

Focus on Seed Programs

The Seed Industry in Iraq

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Introduction

Iraq is an important primary and secondary center of domestication for many crops such as wheat, barley, lentil, chickpea and medics. The country has a great potential for agricultural development with a total area of 44 million ha, of which 11 million ha is estimated to be arable land. About 22% of the population, estimated at 23 million in 1997 is involved in agriculture.

At present approximately 2.8 million ha is rainfed and is classified into three different zones based on annual rainfall: (a) > 450 mm/year (0.1 million ha); (b) 250-450 mm/year (0.7 million ha); and (c) 200-250 mm/year (2 million ha). The rainfed area is planted with wheat, barley and food legumes.

The irrigated area is approximately 2.1 million ha which is allocated as shown below to winter and summer crops (Table

1).

Table 1. Area allocation of irrigated lands

Cropping period	Area in ha ('000)
Winter crops	
Cereals	1, 100
Vegetables & Forages	600
Fruit production	40
Summer crops	
Rice	110
Maize	140
Vegetables and Forages	230

About 6.1 million ha of agricultural land is affected by salt particularly in irrigated areas.

Cereal production occupies about 95% of the arable land. Area under cultivation and production of major crops are shown in Tables 2 and 3, respectively.

Table 2. Area cultivated (ha) with major crops during 1990-1995 ('000)

Crop	1990	1991	1992	1993	1994	1995
Wheat	1,996	2,517	1,677	2,013	1,806	1,535
Barley	1,995	2,412	2,012	2,314	1,535	1,389
Rice	79	86	95	110	163	175
Maize	77	118	141	160	70	75
Total	4,147	5,133	3,925	4,597	3,574	3,174

Source: FAO, 1995

Although, there is great potential, the country imports 3.8 million tonnes of grain per year which accounts for 89% of total national requirement of about 4.2 million tonnes. The economic embargo since 1990 has severely affected import of agricultural products. The Government strongly supports production of food crops such as wheat, barley, rice, etc. The effort to expand agricultural production is supported through provision of inputs, particularly seed, fertilizers, machinery and implements. The Government also encourages domestic production by paying higher prices for locally produced commodities.

Table 3. Cereal production (tonnes) during 1990-1995 ('000)

Crop	1990	1991	1992	1993	1994	1995
Wheat	1196	1477	1006	1187	1342	1236
Barley	1854	768	1509	1562	971	892
Rice	228	189	180	206	383	315
Maize	173	236	260	280	128	90
Total	3451	2670	2955	3235	2824	2533

Source: FAO, 1995

National Seed Policy

In Iraq, the importance of seed was recognized as early as 1927 when legislation was issued to encourage the use of improved seed for cotton. A major development in the seed sector happened in 1968 when the Government established seed production farms and promoted seed certification activities. In the same year, the FAO project on seed production and

certification was started. This was followed by the five-year plan (1969-1974) aimed at production of improved seeds of wheat, barley, rice, maize, cotton and other crops. Since 1975 there is a national law and regulations for variety testing, release and registration.

In 1990, the Government endorsed a national seed program to streamline and strengthen the seed sector recognizing the role of seed as one of the least expensive,

but most productive inputs in increasing crop production. In 1995, it set up a National Seed Board (NSB) which is chaired by the Minister of Agriculture to advise the Government on seed issues. The Board develops policy guidelines and monitors its implementation by agricultural research institutions such as the IPA Agricultural Research Center, the State Board for Agricultural Research (SBAR), Agricultural and Biological Research Center (ABRC), Rabii Agricultural Research Center and Agricultural Colleges as well as seed production and marketing companies. These institutions succeeded in establishing and strengthening agricultural research, seed production and supply in the country.

Agricultural Research and Crop Improvement

The Government gives priority to the agricultural sector to meet self-sufficiency in food production. As a result, there is strong support to agricultural research and several institutions are involved in research and variety development. The agricultural research institutes are responsible for variety development, evaluation and maintenance as well as Breeder Seed production.

Variety Development

Agricultural research and variety development is the domain of the public sector and focuses on strategic crops mainly cereals and legumes. The IPA Agricultural Research Center (IPARC) is responsible for variety development of crops such as cereals (barley, wheat, rice, maize), food legumes (lentil, chickpea, faba bean) and industrial crops (peanut, soybean, sunflower). The State Board for Agricultural Research (SBARC) is responsible for cereals, vegetables and cotton. The Agricultural and

Biological Research Center (ABRC) also develop varieties of cereals and industrial crops. The agricultural colleges play a lesser role in variety development and at present there is no private plant breeding in the country.

There are two breeding strategies for developing new varieties. The short-term goal focuses on introduction and screening nurseries to select and evaluate genotypes that are adapted to the climatic conditions of the country. Introductions are made from international agricultural research centers such as ICARDA, CIMMYT and ICRISAT or from other regional institutes or through exchange with NARS from the region (Cyprus, Jordan, Syria and Yemen).

The long-term plan is to develop and handle segregating populations to identify early or advanced generations for local adaptation. The Agricultural and Biological Research Center use mutation-breeding techniques to develop new varieties.

Each agricultural research center has stations representing different agro-ecological regions to conduct the breeding and selection programs. They evaluate segregating materials, pure lines or varieties in observation trials for 1 to 2 years based on maturity groups for yield and yield components, resistance to major pests and quality characters. After observation trials, the yield trials are conducted for 2-3 years to identify promising materials in 2-3 stations. Promising lines will be further tested in on-farm trials using farmer's management practices.

Variety Release and Registration

Variety registration and release is the responsibility of the National Committee for Registration and Release of Agricultural

Varieties (NCRRAV) which is chaired by the Deputy Minister of Agriculture.

The Committee was established in 1992 under Ministerial Decree No. 9; it has the force of law and set the terms and conditions for variety registration and release. The Committee is composed of representatives of agricultural research institutes, the certification agency, agricultural colleges and the Ministry of Agriculture. Candidate varieties are evaluated based on the technical reports submitted by the breeders.

The procedures for variety registration and release mechanism are as follows:

Prior to registration and release, breeders should submit the description and agronomic performance of the variety. The report should also include the performance of the variety under farmers' conditions compared with local checks. Agronomic characters such as time to flowering and maturity, yield and yield components, resistance to major diseases and insect pests and quality characters are the main criteria for evaluation.

When submitting the report to the NCRRAV, breeders should plant the variety on an area not less than 1 ha in at least three locations in the target region and one or more locations in farmers' fields.

The NCRRAV appoints a technical committee composed of breeders, agronomists and pathologists from the research institutes and universities to evaluate the new variety. The committee at least visits these variety trials twice before submitting a final report to the NCRRAV. According to this report the variety would either be accepted for registration and

release or rejected.

The number of varieties released during the last seven years by agricultural research centers is given in Table 4.

Table 4. Number of varieties released in Iraq ('1991-98)

Crop	Number of Varieties
Wheat	24
Barley	16
Rice	4
Triticale	1
Maize	9
Sorghum	1
Chickpea	1
Lentil	2
Soya bean	1
Phaseolus bean	1
Sunflower	5
Safflower	1
Linseed	1
Sesame	3
Rape seed	1
Vegetables	43
Cotton	1
Tobacco	1
Fruit trees	3
Total	119

Variety Maintenance

Variety maintenance including parental materials for hybrids is carried by the agricultural research center such as the IPA Agricultural Research Center, the Seed Technology Center of the Agricultural and Biological Research Center.

Seed Production

Cereal seed supply is a major goal in the national program. The total national cereal seed demand for wheat, barley, rice and maize is estimated to be over 300,000 tonnes per year (Table 5). The formal sector is anticipated to supply 25% of this requirement for self-pollinated crops. At present, however, the formal sector provides only 10% of the national seed demand. About 90% of seed for planting is used from farm saved seed. There

are problems arising from planting low quality seed including poor germination, high weed infestation and deterioration in varietal purity.

The agricultural research centers are responsible for production of Breeder and Foundation Seed. The Iraqi Company for Seed Production (ICSP) and Mesopotamia Seed Company (MSC), are parastatal companies responsible for large-scale commercial production of later generations (Tables 6 and 7).

Table 5. Area cultivated (ha) and amount of seed required (tonnes) for major crops in 1995

Crop	Area in ha ('000)	Seed rate kg/ha	Seed required ('000)	25% renewal ('000)
Wheat	1,535	100	154	38
Barley	1,389	100	139	35
Rice	175	120	21	5
Maize	75	32	2	1
Total	3,174		316	79

Registered, Certified and Commercial Seed are produced through contract growers who are selected by the State Board for Seed Testing and Certification (SBSTC) in collaboration with the seed producing companies. Seed growers and fields are selected based on specific criteria to ensure proper agronomic practices such as crop rotation, isolation, etc. Seed growers who do not conform to the regulations of the certification agency are cancelled from contract seed production. At present, three agricultural research centers, three companies and about 1500 growers are primarily involved in production of various seed classes nation wide.

Some seed companies import seed from abroad for further multiplication and

distribution in the country.

Seed Processing and Storage

The Iraqi Company for Seed Production, Mesopotamia Seed Company and Seed Technology Center are responsible for seed processing. There are 17 seed processing centers distributed throughout the major seed production areas of the country (Table 8). In addition, there is one cotton delinting plant.

Cereal seed is cleaned, treated and packaged in 50kg polypropylene or gunny bags for distribution.

The storage facilities are located at the seed processing centers and are also used as the main distribution points.

Table 6. Seed production of major crops during 1990/91-1995/96

Crop	Seed class	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96
Wheat	Foundation	423	74.8	117.5	159	182	315
	Registered	215	-	-	120	342	727
	Certified	19380	30503	17649	11452	14322	11411
Barley	Foundation	74.1	113	58	112.7	109	24
	Registered	-	-	-	468.4	60	49
	Certified	1300	196	848.6	-	278	152
Rice	Foundation	76.0	17.7	22.3	49	35.8	NA
	Registered	60	-	-	-	1156	NA
	Certified	858	6000	5551	4490.7	13986	NA
Maize	Foundation	20	10	16	19.5	52.25	NA
	Registered	120	103	1.31	832.4	556.5	NA
	Certified	1860	1786	996	739.7	1300	NA

Table 7. Wheat and barley seed production (tonnes) during 1996/97 - 1998/99 ('000)†

Organization	1996/97			Total	1997/98			Total	1997/99			Total
	F	R	C		F	R	C		F	R	C	
IPA-ARC	305	797	467	1568	211	44	34	289	136	36	-	172
Seed Technology Center	323	194	1067	1584	602	-	-	602	561	1435	-	1996
Mesopotamia Seed Company	83	14	3854	3952	79	2297	9385	11761	-	312	3241	3553
Iraqi Seed Company	142	448	14998	15588	14	4711	19349	24074	66	2684	22904	25654
Total	853	1453	20386	22692	906	7052	28768	36726	763	4467	26145	31375

NB: † F, R and C are Foundation, Registered and Certified Seed, respectively

Table 8. Available seed processing facilities in Iraq

Location Seed Companies

	Mesopotamia Seed Company	Iraqi Seed Company	Seed Technology Center
Al-Taamim	1	1	-
Baghdad	2	1	1
El-Khadisya	1	1	-
Misan	-	1	-
Mosul	4	1	-
Salah Eddine	-	-	1
Wasit	1	2	-
Total	9	7	2

Seed Marketing and Distribution

Seed marketing and distribution are centrally planned and coordinated by the National Seed Board. In Iraq only certified seed can be officially marketed.

The Agricultural Supply Company (ASC) coordinates the marketing and distribution of vegetable seed produced by local research centers.

Seed prices are based on cost of production and a profit margin. The price paid to the contract growers is based on the grain price and a premium of 50-100% for Foundation, 35-75% for Registered, 25-50% for Certified and 10-25% for Commercial Seed. There is an additional incentive for seed with 97% purity and low moisture content for cereals. Farmers can get credit which is available from the Agriculture Credit Bank to buy agricultural inputs including seed.

Seed Import and Export

The SBSTC is responsible to coordinate the import, marketing and distribution of vegetable seed imported from abroad. The varieties imported should be tested in Iraq and released according to Decree No 9 of 1991. Moreover, the seed must meet minimum quality standard (germination) as recommended by Act No. 83 of 1974 and free of diseases. In Iraq, about 90% of the total vegetable seed need is imported by the Agricultural Supply Company (20%) and the private sector (80%). The seed import is supervised and controlled by the State Board for Seed Testing and Certifications. The guidelines for seed import are as follows:

- seed should not be imported or offered for sale without proper phytosanitary certificates
- seed must be tested and certified before

distribution

- import is allowed only for varieties approved for cultivation in the country

The SBSTC has launched an intensive campaign to enforce these guidelines among the seed traders.

During the past five years, Iraq exported alfalfa and clover seed and imported sunflower and vegetable seed. The quantity of vegetable seed imported during 1998 was about 200 tonnes, mainly of tomato, cucumber, pepper, eggplant and watermelon.

Seed Quality Control

Seed quality control was started from 1962 and the seed testing laboratory was affiliated to ISTA in 1975. In 1994, the government established the State Board for Seed Testing and Certification (SBSTC) as an autonomous organization authorized for seed quality control and certification. It has four regional branches in Khadisyah, Nineveh, Salah Eddine and Wasit provinces. They operate seed quality control within the provinces and have seed testing facilities. The certification scheme covers wheat, barley, rice, maize, sorghum, lentil, chickpea, potato and tomato.

There are four classes for seed production of self-pollinated crops: Breeder, Foundation, Registered and Certified Seed. For cross-pollinated the multiplication has three generations only.

All seed crops are subjected to field inspection by SBSTC (Tables 9 and 10). Seed production fields are inspected 3 times i.e. twice during the growing period and once at full maturity. The field inspectors also supervise the seed harvesting and delivery operations at the processing plants.

Table 9. Area of seed crop inspected in 1998 crop season

Crop	Area inspected (ha)	Area Accepted High grade	Commercial
Wheat & Barley	168892	92063	-
Rice	7289	6382	-
Maize	13261	12486	-
Chickpea	100	100	-
Lentil	502	502	-
Cotton	11839	795	10724
Tomato	2537	-	2523
Potato	7536	6906	-

The seed is sampled by inspectors and submitted to the SBSTC laboratories for quality tests including physical purity,

germination, moisture content and seed health (Table 11). Sampling and testing are carried out according to ISTA rules.

Table 10. Number of seed samples tested in 1998

Seed quality test	Number of tests
Purity	30,439
Number count	4,788
Seed weight	36
Moisture content	25,747
Germination	3,792
Health	11,166
Total	75,968

Constraints in the Seed Sector

There are several constraints hindering the development of the national seed sector. These constraints are evident

in agricultural research, variety development, evaluation and release; seed production, processing, marketing and distribution; and seed quality control. They are of technical, regulatory and policy nature

as described below.

Variety improvement

- Inadequate variety evaluation/testing system (VCU)
- Lack of appropriate DUS testing system
- Inadequate variety maintenance procedures to produce good quality Breeder Seed
- Low adoption of new varieties by farmers

Seed Production

- lack of research to address seed technology related problems
- low participation of private companies in seed sector, particularly in vegetables

Seed Processing

- Technical/operational problems in managing seed plants leading to variety mixtures during processing
- Lack of appropriate seed storage facilities

Seed Marketing

- Fixed seed prices limiting options to operate based on market forces
- Large quantity of unsold stock due to high seed prices as a result of high production costs
- Heavy losses by seed companies leading to subsidies from the state
- Inappropriate credit policies for farmers to borrow and purchase inputs
- Less uptake of seed by farmers due to high prices

Seed Quality Control

- Lack of lot numbering systems and post control tests to maintain seed quality

- Lack of facilities and expertise for testing seed-borne viruses
- Lack of up-to-date seed legislation conforming to international regulations

Recommendations for the Seed Sector

In principle, all the basic components of a seed program exist in Iraq. However, some components are better developed than others and are contributing to the progress of the seed industry.

The following recommendations are useful to improve the ability of the seed sector to supply farmers with quality seed of improved varieties.

Variety Maintenance

- Initiate proper variety maintenance procedures and joint inspection by SBSTC and breeders

Seed Production

- Upgrade the knowledge of technical staff working in the seed companies
- Improve selection of contract growers and supervision during seed production and harvesting
- Encourage companies to enter vegetable seed production and, if possible, cooperate with international seed companies

Seed Processing

- Ensure adequate maintenance of existing seed plants and establish new plants where necessary
- Upgrade the knowledge of technicians and introduce proper management to avoid variety mixtures during processing
- Enhance the internal quality control of

seed plants through the assistance of SBSTC

Seed Marketing

- Allow seed companies to set seed price based on market forces and establish their own distribution network
- Establish enough sale points to bring seed within mobility zone of farmers
- Promote use of new varieties and quality

seed using the media

- Encourage use of certified seed for farmers to adopt higher seed renewal rates

Informal Seed Sector

- Provide seed cleaning and treatment services by mobile cleaners for farmers using retained seed



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