Focus on Seed Programs

The Tajikistan Seed Industry

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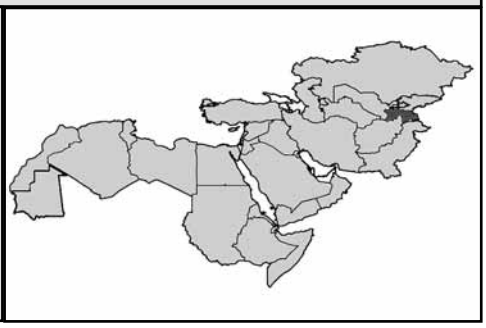


Introduction

Tajikistan is located between 36°40" and 41°05" N and 67°31" and 75°14" E. It borders Kyrgyzstan in the north, China in the east, Afghanistan in the south and Uzbekistan in the west. Tajikistan is a mountainous country, lying between 300 and 7495 masl, with 11 agro-climatic zones from from hot arid valleys in the west to high mountains in the eastern Pamirs. The climate is mainly continental. Agriculture is mostly rainfed in the mountains while irrigated farming is most common in the lowlands.

The population is approximately 7.1 million, of which 75% lives in rural areas. In 2006, the agricultural sector contributed 18.4% of GDP and 51% of employment. About 39% of the population working in agriculture is employed by state agricultural production enterprises, and the remainder are involved in private household farms. In 2004, agriculture contributed 30% of export value and 35% of tax revenues.

Tajikistan has a total land area of 14.31 million ha; and only 6.3% is used for agriculture. The arable land area for crop production is close to 900,000 ha. About 594, 000 ha is irrigated while the remaining is rainfed. Double cropping is common. The major agricultural crops are wheat, cotton, potato, vegetables and fruits, although more than 50 crops are cultivated in Tajikistan. Crop production accounts for more than 70% of gross agricultural product.

Under the former Soviet Union, Tajikistan produced cotton for export to other republics and imported foodstuffs and other agricultural products. After independence, the aim shifted towards food security and these changes in agricultural production are reflected in Table 1, which shows the area planted with different crops. Table 2 shows trends in average crop yields.

In 2007, cereals occupied the largest proportion (45%) followed by cotton (25%), forages (15%), vegetables (4%), potatoes (3%), other crops (3%) and melons (1%).

Considerable effort is made in reforming land use, property ownership and private farming. All land is state owned, and farmers have the right to use land and inherit the right to family members.

Tajikistan is in state of transition from a centrally organized economy towards a market-oriented economy. The government policy is undergoing transformation and an agricultural policy framework is being is developed, harmonized with developments in the international arena.

Table 1. Area planted (ha) with major crops in Tajikistan

Crop	Cropping season		
	1991	**2001**	**2006**
Wheat	143590	326362	320694
Barley	45996	29689	47200
Rye	1961	799	135
Oat	3375	409	1807
Rice	9389	14225	10692
Maize	15256	9003	10137
Sorghum	275	80	199
Cereals	**231697**	**389055**	**401912**
Pea	1871	4923	5496
Lentil	1726	425	1154
Legumes	**11843**	**8452**	**11037**
Cotton	298835	257371	262893
Cotton (fine fiber)	62932	35310	25442
Industrial crops	310054	288145	293975
Linseed	3802	20872	19480
Sesame	151	561	612
Essential oil crops	956	4	4
Oilseeds	5319	26649	29091
Tobacco	4232	3096	1160
Potato	12800	24000	27500
Other crops	245099	110511	135485
Total	821044	849908	900160

Essential oil crops (geranium); other crops (vegetables, forage crops, etc.)

Source: Statistical Yearbook, Dushanbe, 2006

Table 2. Average yield (t/ha) of major crops in Tajikistan

Crop	Cropping season		
	1991	**2001**	**2006**
Wheat	1.07	1.31	1.99
Barley	1.09	0.86	1.61
Rice	2.74	2.61	3.14
Maize (grain)	3.92	29.5	3.77
Linseed	0.42	0.28	0.47
Cotton	2.76	1.76	1.7
Tobacco	2.62	1.32	1.44
Potato	14.1	12.9	19.9
Vegetables	19.3	11.7	18.7
Gourds	8.7	10.3	18.6
Fruits	3.21	2.49	3.11
Grapes	4.45	3.29	3.31

Source: Statistical Yearbook. Dushanbe, 2006

Several projects are financed and implemented by international donor agencies for the development of agriculture in Tajikistan. A number of NGOs have projects for development of the seed sector, particularly assisting small farmers in the informal seed sector.

There are two seed projects in the seed sector. These are 'Support to Seed Industry Development in Tajikistan' funded by the Swedish International Development Cooperation Agency (Sida) (since 2004) and 'Strengthening Seed Supply in ECO Region' financed by ECO/FAO/ICARDA (2006), working to develop a commercial, market-oriented seed industry in Tajikistan.

National Seed Policy and Regulatory Framework

During the former Soviet Union, agriculture was focused on cotton production. After independence, the country has aimed at achieving national self sufficiency and food security. This has led to changes in agriculture and diversified the range of crops grown in the country. A seed policy is being developed by the Ministry of Agriculture and Environmental Protection (MAEP) with the assistance of the Sida funded seed project.

The existing laws regulating the Seed Industry are:

- Law #83 of the Republic of Tajikistan 'On Crop Breeding Achievements' dated 4 November 1995 and amended 2 December 2002
- Law of the Republic of Tajikistan on 'Plant Quarantine' dated 28 April 2001
- Law of the Republic of Tajikistan on 'Seed Industry' dated 5 January 2008.

The new law regulates variety testing and registration as well as seed quality control and certification. A new law for plant variety protection is being discussed in parliament. The laws have been harmonized with the respective international organizations to enable Tajikistan to participate in international seed trade. Amendments to the current plant quarantine law are under development to enable Tajikistan to meet SPS (Sanitary and Phytosanitary Measures) agreements and to join the International Plant Protection Convention (IPPC).

Agricultural Research and Variety Development

All agricultural research and plant breeding institutions belong to the public sector. The Agricultural (Ziroatkor) and Horticultural (Bogparvar) Scientific and Production Enterprises belong to the Tajik Agrarian Academy of Sciences under the MAEP. The National Academy of Science also administers the Research Institute of Plant Physiology and Genetics and Pamir Biological Institute.

Variety development is carried out for cotton, wheat, barley, rye and fodder crops, but not for rice, maize, oilseeds and tobacco. The resource allocation for crop improvement (variety development) is similar in all institutions and does not exceed 10%, except for cotton, where most of the resources are used for variety development. In cotton breeding higher proportions of resources, normally between 25 and 60%, are allocated for variety development. At present, cotton breeding is scattered among different institutions.

The Biotechnology Institute of Tajik Agrarian University and the Research Institute of Physiology and Plant Genetics use biotechnology tools for production of virus-free seed potato.

From 1991 to 2006, about 66 varieties were released of which 37 were from national breeding programs in Tajikistan. Cotton varieties constitute the largest number of releases.

Research Institute of Farming, Scientific and Production Enterprise (Ziroatkor)
The Research Institute of Farming (RIF) is situated in Sharora settlement (20 km west of Dushanbe) and is under the Tajik Academy of Agricultural Sciences. It was established 70 years ago and involved in plant breeding for over 50 years. Research is carried out at SPE branches in Vakhsh valley, Soghd province (Oblast) and experimental stations in Panjakent and Shahriston region (Rayon).

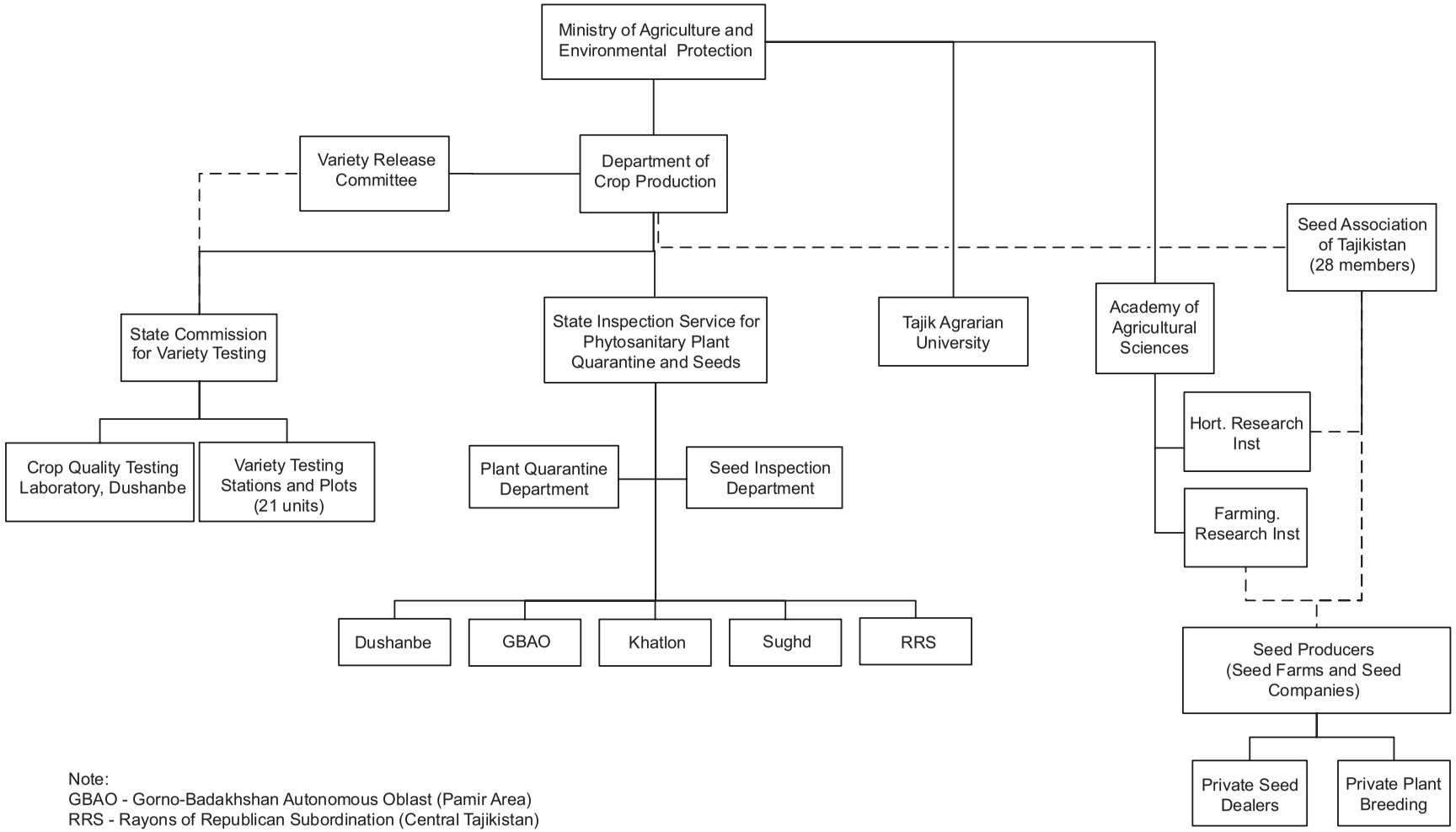
RIF breeding is primarily focused on cotton followed by wheat whereas the remaining resources were equally allocated among small grain cereals, maize, sorghum, grain legumes and oilseeds, with a smaller proportion for tobacco and rice. The resources allocated for cotton have been reduced which may benefit breeding of other crops.

The Vakhsh Branch of Scientific and Production Enterprise Ziroatkor was established in 1930 and is situated in southern Tajikistan. It is one of the major fine fiber cotton breeding centers, but also works on wheat, sorghum, soybean, rapeseed, mustard, clover, lupine, forage beet and forage maize. Since 1999 the wheat breeding program is collaborating with CIMMYT/ ICARDA.

Research Institute of Fruit and Vegetable Growing and Viticulture Scientific and Production Enterprise (Bogparvar)
The Research Institute of Fruit and Vegetable Growing (RIFVG) operates under the Tajik Academy of Agricultural Science and has its center in Dushanbe and 11 branches or stations in different agro-ecological zones. They specialize in research on horticultural crops.

Since the 1980s, the institute belongs to the Scientific and Production Enterprise (Bogparvar) which includes research institutes, branches, experimental stations and experimental production farms. RIFVG has been involved in breeding for 70 years and has 12 breeding programs. The main crops include potato, onion, garlic, carrot, tomato, cucumber, melons, grape, apple, apricot, peach, citrus and subtropical fruits (pomegranate and figs).

Figure 1. Structure of the Tajikistan Seed Industry



Note:
GBAO - Gorno-Badakhshan Autonomous Oblast (Pamir Area)
RRS - Rayons of Republican Subordination (Central Tajikistan)

In the 1980s, the Soghd Branch of Scientific and Production Enterprise became part of Bogparvar. It is the main breeding center for the northern plains of Tajikistan and has been involved in breeding for 70 years, focusing on vegetables (tomato, cucumber, cabbage, onion), fruits (apricot, peach, walnut, mulberry) and grapes.

Research Institute of Plant Physiology and Genetics
The Research Institute of Plant Physiology and Genetics (RIPPG) is situated in Dushanbe and belongs to the Tajik Academy of Sciences. The institute has been involved in plant breeding for 30 years and biotechnology research for 20 years. The most important crop is cotton, but it also works on wheat, triticale, rye and potato. This is one of the few institutes where the number of breeders has increased since independence.

During the last few years the institute participated in the FAO-funded virus-free potato seed production project which is implemented in cooperation with the Tajik Agrarian University and Scientific and Production Enterprise (Bogparvar). There is also a regional project supported by Bioversity International in collaboration with Bogparvar focusing on conservation and utilization of fruit tree genetic resources.

Pamir Biological Institute
Pamir Biological Institute (PBI) is under Tajik Academy of Sciences and located in Khorog in Gorno-Badakhshan region. The institute was established in 1969 and has been involved in plant breeding. The main crops are potato, wheat, barley, triticale and legumes (e.g. faba bean).

Tajik Agrarian University
Tajik Agrarian University (TAU) is a public university managed by both the Ministry of Education and the MAEP. The University has been working on cotton for 40 years and recently started wheat breeding. In the early 1990s, TAU began a biotechnology program which evolved into a Biotechnology Institute within the university in 2000.

Variety Testing, Registration and Release

The State Commission for Variety Testing (SCVT) operates under the Ministry of Agriculture and Environmental Protection. The SCVT is testing new varieties for approval and inclusion in the national variety list. According to the Law of 'Crop Breeding Achievements', new varieties have to be tested for VCU (Value for Cultivation and Use) for at least three years, followed by large-scale farm trials. Thereafter, varieties with superior performance could be released in the country for commercialization.

Previously there was no DUS (Distinctness, Uniformity and Stability) testing for any crop. During the former Soviet Union the State Seed Inspectorate conducted post-control testing for varietal purity. For locally produced varieties the description of the new variety was done by the SCVT in post-control plots. The Sida seed project has organized training in DUS testing during the last two years. DUS testing is currently carried out only for maize and cotton.

To date, the SCVT has 21 Variety Testing Stations (VTS) and Variety Testing Plots (VTP). The VTS are mainly self-financing large farms, with permanent buildings irrigation facilities and laboratory equipment. The VTPs are situated on large farms with similar facilities.

In 2007, VCU testing was carried out for wheat, beans, sunflower, potato, cotton,

alfalfa and sainfoin with a total of 47 entries. Table 3 shows the number of varieties released on the national list since independence.

Table 3. Varieties released from 1991 to 2006 in Tajikistan

Year	Number of varieties released		
	Tajikistan	Foreign	Total
1991	0	12	12
1992	1	3	4
1993	5	1	6
1994	3	0	3
1995	1	3	4
1996	3	2	5
1997	2	2	4
1999	6	0	6
2000	1	0	1
2001	2	0	2
2002	2	1	3
2003	1	0	1
2004	3	2	5
2005	4	1	5
2006	3	2	5
Total	37	29	66

Source: SVTC, Dushanbe, 2007

The Variety Release Committee (VCR) meets every year in January to decide which varieties are approved for commercial seed production in the country. The VCR is chaired by the Deputy Minister of Agriculture responsible for crop production. Members of the committee are representatives from the SCVT (head, deputy head, crop specialists) and representatives from research centers in related areas. Breeders are not allowed to be members of the committee. After the decision by the VRC, an updated version of the national list is published by the SCVT.

SCVT organized the Second West and Central Asian Regional Workshop on Plant Variety Protection in cooperation with the International Union for the Protection of New Varieties of Plants (UPOV) from 15-18 September 2006 in Dushanbe, Tajikistan. It aimed at creating awareness on plant variety protection and its role in seed sector development. A new law on plant variety protection is currently in the parliament for approval. The new law will provide for protection of varieties and will enable Tajikistan to become a full member of UPOV.

Formal Seed Production

Seed multiplication is carried out by research institutes and special public or private seed farms. There are four generations recognized for seed production: Elite, Certified 1, Certified 2 and Certified 3, based on the crop. Variety maintenance and early generation seed production is not well organized, leading to shortages of good quality seeds. The Sida seed project is assisting plant breeders in this area.

The breeders from breeding institutions or farming institutes or license holders are responsible for elite seed production. For the later generations, approved public and or private seed farms are responsible for seed production. Any farm that is interested can produce seed and become a seed farm.

Table 4 shows the potential seed demand and current seed supply for 2008. The official statistics clearly show that current production does not meet potential demand.

Table 4. Potential seed demand, availability and supply in Tajikistan for 2008

Crop	Seed demand	Seed availability	% seed supply
Wheat	64,138	33,991	53
Rice	1,925	1	0.1
Maize	608	145	24
Other cereals	9,134	1,712.3	18.7
Legumes	588	150	25.5
Potato	88,500	7,451	8.4
Cotton	28,050	15,679	56

Other cereals (barley, oats, sorghum, millet); legumes (faba bean, pea, chickpea, lentils). Source: MAEP, 2007

To some extent, seeds are imported from other countries, but this is only true for wheat. Import of cotton seed has been prohibited by a Presidential decree since 1995 which is now in the process of being revoked.

To overcome seed shortages farmers use informal sources. Most often they use farm-saved seeds or buy from the local seed farms. The informal seed supply by NGOs has been very high, especially for staple food crops such as wheat, as a result of the civil war. Most organizations have now shifted their strategy by encouraging farmers to save or to produce and use their own seeds. The percentage of farm saved seed is up to 100% in some crops. For example in rice less than 1% of the need is available for 2008.

Seed Processing and Storage

Most seed farms have mobile seed cleaning equipment. Seed production and seed cleaning equipment are dilapidated and do not meet modern seed industry standards. Most seed is sold without treatment and would be treated only on request. Seed is often treated in seed farms manually by mixing the seed and chemicals with shovels.

Cotton seed is usually processed in the ginneries that are located in different regions of Tajikistan. The ginneries have storage facilities where they store the seed, treat with the chemicals and sell to the farms. Seed of cereals and vegetables are processed by farms and stored in their warehouses. Farmers use mobile seed cleaners for cereals. For vegetable seed including some small grains and fooder crosp (e.g. alfalfa) the state unit called Tajiksortsemovosh is responsible for processing.

Seed Marketing and Pricing

The seed market in Tajikistan is emerging and is being deregulated. The formal seed market consists of mostly privatized former state farms that formerly produce seed for the government but have now shifted to the open market. Seed prices are not officially controlled by government. In reality cotton prices are agreed and regulated by the ginneries that wholesale cotton seed. Generally, seed prices are 20-30% higher than the grain prices in case of food crops. For example wheat, rice and cotton (seed for oil extraction) costs 1.8, 3.5, 1.5 Somoni per kg, respectively. Seed for planting costs 2.2, 40 and 2 Somoni per kg respectively (USD 1 = 3.45 Somoni).

Credit is available for the seed sector, but because of high interest rates most seed producers are reluctant to use credit for investments. Foreign banks are entering the market with competitive interest rates and the enlarged market will hopefully benefit farmers by lowering the interest rates. Several organizations offer good micro-finance loans, but these usually do not provide enough money for investments.

For grain crops, seed is marketed directly to farmers. Seed producers will find a market for their seed by identifying buyers. For vegetable seeds, some companies have entered the market. SAT will also assist in connecting seed buyers with seed producers.

The overall objective of the Sida project is to strengthen the seed sector towards commercialization and market-orientation.

International Seed Trade

Cereal seed is imported, and Krasnodar varieties from Russia are widely used in the country. There is some export of seeds within the region, especially vegetable seeds. For the first time, in 2007, the MEAP have procured 60 tons of cotton seed from Bayer Crop Science in Tajikistan.

For import, the State Inspection Service for Phytosanitary Plant Quarantine and Seeds (SISPPQS) requires a certificate that the seed or planting material meets Tajik standards and that it must be delivered in closed containers. The SISPPQI examines the import application. The seed must be free from important quarantine pests from exporting countries and this will be indicated in the import permit certificate. If the seed is meant for further multiplication and marketing in Tajikistan, the variety must be in the national list.

The importer must apply for an import quarantine permit before bringing in the consignment. Based on the import permit certificate the exporter applies for a phytosanitary certificate issued by the exporting country officials and a description of possible treatments accompanying the consignment.

After the seed arrives in Tajikistan, it should be inspected by Plant Quarantine Services which on approval of the seed health department, allows it to be planted.

The new Seed Law allows import of seed of non-released varieties for seed multiplication for export purposes.

Seed Quality Assurance

In January 2007, the State Seed Inspectorate and the Plant Quarantine Service merged and become the State Inspection Service for Phytosanitary Plant Quarantine and Seeds (SISPPQI). The SISPPQI operates under MEAP and is responsible for seed quality assurance. The newly adapted Seed Law has harmonized the Tajik legislation to international requirements. The development of new regulations adjusted to the new Seed Law is under process.

The SISPPQI headquarters is located in Dushanbe. The seed quality assurance agency including plant quarantine service operates in all regions, represented by 40 inspectors assigned throughout the country. The main tasks of the inspectors are to control seed quality through field inspection, sampling and laboratory seed testing.

The central seed laboratory is located in Dushanbe and has been refurbished and upgraded by Sida project. It is aiming to become an ISTA accredited laboratory by 2010. The laboratory tested approximately 500 seed samples in 2007 compared to 169 samples the previous year and the number is expected to increase. The two regional seed laboratories, one in Soghd (north) and one in Varkhsh (south), have been upgraded by the Sida project. Several training courses have been conducted to harmonize the seed testing methods to ISTA rules and methods. The Sida funded seed project has also assisted in upgrading four laboratories of seed farms for pre-control of seed samples.

Near Dushanbe, control plots have been established for cotton and wheat based on OECD seed certification schemes. Lack of access to adequate equipment is currently hindering further development of control plots.

Plant Quarantine

The State Inspection Service for Phytosanitary Plant Quarantine and Seeds under the MAEP is responsi-

ble for plant quarantine. The headquarters and the central laboratory for phtosanaitary and plant quarantine are located in ushanbe. In each of the five provinces in Tajikistan, the SISPPQS has regional offices under which regional laboratories, border points and fumigation groups are operating, covering the whole country.

The Plant Quarantine Law was approved on 28 April 2001. The amendment of the law for adherence to the SPS agreement and the IPPC has been initiated and is expected to be finalized in 2008. The law stipulates the national quarantine policy, quarantine phytosanitary inspection, and certification. The Plant Quarantine Service is responsible for preventing the introduction of quarantine pests and for eliminating such diseases and pests in the country.

At present, the plant quarantine facilities are not adequate. The representatives of Plant Quarantine Service participated in international events such as EPPO (Paris, 2007), ECO-FAO-ICARDA (Islamabad, 2006) and CIS (Erevan 2007) and training (FAO in Bishkek 2007) to upgrade their skills.

Education in Seed Science and Technology

The curriculum of the Agronomy Faculty of TAU specializes in plant breeding and seed production. The program includes seed related courses such as plant breeding, variety testing, seed production, seed marketing and seed quality assurance. The Sida project is providing support to assist in the development of the curricula.

The MAEP has established a National Agricultural Training Centre (NATC) which is frequently used by international NGOs and development projects to train specialists on different topics in agriculture including seed production.

The Seed Association of Tajikistan (SAT) arranges seminars, lectures and field trips upon the request of its members with the view to train and disseminate information about the seed industry.

National Seed Association

The Seed Association of Tajikistan (SAT) was formed on 23 September 2006 and is in the emerging phase. SAT has 28 seed farms and 10 breeders as members. The aim of SAT is to represent the interests of its members, promote use of quality seed and facilitate seed trade within and outside the country.

SAT is currently a member of the Central Asian Seed Association (CASA) and will in the near future apply for observer status in the International Seed Federation (ISF). SAT was represented in the ISF conference in 2006 and Second International Seed Trade Conference for CWANA Region in 2007.

Membership in International Organizations

Tajikistan has ratified both the Convention on Biological Diversity and the Cartagena Protocol on Biosafety. When the new PVP law is approved by the parliament, the country will become a member of UPOV. Work towards membership in international organizations such as IPPC, WTO, ISTA and ISF has been initiated and it is expected that Tajikistan will become a full member of these organizations in the near future.

Constraints to the Seed Sector

There are several policy, regulatory, institutional, organization and technical constraints in the seed industry in the country.

- Tajikistan has made substantial progress in moving towards a market economy through provision of a sound policy and regulatory framework for seed industry development. The effort should continue at pace, until the industry reaches adequate levels.

- The Sida funded seed project laid a firm foundation for the development of the national seed industry. However, since funding will be terminated earlier than expected, it will not able to finalize many of the initiatives and may leave behind a lot of loose ends. A concerted effort should be made to find new donors to support the further development of a sustainable seed industry in the country.

- At present plant breeding is carried out mostly by the public sector with overlapping responsibilities and little coordination among different institutes. This will require some realignment.

- Variety maintenance and early generation seed production is not well organized by breeders in research and scientific institutes, leading to a shortage of seeds for further multiplication by public and private seed farms. This requires attention.

- Apart from wheat and cotton, seed supply from the formal sector is inadequate. Most farmers lack the necessary knowledge to appreciate the value of, or the financial resources to buy, certified seed.

- The infrastructure for seed production, processing and storage and quality assurance is in a state of disrepair and dilapidated. There is urgent need for investment to replace field machinery and processing equipment.

- To date Tajikistan is not yet a member of international organizations regulating the seed trade. This makes foreign seed companies reluctant to introduce their improved varieties and enter the domestic seed market.

Recommendations for the Seed Sector

It is important that the government address these constraints, to develop a more sustainable and competitive private sector-led seed industry in Tajikistan.

- In a private sector led seed industry plant breeding should remain competitive and client-oriented, serving the interest of farming communities. Efforts should be made to improve coordination between different breeding programs both in Tajikistan and within the region, in order to develop market preferred varieties.

- The release of varieties by itself is not sufficient to guarantee availability of seed. Research institutes should strengthen their capacity in variety maintenance and early generation seed production to ensure availability and access to both public and private seed producers.

- Given the state of infrastructure in the seed sector both the public and private sector seed producers should have access to modern field machinery, processing equipment and storage facilities for quality seed production and delivery to farmers.

- In Tajikistan many areas are suitable for quality seed production. For example, the high mountain areas offer Colorado beetle and virus free seed potato production. This advantage should be exploited by the private sector.

- The Tajik seed industry is in a state of transition. A rigorous effort should be made to improve quality and promote the sector to build the trust of the international seed community towards Tajik seed producers.

Conclusions

There are several ongoing efforts to develop the national seed industry in Tajikistan. The country still requires substantial investments in infrastructure and considerable improvement in institutional and organizational capacity, particularly within the governmental structures. Policy and regulatory reforms should continue. These create a competitive seed market and encourage private sector participation both domestic and international markets, and establish trust in the seed industry.

The Seed Association of Tajikistan is at forefront of efforts, leading its members in developing and promoting the Tajik seed industry. Immediate results cannot be expected, but long-term and sustained efforts are required to build confidence in the seed sector and promote the role of Tajikistan in international seed trade.

Final Announcement

Central Asia and Caucasus Seed Trade Conference (CACSTC)

The conference aims at promoting seed trade between the Central Asia and Caucasus (CAC) region and the rest of the world. It will not only provide opportunities for seed trade, but also contribute to dialog between the private and public sectors to promote seed trade in the region. The conference will discuss the status and prospects of seed markets for agricultural and horticultural crops in the CAC region; case studies on seed sector privatization; seed farm mechanization; agricultural crop diversification; and developments in production of industrial crops. 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 Information
For more information on the conference visit the websites:
ECO: http://www.ecosecretariat.org (Russian and English)
ICARDA:http://www.icarda.cgiar.org/announcement/seedtradeconf_jun08.htm (English)

Conference Secretariat
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