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# Focus on Seed Programs

## The Kyrgyzstan Seed Industry

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### Introduction

**K**yrgyzstan is one of the smallest countries in Central Asia bordering Kazakhstan in the north, China in the east, Tajikistan in the south and Uzbekistan in the west. Seventy percent of the country is situated more than 2000 masl, with extensive mountainous areas. The climate is continental, with hot and dry summers and cold winters with large local variations depending on the altitude. Annual precipitation is unevenly distributed, ranging from 200 mm in the lowlands to more than 1000 mm in other areas. In the winter there is frost in all regions.

Kyrgyzstan has a total area close to 20 million ha. About 1.5 million ha is arable land of which 900,000 ha is irrigated. Nearly 10 million ha is natural grazing land.

The agricultural sector is of great importance and contributes 35 % of the national GDP. The agricultural sector provides employment for over 50 % of the population. The main crops in Kyrgyzstan are cereals, potato, cotton, oilseeds, sugar beet, vegetables, fruits, and forage crops like alfalfa and sainfoin. The use of irrigated agricultural land is presented in Table 1 and average yield of the main crops in Table 2.

During the Soviet era, agriculture was focused on animal production. After independence the country shifted towards self sufficiency for agricultural products. This has led to changes in national agricultural policies and diversified the range of crops grown in the country.

Historically, Kyrgyzstan was a major seed producer within the former Soviet Union due to favourable growing conditions, low humidity resulting in low disease pressure, allowing high quality seeds to be produced. As in all post-Soviet countries, the basic structure of the seed industry was based on the activities of the Ministry of Agriculture and only the formal seed sector operated. Therefore, countries in the region do not face the same difficulties that other regions are experiencing in developing their seed industry. The Swedish International Development Agency (SIDA) has been supporting the development of Kyrgyzstan national seed industry development since 2004. Previously the European Union provided technical assistance during a three year period (2000-03), complementary to investment support provided by the World Bank Agricultural Sector Support Program (ASSP).

**Table 1. Area planted with major crops in 2005 and 2006 crop seasons (ha)**

Crop	Crop season	
	2005	2006
Winter wheat	279,353	261,095
Spring wheat	146,496	151,106
Winter barley	16,006	11,415
Spring barley	86,220	94,544
Oats	1,404	912
Buckwheat	378	203
Rice	5,868	6,347
Maize	72,604	72,045
Millet	99	92
Sorghum	5	124
<b>Sub-total</b>	<b>608,433</b>	<b>597,883</b>
<b>Pulses</b>	<b>24,611</b>	<b>35,885</b>
Cotton	45,561	45,743
Sugar beet	14,522	13,643
Tobacco	5,554	5,607
Oil crops (Sunflower)	59,181	58,912
Other oil crops	22,339	18,995
Other industrial crops	534	466
<b>Sub-total (industrial crops)</b>	<b>147,691</b>	<b>143,366</b>
Potato	76,064	81,150
Vegetables	40,647	41,181
Cucurbits (melon, pumpkin etc)	4,526	5,054
Other vegetables	112	76
<b>Sub-total (vegetables)</b>	<b>121,349</b>	<b>127,461</b>
Maize for silage	6,252	6,328
Perennial forages (1 year)	10,396	9,590
Perennial forages (+ 1 year)	181,322	186,672
Other forage crops	18,161	26,388
<b>Sub-total (forages)</b>	<b>216,131</b>	<b>228,978</b>
<b>Total</b>	<b>1,118,215</b>	<b>1,133,573</b>

### National Seed Policy and Regulatory Framework

Kyrgyzstan is transforming from a centrally organized economy towards market-driven economy. The government policy encourages liberalization of the seed sector from a public sector managed system into a market oriented and internationally harmonized seed industry.

#### National Seed Policy

Kyrgyzstan has developed an agricultural policy and a specific seed policy is in the process of being developed. The regulations

support the activities of private sector seed production.

**Table 2. Average yield of main crops in 2005 and 2006 crop seasons (tons per ha)**

Crop	Crop season	
	2005	2006
Wheat	2.2	2.1
Barley	2.1	2.0
Rice	2.9	2.8
Oats	2.2	2.2
Buckwheat	0.9	1.9
Maize	5.9	5.9
Millet	2.0	1.2
Phaseolus bean	2.0	1.5
Oil crops	1.1	1.0
Cotton	2.6	2.6
Sugar beet	20.0	16.8
Tobacco	2.4	2.4
Potato	14.8	15.2
Melons	19.0	19.3
Vegetables	17.4	17.6
Maize for silage	18.0	18.3
Perennial grasses	5.8	5.6
Fruit & berries	3.6	4.6
Vines	1.7	2.2

In 2004, a National Seed Council was established to create a forum where all stakeholders involved in seed production could interact to address the constraints facing the seed sector. The Council has 30 to 40 members, but there is a plan to reduce the number. The Council members are representatives of government organizations such as the State Commission for Variety Testing, State Seed Inspectorate and Plant Quarantine and the private sector, represented by the Kyrgyz Seed Association.

#### Regulatory Framework

The Seed Law was signed by the President on 8 January 2007. The law includes the main regulatory framework for production

and certification of seed and planting material. Article 4 and 5 in the law regulate the principles of seed production and certification. Certification of seed is in accordance with the OECD seed scheme and certification is compulsory for all species included in the "List of Species for Certification" which is approved by the state agriculture (forestry) management institution. Article 6 states that everyone has the right to produce seeds, as long as the producers have an agreement with the owners of the variety and acknowledge the breeder's rights.

#### *Plant Variety Protection*

The Plant Variety Protection law (PVP) was signed in 1997, and every other year amendments have been made to the law. In the near future, additional amendments will be made, especially concerning the acreage permitted for farmer's privilege.

The Law on Pesticides and Plant Protection was amended in June 2003 to address the issues related to the sale of pesticides and agro-chemicals.

The royalty collection system is in place and is expected to be fully operational in the near future. Varieties may be protected by Kyrgyz patent. An agreement to simplify the system for foreign companies to protect their varieties is also in place. Farms are now able to multiply seed under license agreements with the plant breeder or license holder and to pay royalties through the Kyrgyz Patent Office.

#### *Plant Quarantine*

The Plant Quarantine Inspections Service operates under the Ministry of Agriculture, Water Resources and Food Processing (MAWRFP) and is responsible for regulating phytosanitary issues (Figure 1). Plant quarantine is regulated by the Law on Plant Quarantine of 1996 and 1998 and the Phytosanitary Regulations of Kyrgyz Republic of 2000.

## **Agricultural Research and Variety Development**

In the past, all agricultural research including plant breeding and variety development was carried out by government institutions. Agricultural research suffered severely when financial support was cut off after the collapse of the Soviet Union. Plant breeding is conducted mainly by the Crop Research Institute and Forage & Pasture Research Institute, but after independence a few private breeding companies have emerged. The former main breeding institutes are mostly subsidiaries of the MAWRFP (Figure 1).

### **Variety Development**

Agricultural research and variety development is carried out by various public and private sector institutions.

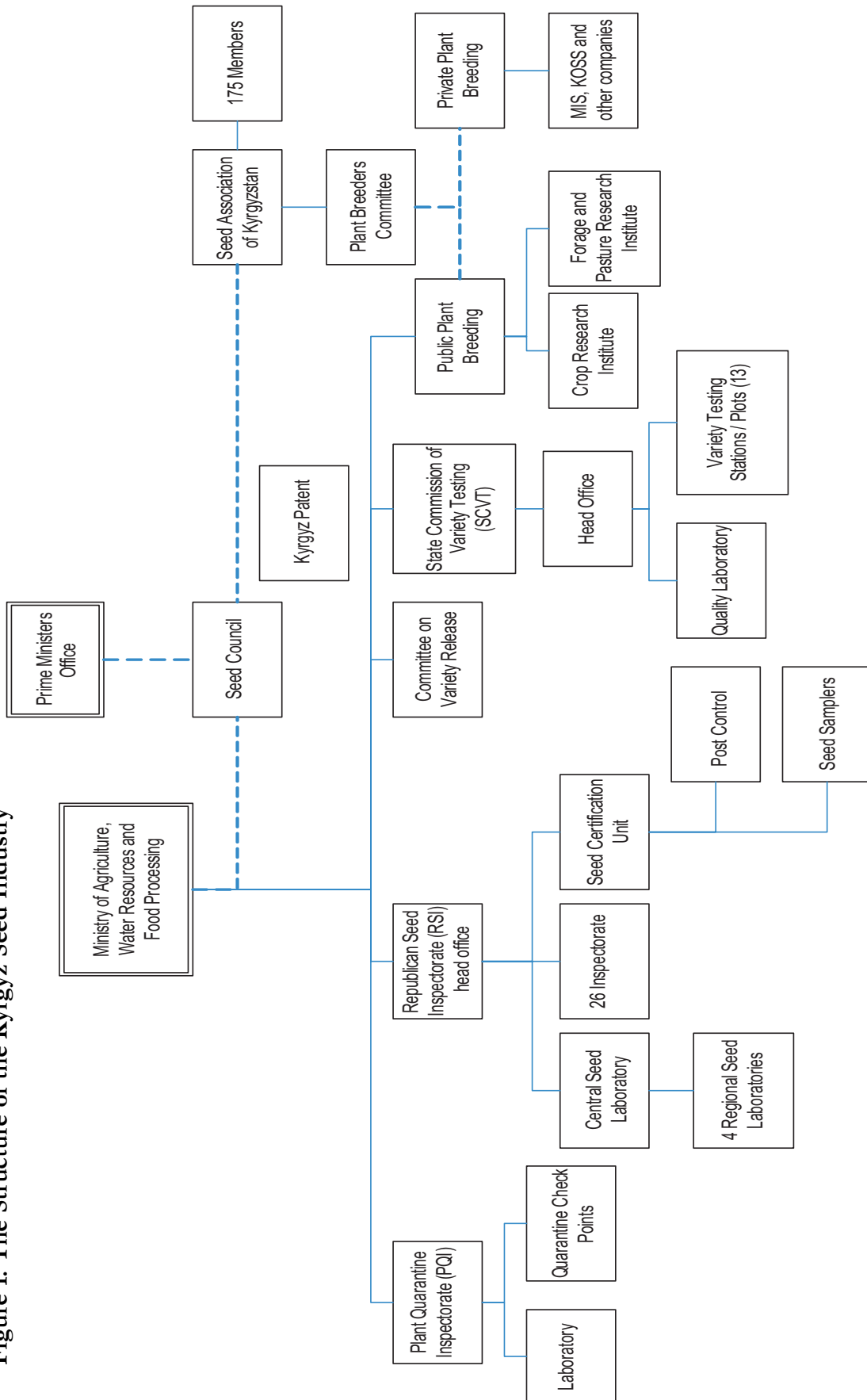
#### *Crop Research Institute*

The Crop Research Institute operates under the MAWRFP. There is a large breeding program at CRI central research station near Bishkek and regional research centers throughout the country in Chui, Issyk Kul, Naryn and Osh. The main crops being bred are cereals (wheat, maize and barley), cotton, potato, sugar beet, oil seeds, pulses, vegetables and fruits. CRI has an active crossing and selection program including both local germplasm and introduced germplasm received from international organizations, especially CIMMYT, ICAR-DA and the Turkey-CIMMYT-ICARDA International Winter Wheat Improvement Program (IWWIP).

#### *Institute of Pasture and Fodder Crops*

The Institute of Pasture and Fodder Crops (IPFC)/ Laboratory of Pastures and Forage Crops (LPFC) operates under the Livestock Institute, also a subsidiary of the MAWRFP. The main responsibility of the

Figure 1. The Structure of the Kyrgyz Seed Industry



institute is to develop and maintain varieties of pasture and forage crops. IPFC is located near Bishkek and conducts breeding of feed crops such as soybean, chickpea, alfalfa, lucerne, sainfoin, clovers, melilot and grasses (*Bromus*, *Dactylus*, *Lolium*, *Poa*, *Phleum* and *Festuca*) where several varieties have been released. The main focus is on alfalfa breeding, but sainfoin is also a high priority, especially for higher altitudes.

#### *National Academy of Science*

This institution is responsible for breeding of ornamentals and woody species in the Botanical Garden in Bishkek. It also breeds fruit crops, turf grasses and herbs in a special laboratory. The Academy maintains and studies genetic resources of fruit trees and other crops that are used in the breeding program. The National Academy of Science also has a separate institute for breeding of walnut and forest trees.

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#### *MIS farm*

MIS farm is a private enterprise in Chuy Valley just outside Bishkek, specializing in seed production and processing. The wheat breeding program has been going on for 10 years, but they are also working on triticale, barley and to a lesser extent on oats. The breeding program cooperates with international organizations, and is mainly receiving and testing germplasm from the IWWIP program in Turkey. As the MIS has no crossing program, the main focus is on selection of already fixed lines and exploiting variation within almost fixed lines. The breeding and maintenance programs function efficiently, despite the limited resources they have at their disposal.

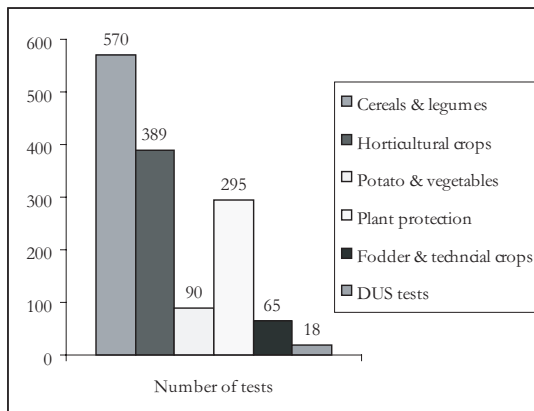
#### *Koss Seed Farm and Kyrgyz Sugar Beet Breeding and Experimental Station*

The Koss seed farm is a state company specialized in sugar beet breeding since 1949 and is producing pre-basic seed. Previously, Koss farm developed sugar beet varieties in partnership with European companies, but the cooperation and exchange of germplasm has now stopped. Koss station also produces pre-basic seed of wheat, barley, maize and alfalfa for the Crop Research Institute.

### **Variety Testing, Registration, and Release**

**T**he State Commission for Variety Testing (SCVT) is operating under the MAWRFP (Figure 1). It is a well functioning institution, coordinating 12 Variety Testing Stations (VTS) or Variety Testing Plots of which four have been fully equipped by the World Bank ASSP project. (VTP). The VTS and VTP differs in that the VTS are usually placed on large farms whereas the VTP are testing stations only managed by the SCVT. Each VTS or VTP

has about 70 ha for variety testing. Annually, up to 1400 VCU (Value for cultivation and Use) and DUS (Distinctness, Uniformity and Stability) tests are conducted, including 1130 comparison trials and 300 tests for disease and pests resistance (Figure 2). The SCVT is exclusively financed from farming activities and testing services (VTS and VTP), to cover its operational costs.



**Figure 2. Number of VCU and DUS tests performed by the SCVT in 2005**

The SCVT has good capacity for quality testing, including 13 chemical and 11 technical tests. Annually up to 3000 tests are carried out in the laboratory. The information system contains a database of 576 varieties and 129 breeding institutions.

The SCVT conducts VCU (trials and increasing number of DUS trails each year. DUS tests are conducted for two growing seasons and in accordance with the UPOV guidelines. VCU tests are also carried out for two growing seasons and in more than one agro-ecological zone.

Both VCU and DUS tests are compulsory for variety release. The varieties on the a national list are approved by the Variety Release Committee (VRC) at their annual meeting in December. The members of the VRC are representatives from the MAWRFP, SCVT, RSI, breeders and the

growers represented by the Seed Association of Kyrgyzstan.

An updated national variety list is published every year and a booklet with the results of the VCU trials is also published and distributed to interested parties. During recent years 223 new varieties have been registered and included in the National Variety Catalogue.

The seed classes are according to the OECD seed schemes, breeder pre-basic, basic, certified 1, certified 2; and following a generation system depending on the crop.

The breeder or owner of a variety is responsible for keeping adequate stocks and maintaining the variety. Variety maintenance is carried out by the breeder of the varieties, i.e. CRI or MIS farm. They produce breeder seed and pre-basic seed which are then sold to seed farms that produce certified seed for farmers.

### Formal Seed Production

About 70 to 75% of the seed sold in Kyrgyzstan is certified seed. The informal sector constitutes only 25 to 30% of the total seed market. There are a lot of seeds in storage, especially of sugar beet and maize, which makes the figures in Table 3 misleading. The major part of the informal seed trade is vegetable and ornamental seeds.

**Table 3. Field inspection of field crops, 2006**

Crop	Class	Area (ha)	Seed produced (tons)	Clean seed (tons)
Cereals	Breeder	63	206	124
	Pre-basic	323	1050	629
	Basic	788	2632	15809
	C1	3981	12970	77263
	C2	21916	5479	38353
Maize	F1 hybrid	15	22.5	15
Sugar beet	C1	22	13.2	9.2

In the past seed was produced by kolkhozes and solvhozes i.e. state or collective farms. Some of these farms have now been privatised. At present seed production is carried out by special seed farms, both public and private sector.

From 2000 to 2003, the government reviewed the status of seed producing cooperative and state farms and by Decree No 586 of 9 August 2004, approved the list of seed producing companies. The number of seed farms is being reduced, to improve seed quality. The government still decides which farms are allowed to produce seeds.

In 2005, about 158 farms were involved in production and marketing seeds. Kyrgyzstan is self sufficient in agricultural crops except vegetables, but around 10% of sugar beet seed is imported. Between 2004 and 2005 the seed production of cereals doubled and maize seed production has also increased (Table 3).

**Table 4. Seed production in Kyrgyzstan (tons)**

Crop	1995	2000	2004	2005
Cereals	46700	42200	42671	88500
Oil crops	19	104	414	312
Maize	1010	1000	421	1600
Beans		50	392	398
Lucerne	502	335	307	318
Sugar beet	505	393	259	303
Potatoes	860	1350	5890	5997
Cotton				1721
Total	49,596	45,432	50,354	99,149

One of the main areas that need immediate attention is improving the level of variety maintenance. This task will be coordinated through the Seed Inspectorate and SAK, the breeders' committee which acts as the link between plant breeders and seed producers.

## Seed Processing and Storage

The total national demand for certified seed in the country is approximately 120,000 tons, that needs to be cleaned during the 150 days from harvesting to planting. About 25 major seed cleaning plants are in operation across the country and three of them have mechanical seed treatment facilities. However, due to outdated seed processing equipment, it is often difficult to meet the demand for processing and packaging seeds on time for planting.

Seed storage is regulated by the Seed Law. National and regional storage facilities are regulated by the Government of Kyrgyzstan in accordance with MAWRFP recommendation. All large seed farms have their own storage capacity of about 5,000 to 10,000 tons seeds per farm.

## Seed Marketing and Promotion

The public sector does not market its varieties, instead it relies on the state to sell the seed. For the private sector, promotion of seed is carried out through field days, demonstration plots as well as through the extension services. Sometimes seeds of new crop varieties are given distributed free to farmers to test as a promotional activity.

For vegetables, ornamentals and turf grass, private companies promote their varieties. They are in the process of establishing a private seed retail network within the country.

The extension services are present in all regions and they work independently. They are partly self-financed but also supported by the World Bank and the Swiss Development Agency. The extension service also promotes crop management technologies and other improved methodologies.

### *Seed prices*

The Anti Monopoly Committee offers the highest grain prices, but in reality the open market prices have so far not been significantly lower. Therefore, the real seed price so far not been affected by this price.

Seed prices for wheat and barley are very similar (Table 5). The cost of local open pollinated sugar beet is USD 4 ( \$1=3.75 Som) per kg while imported hybrids cost ten times more, USD 40 per kg. For maize, the double hybrid costs USD 0.65 while single and three-way hybrids costs USD 0.80 per kg. Basic seed for lucerne costs USD 10.5 per kg, certified 1 USD 4.60 per kg, certified 2 USD 2.90 per kg and certified 3 USD 2.60 per kg.

**Table 5. Seed prices (USD per kg) for wheat and barley**

Seed class	Wheat	Barley	Seed price
Pre-basic	0.56	0.47	0.61
Basic	0.40	0.33	0.45
Certified 1	0.29	0.24	0.29
Certified 2	0.27	0.23	0.21
Certified 3	0.26	0.21	0.17

### *Credit facilities*

Almost 90% of the Kyrgyz farms are now privatized. These farmers receive minimal financial support, and are exempted also from paying income tax. Although it is possible for farmers to get credit, it is often only possible to get short term and very expensive credit. Kyrgyz Agricultural Finance Cooperation (KFC) and the Baitsuschum are some examples of credit institutions for farmers.

### **Seed Quality Control and Certification**

**I**n Kyrgyzstan, the Republican Seed Inspectorate (RSI) is responsible for seed quality control and certification (Figure 1). The central seed laboratory was

ISTA accredited in 2005. One cotton seed testing laboratory in Kara Suu, in Fergana Valley, was recently modernized. In 2005, Kyrgyzstan joined the OECD seed scheme for cereals, and sugar and fodder beets. RSI has developed a well functioning field inspection service, and is planning to join other OECD seed schemes in the near future.

The four regional seed testing laboratories are working to the same standards as the central seed laboratory. The RSI controls around 900 samples per year.

For a seed lot, the field inspection, the control plot and the seed sample must meet the standard requirements for certification.

The seed classes used for certification are harmonized with international standards. The seed classes are pre-basic, basic, certified 1 and subsequent generations. The new Seed Law stipulates that all certified seeds must be packed in labelled and closed containers. However, the enforcement of the law has not yet been achieved. Therefore seeds in lower classes are stored in bulk. From 2008, Kyrgyz standards should meet the OECD seed scheme standards for cereals, beet and legumes.

The big seed farms (e.g. MIS farm) have their own internal seed testing laboratories where they conduct pre-certification tests of seeds they are producing.

### **International Seed Trade**

**I**n the past Kyrgyzstan was a major producer and supplier of seed to the former Soviet Republics which had a highly centralized seed production system. In the 1980s, annually, it supplied about 5 to 5,500 tons of hybrid maize seed to Central Asia and Transcaucasian republics, 5 to 6,000 tons of lucerne seed to former Soviet



Republics, and 10 to 12,000 tons of sugar beet seed to Russia and Kazakhstan. However, seed production levels rationalized and declined gradually due to lack of external markets.

In Kyrgyzstan, seed export and import is duty free according to the legislation. Most seed trade is carried out by the seed farms, who sell their stock to other farmers interested in buying seeds. The export of seeds from Kyrgyzstan is largely unregulated. There are some reports on cross border illegal sale of seed and planting materials of wheat, cotton, vegetables and fruits as well as fertilisers and agro-chemicals at the Kazakh and Uzbek border.

In Kyrgyzstan, seed export is duty free according to the legislation, while VAT must be paid on imported seed. Most seed trade is carried out by the seed farms, which sell their stock to other farmers. There are some reports of smuggling of wheat, cotton seed, fruits and vegetables, fertilisers and agro-chemicals at the Kazakh-Uzbek border. The export of seeds from Kyrgyzstan is largely unregulated.

### National Seed Association

The Seed Association of Kyrgyzstan (SAK) was established in 1999. Today, SAK has 175 members i.e. 145 private seed companies and 30 public seed farms (Table 3). SAK has regional representatives in Batken, Chui, Jalal-Abad, Issyk-Kul, Naryn, Osh, and Talas regions. The main task of SAK is to protect the rights and represent the interests of the members and to strengthen the technical base and knowledge of its members. More information about SAK and its activities can be found at the website of the Central Asian Seed Associations ([www.centralasiaseed.com](http://www.centralasiaseed.com))

**Table 6. Members of seed association of Kyrgyzstan**

Type of farms	No of Members	% of members
Joint peasant farms	12	9
Small seed farms	85	62
Joint stock farms	9	7
Agricultural cooperatives	37	27
Fruit and vegetable nurseries	2	1
State farms	30	22

### Quarantine

The law of 1996 and 1998 gives the legal framework for plant quarantine, which is harmonized with international regulations and is used for protecting plant wealth and preventing intrusion of weeds, pathogens, seed-borne diseases from other states and from quarantine zones within the republic. The plant quarantine facilities have been rehabilitated, the laboratory equipped and the staff have been trained. The main facilities of the Plant Quarantine Service are located in Bishkek.

An import permit is required for import and transit of seed and other plant parts and products. The import permit is valid for 30 days after issue. The Plant Quarantine service is responsible for issuing import and export permits which is valid for 30 days. Plants and plantlets imported for research and commercial samples not exceeding 5 kg may be imported without permits.

All imported commodities must be accompanied by a Phytosanitary Certificate (PC) issued by the National Plant Protection Organization in the exporting country in accordance with the IPPC. The certificate must accompany the consignment at the inspection point. The documents should specify where the seed has been produced,

where the commodity has been grown and certify that the commodity is free from quarantine pests. If the commodity is re-exported, a re-exportation (RC) certificate must be issued according to the FAO model and attached to the PC. The PC and RC are valid for a maximum of 14 days from the time of inspection. In some specified cases, the commodities need to be accompanied with an Additional Declaration (AD), particularly if treatments are required. It is not prohibited to import GMO material into the country.

### **National Seed Organizations and International Membership**

**K**yrgyzstan is a member of major international organizations including the International Seed Testing Association (ISTA), International Union for Protection of New Varieties of Plants (UPOV), and Organization for Economic Cooperation and Development (OECD) seed schemes.

The Seed Association of Kyrgyzstan (SAK) is a member of the International Seed Federation (ISF). The central seed laboratory of the Seed Inspectorate achieved ISTA accreditation in 2005. The same year Kyrgyzstan became a member of OECD seed schemes for cereals, sugar and fodder beets. Kyrgyzstan has been a member of WTO since 1998.

Kyrgyzstan is a member of EPPO (European Plant Protection Organisation) since 2000 and ratified the IPPC (International Plant Protection Convention) on 11 December 2003.

### **Constraints to the Seed Sector**

**A**t present there is no specific national seed policy. Instead, seed issues are addressed within the govern-

ment agricultural policy which partly deals with seeds.

Variety maintenance remains one of the main constraints in the Kyrgyz seed sector. Breeders do not have any tradition of maintaining their varieties, limiting the availability of early generation seed.

The seed processing and storage facilities are antiquated and need replacement for timely operation and supply of seed for planting. The lack of affordable credit limits farmers' ability to invest in improved machinery and techniques for seed production and processing.

The willingness of farmers to pay extra for improved seed is low. This impedes the emergence of private seed companies, since the farmers are not convinced that the high priced seed is better than the local seed.

### **Recommendations for the Seed Sector**

**T**he seed sector plays an important role in Kyrgyz agriculture and there is an urgent need to develop a specific seed policy for the country

Given reduced funding and limited resources there is an urgent need to develop more focused strategic plans including identifying priority crops and identifying the most efficient breeding methodologies and potential areas for regional cooperation.

In order to make available early generation seed, efforts should be made to establish an effective mechanism for variety maintenance. The stakeholders are aware of the problem, and measures are being taken to address this constraint.

The government needs to provide incentives to promote and facilitate investments

in renovating seed processing infrastructure and facilities.

It is also important to strengthen the royalty collection system to encourage foreign breeders to release their varieties in the country.

Efforts need to attract young staff within the whole seed chain, from breeding to seed production, certification and marketing.

### **Conclusions**

The seed industry in Kyrgyzstan is in a state of transition. However, the challenges remain in some key areas.

At present, weak plant breeding programs and old style management of institutions are hampering progress. There is a need to engage a younger generation of people in agricultural research, particularly in breeding.

Farmers need to be convinced of the increased profitability that comes from improved seeds and encouraged to purchase the more expensive seed. Also the international linkage needs to be strengthened to promote Kyrgyzstan as a high quality seed producing country.

Immediate results cannot be expected. Further efforts are necessary to give rise to confidence in the system and promote Kyrgyzstan's role in the international seed trade.

## Final Announcement

### Second International Seed Trade Conference 2007 (Second ISTC2007)

The National Seed Council of Egypt, the Turkish Seed Industry Association (TURKTED) and ICARDA will organize the Second International Seed Trade Conference 2007 in CWANA Region, to be held from 19-21 November 2007 in Cairo, Egypt. The conference aims at promoting seed trade within and between the CWANA region and the rest of the world. The conference will not only provide opportunities for seed trade, but also contribute to dialog between the private and public sectors on harmonization of regulatory frameworks to promote seed trade in the region. A major focus of the conference will be trade exhibitions by seed companies, seed equipment manufacturers, agricultural input supply companies, and agricultural machinery manufacturers. Companies interested in participating in the conference or exhibiting their products should contact the conference secretariat.

### Conference Venue

The conference will be held at Mena House Oberoi, Cairo. Surrounded by 40 acres of scented gardens, the historic palace hotel, built in 1869, is only 700 meters from the Pyramid of Cheops. The hotel is located in Cairo's Giza district, 15 km from the city center and 35 km from the airport.

### Conference Information

More information on the conference visit the websites:

ESAS: <http://www.esas-egypt.org> (Arabic and English)

ICARDA: [http://www.icarda.org/announcement/seedtradeconf\\_nov07.htm](http://www.icarda.org/announcement/seedtradeconf_nov07.htm) (English)

National Seed Council: <http://www.seedcouncil.gov.eg> (Arabic & English)

### Conference Secretariat

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