

Focus on Seed Programs

The Afghanistan Seed Industry

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1. Introduction

Afghanistan is between 29°40' and 38°40' N and 60°31' and 75°00' E. It is bordered by Iran in the west, Pakistan in the south and east, Turkmenistan, Uzbekistan and Tajikistan in the north, and China to the east. Afghanistan is generally considered part of Central Asia, but it is also grouped either in the Middle East or in South Asia. It has a total area of about 65 million ha (Table 1). The population of Afghanistan was estimated at 29.8 million in 2010 with a growth rate of 2.4%.

Afghanistan is a mountainous country with the Hindu Kush system stretching about 966 kilometers and splitting the country from east to west. There are also several smaller mountain ranges. The lowest point of elevation is Amu Darya 258 masl and the highest one is Nowshak 7,485 masl. These mountainous areas are mostly barren or at most sparsely sprinkled with trees and stunted shrubs. In addition, the country has many rivers, lakes, and deserts. The four major river systems are the Amu Darya; the Helmand; the Harirud; and the Kabul.

Afghanistan is divided into six agro-ecological zones: Northern Zone (Balkh, Samangan,

Jowzjan, SariPul and Faryab provinces) and North-Eastern Zone (Baghlan, Kunduz, Takhar and Badakhshan provinces) known as food baskets (except Badakhshan); North-Western Zone (Badghis, Herat, Ghor and Farah Provinces) mostly rangeland and rainfed areas; Western Zone (Nangarhar, Laghman, provinces) known for production of vegetables and (Kunar and Paktika provinces) for agroforestry; East Central Zone (Bamyan, Parwan, Kabul, Panjshir, Dikundi, Logar, Wardak, Kapisa and Ghazni provinces) high elevation with cold winter; and Southern Zones (Nimroz, Helmand, Kandahar, Oruzgan and Zabul provinces) low elevation with arid and semi-arid climate.

Table 1. Land and crop area in Afghanistan

Land Cover	Area in ha	
	(000)	Percentage
Urban	29.5	0.05
Irrigated lands	3,207.8	5
Rainfed lands	4,517.7	7
Orchards	94.2	0.1
Forests	1,337.6	2.1
Rangelands	29,176.7	45.2
Barren lands	24,067	37.3
Marsh lands	417.6	0.6
Water bodies	248.2	0.4
Snow covered areas	1,463.1	2.3
Total	64,559.4	100

Afghanistan has mostly a sub arctic mountain climate with dry and cold winters, except for the lowlands, which have arid and semi-arid climates. It has clearly defined seasons where summers are hot and winters can be bitterly cold. Variations in temperature during the day may range from freezing conditions at dawn to the upper 30°C at noon. Summer temperatures are as high as 54°C (in Zranj) and the lowest temperature recorded is -54°C (Shark). Most of the precipitation falls between the months of October and April. The desert receives less than 100 mm of rain a year, whereas the mountains receive more than 1000 mm of precipitation, mostly as snow.

Afghanistan's economy is recovering from decades of conflict. Since 2001, the economy has improved significantly largely because of inflow of international assistance and gradual recovery of the agricultural and service sectors. Agriculture is the mainstay of the Afghan economy accounting for about 32% of GDP and supports over 80% of the population. About 12% of the country's total land area is arable mainly in scattered valleys, 46% is under permanent pastures, with the remaining 39% being mountainous (Table 1). Desertification, particularly in the southwest, and deforestation are increasing at an alarming rate, while some of the pastures are cultivated when rainfall is plenty and left fallow the following year, causing some erosion and loss of grazing land. Given highly variable rainfall and concomitant variation in production from the rain-fed sector, the irrigated sector traditionally provided a higher proportion of all crops. At least two-thirds of this arable land requires irrigation. Water is drawn from springs and rivers and is distributed through surface ditches and through underground channels/tunnels, which are known as *karez* (*qanat*). In 1987, about 2,660,000 ha of farmland were irrigated.

Land holding size and type vary both between and within provinces. While most of the rural population depends on agriculture, the arable land is very limited and a significant part of the population does not own farmland, yet together they provide a highly significant part of production, as sharecroppers, workers or tenants. Given the highly complicated land tenure arrangements, farm size is best measured by cultivated area; and the average farm size ranges between 1-2 ha. About 80% of farming households cultivate up to 2 ha with nearly 50% less than 1 ha per household.

Wheat is the main staple cereal and accounts for about 70% cropped area and cereal production each year and 70% of total cereal consumption. Wheat cultivation was estimated to cover 2,575,000 ha (1,426,000 ha rain-fed and 1,149,000 ha irrigated) during 2008/09 crop season, which recorded one of the highest production levels (5.064 million tonnes) in recent years. With an average yield of 2.5 t ha⁻¹, the productivity of irrigated wheat is generally considered to be between 2 to 3 times that of rain-fed wheat. The average yields of 2 and 1 t ha⁻¹ for irrigated and rainfed areas, respectively shows the need to improve productivity and narrow the wide yield gap by demonstrating best practices to farmers and encouraging their adoption in order to achieve higher crop yields.

Cereals (barley, rice, maize) and pluses (chickpea and mung bean) are also important crops (Table 2). Several summer and winter vegetables like potato, tomato, onion, okra, cauliflower, melon and watermelon are also produced both for domestic and export market. Cotton is also a widely cultivated crop. Fruits (apricots, cherries, figs, mulberries, pomegranates and grapes) and nuts (pistachios, walnuts) are among the most important export crops produced.

Table 2. Area (ha), production (MT) and yield (MT/ha) of major crops in Afghanistan (irrigated and rainfed)

Crops	2008			2009			2010		
	Area in ha (000)	Production in tonnes (000)	Productivity (t/ha)	Area in ha (000)	Production in tonnes (000)	Productivity (t/ha)	Area in ha (000)	Production in tonnes (000)	Productivity (t/ha)
Wheat	2139	2623	1.23	2575	5064	1.97	2504	4532	1.81
Barley	236	333	1.41	267	480	1.80	270	437	1.62
Maize	137	280	2.04	140	300	2.14	140	301	2.15
Rice *	190	410	3.22	200	469	3.50	200	450	3.36
Total	2702	3646	-	3182	6313	-	3114	5720	-

*Source: General Department of Policy and Planning, MAIL, 2010; *Milled rice (paddy yield)*

There is a significant deficit in food production which results in food insecurity particularly for poor vulnerable households to meet the total national food and creating the need for emergency food aid. For example, against a total wheat requirement of 5.25 million tonnes in 2009, the net import requirement was 191,000 tonnes. Closing the yield gap through higher crop productivity would improve food self-sufficiency and food security particularly for rural households. Furthermore, the focus on crop diversification especially into food legumes and vegetables will help improve the current poor nutritional status of rural farming households.

2. Historical Context of Seed Sector

The development of the Afghanistan seed sector can be divided into three contrasting phases covering the establishment of the formal seed sector (1978-1992), the conflict period (1993-2002) and the post-war reconstruction and rebuilding phase (after 2002).

3.1. Establishing organized seed industry (1978 – 1992)

Until late 1970s, there was virtually no large-scale organized seed delivery system in Afghanistan. The first government joint stock company (Afghan Seed Company – ASC) was established in 1978 with a loan of US\$ 14 million from the Asian Develop-

ment Bank. ASC was established to perform all seed delivery functions including seed production, processing, distribution and marketing. ASC was changed into the Improved Seed Enterprise (ISE) in 1985 with its headquarters located in Kabul and sub-offices in different provincial towns, namely; Herat, Kandahar, Kunduz, Mazar and Pulikhumri. ISE was allocated 21 farms across the country with a total area of over 11,700 ha, about half of which were developed for seed production.

From 1982 to 1992, the Ministry of Agriculture, ISE, the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Development Program (UNDP) operated several joint seed projects in Afghanistan. The UNDP/FAO assisted vegetable seed production and training project established five seed production and training farms, vegetable seed processing facilities, seed testing laboratories and a seed technology training center. This project was followed by a seed improvement program for northern Afghanistan, which focused on production of cereal seed, vegetable seedlings and fruit tree saplings for distribution to farmers. Almost all these facilities were destroyed and looted during the conflict following the collapse of the communist government in 1992. In 1993, due to security situation FAO shifted its operational base from Kabul to Islamabad, Pakistan.

3.2. Sustaining the seed industry (1993 – 2002)

After 1992, FAO implemented two seed projects from its base in Pakistan either through NGOs or directly with the local communities: cross-border seed supply from Pakistan, and in-country seed multiplication of vegetables, wheat and maize using NGOs as implementing partners. Furthermore during 1995-2002, FAO collaborated with World Food Program (WFP) implementing a Food-for-Seed Scheme, which subsidized seed production and gave the implementing partners an opportunity to accumulate substantial revolving funds from seed sales.

In addition, during 1997-2002, FAO received significant support from the UNDP Poverty Eradication and Community Empowerment (PEACE) program, which included trust fund projects that were designed to support household food security by strengthening community seed production. The PEACE initiative was aimed at the restoration of peace in Afghanistan through poverty alleviation, good governance and community empowerment in both rural and urban areas, of which seed was a major component. This program helped in laying the foundation for rebuilding the Afghanistan seed industry. Following the collapse of the Taliban regime, FAO returned its operational base to Kabul in 2002 and the PEACE program ended.

3.3. Rebuilding the seed industry (post 2002)

The collapse of the Taliban regime and end of 23 years of conflict coincided with four consecutive years of drought in Afghanistan. As refugees began returning home to resume agricultural activities, a lot of emphasis was put on making seeds available to farmers as part of relief aid. This brought in several new players including the Future Harvest Consortium to Rebuild Agriculture in Afghanistan (FHCRAA) led by ICARDA and supported by USAID, the French Cooperation and many national and/or international

NGOs. About 15,000 tonnes of wheat seed, mostly imported from Pakistan, were distributed to farmers by different agencies in 2002.

In addition, the FHCRAA/ICARDA renovated and equipped agricultural research stations and seed testing laboratories and initiated village-based seed enterprises. The French Cooperation introduced several wheat varieties for testing at research stations and seed of promising ones are being multiplied by farmers.

FAO has continued its role as seed industry leader in terms of variety improvement, seed production, seed enterprise development and regulatory reform. The EU supported projects 'Strengthening National Seed Production Capacity' (2003-2006) and 'Variety Development and Seed Industry Regulation' (2007-2011) have played a key role in re-establishing the seed sector in Afghanistan.

3. National Seed Policy and Regulatory Framework

The Ministry of Agriculture, Irrigation and Livestock (MAIL) is a national apex body responsible for overall policy formulation and implementation of all agriculture related activities in Afghanistan. There are two Deputy Ministries within in MAIL: Technical Affairs and Irrigation and Construction. The Deputy Ministry for Technical Affairs is responsible for agricultural research, extension, food quality control, animal husbandry and health, and natural resources.

Afghanistan has the national seed policy, the seed law, and the seed rules, regulations and procedures with the National Seed Board serving as the focal point for coordinating all seed industry functions. The National Seed Board advises the Minister on all seed industry functions particularly matters relating to implementation of the Seed Law and National Seeds Policy. It comprises of not more

than 13 members as follows:

1. Technical Deputy Minister of the Ministry of Agriculture, Irrigation and Livestock, Chairperson
2. Advisor to the Ministry of Agriculture, Irrigation and Livestock, Deputy Chairperson
3. Director of Agricultural Research Institute of Afghanistan, member
4. Director of Plant Protection and Quarantine Department, member
5. Director of Agricultural Extension Department, member
6. Dean of Faculty of Agriculture, Kabul University, member
7. Two elected representatives of seed producers, members
8. One elected representative of agricultural cooperatives, member
9. Two elected representatives of trade unions engaged in seed distribution, members
10. Two elected representatives of farmers, members

According to the Seed Law, the National Seed Board (NSB) and its affiliated bodies, the Seed Certification Agency (SCA) and Variety Release Committee (VRC) are the seed industry's main coordination and regulatory mechanisms. Although these new institutional arrangements fall under the responsibility and authority of MAIL, they are not effectively part of the MAIL's official organizational structure like other government departments.

While MAIL may maintain the ad hoc status of NSB and VRC, it is likely that the SCA would be established finally as a semi-autonomous agency which is responsible for foundation and registered seed production. ISE is recognized as part of MAIL but has an autonomous organizational structure and report directly to the Minister of MAIL through the Technical Deputy Minister and does not belong to other regular departmental structures.

A strong foundation has already been laid for the Afghanistan seed industry including a national seed policy, seed law and a rapidly growing private seed sector, an active national seed association, a functional National Seed Secretariat and a quality control system working towards achieving international standards.

3.1 National seed policy

The Ministry of Agriculture, Irrigation and Livestock (MAIL) adopted a National Seed Policy in September 2005, which is now in effect and implemented under the guidance of the National Seed Board. The policy is intended to provide an enabling environment for sustaining and enhancing the growth of the Afghanistan seed industry by defining appropriate strategies relating to seed legislation, agricultural research and variety development, seed production, processing and storage, seed marketing and distribution, quality control and certification, plant quarantine, private sector participation, human resource development, informal seed sector, seed security, emergency seed interventions, credit and financial assistance, oversight arrangements and international cooperation. Many changes have taken place since the adoption of the seed policy in 2005 and a policy revision is being considered.

3.2 Seed law and regulations

The Government enacted a Seed Law in 2009, which was published in Official Gazette 1005 of 16 December 2009. The Seed Law covers true agricultural seeds and vegetatively propagated planting materials. Comprising four Chapters and 29 Articles, the Seed Law regulates seed production and marketing, seed trade (import and export) as well as all seed-related research activities in the country.

Afghanistan's seed industry is surely heading in a positive direction to which the Seed Law now serves as the formal guide and reference for all stakeholders and other relevant parties

to follow. Rules, regulations and procedures for implementing the seed law are being prepared and based on the existing quality control system.

3.3 Plant variety protection and biosafety

According to the National Seed Policy, although plant variety protection including provisions for Plant Breeders' Rights and Plant Patents are not considered as issues with immediate consequence for the country, these would be examined if raised with the National Seed Board by interested parties and decisions made on what action may be required.

Similarly, the Government will follow the progress of research and development in genetically modified crops and will as far as possible investigate the applicability and benefit of relevant aspects to the Afghan situation. At the appropriate time, when this has been done to the satisfaction of all stakeholders, Government will determine the extent and mode of incorporation of relevant aspects of genetically modified crops into the agriculture of Afghanistan.

4. Agricultural Research and Variety Development

In Afghanistan, prior to the conflict, agricultural research was coordinated by the Ministry of Agriculture and activities undertaken in 17 research stations representing different agro-ecological regions of the country. In the absence of a functioning research system during the conflict period, FAO provided technical assistance in variety development including a crop improvement project funded by the Swedish International Development Agency during 1996 – 1999, which resulted into the release of several new crop varieties. Following the rehabilitation of some agricultural research stations by FHCRAA/ICARDA in 2002, some research activities were initiated in major agricultural

research stations while FAO continued to support variety development work.

The Agricultural Research Institute of Afghanistan (ARIA) was formally established in the early 1980s with its headquarters in Kabul and regional agricultural research stations in Baghlan, Bamian, Helmand, Herat, Jalalabad, Kandahar, Kunduz, Mazar and Takhar.

4.1 Plant genetic resources conservation

Afghanistan is known as a center of origin and diversity for a wide range of agricultural (cereals, food legumes) and horticultural (fruits) crops. Apart from the Russian geneticist Nickolai Vavilov who led expeditions in the early 1920s, the US Department of Agriculture, the FAO and ICARDA made additional collections of these valuable plant genetic resources in the 1970s.

A significant proportion of Afghanistan's plant genetic diversity obtained during pre-war expeditions is maintained in gene banks of International Agricultural Research Centers under the trust of FAO. Although this could be repatriated back to an in-country genebank in Afghanistan, a more important need is the further collection and conservation of genetic resources for which an in-country gene bank is more urgently needed. It is also important to take into account of the importance of *in-situ* conservation of genetic resources.

4.2 Variety development

In Afghanistan, advanced breeding lines are obtained mainly from the International Agricultural Research Centers (IARCs) such as CIMMYT, ICARDA, CIP, etc which are tested and evaluated in the various agro-ecological zones for adaptation and thereafter released as varieties.

FAO in close collaboration with the IARCs (CIMMYT and ICARDA) and ARIA is still involved in crop improvement activities. An-

other recent source of varieties is the French Cooperation, which is undertaking adaptation trials of winter wheat varieties of French origin in collaboration with ARIA. Several materials of good potential have been identified and are being considered for release.

The improved wheat varieties are estimated to now cover about 54% of the irrigated wheat area in the country.

4.3 Variety release

A strong seed sector requires well established efficient, effective, representative and transparent mechanism for evaluating and registering new varieties. All potential varieties must pass Distinctness, Uniformity and Stability and relevant Value for Cultivation and Use tests before they are considered for release.

At present, there is no independent agency responsible for the variety evaluation and release in Afghanistan. Under the FAO/European Union (EU) Seed Project, ICARDA provided assistance in establishing a variety registration system through DUS testing of existing commercial varieties and jointly prepared the first national catalogue of commercial wheat varieties in Afghanistan.

VRC is one of the NSB affiliated committees and comprises of relevant technical members from NSB, other experts from stakeholders and co-opted researchers dealing with specific crops under consideration. It is responsible for functions related to official release of new varieties suitable for cultivation in Afghanistan. By the end of 2010, several improved varieties were released and made available to farmers including wheat (17), rice (3.), bean (4), barley (2), chickpea (2) and lentil (1).

5. Formal Seed Production

Afghanistan recognizes four classes for seed production namely Breeder Seed, Foundation Seed, Registered Seed and Certified Seed. The public and private (small to medium scale seed enterprises) sectors produce different seed classes.

The public sector produces breeder and foundation and registered seed whereas the private sector produces certified seed for commercialization.

5.1 Public sector

The Agricultural Research Institute of Afghanistan (ARIA) and Improved Seed Enterprise (ISE) are key public sector implementing partners of the FAO/EU Seed Project. Apart from agricultural research and crop improvement, ARIA is also responsible for breeder seed production of released varieties while ISE produces foundation and registered seed in its six stations for sale to private seed enterprises. Registered seed was only introduced during the 2010/11 crop season. The intention of government to privatize the state-owned ISE has not yet materialized.

The area cultivated and amount of breeder and foundation seed of wheat produced in the past four years are shown in the table below (Table 3).

Table 3. Amount of breeder and foundation seed produced in Afghanistan

Year	Breeder seed		Foundation seed	
	Area cultivated (ha)	Seed produced (tonnes)	Area cultivated (ha)	Seed produced (tonnes)
2007	26.1	40	101	344
2008	17.6	71	212.5	488
2009	18.1	87	361	1,420
2010	35.5	104	464.3	703
Total	97.3	302	1,138.8	2955

5.2 Private sector

Private sector involvement in the seed sector is recent and has been promoted mainly by FAO and ICARDA since 2004. FAO initiated and supported eight pilot seed enterprises which completed their first season of operation in 2005. ICARDA under the USAID funded Revitalizing Agricultural Markets Program (2004-06) established 21 village-based seed enterprises (VBSEs) in five provinces, namely; Ghazni, Helmand, Kunduz, Nangahar and Parwan. In addition, 12 new VBSEs were established in Kunar, Laqman and Nangahar provinces under Alternative Livelihoods Program-Eastern Afghanistan (2006-08) supported by USAID and implemented by ICARDA.

The VBSEs have the potential of becoming more important in the future because of their proximity to farmers and their ability to meet location-specific needs, especially in terms of adapted varieties and reduced transportation costs for seeds. The VBSEs were organized into provincial Agricultural Seed Companies and become members of the Afghanistan National Seed Organizations (ANSOR), which was established as umbrella national association for all seed producers in the country. It should be noted that some of the pioneer VBSEs graduated to the FAO supported medium scale seed enterprises. There are now a total of 95 such seed enterprises in 28 provinces all operating under the FAO/EU Seed Project including 21 enterprises engendered by the EU Food Facility Seed Project. The private enterprises account for all certified seed produced in the country (Table 4).

Table 4. Amount of certified seed produced in Afghanistan

Year	Area cultivated (ha)	Certified seed produced (tonnes)
2007	2,607	3,991
2008	3,052	11,262
2009	3,492	12,948
2010	6,435	18,081
Total	15,586	46,282

5.3 NGOs

NGOs were the main seed producers during the conflict period and until 2005. However, with the active participation of private seed enterprises, NGOs are no longer involved in seed production to any significant degree. From the three previously active NGOs, Mercy Corps has established and transferred its operations to a new private enterprise in the southern region while the Islamic Relief Agency has closed its operations in Afghanistan and the Voluntary Association for Rehabilitation of Afghanistan has maintained a very small seed production capacity.

The formal seed sector (ARIA, ISE, and private seed enterprises) have the capacity to produce up to 30,000 tonnes of quality wheat seed each year, accounting for only 10% of annual replacement rate. Raising the seed replacement rate therefore provides substantial scope for the seed market. The formal sector focuses mainly on wheat seed because more improved varieties are available for this than for other types of cereals. Overall, the informal seed sector predominates with the vast majority of farmers saving their own seed from both local and improved varieties, especially for wheat. Local varieties are mostly used for crops other than vegetables.

6. Seed Processing and Storage

The machines mostly used for wheat seed cleaning are mobile air-screen cleaners of different types obtained either from India or Iran. There are a total of 77 machines in the country, of which 39 machines has capacity of 0.5 t/h, 24 machines of 1 t/h, seven machines of 1.5 t/h, three machines of 2 t/h, one machine of 2.5 t/h, two machines of 3 t/h and one machine of 4 t/h. These machines collectively give a combined total of 100 t/h capacity, which is sufficient to process about 34,000 tonnes of raw wheat seed in about nine weeks at a utilization rate of 40 hours per week. The loca-

Table 5. Seed processing capacity available in Afghanistan

Region	Number of machines	Total capacity (t/h)
Central	15	11.5
Northern	12	10
North-Eastern	19	22
Western	13	38
Southern	6	7
Eastern	12	11.5
Total	77	100

tion of processing facilities and the estimated capacity is as listed below (Table 5).

Seed processing normally takes place during the months of June–September for the major wheat crop. There is sufficient storage capacity for up to 30,000 tonnes of wheat seed with each enterprise having its own facility equipped with wooden pallets. The seed is stored until the planting season during October–December.

7. Seed Marketing and Distribution

From a total annual wheat seed requirement of about 300,000 tonnes, certified seed accounted for only 18,000 tonnes in 2010 but is projected to reach 30,000 tonnes in 2011. This projection would be equivalent to a 10% replacement rate which at present is considered reasonable for certified seed of wheat in many developing countries including Afghanistan. Since 2002, almost all quality seed has been distributed each year to farmers at subsidized rates. MAIL took the leading role in coordination of seed distribution in the past two years and may continue doing so in the foreseeable future with the aim of promoting the use of certified seed widely amongst farmers and encouraging them to ultimately buy directly from the private sector.

A nationwide survey has shown that farmers in Afghanistan buy up to 31% of their required wheat seed from formal and informal

sources. The survey also estimates the total wheat seed market is equivalent to 93,000 tonnes. The current certified seed supply of 30,000 tonnes (10% of total wheat seed requirement) thus indicates a large potential seed market, if all farmers buying wheat for sowing were to purchase certified seed. The study also revealed that enterprises wishing to take advantage of this potential market should have access to new varieties, be able to assure and convince farmers about certified seed which they can sell together with appropriate chemical fertilizer at reasonable prices. The challenge thus facing the seed market is to shift the pattern of purchase away from cheaper and lower quality seed (including grain being sold as seed) to certified seed.

In Afghanistan, the main seed promotion mechanisms are on-farm demonstrations and farmers' field days often organized by private seed enterprises. These events are effective as they often bring together the key stakeholders including local administrative officials, regional MAIL staff, NGOs, enterprise members and contract growers, university/vocational staff and students, farmers, etc., to view demonstrations in the field and exchange ideas. During 2010, a field day each was organized by 23 enterprises and attended by up to 4,000 participants most of whom were ordinary small farmers. Apart from the MAIL extension service which is currently limited in capacity there are other extension efforts ongoing in the country including those provided by the private seed enterprises, NGOs and other development agencies. A key to effective awareness creation about the availability of new varieties and certified seed will require synergy from close collaboration and coordination of the various extension undertakings in the country.

Since the establishment of private enterprises, three national seed fairs has been organized mostly under the aegis of ANSOR to exhibit the diversity of seed and planting

materials available in farming communities as well as to bring together stakeholders including policy makers, technical officials, business groups, farmers, etc., to exchange views and ideas pertaining to variety choice, seed multiplication, exchange and marketing. The fairs attract a wide range of stakeholders including seed enterprises, farmers, NGOs, seed and agro-chemical dealers, research institutes, donors, senior MAIL officials and many other stakeholders nationwide.

An analysis of the seed market shows that profit margins are created as certified seed flows from the contract growers, through the seed enterprises and finally onto the seed purchasing farmers (Table 6). Data have been obtained each year from contract growers, seed enterprises and ordinary farmers in order to assess the nature of profit margins that are created in the seed value chain and hence determine the efficiency and effectiveness of seed industry commercialization in Afghanistan. Results for four consecutive seasons as shown in Table 6.

The 2007/08 season was exceptional and marked by soaring price of grain resulting in corresponding high price for raw seed. The contract growers were the main beneficiaries of the high grain prices, as they received quite high margins compared to actual production costs although actual premium from the seed enterprises was lower. The above analysis on the whole shows that at the mean raw seed purchase price of US\$387 per tonne in comparison with the cost price of US\$197 per tonne, the growers are able to earn good margins over and above the mean grain price of US\$360 per tonne. The average breakeven point of the seed enterprises is US\$490 per tonne and with a sale price of US\$591 they would be able to make a profit margin of 22%. Although the situation in the 2008/09 season almost returned to normal where there was an intervention by the main buyer, MAIL, which fixed the raw seed procurement and final sale price of processed seed. Because of this, growers were still able to get a good premium above the grain price and seed enterprise were prevented from

Table 6. Seed production costs and profit margins in Afghanistan

Item	Cropping Season						Mean
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	
Number of enterprises	9	9	28	35	39	69	-
Number of contract growers	198	345	753	2,240	3,430	3,840	1,801
Grower's cost price (US\$/tonne) ^a	141	173	159	266	210	230	197
Buying price of raw seed (US\$/tonne) ^b	246	290	270	730	384	400	387
Grower's margin (%) ^c	74	68	70	173	83	74	90
Grain price (US\$/tonne) ^d	200	244	233	680	250	290	316
Grower's premium (%)	23	19	16	7	54	38	26
Enterprise cost price (US\$/tonne) ^e	309	413	412	845	470	490	490
Sale price of certified seed (US\$/tonne) ^f	401	474	465	1,053	610	580	597
Enterprise margin (%) ^g	30	15	13	29	30	15	22

Notes: Information on (a) is obtained from a survey of contract growers and information on (b), (e) and (f) from financial records of seed enterprises each year

^a Actual costs for a grower to produce 1 tonne of certified seed including all input costs (foundation seed, fertilizer, herbicide, etc.), labor costs (weeding, roguing, harvesting, threshing, etc.), transport cost and processing costs (drying, cleaning, bagging, etc).

^b Buying price of raw seed paid by the enterprise to the contract grower including an agreed premium over grain price (d), taking into account grower's actual cost price (a).

^c Margin the grower gets above the actual cost (a) for the raw seed

^d Prevailing market price of wheat grain

^e Cost the enterprise incurs to convert the raw seed into cleaned and packaged certified seed for sale and includes the costs of the raw seed (b), transport, cleaning, chemical seed treatment, packaging, etc., but excludes a profit margin (i.e. enterprise break-even price).

^f Final selling price of certified seed i.e. the enterprise break-even price plus a profit margin for the enterprise.

^g Margin the enterprise gets above its actual cost (e)

getting very high margins as they have to pay raw seed procurement prices slightly above the grain price.

8. Seed Quality Assurance

The national seed policy requires that MAIL shall appropriately maintain and conduct external quality control systems (e.g. enforcing Seed Law, field inspection, seed testing, labeling, certification, etc) to protect both seed users and seed suppliers. Seed Act of 2009 stipulates that MAIL establish a competent seed certification agency. It is envisaged that an adequately equipped, staffed and funded quality control agency shall be maintained, and all seed in the formal sector offered for sale shall be subject to requirements of the Seed Law. For the time being quality control activities are undertaken by MAIL under the technical guidance of the FAO/EU Seed Project and the NSB, until such time that permanent arrangements are made under Afghanistan's Seed Law.

The seed quality control follows the Association of Official Seed Certifying Agencies certification scheme recognizing four seed classes as described earlier. Field and seed standards have been established for wheat seed production where the seed project is responsible for seed field inspection and laboratory seed testing.

There are five official seed testing laboratories located in Kabul (Central Region), Herat (Western Region), Jalalabad (Eastern Region), Mazar (Northern Region), and Kunduz (North-eastern Region) with satellite laboratories in Helmand (Southern Region) and Bamyan (Central Highlands Region), which altogether form the basis of a national seed certification system. These laboratories have sufficient total capacity to analyze 3,500 samples a year corresponding to 35,000 tons of wheat seed.

It is envisaged that under the NSB, licensed officers of the SCA inspect and approve seed fields, inspect seed cleaning centers, and test seed lots in officially designated laboratories and issue certificates.

9. International Seed Trade

The Seed Act of 2009 stipulates conditions for seed import and/or export including the procedures and obligations. At present there is very little international seed trade in Afghanistan. Virtually no seed is exported but a substantial quantity of vegetable seed (mostly hybrids) of various types is imported by farmers. These seeds come from large multinational companies without any regulatory control.

10. Plant Quarantine

In Afghanistan, the Plant Protection and Quarantine Department (PPQD) of MAIL is the institution responsible for ensuring healthy seeds and planting materials imported to or exported from the country. However, PPQD at the moment lacks the technical capacity and facilities including equipment necessary for effective seed and plant health testing and certification. There is also no legal framework yet in place for regulating activities related to the production of healthy seeds and planting materials and the movement of such products within the country and across the country's borders. There is therefore a need to review and bring up to date the relevant quarantine laws and regulations, and put in place the necessary infrastructure and institutional arrangements for a sustainable program, and train technicians in the use of appropriate technologies.

An important consideration is for the government to take into account the International Plant Protection Convention provisions and designate an official National Plant Protection Organization that has the tech-

nical capacity to carry out important functions such as integrated pest management, emergency pest control, pesticide analysis, pest survey and surveillance and quarantine. Designating an appropriate institutional arrangement for this purpose is a crucial step necessary for Afghanistan as the country aspires for membership of the World Trade Organization.

11. National Associations and International Membership

In 2008, a national seed association, the Afghanistan National Seed Organization (ANSOR), governed by a Board of Directors, was established as the main umbrella organization of the seed industry for advocacy and representation both at national and international levels. The Association has the mission to promote and develop seed industry in the country and the Economic Cooperation Organization region. It provides a forum for cooperation and information exchange among seed companies and represents its interests to provide trading with high quality seeds.

ANSOR membership is open to all companies, associations, agencies and organizations which have an interest to the objectives and activity of the Association and accepting the Articles of Association. The founding members of ANSOR comprised 30 ordinary and 2 associate members. By mid 2011, the membership of ANSOR had expanded to a total of 95 including 92 ordinary and 3 associate members. ANSOR has registered as a member of other international seed organizations including the International Seed Federation, the Asia and Pacific Seed Association and ECO Seed Association.

12. Constraints of the Seed Sector

The following are key constraints and challenges facing the Afghanistan seed sector:

Availability of new crop varieties

The country is prone to periodic droughts which result in significant crop failure. For example up to 75% failure of the rainfed wheat crop is expected in 2011 due to insufficient rainfall during the growing season. New drought tolerant varieties are needed to enhance wheat production in the rainfed areas. Yellow rust is prevalent in Afghanistan and often causes significant loss of the wheat crop. There are also fears that the virulent Ug99 stem rust may reach Afghanistan and become a potential threat to the country's wheat crop. Therefore, availability of biotic and abiotic stress tolerant crop varieties is critical to achieve food security.

Implementing and enforcing the seed law effectively

Although the seed law has been enacted, there is yet no effective mechanism for its implementation. Steps in this direction would include the formulation of official seed rules, regulations and procedures for all major crops, creating an autonomous and independent Seed Certification Agency within MAIL as specified in the seed law, coordinating seed industry functions including research efforts in creating a common variety trial system.

Promoting competitive commercial seed market

Despite the widespread production of certified seed by private enterprises throughout the country, there is virtually no direct purchase by farmers. Efforts are needed in promoting the attributes of improved varieties.

ies and certified seed and convincing farmers to buy seed directly from seed producers. To do so, the private enterprises should become technically efficient and operate cost effectively so as to sell certified seed at prices farmers can afford and are willing to pay.

Promoting diversification of seed crops

At present, certification procedures and standards exist only for wheat and there is a need to extend these to other major cereal crops, pulses, oil crops and vegetables. In order to produce and certify seeds of other crops, new appropriate varieties of such crops should be developed and the seeds produced in such a manner as to compete with imports in terms of quality, packaging and price. This should be done in conjunction with effective promotion and ways of convincing farmers to buy seed.

Deteriorating security

Poor security conditions in Afghanistan create difficulties for activity monitoring and supervision, transportation of inputs, materials and supplies. In particular, long distance transport of tagged certified seed has proved rather difficult especially in regions with limited government control.

13. Recommendation of the Seed Sector

Since 2002, a strong foundation has been laid in the seed sector within the framework of a national seed policy and a seed law. Further development of the seed sector will require effective implementation of the Seed Law, which will depend on a well administered National Seed Board particularly regarding the following:

- Avoiding decisions leading to market distortions such as control of seed and input prices.
- Establishing a truly autonomous and independent Seed Certification Agency within in MAIL that charges fees and retains income.
- Regulating the seed industry using a combination of instruments including the national seed policy and seed law including rules, regulations and procedures.
- Increasing efficiency in wheat seed production while encouraging crop diversification.

About ICARDA and the CGIAR



Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is one of 15 centers supported by the CGIAR. ICARDA's mission is to contribute to the improvement of livelihoods of the resource-poor in dry areas by enhancing food security and alleviating poverty through research and partnerships to achieve sustainable increases in agricultural productivity and income, while ensuring the efficient and more equitable use and conservation of natural resources.

ICARDA has a global mandate for the improvement of barley, lentil and faba bean, and serves the non-tropical dry areas for the improvement of on-farm water use efficiency, rangeland and small-ruminant production. In the Central and West Asia and North Africa (CWANA) region, ICARDA contributes to the improvement of bread and durum wheats, kabuli chickpea, pasture and forage legumes, and associated farming systems. It also works on improved land management, diversification of production systems, and value-added crop and livestock products. Social, economic and policy research is an integral component of ICARDA's research to better target poverty and to enhance the uptake and maximize impact of research outputs.



The Consultative Group on International Agricultural Research (CGIAR) is a strategic alliance of countries, international and regional organizations, and private foundations supporting 15 international agricultural Centers that work with national agricultural research systems and civil society organizations including the private sector. The alliance mobilizes agricultural science to reduce poverty, foster human well being, promote agricultural growth and protect the environment. The CGIAR generates global public goods that are available to all.

The World Bank, the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), and the International Fund for Agricultural Development (IFAD) are cosponsors of the CGIAR. The World Bank provides the CGIAR with a System Office in Washington, DC. A Science Council, with its Secretariat at FAO in Rome, assists the System in the development of its research program.