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# SEED UNIT

Annual Report for 1990



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**A special project  
jointly financed by  
The Government of The Netherlands  
The Government of Germany  
and  
The International Center for Agricultural  
Research in the Dry Areas (ICARDA)  
P.O. Box 5466, Aleppo, Syria**

## CONTENTS

	<b>Page</b>
<b>1. Introduction</b>	1
<b>2. Training of Regional Seed Production Staff</b>	2
2.1. Regular Headquarter Courses	5
2.2. In-country Training Courses	7
2.3. Individual Trainees	8
2.4. M.Sc. Training	8
<b>3. Building up Seed Production Infrastructure</b>	8
3.1. Roundtable Discussions	8
3.2. Visits	9
3.3. Seed Survey	9
3.4. Follow-up Post-control Plots in Egypt	10
3.5. Assistance in Morphological Varietal Descriptions	10
<b>4. Seed Multiplication Activities</b>	12
4.1. Pre-release Multiplication	12
4.2. Production	12
4.3. Processing	13
4.4. Distribution	13
<b>5. The Seed Testing Laboratory</b>	13
<b>6. The Seed Cleaning Laboratory</b>	15
<b>7. Research</b>	16
<b>8. Publications</b>	16
<b>9. Personnel, Consultants, Visitors, Conferences</b>	17

## 1. INTRODUCTION

A special project "Development of National Seed Production Organizations in West Asia and North Africa" is funded by the Governments of the Netherlands and the Federal Republic of Germany to strengthen seed programs in West Asia and North Africa. The first phase (July 1985 to July 1988) has been successfully concluded and the second phase (July 1988 to July 1991) is being implemented. The overall objective of the project is to strengthen the national seed production organizations in West Asia and North Africa.

Because renewal of funding for the Seed Unit is due in 1991, Seed Unit staff has been assessing the future direction of the project. It was felt that the Unit should continue the regular activities including training, infrastructure development, dissemination of information, and production of limited quantities of quality seed for distribution to the countries of the region. Additional efforts will be devoted to seed health and morphological varietal description, and more attention will be paid to food legume, pasture and forage crops. More region-related seed technology research will be carried out.

New approaches for 1991 and beyond are: (1) a shift towards alternative seed production systems, (2) a shift towards the private seed production sector, and (3) the economic analyses of seed programs and seed program components.

Alternative Systems: The shift towards alternative seed systems is made because such seed systems can complement national seed production organizations. In the coming years the number of varieties and the demand for high-quality seed will significantly increase because vigorous breeding programs are executed at the national and international level and more farmers will realize the benefits of the use of quality seed. Public seed production organizations alone will most likely not be able to cope with this increase. Even nowadays they are often not able to produce the necessary quantities nor the required quality. Therefore, in the future, large areas will still be planted with seed produced by the farmers themselves. Alternative systems are systems whereby farmers produce seed for themselves or for neighbors. Both systems (formal and alternative) are needed, and the one cannot substitute for the other. The formal system produces, releases, and distributes the new varieties to the farming communities. The alternative systems ensure that resource-poor, low-income farmers also benefit from public and private developments. The Unit intends to increase the awareness of such aspects of seed programs through training, and organizing national and sub-regional workshops.

Private Seed Sector: Experience in developed countries and

many developing countries has shown that the private seed sector can play a significant role in national seed production and distribution activities. The Unit will emphasize young emerging private seed sector initiatives and will (1) train private sector seed staff in its regional, sub-regional and in-country training courses, (2) encourage private sector participation in other project activities, and (3) disseminate seed production information to private seed enterprises.

The Unit will attempt to increase the awareness of the important role that the private seed sector can play in producing and supplying quality seed.

Economics of Seed Programs and Seed Program Components: In many cases seed programs or individual seed program components are implemented or strengthened without carrying out financial and economic analyses. Such information is essential when deciding on seed program development activities. The Unit plans to calculate the economic, financial, and social rate of return of seed programs and individual seed program components.

## **2. TRAINING OF REGIONAL SEED PRODUCTION STAFF**

Training courses are essential to develop well trained staff to operate the seed program. Table 1 and 2 summarize the number of regional seed production staff that has been trained since 1982. Table 1 presents a summary of training participants per country and Table 2 per organization. Since the initiation of the seed activities in ICARDA in 1985, annually more than 90 seed production staff, from 24 countries, were trained. The majority of training participants originated from national seed production organizations and from national agricultural research systems. The number of trainees from research systems may seem high, but in many countries no separate seed production organization exists.

Some highlights of the 1990 training efforts:

- A series of regional courses have been developed (Table 3). Responsibility to conduct some of these courses will be shared with the Seed Technology Unit of the University of Jordan in Amman.
- The regional course on Morphological Variety Description and varietal Maintenance is being reorganized as an international course to be jointly organized with the

Table 1: Seed production personnel (by country) trained in ICARDA's seed courses.

Country	Number trained					Total
	1982- 1985	1985- 1987	1988	1989	1990	
Afghanistan	1	1	-	-	-	2
Algeria	1	3	-	9	11	24
Cyprus	-	-	-	1	1	2
Egypt	3	34	46	30	13	126
Ethiopia	-	6	25	1	2	34
India	1	-	-	-	-	1
Iran	4	1	-	-	2	7
Iraq	-	2	-	-	-	2
Jordan	7	2	-	4	5	18
Kuwait	-	-	-	1	1	2
Lebanon	1	-	-	3	3	7
Libya	-	1	-	-	5	6
Morocco	5	2	-	11	6	24
Oman	-	-	-	-	2	2
Pakistan	-	-	-	1	-	1
Saudi Arabia	-	2	-	-	-	2
Somalia	2	1	-	-	-	3
Sudan	2	0	-	2	3	15
Syria	6	24	3	6	15	54
Tunisia	2	3	-	5	3	13
Turkey	-	-	-	1	1	2
Yemen (North)	-	2	23	4	-	29
Yemen (South)	2	3	-	2	19	26
Republic of Yemen	-	-	-	-	3	3
Uganda	-	-	-	-	1	1
ICARDA (GRU)	-	-	-	2	1	3
<b>Total</b>	<b>37</b>	<b>95</b>	<b>97</b>	<b>82</b>	<b>97</b>	<b>409</b>

International Agricultural Center (IAC) in Wageningen, the Netherlands. The course will be organized in 1991 in Holland at IAC, in 1992 at ICARDA, and in 1993 somewhere in the ICARDA region. Nor ICARDA, neither IAC will sponsor participants to the course. Participants are expected to be supported financially through project fellowships, UN agencies, other multilateral, and bilateral donors.

- Roundtable discussions in Egypt during 1989 resulted in a comprehensive procedure and a set of standards for wheat field inspection. The different organizations (CAS, ARC, GTZ, MSU and ICARDA) involved in improving the Egyptian seed program decided in 1989 to train trainers in wheat field inspection methodology. The course was successfully held in 1990. The trained staff is expected to conduct their own courses in 1991 and beyond.

Table 2: Seed production staff of different organizations trained in ICARDA's seed courses.

Organization	Number trained				
	up to 1985	1985-1987	1988	1989	1990
NARCs	19	21	22	27	35
IARCs	2	3	1	2	1
NSPOs	16	67	74	53	61
SCs	-	4	1	-	-
<b>Total</b>	<b>37</b>	<b>95</b>	<b>97</b>	<b>83</b>	<b>97</b>

NARC= National Agricultural Research Center  
 IARC= International Agricultural Research Center  
 NSPO= National Seed Production Organization  
 SC = Seed Company

Table 3: Regional seed training courses scheduled

Name	1991	1992	1993	1994
Seed Certification	(X)	(X)	(X)	X
Seed Testing	(X)	(X)	(X)	(X)
Seed Processing	X	(X)	(X)	(X)
Morph. Var. Description	X	X	(X)	(X)
Seed Health Testing	X	X	X	(X)
Legume Seed Production		X	X	(X)
Pasture and Forage Crops Seed Production			X	X
Alternative Seed Systems			X	X
Farmer' and Seed Grower' Seed Production			X	X

X Courses will be conducted at ICARDA Headquarters  
 (X) Courses will be conducted in the Seed Technology Unit  
 of the University of Jordan in Amman.

- Curricula for several courses have been finalized i.e. general curricula (General Seed Technology, General Legume Seed Production, General Cereal Seed Production) and specialized curricula (Seed Processing and Storage, Morphological Variety Description and Variety Maintenance, Seed Quality Control, Seed Testing, Seed Certification, Field Inspection for Legume Diseases, Seed Health Testing).
- The Unit initiated in 1990 its first Long Term Group Training. Two staff member from the Syrian Seed Organization participated. In 1991 participation from Ethiopia, Yemen, Egypt, and Syria is anticipated.
- With regard to individual training the Unit started training a group of seed and research staff on morphological varietal description. Participants from Jordan (1), Egypt (2) and Syria (2), will come to ICARDA for a period of 3 months (November 1990 and April-May 1991) and carry out planting and morphological description of all cereal varieties used in their own country.

Courses conducted in 1990 are presented in Annex I and are shortly described below. During 1990 no additional training manuals have been developed; individual training of seed production staff from the region in the Unit's facilities continued.

### **2.1. Regular Headquarter Courses**

Seed Certification: The regular headquarter course on Seed Certification was held at ICARDA from 11-19 April. Eleven participants attended; one each from Algeria, Egypt, Ethiopia, Libya and Morocco, and six from Syria. This was the first course in which the methodology, worked out by a Roundtable discussion of seed experts, was used as the basis for field inspection. The methodology was practical and will also be used as the basis for proposals on field inspection for countries in the region.

Morphological Variety Description and Varietal Maintenance: The objective of the course was to train participants in morphological variety description and variety maintenance techniques. Cereals, food legumes, pasture and forage crops were discussed. The course was held at ICARDA Headquarter from May 6-17. FAO partly sponsored the course. The number of participants was 19, coming from 11 different countries (Republic of Yemen, Iran, Egypt, Lebanon, Oman, Syria, Sudan, Morocco, Tunisia, Libya, and Jordan).

## ANNEX I: Seed Unit's training courses in 1990

Name	Location	Date	No of Participants (a)
<b>A. Regular/Regional Courses</b>			
1. Seed Certification	ICARDA, Aleppo	12/04 - 19/04	8(11)
2. Morphological Variety Description & Maintenance	ICARDA, Aleppo	06/05 - 17/05	15(19)
3. Seed Processing & Storage	ICARDA, Aleppo	19/06 - 28/06	11(19)
4. Seed Testing	Amman, Jordan	16/10 - 29/10	16
<b>B. Sub-Regional Courses</b>			
5. Field Inspection of Food Legume Diseases	Algeria	30/04 - 03/05	15
<b>C. In-Country Courses</b>			
6. Wheat Seed Production Technology	Seiyun, PDRY	19/01 - 01/02	19
7. Wheat Field Inspection Methodology	Sakha, Egypt	21/04 - 24/04	7
<b>D. Individual Trainees</b>			
8. Cereal Seed Production	ICARDA, Aleppo	01/04 - 28/06	1
9. Legume Seed Production	ICARDA, Aleppo	01/04 - 28/06	1
10. Seed Processing	ICARDA, Aleppo	03/05 - 25/07	1
11. Seed Processing	ICARDA, Aleppo	19/06 - 19/08	2
12. General Seed Production	ICARDA, Aleppo	3 x 2 weeks	1

(a) Figures in brackets show total number if individual trainees are included.

Seed Processing and Seed Storage: From June 19-28 a course on Seed Processing and Seed Storage was organized at ICARDA Headquarter. Objective of the course was to train participants in seed processing and related topics. It was the second specialized course on this topic and the large and small seed cleaning machines have been extensively used; emphasis was placed on practical aspects. A total of 17 participants attended the course: Syria (7), Yemen (1), Egypt (2), Lebanon (1), Libya (1), Morocco (1), Cyprus (1), Ethiopia (1), and Kuwait (1). Also one staff member from ICARDA's Genetic Resources Unit attended the course.

Seed Testing Techniques Training: A Seed Testing Techniques Course was held from October 16-29 in Amman, Jordan. The objective of the course was to train participants in routine seed testing techniques. Considerable time was devoted to

seed quality control measures and seed-testing related topics. The number of participants was 16, coming from 9 different countries (Yemen, Egypt, Lebanon, Syria, Turkey, Sudan, Uganda, Algeria, and Jordan). Initially this regional course was planned at ICARDA Headquarters, but to assist the recently established Seed Technology Unit of the University of Jordan, in initiating training activities, the course was 'exported' to Amman.

## 2.2. In-country Training courses

Wheat Seed Production, Seyun, Republic of Yemen: The in-country Wheat Seed Production Course was organized jointly with the National Seed Multiplication Center (NSMC) of the Republic of Yemen. The course was held in the Seyun Branch of the NSMC from January 19 to February 1. Nineteen participants attended the course; 6 participants were working with NSMC, 2 at the Research Center in Seyun, 6 in the Extension Service, and 5 at State Farms were improved seed is produced.

'Training the Trainers' in Wheat Field Inspection Methodology, Sids, Egypt: The Egyptian in-country Wheat Field Inspection Methodology course was a 'Training the Trainers' type of course and was organized in cooperation with the Central Administration for Seeds (CAS), Agricultural Research Center (ARC), German Agency for Technical Cooperation (GTZ), and National Agricultural Research Project (NARP). The course was held from April 21-24. Because it was a 'Training the Trainers' course only few participants, carefully selected, attended the course; 1 each from Behera, Beni Sueif and Dakalia and 2 each from Giza and Kafr El Sheikh governorate. The course content was based on the Field Inspection Manual recently developed for Egyptian seed program.

Field Inspection for Food Legume Disease in Seed Multiplication, Algeria: From April 30 to May 3 ICARDA's Legume Program, GRU (Seed Health Laboratory), and the Seed Unit organized a sub-regional (North Africa) course on "Field Inspection for Food Legume Diseases in Seed Multiplication". It was the first time that this course was conducted; emphasis was on disease recognition in seed production fields and field inspection methodology for diseases. The number of lectures was limited, but several visits were made to varietal maintenance plots, Basic Seed, Certified Seed, and farmers fields of chickpea, lentil, and faba bean. Fifteen participants attended the course: 1 from Libya, 3 from Morocco, 2 from Tunisia, and 9 from Algeria. In addition, 7 Algerian scientists attended lectures and participated in the field trips.

### **2.3. Individual Trainees**

During 1990 the following 11 individual trainees have been trained in the Unit's facilities (totalling 12):

- 3 individual trainees were trained in seed processing. One trainee from the Republic of Yemen stayed with the Unit for 3 months, the other two (from Syria) for two months.
- 1 Syrian trainee stayed with the Seed Unit for 3 times two weeks to be trained in a number of specialized topics.
- One trainee from ICARDA's Cereal Program was trained in seed testing techniques for a period of two weeks.
- In November two participants from Egypt, two from Syria, and one from Jordan started their 3 months training period in morphological variety descriptions. The trainees come to ICARDA for a period of 3 man-months (November 1990 and April-May 1991) and carry out planting and morphological description of all varieties used in their respective countries.
- A staff member from Central Laboratory, ARC, Tripoli, Libya -working in seed purity and seed germination- stayed in the Unit's facilities for 4 days to be trained in seed testing.

### **2.4. M.Sc. Training**

The Unit is supporting the senior research assistant of the project in obtaining his M.Sc. degree. Course work at the Cucurova University in Adana was successfully completed and the research project has been started up. The research project studies the building up of resistance in storage insects against the fumigant phostoxin, which is a matter of great concern. No alternative fumigants are available if storage insects will develop resistance.

## **3. BUILDING UP SEED PRODUCTION INFRASTRUCTURE**

### **3.1. Roundtable Discussions**

Roundtable discussions are meetings with a few subject matter specialists; they emphasize one aspect of the seed program. During 1990 no roundtable discussions have been organized, but as a result of 1989 Roundtable discussions, three Ministerial Decrees were published in Egypt on: (1) Field Inspection, (2) Morphological Variety Description, and (3) Post-control plots.

### 3.2. Visits

Several visits to the countries of the region have been made. The most important ones are described below:

Ethiopia: A strong cooperation between the Ethiopian Seed Corporation (ESC) and ICARDA is emerging. Following activities are planned in Ethiopia: (1) a course on practical field inspection, (2) a roundtable to develop uniform field inspection procedures, and (3) a seed survey to establish the quality of the seed.

ILCA: ICARDA's Seed Unit will closely cooperate with the Seed Unit at the International Livestock Center for Africa (ILCA) in the field of pasture and forage crops seed activities.

Jordan: Cooperation with the University of Jordan in Amman has been initiated and is expected to grow in the future.

The Seed Technology of the University of Jordan and ICARDA's Seed Unit will share responsibility for the regional Seed Certification Course and the regional Seed Testing course. Furthermore an In-country Legume Seed Production Course will be organized and a seed survey carried out.

Egypt: The strong cooperation with Egypt will continue; new activities are: (1) organization of a Seed Processing Plant Maintenance Course, (2) roundtable discussions on Lot Numbering System, and on Legume Seed Production.

Sudan: Cooperation with Sudan is initiated; an in-country training course and roundtable discussion on Foundation and Breeder Seed Production will be organized.

Yemen: Planned activities include: an in-country course on seed certification and roundtable discussions to initiate post-control plots and to improve wheat field inspection techniques.

### 3.3. Seed Survey

Seed surveys are carried out to assess the quality of seed used for planting and to identify problems at farmers' level and will be used as a management guide to rectify existing practices. Surveys will be used to obtain an impression of (a) the adoption of Certified Seed by farmers, (b) the replenishment rate, (c) the quality of seed used for planting, and (d) the presence and distribution of seed-borne diseases. In 1990, jointly with the German/Jordan Seed Multiplication Project and the National Center for Agricultural Research and Transfer of Technology (NCARTT) a survey was initiated in Jordan. The seed survey will focus on

wheat and be carried out in two consecutive years. The samples will be collected by staff of NCARTT and quality tests will be carried out in the Seed Technology Unit of the University of Jordan. Two M.Sc. student from the university will be working on the samples to assess seed quality.

#### **3.4. Follow-up Post-control Plots in Egypt**

Post-control plots (plots planted with seed taken from seed lots that were approved in the previous season) were again planted in Egypt and are becoming an integral part of the seed quality control system. In 1990 the plots were planted at two sites, Sakha in the Delta and Sids in the Nile Valley.

#### **3.5. Assistance in Morphological Varietal Descriptions**

The project carries out experiments, aimed at producing morphological descriptions of wheat, barley, lentil, and chickpea varieties. In 1990 23 barley and 56 wheat varieties were included in this experiment. Unfortunately the experiment for chickpea and lentil had to be discarded due to a mistake upon planting. Annex II presents the description of a number of cereal varieties; an example is given of a two row barley, a six row barley, a durum wheat, and a bread wheat. Descriptions of several other varieties are available.

Crop	Wheat	Barley
1987	Preliminary	
1988	20	20
1989	45	17
1990	56	23
No of characteristics scored	32	31

ANNEX II: Examples of morphological descriptions of  
cereal varieties

**Name of Variety: OMRABI 9 (Durum Wheat)**

**PLANT**

-anthocyanin coloration coleoptile	
-growth habit	:not uniform
-anthocyanin coloration of auricles of flag leaf	:semi erect to erect
-time of ear emergence	:very weak (not uniform)
-glaucosity of sheath of flag leaf	:early (not uniform)
-glaucosity of leaf blade of flag leaf	:medium (not uniform)
-plant height	:medium (not uniform)
-cross section straw	:tall
-glaucosity of neck	:not uniform
-hairiness of uppermost node	:medium to strong
	:weak

**EAR**

-glaucosity	:medium
-color	:white
-shape	:tapering
-density	:very dense
-distribution awns	:whole length

**LOWER GLUME**

-shoulder width	:narrow
-shoulder shape	:rounded
-beak length	:very short
-beak shape	:straight

**GRAIN**

-color	:(reddish)
-shape	:not uniform
-brush hair	:very short
-coloration with phenol	:2-3

#### **4. SEED MULTIPLICATION ACTIVITIES**

##### **4.1. Pre-release Multiplication**

Jointly with GOSM in Syria a system of pre-release multiplication was initiated; quality seed of three varieties (Nesser, bread wheat; Lahn, durum wheat; Rihane 03, barley) which will most likely be released in the near future was produced, jointly with the Syrian Seed Multiplication Organization (GOSM), on one hectare each. Yields were excellent and the seed will be further multiplied with cooperative farmers. The variety release committee is expected to meet yearly and it is anticipated that at least one of these varieties will be released.

##### **4.2 Production**

For wheat and barley the complete generation system (Breeder Seed, Pre-basic Seed, Basic Seed) has now been implemented and seed produced through this system is available for distribution. Regarding legumes the Basic Seed production stage has been reached for chickpea, but quantities are limited due to harsh environmental conditions. For lentil the generation system will have to be restarted because of crop failure due to harsh environmental conditions and disease stress. The Unit still produces a special class of seed called "Quality Seed" (seed produced according to official multiplication practices, but not directly derived, through one or more generations, from Breeder Seed).

The quantities of Breeder Seed, Pre-basic Seed, Basic Seed, and Quality Seed produced in 1990 are indicated in Table 4. In total 20.7 tonnes of seed was produced, compared to 31.5 and 80.5 tonnes in 1989 and 1988 respectively. The main constraint was low rainfall. The 80.5 tonnes were produced in a 500-mm year, while 1989 and 1990 only had a rainfall of approximately 230 mm.

Breeder Seed was produced of 23 varieties (1 variety of bread wheat, 3 varieties of durum wheat, 6 varieties of barley, and of 13 species of annual medic). Pre-basic Seed was produced of 44 varieties (8 bread wheat, 11 durum wheat, 18 barley varieties, 2 chickpea and, 5 -species- of medic), totaling 8.7 tonnes.

A total of 4.3 tonnes of Basic Seed and 7.4 tonnes of Quality Seed was produced for distribution to seed and research organizations in the countries of the region.

Table 4: Quantities (tonnes) of seed harvested per multiplication category since 1987.

	1987		1988		1989		1990	
	No of vars	Prod	No of vars	Prod	No of vars	Prod	No of vars	Prod
Breeder Seed	-	-	25	1540 kg	25	413 kg	23	280 kg
Pre-basic Seed	-	-	-	-	24	6.1	44	8.7
Basic Seed	-	-	-	-	-	-	16	4.3
Quality Seed	27	31.7	43	79.0	41	25.0	37	7.4
Total		31.7		80.5		31.5		20.7

### 4.3. Processing

Table 5 gives an overview of the important role the seed processing plant plays in the activities of the Seed Unit. A total of 208 tonnes of seed has been cleaned this year i.e. 20.8 tonnes of seed produced by the Unit, 79 tonnes as a service to ICARDA's commodity programs, and 108 tonnes for the Syrian Seed Multiplication Organization (GOSM).

The number of different crops cleaned has also been expanded and include wheat, barley, chickpea, lentil, vetch, lathyrus, pea, medic, and oat.

### 4.4. Distribution

Table 6 presents the data on distribution of seed. Not only the Basic Seed and Quality Seed produced during this season, but also carry over seed of last year is included in the Table. Breeder Seed and Pre-basic Seed are not included, because this seed is not meant for distribution, but used to produce the next generation. Of the 31.4 tonnes available for distribution 14.8 tonne was distributed to ICARDA's mandate countries, 7.9 tonne for research purposes, and both the Seed Unit and the ICARDA's farm used one tonne for their next year's plantings.

## 5. THE SEED TESTING LABORATORY

The Unit's seed testing laboratory was as in preceding years extensively used. During 1990 36% more seed quality tests

Table 5: Seed processed as a service to commodity programs since 1988.

	1988	1989	1990
A) Seed Production Unit	80.6	31.5	20.8
Wheat	36.2	13.2	7.9
Barley	32.5	15.9	7.0
Lentil	1.1	0.2	0.4
Chickpea	7.8	1.8	3.1
Medic	3.0	0.4	2.5
B) Service to PRGs	52.3	38.9	78.8
CIP	-	1.6	5.8
PFLP	10.5	6.5	16.7
FLIP	3.1	4.3	1.8
FRMP	16.2	20.1	25.5
Station Operation	21.6	6.4	29.0
Others	0.9	-	-
C) Service to GOSM	-	-	108.3
<b>TOTAL</b>	<b>132.9</b>	<b>70.4</b>	<b>207.9</b>

Table 6: Seed Distribution in 1990.

	Carry-over Seed	Seed produced	Total	Distribution			Remaining
				Region	Research Seed Unit	ICARDA Farm	
Durum wheat	3 670	1 900	5 570	2 875	1 065	55	1 575
Bread wheat	6 125	2 300	8 425	5 280	1 465	70	1 610
Barley	9 845	2 300	12 145	6 560	2 580	150 1 040	1 815
Chickpea	0	3 100	3 100		850	600 40	1 610
Lentil	0	350	350		100	200	50
Medic	0	1 800	1 800		1 800		
<b>Total</b>	<b>19 640</b>	<b>11 750</b>	<b>31 390</b>	<b>14 715</b>	<b>7 860</b>	<b>1 075 1 080</b>	<b>6 660</b>

(Table 7) were conducted than in 1989. Tests conducted were: 149 physical purity tests, 531 germination tests, 178 varietal purity tests, 178 moisture tests, 21 vigor tests, and 802 1000-grain weight test.

Table 7: Number of samples tested in the seed testing laboratory

	1985	1986	1987	1988	1989	1990	Total
Physical purity	160	200	434	158	283	149	1384
Germination	160	200	468	290	822	531	2471
Var. purity	120	160	424	304	165	178	1351
Moisture	40	50	26	8	148	178	450
Vigor						21	21
Seed weight						802	802
<b>Total</b>	<b>480</b>	<b>610</b>	<b>1352</b>	<b>760</b>	<b>1418</b>	<b>1934</b>	<b>6554</b>
‡ per Activity							
	100	100	7	13	27	3	Training
	-	-	13	8	8	8	Pre-planting
	-	-	12	13	29	21	Post Harvesting
	-	-	1	17	17	18	Monitoring
	-	-	81	26	-	9	Seed Survey
	-	-	-	18	19	41	Other

## 6. THE SEED CLEANING LABORATORY

The seed cleaning laboratory became operative in the middle of the year and has been extensively used as a service to ICARDA commodity programs. Since the majority of training activities are carried out during the first six months of the year, the seed cleaning laboratory is expected to be used extensively for that purpose in 1991. The equipment in the laboratory includes: air-screen cleaners (separate air-screen cleaner and a Mini Petkus with attached indented cylinder), separate indented cylinder, gravity table, brushing machine, magnetic separator, belt grader, de-awner, spiral separator, aspirators, and a velvet roll.

The following activities were carried out in the laboratory:

- GRU cleaned 6200 samples of Triticum (using the aspirator and the indented cylinder) and 2800 samples of Hordeum (using the de-awner, aspirator, and indented cylinder).
- Cereal Program (CP) cleaned on the Mini Petkus, 2267 samples of barley.
- Farm Resource Management Program (FRMP) used the Mini Petkus to clean 20 samples of wheat.
- Pasture, Forage and Livestock Program (PFLP) cleaned 19 samples of medics, using the brushing machine, indented cylinder, and the gravity table.

All these activities are supervised by SU staff.

## 7. RESEARCH

In the past hardly any research was carried out by the Seed Unit, but in 1989/90 the first experiments were initiated and cooperative research started. Results will be presented in the next Annual Report of the Unit.

1) In the 1989/90 season seed weight, germination and seed vigor was assessed of seeds grown under different management levels. Two varieties (Sham 1 and Sham 4), which were grown under six water levels (rainfed, 20% of water balance up to 100% of water balance) and four nitrogen levels (0 Kg/ha, 50 Kg/ha, 100 Kg/ha, and 150 Kg/ha) were studied. To study the effects of these management levels in the next generation, seeds were sown in a triple 7x7 lattice at four different location. Most important characters scored were initial seedling growth, plant population, and yield.

2) A similar experiment was planted for lentils where 4 genotypes (ILL 5582, ILL 6004, ILL 4401, and ILL 4400), 3 water levels (less than 200 mm, 220-260 mm, more than 300 mm) and one location was used.

3) As part of an M.Sc. study, the phosphine resistance in Rhizopertha dominica in different storage facilities of Northern Syria is being studied. The objective of this study is to investigate the presence, extent and cause for fumigant resistance in Rhizopertha dominica, which infests wheat and barley in storage facilities. Moreover, the study seeks to provide insight into the effects of poor fumigation practices on the build up of resistance against a commonly used fumigant (phosphine).

4) With the Agricultural Research Station in Tamil Nadu, India, and the Seed Technology Unit, ARC, Egypt cooperative research is being discussed. With the Tamil Nadu research station research aimed at establishing suitable standards for chickpea seed production is discussed, while the research with the Seed Technology Unit at ARC in Cairo is aimed at obtaining an insight in seed renewal rates.

## 8. PUBLICATIONS

Goma'a A.S., Gregg, B., Homeyer, B. and van Gastel, A.J.G.  
1990. Development oriented seed policy: Towards establishing a supportive long-range national seed policy. NARP Publication 37, October 1990, Cairo, Egypt.

Gregg, B., van Gastel, A.J.G., Homeyer, B., Holm, K., Goma'a, A.S., Salah Wanis, M., Ghanam, E.H., Abdel Monem, A., Gouda, A. and Shehata, O. 1990. Procedures for inspecting wheat seed fields. NARP Publication 39, October 1990, Cairo, Egypt.

Gregg, B., van Gastel, A.J.G., Homeyer, B., Holm, K., Goma'a, A.S. and Salah Wanis, M. 1990. Roguing seed production fields. A manual of procedures to help ensure uniformly high seed quality and reduce seed production costs. NARP Publication 40, October 1990, Cairo, Egypt.

Seed Unit 1990. Field inspection manual, Egypt. ICARDA, Aleppo, Syria.

van Gastel, A.J.G. and Bishaw Z. 1990. ICARDA's efforts to strengthen seed programs in West Asia and North Africa. Paper presented in the International Conference on Seed Science and Technology, February 21-25, New Delhi, India.

## 9. PERSONNEL, CONSULTANTS, VISITORS, CONFERENCES

### Seed Project Personnel

Dr. A.J.G. van Gastel	Senior seed production specialist
Mr. Zwedie Bishaw	Seed production specialist
Mr. Abdul Aziz Niane	Senior research technician
Mrs. Maha Kabbani	Secretary
Mr. Ghazi Jabri	Research technician
Mr. Saed Hayyani	Research Technician (left in January)
Mr. Naim Azrak	Research technician (since May)

### Consultants

Ir. H. Koster	Centre for Variety Research and Seed Technology, Wageningen Holland (May '90)
Mr. Thomas Edholm	KAMAS Seed Processing Company, Sweden (June '90)
Mr. Nihad Istifari	Establishment for Cereal Trade, Aleppo, Syria (June '90)
Dr. Ahmed Abu El Tassim	Director General National Seed Administration, Khartoum, Sudan. (October '90)
Dr. Serpil Konosor	Entomologist, Cukurova University Adana, Turkey (November '90)

### Visitors

Mr. Salah Abd El Wanis	Central Administration for Seed Cairo, Egypt.
Mr. Bob Howell	Team Leader GTZ Seed Project, Amman, Jordan

### Conference Attended

International Conference on Seed Science and Technology  
February 21-24, 1990, New Delhi, India.

**Name of Variety: NESSER (Bread Wheat)****PLANT**

-anthocyanin coloration	
coleoptile:abs or v weak	
-growth habit	:semi erect to intermediate
-anthocyanin coloration of	
auricles of flag leaf	:abs or v weak
-time of ear emergence	:medium/v late
-glaucosity of sheath of	
flag leaf:medium	
-glaucosity of leaf blade of	
flag leaf	:weak
-plant height	:short
-cross section straw	:thin
-glaucosity of neck	:medium
-hairiness of uppermost node	:medium (not uniform)

**EAR**

-anthocyanin coloration of	
anthers	:absent
-glaucosity	:medium to strong
-color	:white
-shape	:not uniform
-density	:medium to lax
-distribution awns	:whole length

**LOWER GLUME**

-shoulder width	:narrow to medium
-shoulder shape	:sloping
-beak length	:medium
-beak shape	:straight
-internal imprint	:small/large

**GRAIN**

-color	:(reddish)
-shape	:ovoid to rounded
-brush hair	:short/long
-coloration with phenol	:5-7

**Name of Variety: EMIR/APM (Two Row Barley)****PLANT**

-growth habit	:semi prostrate
-Lower leave sheath hairiness	:absent
-anthocyanin coloration of auricles of flag leave	:very strong
-glaucosity of sheath of flag leave	:medium to strong
-height	:medium (not uniform)

**EAR**

-time of ear emergence	:early to medium
-glaucosity	:medium
-number of rows	:two
-shape	:parallel
-density	:dense

**AWN**

-length	:equal to longer
-spiculation of margins	:(strong)

**RACHIS**

-length of first segment	:medium
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**STERILE SPIKELET**

-attitude	:divergent
-length of lemma	:long
-shape of tip	:pointed

**MEDIAN SPIKELET**

-length of glume and awn relative to grain	:shorter to equal
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**GRAIN**

-rachilla hair type	:long
-spiculation of inner lateral nerves of lemma	:absent or very weak

**Name of Variety: RIHANE 03 (Six Row Earley)****PLANT**

-growth habit	:intermediate
-Lower leave sheath hairiness	:absent
-anthocyanin coloration of auricles of flag leave	:v weak to weak
-glaucosity of sheath of flag leave	:strong
-height	:tall

**EAR**

-time of ear emergence	:medium
-glaucosity	:medium (not uniform)
-attitude	:erect to semi erect
-number of rows	:six
-shape	:tapering
-density	:very dense

**AWN**

-length	:longer
-spiculation of margins	:strong

**RACHIS**

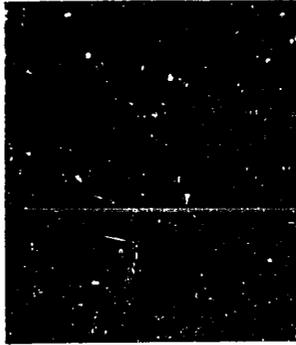
-length of first segment	:short
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**MEDIAN SPIKELET**

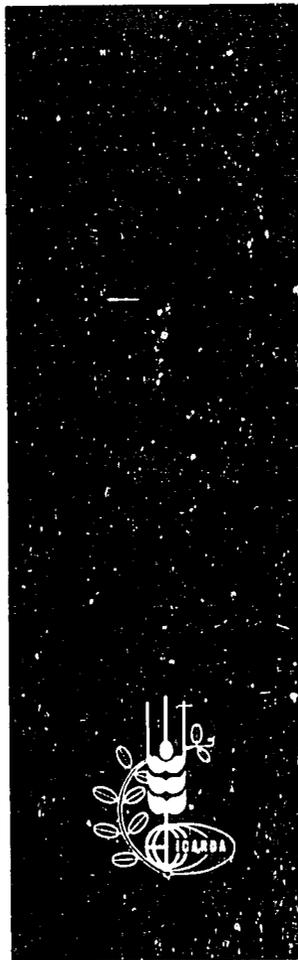
-length of glume and awn relative to grain	:equal
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**GRAIN**

-rachilla hair type	:short
-spiculation of inner lateral nerves of lemma	:strong (not uniform)



# ICARDA'S SEED UNIT



**A Joint Special Project  
of the Governments of the  
Netherlands and Germany**

**and the**

**International Center for  
Agricultural Research  
in the Dry Areas**

## *Introduction*

**T**he International Center for Agricultural Research in the Dry Areas (ICARDA) was established in 1977 to conduct research and training that assists the countries of West Asia and North Africa (WANA) to enhance their agricultural production. The Center's main objective is to improve agriculture in areas that receive limited rainfall. ICARDA works primarily with barley, wheat, chickpea, lentil and pasture and forage crops.

The commodity programs supply germplasm to the national agricultural research programs for development of improved varieties. But high quality seed often does not reach the farming community because of weak seed production and distribution programs. Although sizeable quantities of wheat seed are produced, there is hardly any improved seed of barley, legumes, and pasture and forage crops available in the region. The lack of quality seed of improved varieties at the farmer's level remains an important constraint to increased productivity.

The seed production situation in West Asia and North Africa can be summarized as follows:

- Large areas of arable land are still sown with traditional or local landraces.
- Variety evaluation procedures often hamper release of superior varieties.
- Maintenance of released varieties is often not properly carried out.
- Seed production is limited by lack of trained manpower and facilities.
- Quality control systems are often absent or inadequate.
- Seed prices are obscure and do not stimulate further seed program development.
- Distribution of seed is often inadequate and seed extension non-existent.
- There has been little private initiative.

A major effort should be undertaken to alleviate this situation and improve the agricultural sector. International organizations such as ICARDA can play a catalytic role to strengthen national seed systems.

### *ICARDA'S Seed Unit*

ICARDA's Seed Unit was initiated in 1985 as a special project through the generous financial support of the Governments of the Netherlands and Germany, with an overall objective to strengthen national seed production capabilities in West Asia and North Africa. The project has established a seed center at ICARDA with seed processing, testing, storage and production facilities for human resource development.

The Unit is one of ICARDA's support units and is widely recognized as a center in WANA where seed production problems are addressed and practical seed technology courses taught.



### *Objectives*

The Seed Unit's main objective is to enhance the national seed production capability in the countries of West Asia and North Africa. The Unit is responsible for:

1. Training seed production staff;
2. Strengthening seed production infrastructure;
3. Producing limited quantities of high quality cereal, legume, and pasture and forage crops seed for distribution to national seed programs;
4. Disseminating information and developing training manuals;
5. Conducting region-related seed technology research.

All activities are designed to provide information on cereals, legumes, and pasture and forage crops.

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## *Seed Production Training Opportunities*

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### **Individual Training**

The Unit can receive throughout the year individuals for training in general seed production and/or specialized subjects of particular interest to the national seed programs. The training objectives are achieved through lectures, fieldwork, discussions, and assigned research projects.

General individual training is intended to expose participants to different aspects of seed production and related topics. Participants are involved in theoretical and practical aspects of seed production, seed processing, seed storage and seed quality control, as well as morphological variety description, variety maintenance and post-control plots. Participants usually remain at ICARDA for three to four months.

Specialized individual training is designed to train individual seed production staff in specific topics relevant to their specialization or work, such as morphological variety description, variety maintenance, seed processing, control plots, seed testing, seed health, maintenance of seed processing plants, etc. Individuals usually stay at ICARDA for a period ranging from two weeks to several months.

### **Specialized Short Courses**

Specialized courses are organized annually at ICARDA or in Jordan in cooperation with the University of Jordan. The following courses, aimed to satisfy the training needs of seed production staff in the region, are scheduled periodically:



- (1) General Seed Technology, (2) Legume Seed Production, (3) Cereal Seed Production, (4) Seed Processing and Storage, (5) Morphological Variety Description and Maintenance, (6) Seed Quality Control, (7) Seed Certification, (8) Seed Testing, (9) Seed Health Testing, (10) Field Inspection of Legume Diseases, (11) Pasture and Forage Seed Production, (12) Maintenance of Seed Processing Equipment, and (13) Alternative Seed Systems.

### **In-country Training**

At the request of the national seed programs or research programs, the Unit organizes in-country courses. Such courses usually last one to two weeks, depending on the topics covered.

### **Training Manuals**

The Unit has developed several training manuals which are distributed free of charge to seed production and research staff in WANA. Several audiotutorials, videos and slide series on seed production topics are planned.

## *Strengthening Seed Production Infrastructure*

The seed production infrastructure in the countries of the region requires strengthening. The Unit helps to develop this infrastructure through (1) workshops, (2) roundtable discussions, (3) consultancies, (4) assistance in morphological variety description, (5) distribution of quality seed, and (6) seed surveys.

### **Specialized National Workshops**

At the request of national seed or research organizations, the Unit can organize specialized national workshops on different seed program topics designed to: (1) review the current seed production situation, (2) identify major constraints, and (3) offer recommendations. The objective is to make policy makers, agriculturists, and seed production staff aware of the problems and develop practical solutions.

### **Roundtable Discussions**

Roundtable discussions are meetings where specialists address specific problems. The specialists discuss the issue and draw up final recommendations. Usually an action plan is prepared and implementation of the recommendations monitored. Such discussions have proven to be efficient and effective in strengthening seed production infrastructure.

### **Morphological Variety Description**

The morphological description of released varieties is often overlooked during the variety development process. The Unit assists national programs with morphological variety description.



### **Seed Multiplication**

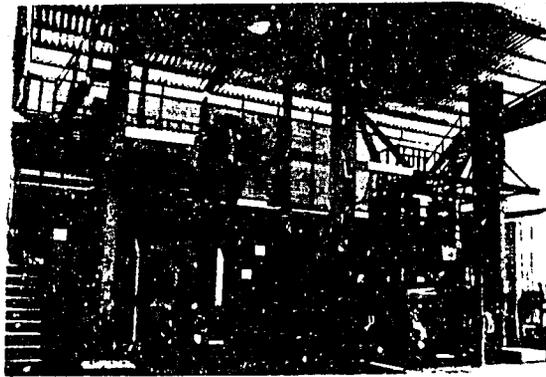
Limited quantities of wheat, barley, chickpea, and lentil are produced annually for distribution to the region for research and seed multiplication purposes.

### **Seed Surveys**

Seed surveys are an excellent tool to identify the seed quality problems experienced by the farmer. They increase awareness of the importance of high quality seed, and the results can be used to improve the seed programs. The unit participates in seed surveys in several countries of WANA.

## *Region-related Seed Technology Research*

The Unit conducts region-related seed technology research at ICARDA and has cooperative research projects with seed production research organizations in WANA. Research topics are: a) influence of environmental conditions and crop management in the region on the quality of seed produced, b) the status of resistance against fumigants in storage pests in the region, c) the need for seed renewal in developing countries, and d) adequate levels of seed quality standards for developing countries.



## *Seed Production Facilities at ICARDA*

ICARDA has improved its capabilities for training by installing seed production facilities at its main station. A small seed processing plant has been installed and a laboratory each for seed testing, seed production and seed cleaning have been equipped. Seed storage facilities and seed production fields are also available.