARDA	F.Nawar@cgiar.org

Annex III: Trainees List of Contacts
JICA

#	COUNTRY	NAME	INSTITUTION/ POSITION	PHONE	EMAIL
1	Afghanistan	Mr. Sayed Ali Shah Sadat	ARIA/ Researcher	+93-0799730832	Sayedalishah.sadat@gmail.com
2	Afghanistan	Mr. Samiullah Ahmadi	ARIA/ Researcher	+93-700154826	ahmadi.smiollah@yahoo.com
3	Afghanistan	Mr. Abdul Naser Naeimi	Agricultural research center in Heart/ Seed multiplication	+93-797126101	Naser.heart@gmail.com
4	Afghanistan	Mr. Ahmad Shah Ahmadi	ARIA/ Researcher	+93-772153042	Ahmad_shah_ahmadi_11@yahoo.com
5	Afghanistan	Mr. Abdul Ghafoor Azizi	ARIA/ Researcher	+937-00020622	Mansorjan786@yahoo.com
6	Afghanistan	Mr. Mohammadullah Ahmadi	ARIA/ Researcher	+93-770819323	Mohammadullahahmadi4@gmail.com
7	Afghanistan	Mr. Sayed Hasibullah Ahmadi	Agricultural research institute / Plant breeder	+93794503344	Sayed.hasibullah1985@gmail.com
8	Afghanistan	Mr. Mohd Hashim Azmat Yar	ARIA/ Researcher	+93-0700946372	mohdhashimazmatyar@gmail.com
9	Afghanistan	Mr. Noor Ul Haq Hakimi	ICARDA/ Researcher	+937-00601594	noorngr@hotmail.com
10	Syria	Mr. Ahmad Ezalden	Agricultural research center in Hama/ Agricultural engineer	+963-0991101615	Ezalden333@gmail.com
11	Iraq	Mr. Abbas Mezher Alwan	SBSTC/ Agronomist	+964-7906498200	Ab-ab3886@yahoo.com
12	Sudan	Mr. Omer Elsheikh Ahmed Ismail	ARC SUDAN/ WHEAT BREEDER	00249122861761	Wadelsheikh72@yahoo.com
13	Lebanon	Mr. Hani Awad Hellany	LARI/ Researcher	+961-70-879518	Hani_hellany@yahoo.com

AFESD

#	Country	NAME	INSTITUTION/ POSITION	PHONE	EMAIL
14	Sudan	MOHAMED KHEIR HASSAN MOHAMED	ARC SUDAN/ WHEAT BREEDER	00249123047240	KHEIRHASSAN@GMAIL.COM
15	Sudan	Elfadil Mohammed Eltayeb Elbashier	ARC SUDAN/ WHEAT BREEDER	00249121150365	elfadilalbasheer@yahoo.com
16	Algeria	Ms. Oumecheikh Alibenyahia	IT. GC/ Agricultural engineer	+213-781519378	oumecheikhalibenyahia@yahoo.fr
17	Algeria	Mr. Adel BACHIR	IT. GC / Durum wheat breeder	+213-666631762	Bachir-adel@hotmail.com
18	Egypt	Ms. Omnya Mahmoud Ameen El-Moselhy	Research assistant	+20-01000978061	Omnya_mahmoud27@yahoo.com
19	Egypt	Mr. MOHAMED MOUSTAFA MOHAMED YASSIN	ARC / Researcher	+20-01008686637	M_yasen82@yahoo.com
20	Lebanon	Ms. Choghag Demirdjian	ICARDA/ Research student	00961-70-449978	choghag@hotmail.com
21	Syria	Dr. Zainab Abd Alkader Tadbeer	GCSAR/ Researcher	+961-78-911725	Tarek.00000@hotmail.com
22	Egypt	Mousa Shawky Salous Mousa	ARC Egypt / Researcher	+961-70-792122	Mousa_saloud@yahoo.com
23	Lebanon	Mr. Hani Awad Hellany	LARI/ Researcher	+961-70-879518	Hani_hellany@yahoo.com

Annex IV: Zero – Final assessment

JICA

#	Country	Name	Results of zero assessment/20	Results of final assessment/20
1	Afghanistan	Mr. Mohammad hashim	12	19
2	Afghanistan	Mr. Ahmad shah	13	17
3	Afghanistan	Mr. Sayed Hasibullah Ahmadi	15	19
4	Afghanistan	Mr. Zamarai Ahmad Zada	10	15
5	Afghanistan	Mr. Abdul Ghafoor	12	18
6	Afghanistan	Mr. Mohmmadullah	9	14
7	Afghanistan	Mr. Abdul Ghani	13	18
8	Afghanistan	Mr. Abdul Nasir	14	19
9	Afghanistan	Mr. Noorullah Haq Hakimi	10	12
10	Iraq	Mr. Abbas Mezher Alwan	10	12
11	Syria	Mr. Ahmad Ezalden	16	19
12	Lebanon	Mr. Hani Awad Hellany	8	10
13	Sudan	Mr. Omer Elsheikh Ahmed Ismail	10	16
		Average	**11.60**	**16.00**

AFESD

#	Country	Name	Results of zero assessment/20	Results of final assessment/20
14	Algeria	Ms. Oumecheikh Alibenyahia	12	19
15	Algeria	Mr. Adel BACHIR	14	18
16	Sudan	Mr. Mohamed Kheir Hassan Mohamed Ahmed	12	18
17	Egypt	Ms. Omnya Mahmoud Ameen El-Moselhy	13	19
18	Egypt	Mr. MOHAMED MOUSTAFA MOHAMED YASSIN	14	19
19	Lebanon	Ms. Rama Jawad	15	19
20	Sudan	Mr. Elfadil Mohammed Eltayeb	13	19
21	Syria	Dr. Zainab Abd Alkader Tadbeer	11	16
22	Lebanon	Ms. Choghag Demirjian	18	20
23	Egypt	Mr. Mousa Shawky Salous Mousa	12	18
		Average	**13.40**	**18.50**

Average of all participants	**12.50**	**17.25**

Annex V: General Course Evaluation

I.   Contents of the course:

Item/rating/percentage	OVERALL AVERAGE
Relevance of the course to your job 1=Not relevant; 5=Very relevant	4.6
Accomplishment of subject matter 1=Inadequate 5=Very comprehensive	4.6
Clarity of course objectives 1=Not clear; 5=Very clear	4.4
Level of lectures 1=Too basic 5=Too	4.2
Time allocated for discussions 1=Too short 5=Too long	3.6
Interaction with participants enrolled in the course 1=Very low 5=Very high	4.1
Overall, how would you rate this course 1=Poor 5=Excellent	4.8

II.   Schedule and time allocation:

Item/rating/percentage	OVERALL AVERAGE
Percentage of Time allocated to lectures 1=Too short 5=Too long	3.4
Usefulness of Lectures 1=not useful 5=useful	4.6

III.   Teaching aids:

Item/rating/percentage	OVERALL AVERAGE
Effectiveness of teaching aids in general 1=Not effective 5=Very effective	4.6
Clarity of slides/overheads/Powerpoint 1=Not clear 5=Very clear	4.4
Handouts and material 1=Not useful 5=Very useful	4.6

IV.   Administrative arrangements:

Item/rating/percentage 1=NI 5=Excellent	OVERALL AVERAGE
Pre-course communication	4..6
Travel arrangements	4.8
Quality of the accommodation	4.6
Payment of allowance on time	4.2
Transportation	4.7
Lecture rooms	4.8

V.   Your comments and suggestions on the course:

1. Please state the three most important ideas/concepts that you learned from this course
- Basic principles of wheat breeding for heat and draught status
- Extract DNA and PCR
- Application of Marker Assisted Selection (MAS) for wheat breeding
- Breeding strategy and Germplasm evaluation
- Wheat diseases and analysis
- Concept of Biotechnology

2. Suggestions for future improvement of the courses
- The course must be longer
- More group work
- It will be good to be covered physiology in the topics.

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

Yes ☐   No ☐
     100%

End