Focus on Seed Programs
The Seed Industry in Iran

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Introduction

Iran is situated between 25˚ to 40˚N latitudes and between 44˚ to 63˚E longitudes. It has a total area of 165 million ha and at present only 20 million ha is under cultivation. From the total arable land 12.5 million ha is under cultivation each year.

The topography is dominated by two mountain ranges which meet in the most northerly part of the country enclosing a plateau in the central and eastern part of the country with two coastal strips bordering the Caspian Sea and Persian Gulf on the northern and southern edges of the country, respectively.

Iran has three distinct agro-ecological zones: humid, semi-arid and arid regions. The humid region has an average annual rainfall of over 700mm within Caspian littoral, the eastern Caspian plains and along the western and central regions of Zagros Mountains.

The semi-arid region has an annual rainfall of 250 to 700mm, mostly falling from October to April. Cereal or legume monoculture based on fallow/rotation dominates agricultural production.

The arid region has an annual rainfall of less than 250 mm. Crop production is possible only under irrigated condition.

The main agricultural areas lie in northern Iran from Azerbaijan province in the west to Khorasan province in the east, where most of the principal agricultural crops are produced. The diverse climatic condition of the country is suitable to produce a wide range of agricultural and horticultural crops. The area, production and yield of major crops are given in Table 1.

Agriculture contributes 20% to gross domestic product and 80% of the national food requirement is produced locally. In 2002, 25% of the total population of 67 million people is employed in agriculture.

Agricultural Research Policy

In 1975, the Agricultural and Natural Resources Research Organization was established as a central agency to formulate policies, develop strategies, prioritize and coordinate the activities of agricultural research institutes. The organization played an important role in providing appropriate policies to increase production of agricultural and horticultural crops in the country.

Table 1. Area, production and yield of main crops in Iran in 2000 crop season

Crops	Area in ha ('000)			Production in tonnes ('000)			Yield (tonnes/ha)	
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed
Cereals								
Wheat	2253.8	2485.2	4739.1	7200.6	1472.6	8673.2	3.2	0.6
Barley	596.0	807.0	1403.0	1579.1	419.9	1999.0	2.6	0.5
Rice	587.2	-	587.2	2348.2	-	2348.2	4.0	-
Maize	186.1	0.3	186.4	1154.5	1.1	1155.7	6.2	3.7
Sub-total	3623.0	3292.6	6915.6	12282.5	1893.6	14176.0	3.4	0.6
Legumes								
Chickpea	18.3	556.2	574.6	19.5	145.1	164.6	1.1	0.3
Beans	105.3	9.4	114.6	175.2	7.6	182.7	1.7	0.8
Lentil	15.2	183.4	198.6	14.1	48.6	62.7	0.9	0.3
Others	34.3	12.8	47.1	39.4	21.7	61.2	1.1	1.7
Sub-total	173.1	761.7	934.9	248.2	223.0	471.2	1.4	0.3
Industrial crops								
Cotton	193.3	22.7	216.0	420.6	20.2	440.8	2.2	0.9
Tobacco	10.1	13.0	23.1	11.3	11.0	22.3	1.1	0.8
Sugar beet	186.0	-	186.0	5548.3	-	5548.3	29.8	-
Oilseeds	139.2	98.0	237.3	192.1	79.0	271.1	1.4	0.8
Sugarcane	25.9	-	25.9	2234.0	1.9	2235.9	86.3	-
Sub-total	554.5	133.7	688.3	8406.3	112.1	8518.4	15.2	0.8
Vegetables								
Potato	157.4	3.5	160.8	3403.9	29.2	3433.1	21.6	8.3
Onion	53.7	2.1	55.8	1652.8	24.1	1676.9	30.8	11.5
Tomato	125.3	3.2	128.5	3445.3	45.1	3490.5	27.5	14.1
Water melon	79.5	23.0	102.5	2033.7	145.0	2178.7	25.6	6.3
Cucumber	79.6	0.7	80.3	1357.4	10.0	1367.4	17.4	14.3
Others	144.6	82.7	227.3	2632.4	597.7	3230.1	18.1	7.2
Sub-total	640.1	115.2	755.3	14525.5	851.1	15376.6	22.7	7.4
Forages								
Alfalfa	545.3	20.8	596.1	3936.9	92.0	4028.9	7.2	1.8
Others	183.8	75.6	259.4	7683.8	1135.2	8819.0	41.8	15.0
Sub-total	729.1	96.4	855.5	11620.7	1227.2	12847.9	15.9	12.7
Total	**5719.9**	**4399.6**	**10119.5**	**47083.1**	**4307**	**51390.1**	**8.2**	**1.0**

In the 1990s agricultural research organizations have been restructured to improve their performance. In 1990, the forest, range and animal sciences research institutes were transferred from the Ministry of Agriculture and joined the Ministry of Jahad Construction. Meanwhile in 1993, the Agricultural Research Organization was merged with the Directorates of Agricultural Education and Extension leading to the formation of the new institute responsible to coordinate research at the national level, the Agricultural Research, Education and Extension Organization under the Ministry of Agriculture.

The Ministry of Jahad-e-Agriculture was established in 2000, following the merger of the Ministry of Jahad Construction and the Ministry of Agriculture. Subsequently the agricultural research institutes under both ministries were transferred to Agricultural Research, Education and Extension Organization. In 2002, agricultural extension was separated from Agricultural Research, Education and Extension Organization.

In each province, agricultural research centers were also established to coordinate the activities of different branches of each research institute and to implement an integrated and multi- disciplinary research

at a provincial level. The organization of the Iran seed industry is given in Figure 1.

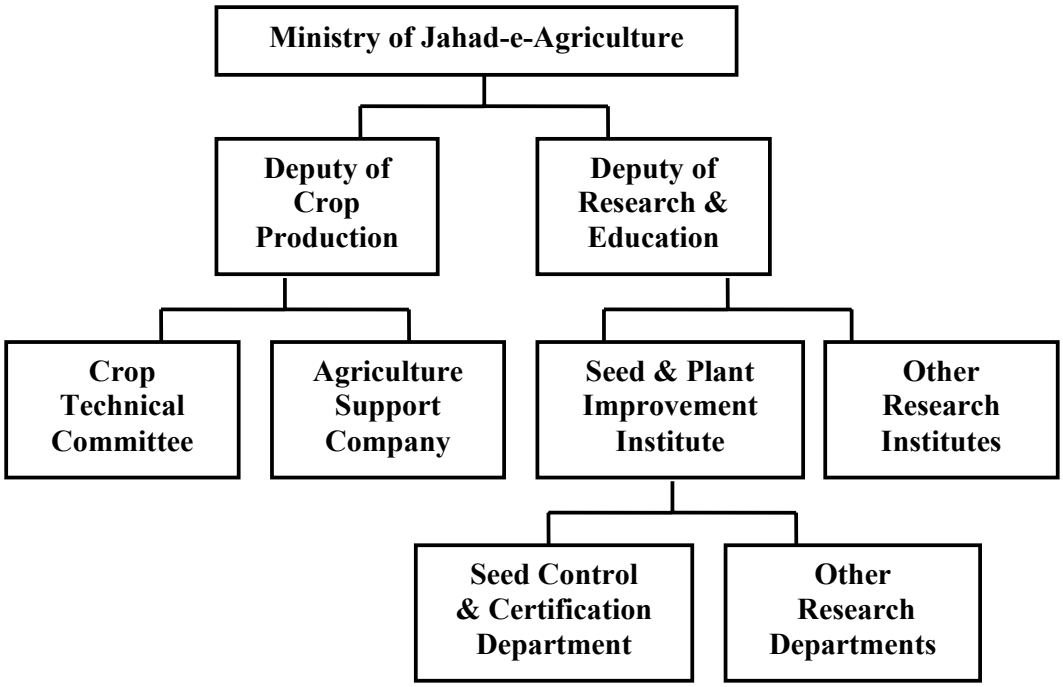

Figure 1. The organization of seed industry in Iran

National Seed Policy and Seed Legislations

A comprehensive national seed law has been drafted by a Seed Committee drawn from relevant departments of the Ministry of Jahad-e-Agriculture and submitted to the Parliament for sanction. The Parliament and the Agriculture Commission of the Parliament have deliberated and approved the seed law pending final ratification. It is expected that the new seed law will be enacted by the Parliament in 2003. The seed law will cover all issues related to varieties and seeds including variety release and registration, plant variety protection and seed quality control and certification.

The import and export of seed is regulated by three organizations. The Economic Bureau of the Ministry of Jahad-e-Agriculture determines the quantity of seed imported every year. The Plant Protection Organization of the Plant Pests and Diseases Research Institute is responsible for quarantine of imported seed. The Seed Control and Certification Department of the Seed and Plant Improvement Institute is responsible for the quality of imported seed. Seed traders require the permission of the Plant Protection Organization and the Seed Control and Certification Department to import seed.

The Plant Protection Regulation No 22037 issued in 1966 forms the legal basis for quarantine law in the country. The Plant Protection Organization of the Plant Pests and Diseases Research Institute is responsible to enforce the quarantine law.

Agricultural Research and Crop Improvement

Agricultural research and crop improvement started as early as 1930s with the establishment of Sugar Beet Research Institute in Karaj (1933) and the Iran Tobacco Center in Tirtash (1937). In 1959, the Seed and Plant Improvement Institute was established to conduct research on major food crops such as cereals, rice, oilseed, cotton, horticultural and forage crops. Later on commodity research institutes were established and become responsible for agricultural research and variety development of the mandate crops.

At present the Agricultural Research and Education Organization administers an extensive network of agricultural research institutes working on different crops and agroecological regions. These include 12 semi-autonomous agricultural research institutes, which are commodity, multidisciplinary, or farming system-oriented and linked to a network of 30 regional or provincial agricultural research centers.

The main agricultural research institutes affiliated to Agricultural Research and Education Organization include:

- Seed and Plant Improvement Institute
- Dryland Agricultural Research Institute
- Rice Research Institute
- Cotton Research institute
- Sugar beet Seed Institute
- Citrus Research Institute
- Date Palm and Tropical Fruits Research Institute
- Pistachio Research Institute
- Plant Pests and Disease Research Institute
- Soil and Water Research Institute
- Razi Institute
- Range and Forestry Research Institute
- Fishery Research Institute
- Agriculture Engineering Research Institute
- Agricultural Biotechnology Research Institute

In addition, agricultural research is also carried out by various organizations affiliated to the Ministry of Jahad-e-Agriculture and colleges of agricultural sciences.

Variety Development and Evaluation

The Seed and Plant Improvement Institute is the largest agricultural research institute with the main mandate for improvement of strategic agricultural, horticultural and industrial crops. These crops include cereals, food legumes, oilseeds, forages and vegetables. Apart from basic research and crop improvement, SPII continue to play a major role in seed production and seed quality control and certification in the country. SPII has eight departments and at present employs 320 PhD and MSc level professional research staff and more than 400 technical staff.

The Sugar Beet Seed Institute was set up in 1988 replacing the Sugar Agency (established in 1940) and is responsible to develop varieties suitable for different sugar beet growing agroecological zones of the country. It is responsible for research in sugar beet breeding, agronomy, beet technology, biotechnology and seed technology in collaboration with national and international research organizations and/or seed companies. The institute employs 290 staff including 11 PhD, 36 MSc, 29 BSc and other technical staff.

Like wise the Rice Research Institute and the Cotton Research Institute are also responsible for the improvement of rice and cotton crops, respectively. The Dryland Agriculture Research Institute is responsible to develop crop varieties suitable for rainfed areas of the country.

Most commodity or multidisciplinary agricultural research institutes implement the crop improvement program through: (a) use of local landraces and selecting best genotypes; (b) introduction and evaluation of new crop varieties adapted to various agroclimatic conditions of the country; (c) breeding and development of new cultivars using local and foreign germplasm; and (d) seed production of released crop varieties. The major breeding objectives include early maturity, tolerance to biotic or abiotic stresses such as salinity and drought. Figure 2 shows variety development, evaluation, release and registration procedures of cereal crops.

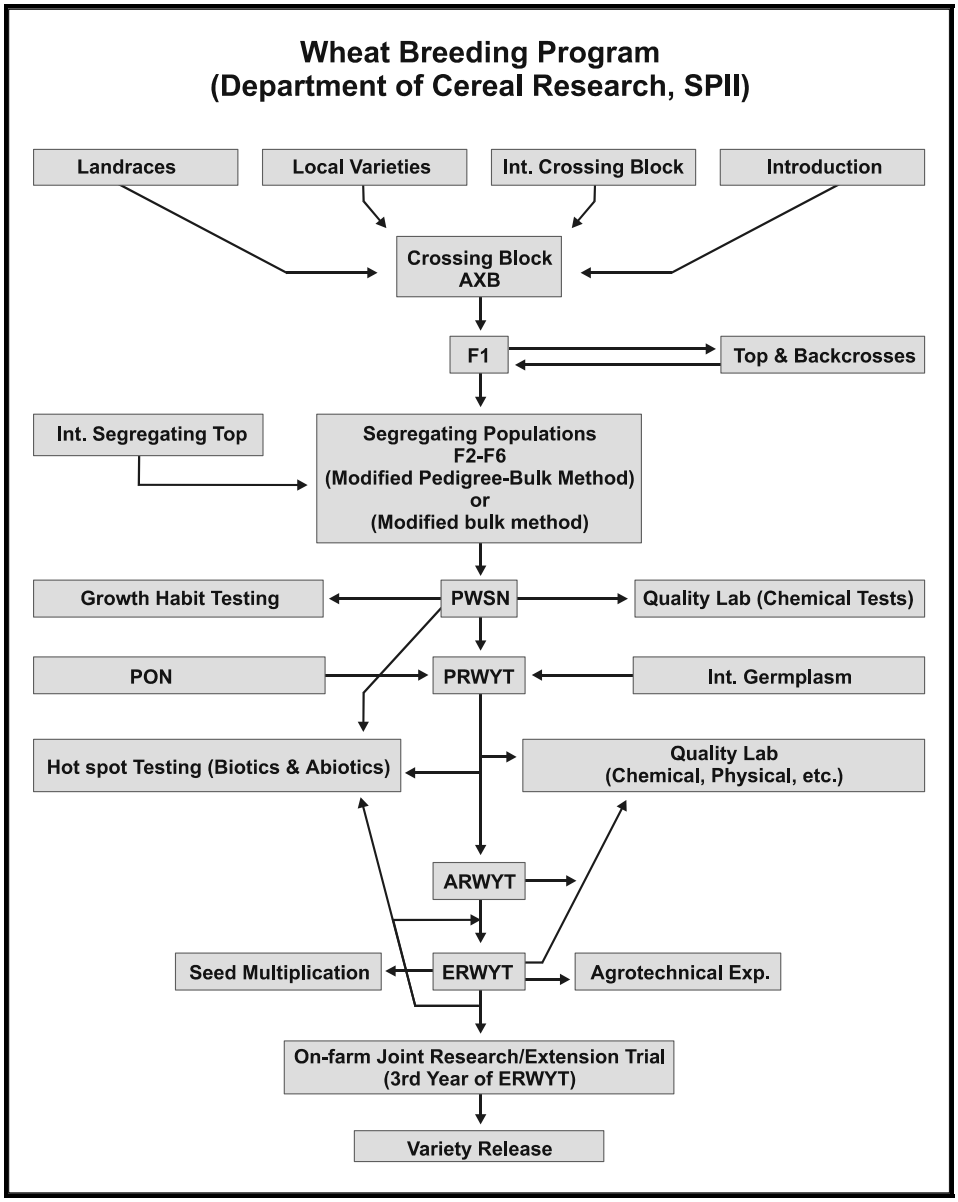

Figure 2. Variety development, evaluation and release procedure in Iran

Variety Release and Registration

The agricultural research institutes conduct variety evaluation in different agricultural research centers (e.g 30 stations for cereals) representing different agro-ecological zones to identify promising lines suitable for major crop growing regions of the country. The procedures of variety release and registration are similar to procedures practiced elsewhere except that the same institutes that bred the varieties are also responsible for final evaluation of the new varieties. The breeder or the research institute is responsible for variety performance trials. The trials compare the agricultural value of promising varieties with existing commercial varieties and identify those found to be superior in certain agro-ecological zones.

The final report of performance trials is prepared by the breeder and submitted for release and registration to be reviewed at three levels i.e. (1) the multidisciplinary Technical Committee at the department level (e.g. Cereals Research Department of SPII); (2) the Technical Committee at the Institute level (e.g. SPII); and (3) the Research Project Coordinating Commission of the Agricultural Research and Education Organization.

After the report is reviewed and confirmed by the two Technical Committees and the Commission it will be submitted for approval to the Higher Council for Agriculture Research and Education (HCAREO). The HCAREO is composed of representatives of various research institutes, faculty members of agricultural colleges or universities, extension services and the Deputy Minster of Crop Production (Horticulture). The HCAREO will review the report, and if accepted, choose the name for the new variety from the list of three names proposed by the breeder(s).

A brief report together with the proposed name will be submitted to the Minister of Jahad-e-Agriculture to confirm the release of the variety. Upon approval of the variety release the certificate of registration is signed by the Minister of Jahad-e-Agriculture and sent to the Agricultural Research and Education Organization. The Agricultural Research and Education Organization will accordingly advise the agricultural research institute and the responsible breeder(s) the registration of the new variety. The number of cereal varieties released over a period of six decades is presented in Table 2.

After the variety is released breeders or the breeding institutes are responsible for variety maintenance and seed production of early generation materials (breeder, pre-basic and basic seed) based on the plan of the Crop Technical Committee. The Committee is composed of members from Seed and Plant Improvement Institute, Soil and Water Research Institute, Plant Pests and Disease Research Institute, Agriculture Support Company, extension service and the responsible office of the Deputy Minster of Crop Production (Agronomy).

Table 2. Number of cereal varieties released during the last six decades

Crop	Up to 1959	1960-1969	1970-1979	1980-1989	1990-1999	Total
Bread Wheat	14	20	12	6	18	70
Barley	3	2	1	3	6	15
Durum Wheat	-	-	-	-	2	2
Triticale	-	-	-	-	2	2
Rye	-	-	-	-	1	1

On the other hand little attention is given to test the new crop varieties for distinctness, uniformity and stability for release purposes. There is also lack of an independent agency to implement variety

evaluation, release and registration in the country.

At present agricultural research and variety development is carried out by the public sector. There is no private plant breeding and no plant variety protection law in the country.

Formal Seed Production

The origin of formal seed sector in Iran is associated with the establishment of the agricultural research centers and crop improvement programs. In 1956, the Cereal Committee of the Ministry of Agriculture in cooperation with FAO initiated the first large-scale seed distribution to farmers. The Committee also prepared national certified seed production and distribution program. Since then the Seed and Plant Improvement Institute become responsible for seed production and quality control.

The major policy of the Government is to increase agricultural production through provision of improved seed and ensuring wider certified seed use by farmers. The majority of farmers have recognized the value of good quality seed in guaranteeing high yields leading to better incomes.

Four classes of seed are recognized for the purpose of seed production: breeder, pre-basic, basic and certified seed. Breeder and pre-basic seed production of self-pollinated crops and inbred lines of cross-pollinated crops is carried out by the respective agricultural research institutes on experimental stations or specialized seed farms.

Basic seed production of self-pollinated crops is also the responsibility of public research institutions mainly on contract with private seed growers. The amount of basic seed produced is given in Tables 3 and 4.

The Seed and Plant Improvement Institute produces breeder seed and inbred lines of its mandate crops and make contract arrangement with seed growers for the production of basic and hybrid seeds for irrigated areas. The Seed Control and Certification Department organize contracts, supervises and inspects seed production fields and performs quality control and certification including all seed crops produced in the country.

The Dryland Agricultural Research Institute is responsible for seed production and supply for crops grown in rainfed conditions.

The Sugar Beet Seed Institute is responsible for production of elite and commercial sugar beet seed. The quantity of sugar beet seed produced is presented in Table 5. The Sugar Beet Seed Institute has a capacity to produce 125,000 units of monogerm and 4,000 tonnes of multigerm sugar beet seed per year contracting approximately 2000 farmers with a total area of 3500ha.

The Agriculture Support Company is a public sector organization under the responsibility of the Deputy Minster of Finance and Planning of the Ministry of Jahad-e-Agriculture. The Agriculture Support Company has an overall responsibility for certified seed production, marketing and distribution of major agricultural crops in the country. ASC produces certified seed (including hybrids) on contract with selected seed growers under the supervision of the Seed Control and Certification Department of the Seed and Plant Improvement Institute. The quantity of certified seed produced and marketed is given in Table 6. In addition, each year the Dryland Agricultural Research Institute made arrangements for production of 20,000 tonnes of seed for rainfed areas.

For all agricultural crops the seed requirement is produced locally whereas for the vegetables the major portion of seed is imported from abroad.

Table 3. Basic seed production for irrigated crops from 1992 to 2002 (tonnes)

Crop	1992/3	1993/4	1994/5	1995/6	1996/7	1997/8	1998/9	1999/0	2000/1	2001/2
Wheat	9580	15176	15106	14827	15593	14542	20000	21826	21315	17354
Barley	1399	1278	1762	2278	2442	2849	3135	2930	2231	4373
Total	10979	16454	16862	17135	18035	17391	23135	24786	23547	21727

Table 4. Basic seed production for rainfed areas from1997 to 2000 (tonnes)

Crops	1997	1998	1999	2000
Wheat	4077	7019	6997	7000
Barley	827	831	1073	803
Maize	230	8	13.3	61.5
Sorghum	1	1.2	4	6
Sunflower	78.7	73.8	49	32.2
Rape	4.9	26.9	11.6	75
Soybean	91	84.7	48	57
Sesame	7.1	7	6	5
Safflower	3	5.7	3.6	5
Beans	25.8	3.8	7	5.5
Faba	22	3	9	9
Mung bean	0.6	-	0.5	0.3
Potato	1150	1935	2300	3200
Lucerne	0.96	5.8	10.8	7.4
Clover	-	1.4	7.4	2.9
Sainfoin	0.08	0.98	0.5	-
Total	6519	10007	10541	11270

NB: Figures were rounded to one decimal point for clarity

Table 5. Quantity of elite and commercial seed of sugar beet produced from 1997 to 2001

Year	Multigerm seed (tonnes)		Monogerm seed (tonnes)	
	Elite	Commercial	Elite	Commercial
1997	28	2917	50	200
1998	30	5964	2.4	100
1999	22	5170	CMS lines	
2000	15	8719	0.8	20
2001	12	7535	1.5	50

Seed Processing and Storage

Seed processing facilities are widely distributed throughout the country to reduce transportation cost. Early generation seed, pre-basic, basic seed and inbred lines are cleaned by the Seed and Plant Improvement Institute and respective agricultural research centers. However, the public sector is responsible for cleaning certified seed and the private sector the hybrid seed.

All agricultural research institutes or centers have seed processing and storage facilities for cleaning breeder, pre-basic and basic seed. There are 25 seed processing plants with a total capacity of more than 30,000 tonnes per year located in agricultural research centers or institutes throughout the country.

The Sugar Beet Seed Institute has two seed processing plants one each located in Ardebil with 4-5.3 tonnes/hour for multigerm seed and in Kamalshahr with 2-5.2 tonnes/hour for monogerm seed. The total annual capacity of the seed processing plants is 8,000 tonnes and 150,000 units per year in the same order.

The Agriculture Support Company is responsible for processing certified seed of self-pollinated crops and some hybrid seed. ASC has 28 provincial branch offices each with seed processing and storage facilities based on the quantity of seed produced in the region. ASC has a total seed processing and storage capacity of

200,000 tonnes per year distributed throughout the country.

However, part of hybrid seed of maize and sorghum is cleaned by the seed growers or the private sector and distributed by the ASC.

Table 6. Quantity of certified seed produced from 1994 to 2001 (tonnes)

Crop	1994	1995	1996	1997	1998	1999	2000	2001
Wheat & Barley	142,000	146,375	170,000	100,000	120,000	180,000	162,875	164,000
Maize	-	-	-	-	4,000	2,195	5,346	11,100
Clover	-	-	-	-	500	1,000	1,085	1,200
Sorghum	-	-	-	-	250	300	150	-
Soybean	-	67	70	91	84.7	-	-	-
Sunflower	-	43	40	78.5	73.8	-	-	-
Sesame	-	1.5	3	7.1	7	-	-	-
Oilseed-rape	-	0.2	0.8	4.8	27	-	-	-
Safflower	-	3.5	2.5	3	5.7	-	-	-
Total	142,000	146,490	170,116	100,184	124,948	183,495	169,456	176,300

Seed Marketing and Distribution

The Agricultural Support Company is responsible for seed marketing and distribution of agricultural crops except for vegetable crops. ASC distributes seed through its 28 branches and the local agricultural offices of the Ministry of Jahad-e-Agriculture.

The Oilseeds Development Company is a public organization responsible for seed marketing and distribution of seed of oil crops including cotton seed. Sugar beet seed is distributed by the sugar industries.

Vegetable seed marketing and distribution is handled by the private sector whereas seed growers distribute potato seed.

The Economic Council of the Ministry of Jahad-e-Agriculture determines the seed price of major agricultural crops. The price of seed distributed by the public sector is lower than free market prices. For private companies price is determined based on supply and demand particularly for vegetable seeds where there is better competition. The grain price and seed price of major crops is presented in Table 7.

The agricultural bank provides credit with low interest rates to farmers. Credit is available for contract growers to encourage contract seed production and for establishing seed drying and cleaning facilities. However, credit is not available for purchase of certified seed because the government is already subsidizing the production of seed.

Table 7. Grain and seed price of major crops in 2002 (Rls/kg)

Crop	Grain price	Seed price
Wheat	1300	1800
Barley	1050	1400
Hybrid Maize	-	9600
Hybrid Sorghum	-	8000
Rape seed	3200	6500
Hybrid sunflower	2500	14000
Rice	5000	6500
Alfalfa	-	12000

NB: 8000 Rls =$1

Seed Quality Control and Certification

Seed quality control and certification is based on field inspection of seed crops and laboratory testing of seed lots to ensure that the seed distributed to farmers meets the minimum standards laid down by the national regulations.

The Seed Control and Certification Department of the Seed and Plant Improvement Institute has an overall responsibility to implement the quality assurance and seed certification program of all crops in the country except potato seed.

The Seed Control and Certification Department has five sections and seed testing laboratories for seed quality and health. Each year, 125,000 ha of seed crops are inspected by an official and part time field inspectors for the mandate crops of the Seed and Plant Improvement Institute.

The central seed testing laboratory is a member of the International Seed Testing Association and all routine laboratory analysis is carried out according to the International Rules for Seed Testing recommended by the association.

In addition to the central seed testing laboratory at Karaj, the Seed Control and Certification Department has 25 laboratories located within the provincial agricultural research centers. Each year a total of 28,000 analyses are carried out to check purity, germination, vigor, moisture and recently seed health. Seed is sampled for testing at processing plants before distribution for locally produced seed and at the point of entry for imported seed.

Post-control tests are carried out randomly after the seed has been certified to assess the performance of seed quality control and certification program. Each year about 20% of certified seed lots are planted for post control tests.

Apart from the Seed Control and Certification Department the Plant Protection Organization is responsible for field inspection and seed certification of potato seed. Moreover, the responsibility for field inspection and seed quality control of some crops is also transferred to commodity research institutes. In case of any difference of opinion, however, SCCD will act as a reference organization for all crops.

For each crop or group of crops a Technical Committee of the Ministry of Jihad-e-Agriculture is responsible to set the national field and seed standards. The committee is composed of technical staff from Seed Control and Certification Department, Agriculture Support Company, Plant Protection Organization and plant breeders.

Since 1995, the Sugar Beet Research Institute is a member of the OECD Seed Scheme for beet. Sugar beet seed certification is based on OECD guidelines particularly for the export market.

The Government envisaged to separate seed production from seed quality control and certification. In the near future, an independent Variety Registration and Seed Certification Institute will be established and become operational for variety registration and quality assurance.

International Seed Trade

The Ministry of Jahad-e-Agriculture-regulates the seed trade including the variety and the quantity of vegetable seed for import. Besides, any overseas seed export by the public or private sector requires the permission from the Ministry of Jahad-e-Agriculture.

The vegetable seed market and distribution is carried out by the private sector and most of the seed is imported (Table 7).

For seed import permission from Seed Control and Certification Department and Plant Production Organization is required. For seed export, the Seed Control and Certification Department will issue the International Seed Testing Association certificate and the Plant Protection Organization will issue the phytosanitary certificate.

In comparison to seed import, seed export is very small and mainly include forage crops such as alfalfa, clover and vetch.

The Plant Protection Organization is responsible for implementing national quarantine regulations**.** It advises seed importers to comply with the regulation and provides the list of quarantine pests. The Plant Protection Regulation No 22037 issued in 1966 forms the basis for quarantine law in the country and being enforced by the PPO.

Table 6. Quantity of imported seed (vegetable seeds) from 1995-2001 (kg)

Year	Quantity (kg)
1995	281,219
1996	3,268,396
1997	208,408
1998	639,700
1999	726,478
2000	620,633
2001	797,925

Seed Extension and Promotion

The Deputy Minster of 'Extension and Popular Partnership' of the Ministry of Jahad-e-Agriculture is responsible for agricultural extension. In addition, the agricultural research institutes are also involved in extension through on-farm trials, field demonstrations and dissemination of information using printed materials.

The Seed Control and Certification Department organizes training courses in various aspects of seed technology for staff from provincial agriculture offices, Agriculture Support Company and seed growers in collaboration with agricultural research institutes.

Seed Technology Research

The Seed Control and Certification Department is striving to introduce new technologies to improve seed production and certification procedures in the country. The Department is searching for practical application of new technologies in collaboration with research institutions and universities. SCCD sets its research objectives, carry out specific seed research and try to apply the findings in its formal activities.

The main research areas include the following:

- Seed testing procedures for assessing seed quality of some crops
- Seed health testing procedures for seed-borne diseases
- Evaluation of appropriate technologies for production of quality seed
- Variety identification using molecular tools

Informal Seed Sector

Iran is self-sufficient in seed of major agricultural crops. The formal sector produces almost all seed requirements for irrigated areas except for legume crops and forage crops, which is supplied through the informal sector.

Apart from the formal sector farmers produce seed for own use or sale to others without any official quality control. These include seed of legume crops, forage crops

and native vegetable crops such as leafy vegetables, melon and muskmelon.

The Seed Control and Certification Department provides seed testing services for seed produced informally on request. In recent years some farmers established seed growers association (e.g. Potato Seed Growers Union) to produce and market seed in domestic markets.

Constraints of the Seed Sector

The agricultural sector enjoys considerable government support to increase production and to achieve food security. However, there are some constraints limiting the performance of the national seed industry. These constraints include:

- Lack of adequate national seed policy and legislation to enhance the performance of the seed sector
- Lack of systematic variety release and registration procedures for rapid and efficient release of new crop varieties
- Lack of private sector participation in the seed industry sector which is dominated by the public sector
- Lack of plant variety protection to promote private sector investment in plant breeding
- Lack of independent seed quality control and certification agency to implement quality assurance and certification

Recommendations

The government has established a national committee to review the seed sector and present possible recommendations for improvement of the national seed industry. The committee prepared a national seed law and this has been presented to the Parliament for sanction.

In October 2002 a national seed workshop was organized to bring together national stakeholders and a number of international experts to discuss options for the improvement and development of the seed industry in Iran. The workshop reviewed the status of the national seed sector with particular reference to policy, regulatory, institutional and technical issues and made recommendations for the improvement of the seed sector. The recommendations include to:

- Sanction a national seed policy and establish a national seed council to guide the development of the seed sector
- Enact and implement a seed law and regulation including plant variety protection to encourage private sector investment in the seed sector
- Liberalize and/or privatize the seed sector to encourage particpation of the private sector in the industry
- Establish a separate seed quality control and certification agency responsible for variety registration and quality assurance program
- Encourage the establishment of seed growers associations and seed trade association to ensure the interest of the private sector in the seed industry
- Provide training opportunities for professional and technical staff in the seed sector and encourage participation in workshops

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