



**IMPROVEMENT OF CEREAL, LEGUMINOUS, OIL AND FORAGE CROPS
SEED PRODUCTION (FAO TCP/UZB/3002 (A))**

**THE STATUS OF VARIETAL DEVELOPMENT AND SEED SECTOR
ACTIVITIES IN UZBEKISTAN**

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1. GENERAL BACKGROUND

Uzbekistan was part of the Former Soviet Union until it became independent in 1991. It is one of the most important republics in Central Asia with many natural resources (oil, natural gas, gold, uranium, etc.). The country has a total area of 44.8 million hectares, but only 4.5 million hectares are arable; 4 million hectares are irrigated. Agriculture provides approximately 40% of GNP. According to recent estimates, it has a population of 26.8 million growing at 1.67% per year. Agriculture plays an important role in the economy contributing 38% to the GDP and employing 44% of the population. The main crop is cotton followed by wheat, barley, rice, maize and potatoes. Fruits and vegetables are also important crops.

Uzbekistan is the world's fifth largest producer of cotton, after the United States, India, China and Pakistan, and the second largest exporter. It produces 75% of Central Asia's cotton fibre where a vast area of irrigated land equivalent to 1,517,000 ha is under cotton production. During the first six years of independence, the area under cotton was reduced from 2 to 1.5 million ha and replaced by grain production. Average cotton yield was 2.2 tons ha⁻¹ in 2000, down from 2.6 tons ha⁻¹ in 1995 compared to an international average of 3.2 tons ha⁻¹. In 2004 farmers harvested 3.4 million MT of seed cotton which is 25% more than the previous year.

Although wheat accounted for 85% of staple food consumption in Uzbekistan, it produces less than 20% of wheat consumed in the country. After independence in 1991, access to wheat became less secure because of the abolition of subsidies and centrally administered barter system and instabilities of regional economies. As a landlocked country with limited access to international markets, food security became a major concern.

Uzbekistan had, therefore, to rationalize its cereal, legume and forage crops production to increase farm income and to ensure food security. In 1993 and 1994, the Government began a new policy of "independence in cereals" and "self-sufficiency in wheat", respectively. Since then efforts have been made to increase grain production through state orders, subsidies and provision of credits. The main cereal crops are wheat and barley. The area under wheat production has increased by more than 200%, and irrigated wheat has replaced other crops such as cotton, vegetables, and fodder crops. According to official sources, Uzbekistan is now self-sufficient in grain production. The average yield of wheat is 4.2 tons ha⁻¹, which is almost 3 times higher than in 1994, but still low compared to normal yields of up to 7.0 tons ha⁻¹.

Most of cereal, legume, oilseed and forage crops varieties are still imported from Russia. The national seed system is not well organized and seed production is mostly centralized through Government involvement and direct participation of agricultural research institutions and shirkats. The involvement of private sector is limited and good quality seeds are not available to the farmers.

Seed multiplication, pricing and distribution remain centrally controlled, based on annual resolutions of the Cabinet of Ministers, and are not well developed due to a lack of technical know-how and lack of technical expertise for establishing and implementing a comprehensive seed programme. The major seed enterprises are producing cotton and wheat seed only. For example, seed production of wheat is mainly dedicated to irrigated areas which is about 270 thousand tonnes per year.

The Government plans both to modernize the seed sector and privatize it by the year 2007. The Government is planning to increase crop production and productivity through application of modern agricultural techniques, including the provision of high yielding varieties, agricultural inputs and appropriate cultural practices. The state farms are gradually moving from state control to private ownership. There are now private ownership of agricultural lands in Jizzakh province

(e.g. Gallaral area) while other provinces are gradually being opened to private sector participation. Moreover, commercial banks operating in rural areas offer Government-funded credit lines for local agricultural enterprises. This could allow farmers to form family/group/cooperative seed enterprises.

The Government of the Republic of Uzbekistan has requested FAO's assistance under the Technical Cooperation Programme to help establish an efficient varietal development and seed production programs. To ensure the linkage of the various components of the seed program and of different on-going projects and to facilitate the access of farmers to good quality seeds on a timely basis, it is envisaged to establish a system to monitor the whole process and ensure the coordination of activities with the support of an enabling policy and legislative framework.

2. NATIONAL POLICY AND REGULATORY FRAMEWORK on SEED AND VARIETAL DEVELOPMENT

2.1 Policy and Regulatory Framework

In a national drive for food security, the Government of Uzbekistan has set a clear goal of liberalizing its agricultural economy by reducing the role of the public sector and encouraging private sector participation and investment. The economic liberalization coupled with policy and regulatory reforms pursued by Governments had a profound impact on the organization of the agricultural sector in general and seed sector in particular.

2.1.1 National Seed Policy

In Uzbekistan, it is evident that the national seed sector is in a state of transition. At present, there is a mix of public sector and domestic private seed companies, cooperatives and farmers involved in seed production and marketing. This process of diversification seems likely to continue, but also calls for sound and responsive policy options which reflect the interests of different stakeholders.

While the Government policy is crystal clear; however, there is still lack of documented national seed policy pronouncements. It is important to have a clear, stable and consistent seed policy which defines the organizations, functions and linkages among the institutions involved in the seed sector and the mechanisms for coordinating the activities and monitoring the progress of the national seed industry.

Moreover, it is envisaged establishing a national apex body such as the National Seed Board or Council which will assist the Government in formulating policies and guide the development of dynamic and competitive national seed industry.

2.1.2 Regulatory Framework

Within the national seed sector context the regulatory framework encompasses laws, regulation, procedures and guidelines that governs the organization and management of variety development, evaluation, registration and release; seed quality control and certification; international seed trade for import or export; quarantine/phytosanitary issues; and recent international conventions on IPRs and biosafety which directly or indirectly impacted on exchange and access to genetic resources. A review has been made regarding existing regulations and other instruments concerning the regulatory framework for quality control and seed certification. The National Legal Consultant has critically examined the laws and secondary level legislation available in PRAVO Legal Database, official publications of the Ministry of Agriculture and Water Resources, State Seed Certification and Quality Control Center, State Variety Testing Commission as well as information available on internet.

The main national seed law is the “Law on Seed” breeding adopted in 1996. The law (containing 19 articles) is related to agricultural seeds and aimed for conservation and effective utilization of valuable domestic and international genetic resources; development of strong national plant breeding base; conservation of valuable varieties and hybrids in variety renewal and replacement processes; developing and production of new high-yielding varieties adapted to various agro-climatic regions; providing the agricultural sector with high-quality seeds; realization of the state control of seed and application of new technologies in seed production and quality control.

2.1.2.1 Variety development

Government policy in plant breeding is stipulated by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan “On Government Policy of the Republic of Uzbekistan in Plant Breeding”, #328 dated 19 September 1996.

2.1.2.2 Variety release

The Regulation on State Register of Agricultural Crops is Annex #2 to the Resolution #553 dated 18 December 1997. The regulation is aimed for maintaining a state register of agricultural crops recommended for growing in Uzbekistan. All agricultural plants [by varieties] to be sown on large area are subject to registration in the state register.

The state register is administered by the State [Agricultural Plants] Variety Testing Commission for Agricultural Cultivars acting on the basis of its charter adopted by MAWR Order #30 dated 31 January 1997.

2.1.2.3 Plant variety protection

A parliamentary level PVP act is the law on “Breeding Achievements” (dated 29 August 2002, see Annex 1) covers intellectual property (IP) related issues such as patenting procedures, testing for patenting, responsibility for patenting, breeders rights and their protection. The law covers the creation, legal protection and use of achievements in breeding.

In October 2004, Uzbekistan has become the 57th member of the International Union for Protection of New Varieties of Plants (UPOV). The regulation and criteria used in Uzbekistan’s PVP Act “Breeding Achievements” for registering new crop varieties for granting plant breeder's rights is in line with UPOV Convention. The varieties have to be distinct, uniform, stable and not exploited before the date of application for the registration. The PVP Act also grants the right to the public or community for authorization of their local landraces and wild species found in their habitat.

2.1.2.4 Seed quality control

The Law of the Republic of Uzbekistan “On Certification of Products and Services” #245 dated 28 December 1993 is a general certification regulation. This is an initial regulation in seed certification together with the Law on “Standardization”.

2.1.2.5 Plant quarantine

In Uzbekistan, seeds produced, imported, exported or transited are subject for obligatory phytosanitary and veterinary control in accordance with the Law on Agricultural Plant Protection dated 31 August 2000 and Regulation on Procedure for Certification of Products (Annex to Resolution of the Cabinet of Ministers #318 dated 6 July, 2004), Rules of Main State Veterinary Control Department dated 25 July 2003.

According to these regulations the function of phytosanitary and veterinary bodies is executed by MAWR. Main State Inspection of the Republic of Uzbekistan on Plant Quarantine according to Resolution of the Cabinet of Ministers of the Republic of Uzbekistan #449 dated 5 December

1995 carries out phytosanitary control of seeds. The main State Quarantine Department issues phytosanitary certificates for seeds exported, imported or transited in Uzbekistan.

Since independence, Uzbekistan felt the need to modify quarantine rules to meet the requirements of the agricultural and industrial sectors. With the promulgation of the national seed policy the need arises to revise existing rules to facilitate easy flow of hybrid seed/planting materials into the country. Consequently, 'Plant Quarantine Laws, 1995' have been framed and submitted to the Government for approval and is under active consideration at the present.

3. CURRENT STATUS OF VARIETAL DEVELOPMENT

3.1. Varietal Development

Uzbekistan, as part of the former Soviet Union, had been a major producer of cotton, fruits, and vegetables. About 70% of the total irrigated land was devoted to cotton production. Fodder crops (alfalfa, rye, barley, and maize), which were grown in rotation with cotton, supported a limited production of livestock. Key food items such as wheat, potato and sugar were mostly imported from other regions of the Soviet Union. After the independence in 1991, Uzbekistan's access to strategic food imports became less secure because of the abolition of the centrally coordinated commodity supply and subsidy systems between Russia and its Republics. Subsequent economic structural adjustments within the Republics also reduced the reliability of contracting system and regional trade.

Since independence, wheat has become second in importance to cotton. In order to attain food security, wheat area under irrigation increased over the years, currently at 1.3 million ha including rainfed production. This increase in cultivated area stimulated the use of modern production approaches in the national wheat program.

In the past, many Russian and foreign wheat varieties were introduced to Uzbekistan and were widely grown in large areas. This scenario has changed with release of some newly developed wheat varieties by the national agricultural research programs. The number of currently released varieties is given in Table 1 (see Annex 1 and 2 for details).

In 2002, the State Scientific Committee was re-established and named as the Center for Science and Technology under the Cabinet of Ministry, Republic of Uzbekistan. The state programs for basic research, science and technology development and innovation are being financed by the Center. Since 1991, each year the Government has allocated US\$ 100,000 for wheat breeding program through the Science and Technology Center. This funding has accelerated the wheat breeding program resulting in developing new varieties where 37 winter and spring type bread and durum wheat varieties are currently released and under seed production. In order to further evaluate new breeding lines, more funding support will be critical.

While a good breeding program, supported by the Government, is only beginning to emerge, the next generation of farmer-funding research is fast approaching. Government funds are currently allocated based on 3-year contracts for institutions that propose breeding targets and related research activities. These contracts are likely to expire at the end of 2005 and efforts are underway to develop new contacts to begin in 2006.

Traditionally, wheat breeding has not been profitable enough to attract private sector interest and investment. But this is changing significantly with the new potential opened up by local institutes and a greater awareness brought about by the International Centers. Both have increased the potential return on investment in wheat breeding programs, which is likely to continue attracting new players in the future. While no major shifts are expected in the short-term, the rapid

evolutions of science, agriculture and business make the long-term possibilities wide open. One thing is certain - those involved on both the breeding and funding side will have a major say in setting the agenda for the future.

Availability of improved variety and high quality seeds combined with better agronomic practices play an important role to increase the yield of cereal crops. The present plant breeding objective is oriented towards high and sustainable yields using good quality seeds of improved varieties. The future orientation is towards the development of hard and good quality wheat with ideal plant type. Yield increase, as well as stabilizing agricultural production, is the priority challenge for the scientists and farmers in Uzbekistan. The Government aims to achieve increased production of wheat mainly through increased productivity. This is obtained through crop intensification coupled with improved agricultural practices including improved varieties that are resistant to lodging, diseases and other environmental factors limiting the yields of wheat under irrigated conditions.

3.2. Variety Development System

Plant breeders need to adjust the priorities, selection strategies and criteria to the new realities of farming systems, the social demand, and national policies that may affect agricultural production. In anticipating changes in resources, climatic conditions, environmental regulations, consumer perceptions and demand, and by learning from past experiences, plant breeders could envision future scenarios that are likely to happen and the plant varieties that would be eventually preferred by producers and consumers.

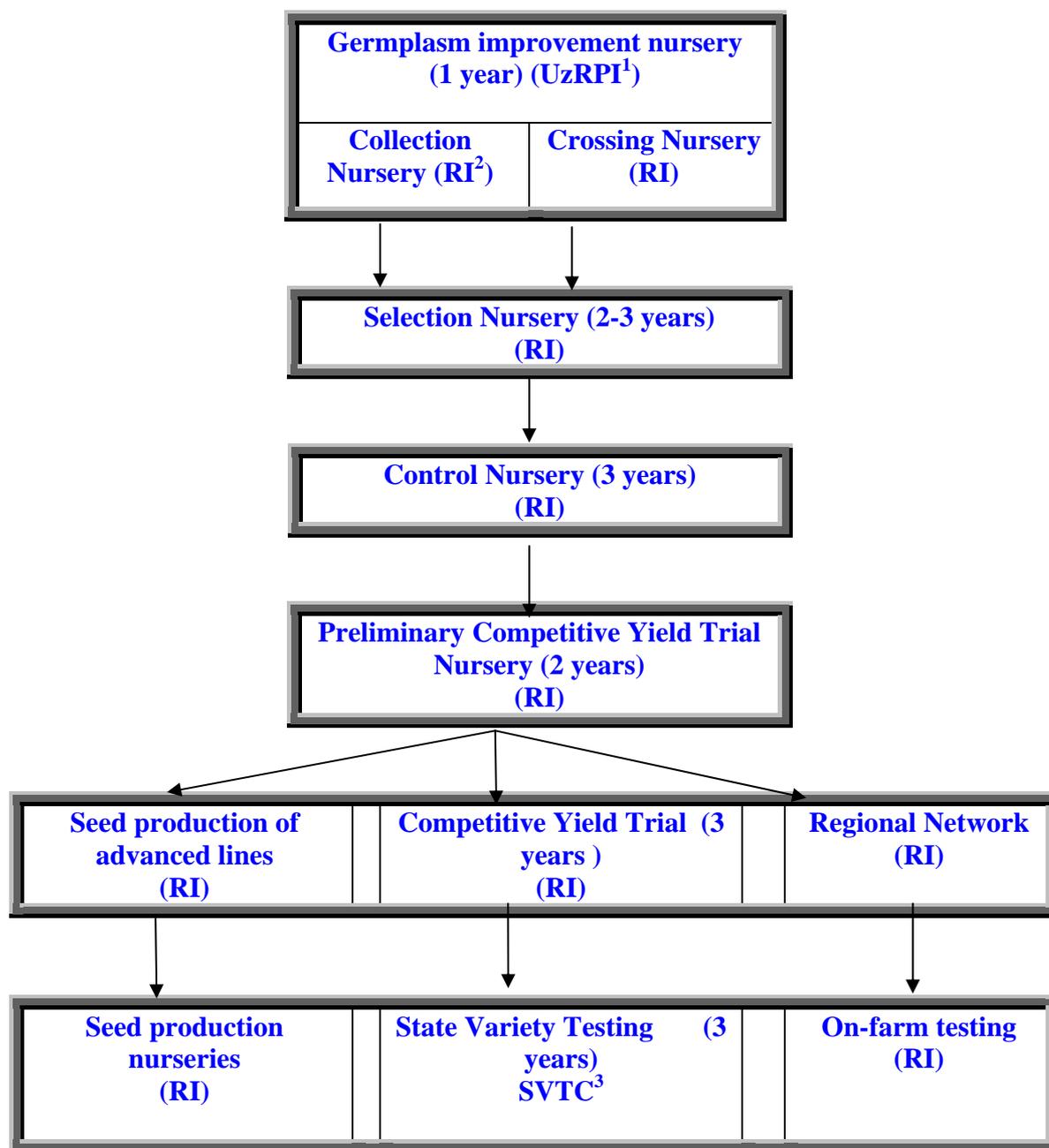
Plant breeders have been making new crosses and breeding material using the available local germplasm. They may also introduce and evaluate new germplasm from external sources. They have been using the techniques such as pedigree, back-crossing and bulk selection to create new breeding lines which are further evaluated under field conditions. With each successive generation, the selection process becomes more rigorous. The first round of selection is generally for easily recognizable characteristics, such as yield, straw strength and days to maturity. As the breeding material becomes more advanced, the breeder uses disease epidemic conditions to evaluate for resistance of promising lines. The current scheme of varietal development in Uzbekistan is presented in Figure 1.

Following the preliminary observation of crossing or collection nurseries, the most promising materials are advanced to the selection and control nurseries. At this stage, breeding lines will normally be at the F₆ to F₈ generation. Lines that survive the rigorous selection process are then advanced to the competitive nursery field trials where evaluation for grain quality is carried out, although some preliminary screening for quality (e.g. kernel hardness, protein content) and yield potential are carried out at earlier stages. Subsequently, advanced varieties are submitted to the State Variety Testing Commission for further testing and release. At the same time, seed production of advanced varieties is also undertaken as per seed production scheme defined later in this report.

3.3. Agricultural Research in Varietal Development

In Uzbekistan, cereal, legume, oilseed and forage crops breeding and seed production activities are being carried out by the Uzbek Research Institute Cereal and Legume Crops under Irrigation at Andijan, and its Gallaaral branch; Uzbek Research Institute of Rice in Tashkent and its branches; Uzbek Research Institute of Plant Industry (Tashkent); Samarkand Institute of Agriculture (Samarkand); Tashkent State Agrarian University and other Research Institutes related to plant improvement activities.

Figure 1, Varietal development scheme in Uzbekistan



Uzbek Research Institute Cereal and Legume Crops under Irrigation

The Uzbek Research Institute Cereal and Legume Crops under Irrigation (UzRICLCI) was established in 1997 in Andijan by the Ministerial Decree # 413 of the Republic of Uzbekistan. According to the Decree, 11 new experimental stations were established for crop improvement program and seed sector development in each of the provinces.

The main objectives of the institute are:

- Evaluate and catalog cereal germplasm from different international and local institutes in varying conditions of Uzbekistan

¹ UzRPI – Uzbek Research Institute of Plant Industry

² Research Institutes

³ State Variety Testing Commission

- Develop new advanced varieties of cereal and legume crops under irrigated conditions of Uzbekistan.
- Prepare recommendations for growing wheat in different soil-climatic conditions of the Republic (based on results of Branches)
- Study world collections of grain and legume crops and select best lines that are resistant to diseases.
- Develop appropriate crop rotation system for different wheat growing zones and their effective soil fertility management.
- Assemble, strengthen, manage, and make available to diverse partners information on cereals, and legumes genetic resources

At present, there are 75 scientific staff at the Uzbek Research Institute Cereal and Legume Crops under Irrigation including all its branch offices or experimental stations, excluding the Gallyaral Branch. There are 3 Professors and 16 PhDs in Agriculture working in the Institute. The Institute has eight laboratories that are working on different aspects of variety development, plant physiology and seed production of cereal and legume crops.

Initially the Uzbek Research Institute Cereal and Legume Crops under Irrigation started working mainly with Krasnodar Research Institute for Agriculture where many varieties from Russia have been introduced, evaluated and released. These varieties have showed good yield potential under irrigated condition and have increased the average yield potential of wheat by almost two fold since independence.

According to State Variety Testing Committee (SVTC), three varieties of bread wheat Andijan-2, Chillaki, and Andijan-3 have been released for irrigated areas of Andijan, Surkhandarya, Samarkand and Fergana provinces. These varieties are resistant to both biotic and abiotic stresses, and have better adaptation to local climatic and environmental conditions.

In 1999, the Institute started cooperation with the international agricultural research centers such as ICARDA and CIMMYT, receiving annually more than 2000 lines of cereals and legume crops. Currently, the breeders have submitted nine varieties of bread and durum wheat and three varieties of legume crops to SVTC for official testing. Most of these new varieties are resistant to diseases and lodging being these are important traits preferred by farmers.

In addition, the Institute also involved in seed production of registered and promising bread and durum wheat varieties where 50 tons of breeder seed and 100 tons of foundation seed are produced annually according to national seed laws and standards.

Gallyaral Research Station

The Gallyaral Research Station operates under Uzbek Research Institute Cereal and Legume Crops under Irrigation. It is one of the oldest research center in country and was established in 1913, as a station for rainfed crops. The leadership provided by the eminent scientists, such as N.Pokrovskiy, M.Baygulov, M.Amanov, G.Lavronov, N.Mamirov, G.Atabaev, had enormously contributed to the development of this Institute and provided appropriate research directions for breeding of cereal, legume and oilseed crops under rainfed conditions. Since its inception, it had made significant contributions in variety development and seed production of cereals, legumes, and alfalfa.

During Former Soviet Union, wheat breeding and seed production activities were implemented in Uzbekistan by the Research Institute of Grain Production located at Djizakh province. Agricultural research carried out at the Institute were mostly focused on rainfed areas because

cotton and alfalfa dominated irrigated conditions of Uzbekistan. The Institute therefore has rich experience working on rainfed wheat, barley, alfalfa, legumes and safflower. It has so far developed 19 varieties of bread wheat, 3 varieties of durum wheat, 11 varieties of barley, and several varieties of legume crops. The Institute has also for the first time developed techniques of growing alfalfa by planting in August under rainfed conditions.

The main objectives of the Institute are to:

- Collect, evaluate and document wild species and cultivated crops
- Improve varieties of cereals, legumes and oil crops under rainfed conditions
- Develop new cropping system for rainfed areas
- Develop new varieties of cereal crops to be planted under irrigated conditions
- Crop and soil management under rainfed conditions
- Develop appropriate farming/cropping systems for different wheat growing zones and their effective soil fertility management in irrigated areas
- Study end use quality of cereal and legume crops

The objective of the breeding program at Gallyaral Research Station is to develop cultivars having good grain quality, high-yield potential and resistance to diseases both under irrigated and rainfed conditions of Uzbekistan. But real wheat program for irrigated land was started in 1992 when Uzbekistan had achieved State Sovereignty. Since, 16 varieties of bread wheat have been released for irrigated condition. In 1995, the released varieties covered 300,000 ha under irrigated areas. Some Russian and foreign wheat varieties were also introduced to Uzbekistan replacing older varieties. Accordingly, the area covered by local varieties decreased to almost 100,000 ha in 1998 and presently the area under the local varieties covered near the 200,000 ha.

The Gallyaral branch is funded by the state programs. Currently, the Branch has six Government funded projects on wheat, barley, legumes and oil crops breeding, and soil and crop management under both rainfed and irrigated conditions.

The Gallyaral Research Station also produces seed of introduced and promising crop varieties. The volume of breeder and foundation seed nurseries is dependent on the plan for foundation seed. About 600-750 tons of breeder and foundation seed of different crops is multiplied at Gallyaaral each year and subsequently provided to specialized seed production farms for further multiplication.

Uzbek Research Institute of Rice

The Uzbek Research Institute of Rice (UzRI-Rice) is responsible for rice crop improvement and seed production. The Institute was established in 1971 with the main objectives to conduct basic and applied research on rice and legume crops; to provide basic information and research production problems using multidisciplinary approach; to increase overall rice production and improve grain quality in Uzbekistan thereby raising the living standard of farmers and the development of the nation.

There are four research laboratories on rice, wheat, sorghum, mung bean, soy bean, chickpea crops. The Institute has 320 staff of which 80 of them are scientific staff. There are 10 PhDs in Agriculture and fifteen scientific investigators involved in rice breeding, wheat breeding and agronomy of sorghum, rye and other crops.

The mandate of the institute is to:

- Collect, conserve, evaluate and catalog rice germplasm
- Conduct research on improvement of rice yield, grain quality and byproducts in Karakalpakstan Autonomous Republic.

- Develop new varieties of rice for irrigated conditions
- Develop new genetic variability for location specific adaptation in rice based cropping systems (Rice –Cotton).
- Develop appropriate farming/cropping system for different rice growing zones and their effective soil fertility management in the salt affected regions of Uzbekistan.
- Coordinate Rice research network with the various organizations of the Republic of Uzbekistan.
- Assist in transfer of modern rice production technology to various user organizations.
- Develop new varieties of soybean, mung bean and chickpea to be planted under irrigated conditions

During 2003-2005 the Rice Research Station was involved in five projects with participation of more than 80 scientific staff of the institute. The five projects were oriented towards improved rice, mung bean, soybean, wheat breeding, crop rotation of wheat and rice system adapted to the conditions of Uzbekistan and wheat varietal development programme. The institute achieved good results on research related to rice, soybean and mung bean breeding, rice-wheat, and also wheat-sunflower rotation systems.

This Rice Research Institute undertakes varietal development and seed multiplication of rice in Karakalpakstan region. It released for irrigated conditions varieties of rice namely Jaykhun, Istiqbol, Avangard, Alanga, Tolmas and etc. All released varieties are early maturing and resistant to diseases and drought especially under Aral Sea basin. Yield potential of these varieties is higher than other rice varieties planted in Uzbekistan.

Uzbek Research Institute of Plant Industry

Uzbek Research Institute of Plant Industry (UzRIPI) was established in 1924. The Institute is working on plant genetic resources and has undertaken breeding program on sunflower, ground nut, triticale and other cereal crops under irrigated conditions of Uzbekistan. There are 108 people working in the Institute, 72 of them as scientific staff. There are two branches, in Andijan and Surkhandarya provinces.

The objectives of the Institute are to:

- Collect and conserve plant genetic resources, including wild relatives.
- Study the on-farm management of cereals, legumes and oil crops genetic diversity and support research institutes and farmers who wish to continue growing landraces.
- Characterize genetic resources to identify useful diversity and make it available to the breeders and other researchers in usable forms.
- Develop and provide new technologies to facilitate breeding.
- Develop germplasm with new genes for desirable traits through conventional and molecular techniques.
- Assemble, manage, and make available to diverse partners information on cereals, legumes and oil crops genetic resources.
- Manage intellectual property associated with germplasm.
- Undertake varietal development of sunflower, groundnut and triticale.

Annually, the UzRIPI provides 400-600 accessions of different crops to 20 research institutions in Uzbekistan for further evaluation of which 250-350 accessions are of cereals, legumes and oil crops. Accordingly, the breeders have selected many varieties of these crops for different agro-climatic conditions of the country.

To date, there are nine departments and laboratories functioning under the Institute, namely; Department of Documentation; Department of Introduction; Department of Field Crops; Department of Wild Species Crop; Department of Vegetable Crops and Potato; Department of

Fruit Crops; Laboratory of Seed Testing; Laboratory of Viticulture; and Laboratory of Biochemistry.

ICARDA provided support to UzRIPI in building a National Genebank of Uzbekistan. The staff was trained by specialists from ICARDA on documentation of genetic resources collected in the country. The PGR Documentation Unit established a genetic resources computer database according to international requirements. The Seed Science Laboratory was organized in 1999, and involved genetic resources conservation and monitoring seed quality. After the re-construction of storage unit, the preparation work on transferring cereals, legumes and oilseed crops germplasm to long-term storage has begun. So far 15,000 accessions of different crops have been stored after rejuvenation, and testing for moisture content and germination.

International Agricultural Research Centers

Substantial progress has been made in building the partnership with the national agricultural research system and the human resource development in Uzbekistan. The collaborative research is being implemented in accordance with Memorandum of Agreements signed with Uzbekistan. This has demonstrated the willingness of Uzbekistan to join hands with ICARDA in order to ensure sustainable agricultural production in the region. Since 1998, The International Centers have played an important role to promote collaboration for agricultural research and development in the region. Through CGIAR system-wide program for CAC and its Project Facilitation Unit (PFU), located in Tashkent, successful partnership among all the stakeholders has been built in order to ensure effective linkages with CGIAR, GFAR, FAO and other International organizations.

International collaboration was initially established with Gallaaral Research Institute of Grain and the Uzbek Research Institute of Plant Industry. Subsequently, the germplasm exchange program got intensified with the involvement of Uzbek Research Institute of Cereals and Legumes as well as the Tashkent State Agrarian University and the Gulistan State University. The cooperation in germplasm enhancement aims primarily in developing and promoting high-yielding, disease resistant wheat varieties and production technologies for irrigated conditions in Uzbekistan. Annually, over 1,000 wheat germplasm lines are provided through CIMMYT-ICARDA-Turkey winter and facultative wheat program. As a consequence, several crop varieties have been developed, released and registered by the State Variety Testing Commission (SVTC) and their seed production program strengthened. For example, bread wheat advanced line VDME-9 was selected from CIT (CIMMYT, ICARDA and Turkey) nursery and named as Dostlik. It was submitted to SVTC for testing in 1999 and released in 2003 for the irrigated conditions of Uzbekistan. The variety is resistant to drought, salinity and diseases with high yield potential. Two improved winter wheat varieties Grecum-2002 and Ravat, originating from the crosses made in Mexico, have currently been submitted for official testing. These varieties combine resistance to diseases, especially yellow rust with high yield potential. Another variety Saidaziz has been submitted to SVTC during 2003 by the Tashkent branch of the Uzbek Research Institute for Irrigated Cereals and Legume Crops. This variety has originated from breeding line Kauz, bred in Mexico. Today, it is widely grown on millions of hectares in Asia. Good adaptation of this line for Uzbek conditions demonstrates similarity of the local environment with that of South Asia.

Each year over 1000 legume lines are being provided by ICARDA to the scientists of Uzbekistan. ICARDA legume specialists also have supplied bulk seed of improved varieties to speed up seed multiplication. The Gallaaral branch of URICLCI has submitted a new lentil variety named "Oltin don", selected from ICARDA's entry ILL-7513, to the SVTC for final evaluation. This is a high-yielding variety (1.2 t/ha) and maturing in 116 days. Moreover, based on the results of last four

years, two promising lines of lathyrus, IFVN-560 are being multiplied. Forage legumes, such as vetches and lathyrus have also been screened for drought resistance.

During the last two years, ICRISAT has also provided groundnut germplasm, including early, and medium maturing varieties, with resistance to foliar diseases and drought. Moreover, some good confectionery lines have been tested. Breeders of Uzbek Research Institute of Plant Industry have selected two promising lines of groundnut and already submitted to SVTC under the names Salomat and Mumtaz for further testing and release.

Under the support of ICARDA and CIMMYT, regional wheat Yellow Rust Network has been established to unite efforts of breeders, pathologists and geneticists with an aim to facilitate the development of promising resistant wheat varieties.

Under a joint ICARDA/CIMMYT/GTZ initiative, a National Program Committee on strengthening wheat research was established in Uzbekistan. Four meetings have already been held in September in 2002, 2003, 2004 and 2005, respectively, involving about 130 participants from different national institutions/organizations.

A National Wheat Conference was also organized at the Tashkent State Agrarian University on 17-18 May, 2004, in which about 120 scientists participated to review wheat research and development efforts at the national level. It was held jointly by the Ministry of Agriculture and Water Resources, ICARDA, CIMMYT and GTZ with participation of some international scientists.

An efficient system of seed multiplication and variety promotion is very important for grain production in Uzbekistan. In 1994, a senior ICARDA seed specialist visited Uzbekistan for identifying the needs and strengthening its seed production system. The constraints to and needs for efficient seed production were also identified in Tashkent workshop in December 1995. CGIAR seed specialists also helped colleagues in Uzbekistan to prepare proposals for seed sector development for funding by the Asian Development Bank, which has since been sanctioned and presently being implemented, thus providing support for cereal development and seed processing in Uzbekistan.

The new GTZ-CIMMYT project “Regional network for wheat variety promotion and seed production” is aimed to establish a mechanism of efficient linkages between the plant breeding institutions, seed farms and regular farms for multiplying and promoting the new wheat varieties. The project concentrated in three pilot districts in Andijan, Tashkent and Djizzakh regions. The research institutes substantially improved the capacity to identify and promote new varieties on the farmers’ fields. The project activities have helped in multiplying seeds of new varieties and their dissemination to the cooperatives and private farms.

3.4. Variety Testing Registration and Release

In Uzbekistan, the State Variety Testing Committee (SVTC) is a national agency entrusted with responsibility for implementing the variety testing, registration and release system. The SVTC is a legal entity whose functions include the testing new varieties of agricultural crops developed by the breeders before their official release.

The variety release system of agricultural crops requires testing of promising lines to meet the agronomic, disease resistance and grain quality requirements. The SVTC has proposed a major overhaul of the entire variety release system with changes being implemented since 1991. All stations of SVTC were oriented to test cotton and other industrial crops. Eight additional stations were established in different regions for testing cereals and legume crops.

The nets monitoring morphological and agronomic traits of high-yielder varieties of different agricultural crops for release in the conditions of Uzbekistan, which are capable of become principal industrial technologies production products of plants.

Variety testing net consist in following: 12 state variety testing experimental stations and special 36 State variety Sites, in different soil-climatic zones of the Republic.

Regulation on State Register of Agricultural Crops is Annex #2 to the Resolution #553 dated 18 December 1997. The regulation is aimed for maintaining a state register of agricultural plant recommended for sowing in Uzbekistan. All agricultural plants [by varieties] to be sown on large territory are subject registration in the state register.

State Commission conducts testing of varieties and hybrids in two directions:

1. Test of varieties and hybrids of agricultural crops on economic useful to be included them in State Reestr of agricultural crops recommended to planting on territory Republic of Uzbekistan. Value for cultivation and Use (agronomic performance or variety trails).
2. Test of varieties and hybrids of agricultural crops for patentability: Distinctness, Uniformity and Stability (morphological description of varieties).

Table 1 Number of varieties currently released and registered in Uzbekistan⁴

Crops	Number of varieties			
	National	Foreign	Total	
Cereals	Wheat	26	23	49
	Barley	12	1	13
	Oats	4		4
	Rye		1	1
	Triticale	2	1	3
	Rice	12		12
	Maize	8	14	22
	Sorghum	8		8
	Millet		1	1
	Sub-total	71	42	113
Legumes	Chick pea	3	1	4
	Mung bean	4		4
	Green bean	3	1	4
	Soy bean	4		4
	Sub-total	14	2	16
Oilseeds	Ground nut	1		1
	Flax	1		1
	Sunflower		4	4
	Safflower	1		1
	Sesame	1		1
	Sub-total	4	4	8
	Alfalfa	9		9
	Clover	2		2
	Sudan grass	2		2
	Sainfoin	1		1
Fodder beat	2		2	
Sub-total	16		16	
Total	97	56	153	

The final stage of wheat variety evaluation is the performance testing, known also as the variety testing. Variety performance testing involves three years of field evaluation at various locations,

⁴ Source: variety register book of the State Variety Testing Commission

extensive disease resistance screening and quality testing by the State Variety Testing Commission.

The promising lines that survive rigorous testing process can be proposed by the head of department for specific crops (from SVTC) for registration at the SVTC meetings on Agricultural Cultivars held every year in December. The Subcommittee for specific group of crops which includes nearly all researchers related to the crop critically examines the performance data of promising lines submitted to the SVTC and recommends the variety for registration and release. The crop varieties that are recommended by the subcommittee will be submitted for formal approval to the Ministry of Agriculture and Water Resources for official approval and release. Then, the SVTC publishes the variety register book for all released agricultural crops. The status of new varieties that are currently under testing by SVTC is given in Annex 2.

Regulation on State Register of Agricultural Crops is Annex #2 to the Resolution #553 dated 18 December 1997. The regulation is aimed for maintaining a state register of agricultural plant recommended for sowing in Uzbekistan. All agricultural plants [by varieties] to be sown on large territory are subject registration in the state register.

At present, 153 cereal, legume, oilseed and forage crop varieties were released by the SVTC (see Table 1, Annex 3 and 4) where 63% of these varieties are bred by the national agricultural research institutes in Uzbekistan. Wheat is the single most important crop which occupy the largest proportion of released and registered varieties. For example, winter wheat alone has 37 varieties released and registered by the SVTC from 157 varieties tested. It should be noted that 57 varieties have been selected by the breeders using germplasm and breeding materials received from CG centers and other countries.

Currently, there is a debate on SVTC's recommendation to remove agronomic performance for wheat from the prior merit assessment requirement. A minimum of two years of agronomic data would still be collected, but only for the purpose of making this information available to farmers and others. There are several key arguments for removing required agronomic merit assessment. It would allow varieties to enter the market place more rapidly, reduce costs and give farmers more choice of varieties. After objections from the research community, producers group, and representatives of some seed companies, the SVTC has reversed this recommendation, opting to retain agronomic merit as a requirement for wheat. Arguments against this is that it could result in flooding of inferior-yielding varieties, thus having a negative impact on performance and making it more difficult for farmers to get good agronomic information for decision-making. But changes have not been finalized and the debate for registration requirements is likely to continue for some time.

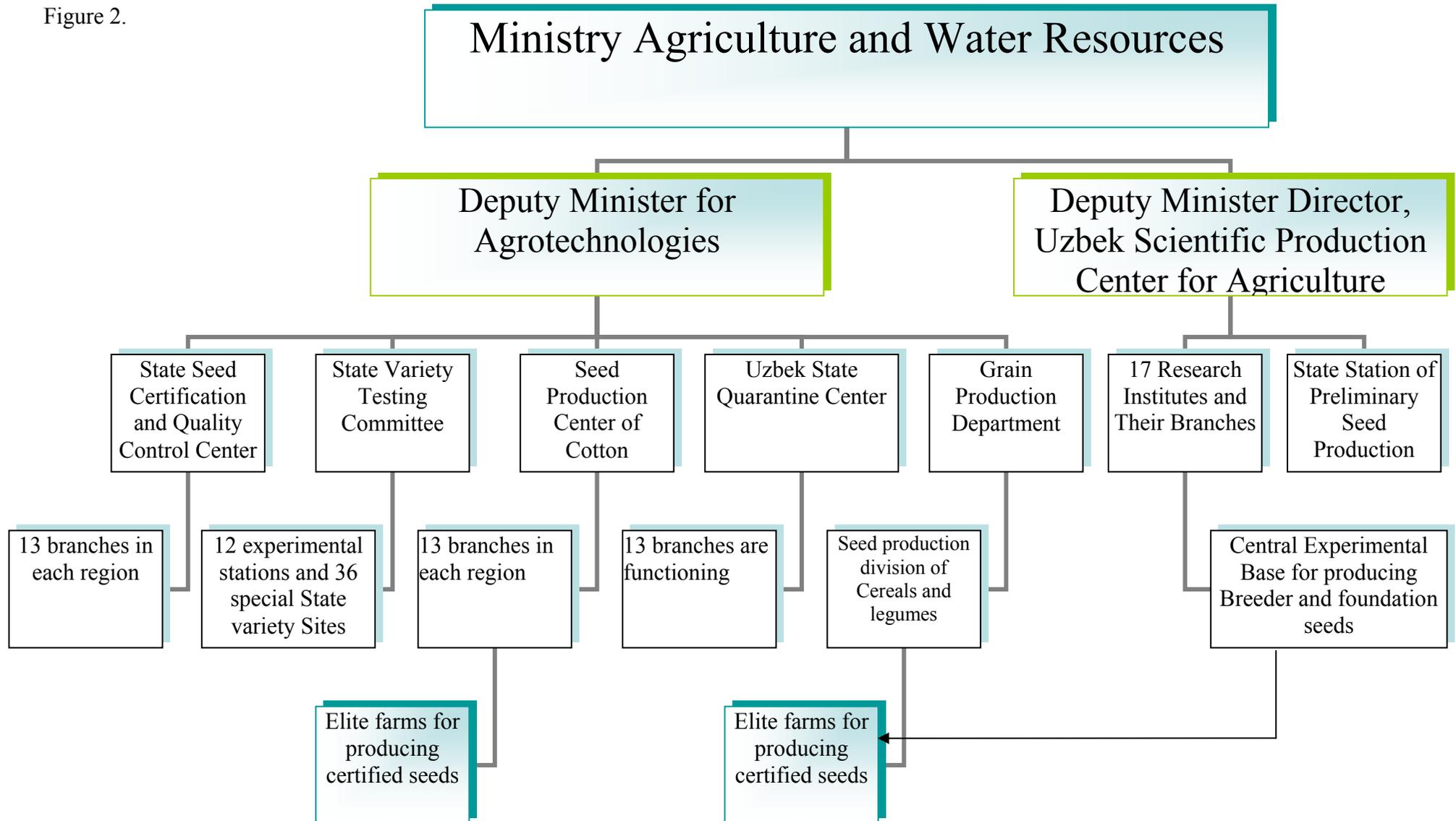
SVTC is currently working with International Agricultural Research Centers such as ICARDA, CIMMYT, AVRDC and foreign institutes such as Krasnodar Research Institute of Agriculture, Ukraine Institute of Genetics, to test their varieties for registration and release in Uzbekistan.

4. STATUS OF SEED SECTOR

4.1. Seed Production

Seed is the most important input for accelerating agricultural growth. Therefore, seed production of high-yielding varieties is important to make available quality seed for increasing agricultural production. The main objective of seed production is rapid multiplication of the newly released or commercially available varieties by maintaining the varietal identity and genetic purity that represent the plant population created through breeding and characterized by certain heritable morphological, biological and agronomic traits. During seed multiplication the varietal purity gradually deteriorate as a result of mechanical contamination, cross-pollination, segregation, mutation, etc. It is necessary to periodically renew from a breeder seed, which is a basis for certified seed production

Figure 2.



As well as developing new varieties, plant breeders maintain the genetic purity of existing lines and pre-commercial seed supplies year by year. This is essential to maintain the quality and performance of each variety. For cereals, variety maintenance begins after a few years of selection trials, when all that exists of what may become a widely grown variety is a single row containing around 100 plants. The breeder bulks up supplies of the purified lines of breeder's seed into pre-basic and basic seed. Breeders continually maintain breeder's seed for the process of multiplication to ensure the variety's performance and quality year after year.

Preserving the identity of individual varieties has become more important; both to conserve quality characteristics and to meet consumer demands for assurances about the integrity and traceability of their food. Ministry Agriculture and Water Resources is taking a leading role and responsibility in organizing certified seed production at national level (see figure 2). Public sector is responsible for cleaning certified seed and the private sector the other crops and hybrid seed. The Grain Department in the Ministry of Agriculture is controlling for producing certified seed of self-pollinated crops such as wheat, barley, triticale and some hybrid seed throughout the country. Shirkat seed producers' and some private seed farms producing certified seeds under the patronage of the grain department of the Ministry of Agriculture. The department has 13 regional branches to produce certified seeds, except Andijan region. For the Andijan has special quota for producing certified seeds through the region. Grain department is producing seeds of wheat about 270,000 tonnes per year.

Barley, oat, oil seed and forage crops can be produced by the eligible private seed enterprises and farms. In the absence Government intervention, most farmers are interested in growing these crops. They use their own farm to be produce the certified seeds and they have contract with Uzdonmakhsulot Company to sell the seeds fixed prices.

Table 2. Seed production (tons) of cereal, legume and oilseed crops in Uzbekistan (1991-2005)⁵

Crops and seed reproduction stage	1991	1995	2005
Wheat			
Breeder seed	223	2204	5690
Foundation seed	3540	22045	45560
Certified seed	20850	186729	218750
Sub-total	24613	210978	270000
Barley			
Breeder seed	25	15	11
Foundation seed	478	345	150
Certified seed	2500	1875	750
Sub-total	3003	2235	911
Legume (chickpea)			
Breeder seed	9	12	15
Foundation seed	45	55	61
Certified seed	190	215	215
Sub-total	244	282	291
Safflower			
Breeder seed	40	15	22
Foundation seed	108	32	56
Certified seed	225	64	112
Sub-total	373	111	190
Total	28,233	213,606	271,392

⁵ Source: Ministry Agriculture and Water Resources

Seed being the basis for agricultural growth and development guaranteeing farmers continuous access to quality seed can only be achieved through the establishment of viable seed supply system that ensures multiplication and distribution of seeds of high yielding varieties. At present, the country does not have well organized seed production system for cereal and legume crops.

The Cabinet of Ministers of the Republic of Uzbekistan allocates specific quotas to each of the foundation seed production farms under the Ministry of Agriculture and Water Resources, and decides the sale price. The quantity of foundation seed produced is increasing annually. According to the target set by the Government, the total planned wheat seed production is about 290,000 tons each year produced by the elite seed farms. GTZ also provides assistance to private seed companies to undertake seed production including harvesting, cleaning, treatment and marketing of different crops (which crops), except for cotton and vegetable crops. Analyses of production show that during the last two years such private firms have produced 500 tones of foundation seeds of cereal, legume, oil seed and forage crop varieties. Detailed seed production of important crops is given in Table 2.

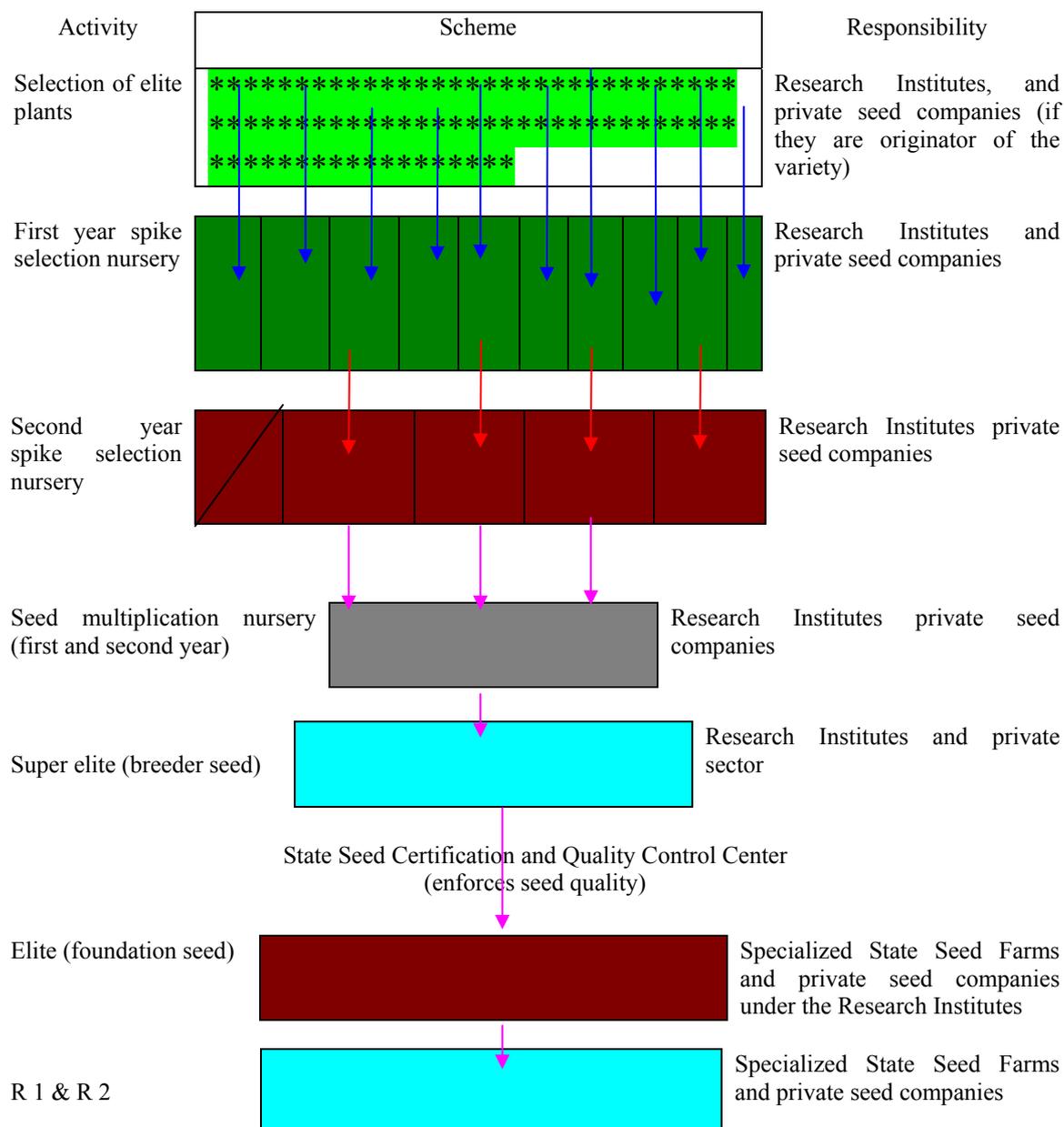
4.2. Seed Production System

The realization of the plant breeding achievements is possible only through a well organized seed production based on a generation system. Different seed classes are produced by agricultural research institutes, elite seed production farms, cooperatives and private farms. The agricultural research institutes are responsible to produce early generation materials i.e. super elite (breeder) and elite (foundation) seed whereas the later generations are produced on elite seed farms or private farmers.

The seed production system followed currently is as follows:

- First year spike selection nursery: Selection is made of typical 2000-3000 spikes of promising lines. Each spike is planted in rows and observations are recorded during the vegetative period, including disease reaction and mass selection at agricultural research institutes and by private seed companies (if they are originators of the variety).
- Second year spike selection nursery: Selected material from the first year are planted in 10m² plot and evaluated for disease reaction and mass selection at agricultural research institutes and by private seed companies.
- First year seed multiplication nursery: Planting made representing farmers conditions and evaluation continued for disease reaction and mass selection at the agricultural research institutes and private companies.
- Second year seed multiplication nursery: The same procedure is followed as in the first year and is undertaken at the experimental farm of the Institute.
- Super elite seeds (Breeder Seed): It is produced by Experimental farm of the Institute, elite seed farms and private farms.
- Elite seeds (Foundation seed): It is produced by elite seed farms and private seed companies.
- R1 seed is produced by elite farms, private companies and private farms.
- R2 seed is produced by elite farm, private companies and private farms.

Figure 3. Wheat seed production system in Uzbekistan (e.g. wheat)



4.3. Seed Processing and Storage

Uzbekistan has different soil and climatic conditions for agricultural production hence the country needs not only high-yielding varieties, but also those that are resistance to severe environmental factors such as soil salinity, drought, high summer and low winter temperatures, lack of irrigation water, etc. Before releasing a variety, it is necessary to study the associated technology for its cultivation and seed multiplication. It has been demonstrated that, the wheat seeds grown in local conditions have yielded more grain and biomass in comparison with seeds of the same varieties brought from other regions of the Republic. This confirms that the seed production undertaken under local conditions was better, than imported seed from elsewhere.

Three years ago Government has decided to organize seed processing facilities in region of the country. At present seed processing facilities are widely distributed throughout the country to reduce transportation cost. Early generation seed, nuclear seed, breeder seed and foundation seeds are cleaned by the appropriate Research Institutes (Uzbek Research Institute of Cereals and

legume crops under irrigation, Rice Research Institutes, Cotton breeding and seed growing Research Institutes and etc.) and respective agricultural research stations. All agricultural research institutes or centers have seed processing and storage facilities for cleaning breeder, and foundation seed. There are 14 seed processing plants with a total capacity of more than 5,900 tonnes per year located in agricultural research centers or institutes and some private seed companies throughout the country.

Uzdonmakhsulot Company has 47 seed processing plants throughout the country. The total annual capacity of the seed processing plants is 450,000 tonnes. The Uzdommakhsulot Company is responsible for processing certified seed of self-pollinated crops (wheat e.g.) and some hybrid seeds of maize, sunflower crops. UzDonmakhsulot Company has 13 regional branch offices each with seed processing and storage facilities based on the quantity of seed produced in the region. UzDonmakhsulot Company is processing 293,000 tonnes of seeds to be sold to the shirkat and private farms of the country.

4.4. Seed Marketing

Seed distribution is provided under State monopoly via Uzdonmakhsulot Company. The Company acts as a trade intermediary of the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan.

The UzDonMakhsulot Company is responsible for seed distribution of agricultural crops except for cotton and vegetable crops (there are two appropriate seed companies which are responsible for processing of seeds cotton and vegetable crops in the country).

The Ministry of Finance determines the seed price of major agricultural crops. The price of seed distributed by the public sector is low. For private companies price is determined based on supply and demand particularly for vegetable seeds where there is better competition.

There are additional costs in producing good quality seed which increases cost of production and increase the price. To obtain some profit, producers certainly have to set prices higher than the grain price, considering the price of seed from the informal sector. However, in self-pollinated crops, farmers may choose to source their own seed for the next planting season making it difficult to estimate the actual seed demand each year both by public and private sector enterprises. Seed prices also seem to be a problem for private sector to produce seed of self-pollinated crops such as wheat, rice, soybean, mung bean and groundnut. However, seed growers and public elite seed farms are more profitable compared to other farmers because there is a premium price of 300 % and 250%, respectively for breeder and foundation seed.

Since the cultivated area is enormous there is considerable national seed demand each year. Most farmers and private seed companies have established and have begun to produce elite seed for marketing but according to State quota. There has been some progress in wheat sector because of consistent promotion to use quality seed of improved varieties, although most formal wheat seed comes from the public sector.

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

The success of community seed project lies in the ability of the seed growers to market their seed. Some farmers have used field days as a way of advertising the availability of good quality seed to fellow farmers, while others have used public meetings and ceremonies in their villages to market seed. Seed growers should be innovative adopting ideas that are workable within their rural setup. For some crop such as groundnut, sorghum, alfalfa and maize which is not under Government quota farmers can produce seed according to local demand and the price is dependent on market forces. Farmers would like to produce seeds of crops not included in quota system or look for seed from reliable sources, especially the public sector producers.

It is important to help establishing a credit scheme by providing a revolving fund to assist community based organizations to buy seed from seed growers and provide new loans for resource poor farmers to purchase seed. Some farmers do loan seed to others farmers, to be repaid later in the form of grain, labor or livestock. After selling off their produce, farmers should be encouraged to save some of the income for purchasing seed and to cover other overheads during the next growing season.

A number of actions were undertaken with the help of international organizations (WB, ADB, FAO, ICARDA, CIMMYT and USAID) which showed keen interest and aware of the need of establishing a national seed production and seed marketing agency. A World Bank project on improved seed production system is introduced a new approach in the sector. After the project, Uzbekistan has improved its standards in variety development and seed production. The Asian Development Bank project on "Grain Productivity Improvement" is assisting the wheat sector to improve farm productivity and incomes, mitigate the adverse impacts of food shortage and loss of employment in the rural areas, and facilitate a phased transition of the agricultural sector towards the market system.

4.5. Seed Quality Control

The State (Agricultural) Seed Certification and Quality Control Center (SSCQCC) is a Government agency responsible for quality control and certification of agricultural crops. The SSCQCC was established in 1995 under the Ministry of Agriculture and Water Resources by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 31 October 1995 # 421. The objectives, tasks and functions of the SSCQCC are stipulated by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan #553 dated 18 December 1997. A major document governing the status of the SSCQCC is the Regulation on State Seed Certification and Quality Control Center, Annex #1 to the Resolution #553 dated 18 December 1997.

The Government maintains quality assurance programs that monitor quality during seed production and ensure the supply of high quality seed to farmers. An array of "conventional" field inspection procedures and seed quality testing methods are used to maintain varietal purity, physical purity, germination and health tests. However, quality assessment techniques continue to evolve with advances in science. Advances in seed enhancements, such as pelleting, priming and pre-germination, require inspection of seed quality before and after the enhancement process.

Table 3 Seed certification standards

#	Standards	Seed classes				
		Elite seed)	(foundation	R-1	R-2	R-3
	Pure seed (min. %)	99.0		99.0	98.0	97.0
	Inert matter (max. %)	1.0		1.0	2.0	3.0
	Other seeds (no/kg)	3.0		5.0	10.0	30.0
	Weed seeds (no/kg)	5.0		10.0	20.0	35.0
	Infected seeds (max. %)			0.01	0.2	0.5
	Germination (min. %)	95		95	92	90
	Moisture content	13.5		13.5	14.0	14.5

Seed quality is determined by many factors, principally physical purity and germination. However, other attributes such as varietal identity and purity, seed health, vigor, and seed size are important when considering seed production and marketing. In Uzbekistan, certified seed should meet basic quality standards such as varietal purity, physical purity, germination and health standards before certification.

Fields used to produce breeder seed are inspected by the breeder; foundation seed fields are inspected by the breeder or his authorized representative. The latter should be trained by the breeder or in special training courses and be well acquainted with the morphological characteristics of the varieties. Fields used to produce certified seed are usually inspected by authorized inspectors which have certification to be inspected.

The number of inspections depends on the species and cultivar. Bread wheat, as well as many open-pollinating species, generally requires only one inspection. Hybrids and inbred lines require four to five; at least one inspection must be carried out during vegetative growth to check morphological and physiological characters; one or two is carried out during flowering to remove plants which may show variation in inflorescence characters; and one during seed repining to remove diseased plants and noxious weeds.

Steps during each inspection are:

- Check field details that the field is located as indicated in the application.
- Check the number of varieties (for given species, each farm can grow only one variety of foundation seed or certified seed)
- Check the category of seed used (the growers must show the official certification or label from the seed lot or sack)
- Check that isolation distances are as required by regulation.
- Check that the previous crop was a different species (it can be the same species only if the seed grower grew the same variety the previous year).

Variety identity and purity must conform to regulations. Inspection is carried out by walking through the field, following a route which allows the entire area to be covered. Inspection should be carried out on limited areas, or sample of at least 100 m². Off-type counts in the sample area are then related to the population estimate to determine the cultivar purity for the crop. At the end of each inspection a report is written including the decision to approve or discard the field.

If approved, recommendations which will improve the quality of the seed and increase yield may be given.

State laws and standards for seed production require that all agricultural seed be labeled before marketing, although labeling requirements for agricultural crops may differ for flower, tree and shrubs. If the seed is treated, a label must state that the seed has been treated and shall be labeled with a poison symbol. Terms that must appear on the label are: (i) varietal name and category of seed; (ii) production year; (iii) plot number; (iv) percentage by weight of pure seed; (v) percentage by weight of all weed seeds; (vi) percentage by weight of all crop seeds; (vii) percentage by weight of inert matter; (viii) name and number per kg of restricted noxious weed seeds; and (ix) date of germination test. The label should include the name and address of the person who labeled the seed, or who sells or offers the seed for sale within the state.

During seed production, proper fertilization, adequate water, sufficient isolation, proper roguing of off-types, and timely harvests are all important factors. Care also must be taken to clean harvesting equipment, trucks, and storage and handling facilities to prevent contamination. During the seed conditioning and packaging process, the seed must be handled carefully to avoid contamination and damage.

Proper seed moisture at the time of packaging and seed treatment also are important considerations. Seed storage conditions must maintain the vigor and quality of the seed. Excess humidity or heat can cause severe damage to seed in a short time.

Elite farms should have the capability and facilities to provide the conditions listed above. Their reputation as quality seed producers usually is a good indicator of the quality of seed offered for sale.

Certification order **ПЦМК**-02-2003 is a document approved and used for certification by the SSCQCC. The document has been agreed with Uzgosstandart and is part of National Certification System. The document stipulates in detail all the procedures for certifying agricultural seeds and defines an order of seed (except for cotton seed) certification in the National Certification System. The document is obligatory and used by the SSCQCC and its Central seed testing laboratory, seed production farms, processing plants, procurement centers, and other seed producers and consumers. It complies with requirements of RST UZ 5.0, RD UZ 51-62 standards.

Central seed laboratory of State Seed Certification and Quality Control Center tests for over 40 different agricultural crops. Cotton, wheat, barley, alfalfa, sunflower, chickpea and represent approximately 80% of the service seed samples tested annually. Every province has regional branches of Central Seed Laboratory for testing seed samples according to state approved procedures on seed quality control. The Central Seed Laboratory receives service seed samples from 13 regions of Uzbekistan and certifies the seeds to be planting in the state farms or private farms.

Seed regulations and standards

In accordance with the seed law, seed quality control and certification is carried out centrally by the Government. The legal act stipulate procedures for seed quality control and certification, the responsible agency, seed related transactions, national seed reserve and personnel. In compliance with the Law “On certification” the SSCQCC was accredited by the State Committee on Standardization, Metrology and Certification (Uzgosstandart).

Agricultural crop seeds to be certified in Uzbekistan shall comply with the following standards and regulations:

- GOST 20290-74. Agricultural seeds. Determination of sowing qualities
- GOST 20081-74. Seed breeding process. THIS NOT CLEAR
- GOST 12036-85 Agricultural seeds. Rules of procurement and sample collecting methods
- GOST 12038-84 Agricultural seeds: Germination determination methods
- GOST 12039-82 Agricultural seeds: Viability determination methods
- GOST 12041-82 Agricultural seeds: Humidity determination methods
- GOST 12042-80 Agricultural seeds: Weight determination methods (1000 seeds)
- GOST 12043-88 Agricultural seeds: Originality determination methods
- GOST 12044-81 Agricultural seeds: Contamination determination methods
- GOST 12045-81 Agricultural seeds: Pest determination methods
- GOST 12046-85 Agricultural seeds. Seed quality documentation.
- GOST 12047-85 Agricultural seeds: Random seed quality determination
- PMG 36-2001 Rules for international standardization
- O`z DSt 1.19:2000 State standardization system of Uzbekistan. Conformance marks (labels)
- O`z RH 51-062-97 NSS UZ Product certification
- O`z RH 51-104:2000 NSS UZ Inspection check of products certified

Regulations on procurement, allocation, seed storage by grain producing enterprises, Registered by the Ministry of Justice on 20 June 2000 #935??. Instructions on aprobation of varietal crops have been stated in 1978.

4.6. Seed Quarantine System

Plant Quarantine makes efforts to prevent entry of a foreign pest to the country through legal restriction of plants and plant products. The Uzbek State Quarantine was established in 1934 by the Decree of Former Soviet Union People Commissariat under Union Plant Quarantine System. According to the Decree, six branches of Uzbek State Quarantine were established and at present 13 branches are functioning.

In Uzbekistan, plant quarantine stations are functioning in the following entry points: (i) International airports in Tashkent Samarkand and Bukhara; (ii) Riverport in Amudarya; and (iii) Land Border Checkpost at Olot, Khorezm, Usturt, etc. The Uzbek State Quarantine has a total of 233 staff. In each province there are Fumigation Groups to prevent the spread of the most dangerous pests in the country.

In Uzbekistan, seeds produced, imported, exported or transited are subject for obligatory phytosanitary and veterinary control in accordance with the Law on Agricultural Plant Protection dated 31 August 2000 and Regulation on Procedure for Certification of Products (Annex to Resolution of the Cabinet of Ministers #318 dated 6 July, 2004), Rules of Main State Veterinary Control Department dated 25 July 2003.

In order to secure distribution of healthy materials to farmers, plant quarantine officials inspect seed production fields are inspected for freedom from seed-borne fungal diseases and noxious weeds. There are nine fungal seed-borne diseases including karnal bunt, dwarf bunt.

The Uzbek State Quarantine Inspection (USQI) regulates noxious weeds. USQI regulation (# 360) contains the list of all prohibited noxious weeds in the country. Listed weeds may not be imported into Uzbekistan or moved within the country without special permit. USQI uses risk assessment as a basis for weed exclusion decisions (see Annex 5).

Uzbekistan is free of many weeds, pests and diseases of plants and animals. This is due to strict quarantine laws. The importation of seed involves a very real risk to the introduction of pests or diseases with serious implications for agricultural industries. All seed consignments entering Uzbekistan are therefore subject to quarantine control, inspection and treatment where necessary by the Uzbek Quarantine and Inspection.

Phytosanitary certificates are required when importing or exporting seed or grain to Uzbekistan. Under Uzbekistan Quarantine regulations there are two main categories for seed:

- **Prohibited seed** is not allowed entry into Uzbekistan unless for specific scientific purposes under strict controlled facilities. Permit to import is required.
- **Restricted seed** includes a range of agricultural and forestry seeds where serious diseases and pests could be introduced into Uzbekistan. There are two types of restricted seeds for quarantine purposes, i.e. restricted seed for sowing in Quarantine and restricted seed for processing. Permit to import is required.

5. RECOMMENDATIONS

Agricultural policies aimed at achieving food security need to emphasize on seed system strategies that will ensure availability of good quality seed to farmers in a timely manner. An in-depth assessment of the seed supply sector in Uzbekistan is essential before any realistic effort for the development of the seed sector is designed. In this document, the seed sector in the country has been examined including issues relevant to variety development, release and maintenance; seed production, processing, storage and marketing; and seed quality control and certification. Furthermore, the document analyzes important linkages between the seed supply systems and other services. Alternative strategies for policy makers that can be adopted according to the prevailing conditions in the country are also proposed.

In view of the varietal development and seed sector activities and considering critical issues on regulatory framework, the key recommendations are presented below:

National Seed Policy, Seed Law and Regulations

1. A national policy is necessary for the development of seed industry. The Government may like to consider having a national seed policy that defines the duties and responsibilities of the formal (public sector, private sector) and informal sector (cooperatives, farmers' groups) forwards varietal development, seed production, seed marketing and distribution, including quality assurance.
2. It is the considered view of all concerned experts that the Government may consider establishing a National Seed Board composed of all stakeholders to guide and monitor the development of the seed industry. Such a Board will help in developing the seed policy, reviewing of seed law and regulations and would make appropriate recommendations for needed improvements to the Government.
3. Uzbekistan has made tremendous progress in providing national regulatory framework of towards development of its seed industry. It would be desirable if the existing regulations are further examined to harmonize with those of international standards and seed laws, especially in view of the fact that Uzbekistan has recently joined UPOV and have plans to also join ISTA.

Liberalization of the Seed Sector

4. The Government should continue to support seed production and supply for non-profitable crops especially suitable for less favorable areas which are not likely to attract private sector investment. It is also important that such Government initiatives do not hinder private sector development due to unfair competition
5. It will be helpful if Government encourages the small and medium size private enterprises/companies/seed growers to undertake quality seed production of less important crops such as legumes, oilseeds, forages etc. currently this will increase both availability and efficiency of seed distribution system for the benefit of farmers, especially for those crops that are not under the direct monitoring of the Government. Even for the crops such as cotton and wheat, the decentralized production under verifying agro-climatic conditions will be desirable.

Variety Development and Maintenance

6. Varietal development activities in Uzbekistan are currently not well developed due to lack of required capital investment for capacity building, resulting in poor infrastructure, including small size equipments and their spare parts, which are in short supply.
7. For proper variety development and maintenance, it will be appropriate if the technical capacity in terms of equipment for planting and harvesting is strengthened.
8. Variety maintenance and breeder seed production are critical steps for rapid transfer of new varieties to the farmers. To ensure proper variety maintenance, the participants suggest establishing special cold storage facilities (with a minimum capacity of 400-500 kg) at the different research institutes located as Andijan, Gallaoral and Tashkent.

Variety Evaluation and Release

9. It is critical that the State Variety Testing Committee, which has the mechanism and infrastructure for variety release system, is further strengthened technically to discharge its responsibility more effectively and efficiently. Both DUS and VCU tests should also be carried out before the release of varieties in accordance to regulation and procedures laid out by the Government. Also possibilities need to be explored to reduce the testing this required before release of new varieties.

10. Taking into account the current modest technical base of the State Variety Testing plots, we propose that data from Uzbek Scientific Production Center for Agriculture, agricultural research stations and its branches should also be used as additional testing locations for evaluating the performance of new varieties before their release.

Seed Production and Processing

11. Barley, oat, oilseeds and forage crops can be produced by the eligible private seed enterprises and farmers. In the absence of Government intervention, most farmers are interested in growing these crops. Main crops such as cotton and wheat can be produced by the private seed companies according to specific regulations and frameworks operative in the country.
12. It is important to establish a credit scheme by providing a “Revolving Fund” to the private seed companies to purchase seed processing equipments for processing and seed handling. Also debt loans for resource poor farmers to buy small farm equipment will be of considerable help.
13. Seed production and processing operations are constrained by lack of infrastructure where private seed producers are not able to clean, process and market seed directly to the farmers, as stipulated in the existing national seed laws. Therefore, provisions should be made for the time being to assist the farmers to install the seed cleaning units at affordable credit rates.

Seed Quality Assurance

14. The State Seed Quality Control and Certification Center has branches and facilities for implementing a comprehensive quality assurance program in the country, but there is urgent need to update laboratory facilities and strengthen the capacity of staff to acquaint them with new seed sector related producers and guidelines.
15. The seed certification system uses different seed classes which are acceptable nationally, but not in conformity with the international nomenclature. Therefore, it would be highly desirable to standardize seed classes in view of harmonization of regulations and seed standards and for the future membership in international organizations.
16. It is also felt that some of the national seed quality standards are high and difficult to achieve by majority of the seed producers, thus leading to rejection of large quantity of good quality seed. Adopting feasible and acceptable standards adopted in line with standards elsewhere would help in accelerating the growth of seed industry. It will also promote seed industry if the price of seed is kept in line with seed quality.
17. The present field inspection system for ensuring variety purity appears to be quite cumbersome and required a lot of work. Simple and reliable methodologies need to be adopted in line with other international norms and procedures. Also there is need to have proper human resources development in this field of specialization.

Quarantine Service and Customs

18. The scientists appreciate that the efforts of the quarantine services and customs concentrate primarily on preventing insects, diseases and weeds of quarantine importance based on sound scientific knowledge and pest risk assessment practices. However, in order to facilitate fast movement of the new germplasm received from well reputed international organizations such as ICARDA, CIMMYT, ICRISAT, CIP, etc. a well defined procedure is required to be put in place in the national interest so that valuable germplasm/breeding materials is made available fasten to the breeders for testing and research purposes.

Human Resource Development

19. In Uzbekistan, the development of the national seed industry is at crossroads. A transition from centrally planned to the free market economy requires individuals with broad technical, practical and managerial competence as well as experience and clear understanding of the future trends in the seed industry development at national, regional and global levels. Training plays a greater

role in providing the required competence for the leadership and managerial expertise relating to in policy, regulatory, technical, institutional and organizational reforms in the seed sector. It is, therefore, essential to develop a strategy for human resource development, appropriate long term for which sufficient resources need to be allocated.

20. Training should be provided through regular short-term courses (regional or national) to technical staff and through workshops or seminars (regional or national) or study tours to sensitize senior policy makers and managers to ensure the development of dynamic and most competitive national seed industry.
21. Training should, however, be prioritized and should focus on seed marketing, seed enterprise development and management, informal and formal seed production, seed quality assurance (certification, quality and health), seed processing etc.

Regional Harmonization

22. In the present context, the seed industry is going through rapid changes at the national, regional and global levels. In view of the long-term development of national seed program, Uzbekistan should participate in all for a concerning regional harmonization of policy, regulations, standards and procedures so as to ensure free flow of varieties and seeds to benefit the nation farmers as well as. In this context, Government may also consider joining regional seed associations such as Asia Pacific Seed Association (APSA), that linkages with other seed organizations in the region could be established and further strengthened.

ANNEXES

Annex-1

THE LAW OF THE REPUBLIC OF UZBEKISTAN ON SELECTION ATTAINMENTS (new edition) dated 29 August 2002

I. General provisions

Article 1. Objectives of the Law

The objectives of this Law shall be the regulation of affairs in the field of creation, legal protection and use of attainments in selection.

Article 2. Basic definitions

The following definitions shall be used in this Law:

Breed - group of animals (including birds, insects, silkworms) or their hybrids, which is determined by genetically caused biological and morphological characteristics and characteristics, and some of them are specific for the given group and distinguish it from other groups of animals. Protected objects of a breed are breed group, in-breed (zonal)

type, pedigree type, pedigree line, familia, parthenoclones, line, hybrids;

Employer - legal entity or natural person requesting generation of selection attainment and financing the request;

Licensor - patenter, conveying the right for use of selection attainment to the licensee on the basis of licensing agreement;

Licensee - legal entity or natural person, who has obtained the right for use of selection attainment from the licensor on the basis of licensing agreement;

Variety - group of plants, which is determined by characteristics, rigidly inherited, characterizing the given genotype or combination of genotypes, and differs from other plant groups of the same botanical taxon by one or several characteristics. Protected objects of variety are a clone, line, hybrid of the first generation, population;

Patenter - owner of the patent on selection attainment;

Selection attainment - new variety of plants, new breed of animals;

Applicant - legal entity or natural person that submitted the application for patenting selection attainment.

Article 3. Legislation on selection attainments

The legislation on selection attainments shall consist from this Law and other acts of the legislation.

If the International agreement of the Republic of Uzbekistan stipulates other rules, than that, which are stipulated by the legislation of the Republic of Uzbekistan on selection attainments, the rules of the international agreement shall be applied.

Article 4. Organizational fundamentals for legal protection of selection attainments

The State the Patent Department of the Republic of Uzbekistan (hereinafter - The Patent Department) shall provide realization of the state policies in the field of legal protection of selection attainments.

The Patent Department shall carry out reception and consideration of the applications on issuing of patents on selection attainments (hereinafter - application for patenting), formal examination, conduct the State Register of plants varieties and the State Register of animal breeds (hereinafter - The Register), shall issue patents for a selection attainment, officially publish information about filing materials and registered selection attainments, protected in the Republic of Uzbekistan, adopt rules and comment on application of the legislation on selection attainments.

The State Commission on Agricultural Plants Variety Tests, the Main State Inspection on Livestock Breeding of the Ministry of Agriculture and Water Management of the Republic of Uzbekistan (hereinafter - the specialized organizations) shall carry out examination on patentability of the declared selection attainments.

Article 5. Author of a selection attainment

A natural person who created (bred or nurtured) new variety of plant or new breed of animals shall be an author of selection attainment.

Natural persons participated in creation of a selection attainment shall be admitted as co-authors. The order of using the rights belonging to co-authors, shall be determined by the legislation and the agreement among them.

Intellectual property rights shall be an inalienable personal right and shall be protected for perpetual term.

The author (co-authors) may be mentioned in the application for patenting, in the patent and in all publications, concerning selection attainment.

Article 6. Patenter

A patent for a selection attainment shall be issued to:

- author (co-authors) of a selection attainment or his (their) successor (successors);
- legal entities and(or) natural persons (at their consent), indicated as author or his successor in application for patenting or in the application for change of the applicant, submitted to the Patent Department prior to registration of a selection attainment;
- employer, in cases, stipulated by the Article 7 of this law.

Article 7. Patenter of selection attainment, created in service

Selection attainment shall be considered as created in service, if at its creation the author (co-authors):

- has been carried out duties inherent in a post, occupied by him (them);
- has been carried out duties, specially assigned to him with the purpose of creating selection attainment;
- used material or financial means, rendered by the employer;
- used knowledge and experience, composing specificity of the employer organization, acquired by him during the employment.

If the employer will not submit patenting application to the Patent Department within four months from the date of the notification by author (co-authors) about created selection attainment, will not concede the right to apply for a patent to other person and will not inform the author (co-authors) about preservation of a selection attainment in secret, the author (co-authors) shall have the right to submit the patenting application and obtain a patent for his (their) name.

In this case employer may use selection attainment in own production with payment of royalty to patenter in accordance with a contract.

In case of preservation by the employer of a selection attainment in secret, it shall pay proportional reward to the author (co-authors) as defined by a contract.

The author (co-authors) of selection attainment, not being a patenter shall have the right for reward for use or licensing of a selection attainment, in size and order of payment determined by a contract with patenter or its successor.

The reward to the author (co-authors) shall be paid by the patenter or his successor during validity of the patent, if other has not been stipulated by a contract on order and terms of reward payment for use of a selection attainment.

The reward shall be paid to the author (co-authors) not later than six months after expiration of the reporting period, during which a selection attainment had been used.

II. Patentability of selection attainment

Article 8. Conditions of granting of legal protection selection attainment

Legal protection shall be rendered to selection attainment which complies with the following criteria: novelty, distinctness, homogeneity and stability.

Selection attainment shall have the title in accordance with requirements of the Article 13 of this Law.

Article 9. Novelty

Selection attainment shall be considered as new, if to the date of submitting patenting application seeds, planting material of a variety or pedigree (breeding) material of a breed have not been sold or transferred by author, his successor or eligible third parties, for use:

- in the territory of the Republic of Uzbekistan - one year prior to the date of submission of application;
- in territory of other country - four years or, in case of grapes, wood, decorative, fruit plants and forest plants, six years prior to the specified date.

Article 10. Distinctness

Selection attainment shall be obviously distinguished from any other notorious selection attainment on the date of patenting application.

Selection attainment shall be considered notorious on the date of submitting patenting application, if the patenting application for this attainment has been submitted and this attainment has been patented in any other country or any other similar form of protection has been rendered, or selection attainment has been included into the official register of selection attainments of this country.

Notoriety shall be established in relation to:

- selection attainment, which has become a part of notorious knowledge level as a result of its development, reproduction, bringing to varietal or breeding condition with the purpose of further propagation, storage and maintaining for above mentioned purposes;
- selection attainment that has been offered for sale, sold, imported or exported.

Article 11. Homogeneity

Selection attainment shall be considered homogeneous, if plants of certain variety or animals of certain breed are homogeneous by selective factors, taking into account their propagating specifics.

Article 12. Stability

Selection attainment shall be considered as stable, if its basic characteristics remain constant after numerous propagation or, in case of special propagation cycle, at the end of each propagation cycle.

Article 13. Name of selection attainment

Selection attainment shall have the name, offered by the applicant and accepted by the Patent Department.

The name of selection attainment shall allow to identify selection attainment, shall be brief, differ from the names of the existing selection attainments of the same or, close botanical or zoological kind. It shall not consist of only figures, mislead in relation to characteristics, origin, value of selection attainment, personality of the author (co-authors), contradict to principles of humanity and morality.

The name of selection attainment shall be registered in the appropriate register simultaneously with including of information about protected selection attainment.

If patenting application submitted in the Republic of Uzbekistan and other countries, the name of selection attainment in these applications shall be identical.

While offering for selling or marketing in the Republic of Uzbekistan or in the territory of a country, which has an agreement with the Republic of Uzbekistan on legal protection of selection attainments, seeds, varietal planting material or pedigree material of a breed, any person shall use the name of selection attainment even after the expiration of the patent on selection attainment, except for cases where third persons do not interfere with such use.

III. Obtaining patent on selection attainment

Article 14. Patent for selection attainment

Patent shall be issued for selection attainment, complying with criteria of patentability and related to botanical and zoological sorts and kinds protected in the Republic of Uzbekistan.

Patent for selection attainment (hereinafter - the Patent) shall certify novelty, distinctness, homogeneity and stability of selection attainment, and right of Patenter for name, possession, usage and dispose of selection attainment.

The right of Patenter shall be effective from the date of the publication of information on registration of selection attainment in the official bulletin the Patent Department.

The patent shall be effective within twenty years from the date of registering selection attainment in the appropriate register. The patent for varieties of grapes, wood, decorative, fruit plants and forest plants, including their tree sticks, shall be effective within twenty five years.

Validity of the patent may be prolonged under the petition of the Patenter, but for a term not exceeding ten years.

Article 15. The right for the patent

The right for the patent shall belong to the author (co-authors) or his successor (successors).

If a number of persons have jointly created one selection attainment, right for the patent shall belong to all of them. Waiver of the right for the patent by one or several of them shall not affect others in acting and participating in procedure for obtaining the patent.

The right for the patent on selection attainment created by the author (co-authors) in connection with performance of his (their) official duties, definite task or through knowledge and experience, component of the employing organization's specificity, shall belong to the employer, if stipulated by the contract between them.

If a number of persons have created selection attainment independently from each other, the right for the patent shall belong to the that person, whose patenting application has been submitted to the Patent Department earlier, provided that the application was not withdrawn or rejected.

The author (co-authors), whose selection attainment has been illegally impersonated and applied for the patent or patented, may dispute the issued patent or claim the patent right as a patenter in legal form.

Employees of the Patent Department and specialized organizations may not obtain the patent, and be mentioned as author (co-author) during their employment, and within one year after dismissal.

Article 16. Application for the patent

Patenting application shall be submitted to The Patent Department by the author (co-authors), employer or their assignee.

Patenting application may be submitted personally, through the patent agent registered in the Patent Department, or through the authorized delegate. Citizens of other countries, not having permanent residence, and legal persons of other countries, not having permanent site in the Republic of Uzbekistan, their patent agents or authorized delegates shall conduct businesses on obtaining the patent and keeping effective through the patent agents of the Republic of Uzbekistan. The powers of the patent agent shall be verified by the power of attorney issued to the agent by the applicant or authorized delegate.

Article 17. Contents of patenting application

Patenting application shall contain:

- request for the patent indicating the author (co-authors) and person (persons), to which the patent will be issued, and information about their residence or site;
- offer for the name of selection attainment;
- description of selection attainment (technical questionnaire);
- photos of selection attainment samples;
- documents on tests of selection attainment, carried out by the applicant;
- declaration of the applicant confirming that selection attainment was not used, was not on sale, was not transferred and corresponds to the requirements of novelty;
- document confirming priority of selection attainment (if necessary);
- commitment of the applicant to submit a material to specialized organization when due hereunder for tests of selection attainment;
- power of attorney in case of applying through patent agent or authorized delegate;
- document, confirming payment of a patent fee in established amount or proof of release from paying patent fee, and for reduction of its amount.

Patenting application shall be related to one selection attainment.

The date of patenting application shall be the date of receiving documents by the Patent Department in accordance with requirements of paragraph one of this Article.

Documents, specified in indentions seven and eight of the paragraph one of this article, shall be submitted by the applicant within three months from the date of patenting application. If the

applicant will not submit these documents within specified term or will not submit the petition for prolongation of the specified term, the application shall be considered as not submitted.

Requirements for patenting application documents shall be established by the Patent Department jointly with specialized organizations.

Materials of patenting applications shall be kept confidential by the Patent Department and information about applications shall not be disclosed without the consent of the applicant during the formal examination of the applications.

Article 18. Priority of selection attainment

Priority of selection attainment shall be established by the date of submitting patenting application to the Patent Department, filled out in accordance with the requirements of this Law.

If identical patenting applications have the same date of priority, the patent shall be issued for application with earlier date of sending to the the Patent Department or with earlier date of receiving application.

If patenting application, submitted to the Patent Department, preceded by application, submitted by the applicant in another country (hereinafter - first application), which has an agreement on legal protection of selection attainments with the Republic of Uzbekistan, the applicant has the right for priority under the first application within twelve months from the date of submitting application.

The applicant shall specify the date of the first application priority in patenting application submitted to the Patent Department. The applicant shall submit a copy of the first application and its translation within three months from the date of submitting application to the Patent Department. While performing these conditions the applicant has the right not to submit additional documentation and material, necessary for test, within three years from the date of submitting the first application.

Non-observance of the term specified in paragraph three of this Article, and non-payment of the established patent fees shall be followed by non-recognition of requested priority.

Submission of subsequent patenting application, publication or use of selection attainment, being subject of the first application, in case they occur during the term, stipulated in paragraph three of this Article, may not be basis for rejection of subsequent application. Such facts may not be basis for occurrence of any rights of third parties.

Article 19. Public examination of selection attainment

Public examination of declared selection attainment shall include formal examination of application and examination on patentability, consisting of an expert examination as for novelty and tests on distinctness, homogeneity and stability.

Article 20. Formal examination of the application

Formal examination of the application shall be carried out after two months from the date of application. During examination the date of priority shall be established, and checking of necessary documents on compliance with qualifying standards carried out.

The applicant may by his own initiative expand, adjust or correct materials of application within two months from the date of application.

If necessary additions, adjustments or corrections have not been made on time or documents missing at the date patenting application have not been submitted, the application shall not be accepted for processing.

Term missed by the applicant, may be restored by the Patent Department based on the petition of the applicant, submitted not later than six months after expiration of the term.

The applicant shall be informed about the decision of the Patent Department based on the results of formal examination of the application.

If the applicant disagrees with the decision of the Patent Department he may appeal to the Board of Appeal of the Patent Department (hereinafter - the Board of Appeal) within three months from the date of sending decision. The appeal shall be heard by the Board of Appeal within two months from the date of its receipt.

Decision of the Board of Appeal may be disputed in court within six months from the date of its pronouncing.

Patenting application that passed formal examination shall be sent the Patent Department to the appropriate specialized organization for examination on patentability.

Article 21. Temporary legal protection of selection attainment

Temporary legal protection shall be rendered to declared selection attainment from the date of publishing information about patenting application until the date of including selection attainment in appropriate register.

The applicant shall have the right of the Patenter during the period of temporary legal protection of selection attainment in accordance with Article 30 of this Law.

Temporary legal protection shall be considered effective, if patenting application has been refused, and appealing potentialities have been exhausted.

A person, using selection attainment, declared for protection during its temporary legal protection, shall pay compensation to Patenter after reception of the patent by the latter, size of which shall be defined by agreement with Patenter.

Article 22. Examination of selection attainment for novelty

Examination of selection attainment for novelty shall be carried out by the specialized organization based on available documents and the proofs, including information, received by its own initiative, and report to the Patent Department about compliance or inadequacy to criterion of novelty of the declared selection attainment. The Patent Department shall notify in writing the applicant about presence or absence of novelty.

Any interested person may claim regarding novelty of the declared selection attainment in appropriate specialized organization within six months from the date of publishing information about patenting application.

Appropriate specialized organization shall notify in writing the applicant about receipt of the claim. The applicant may direct motivated objection to specialized organization within three months from the date of receiving notification, in case he disagrees with claim. Specialized organization shall inform interested person and applicant about decision taken regarding documents received.

If the declared selection attainment does not correspond to criterion of novelty, the Patent Department shall refuse in issuing a patent.

The applicant may appeal the decision of the Patent Department on refusing in issuing a patent in the Board of Appeal within three months.

The appeal shall be considered by the Board of Appeal within two months from the date of receiving.

Decision of the Board of Appeal may be disputed in court within six months from the date of its pronouncing.

Article 23. Testing of the declared selection attainment

Tests of the declared selection attainment shall consist of distinctness, homogeneity and stability tests.

Tests of the declared selection attainment shall be carried out in accordance with methods and within the terms, established by specialized organizations on state variety testing stations, state variety testing sites, other organizations, the list of which shall be approved by the Cabinet of Ministers of the Republic of Uzbekistan.

The applicant shall supply seeds, planting or breeding material in amount necessary for realization of tests, to an address and within the terms established by specialized organization.

Specialized organization may use test results presented by the applicant, and by enterprises, establishments, organizations of the Republic of Uzbekistan and competent bodies of other countries.

Specialized organization shall make decision on compliance of selection attainment to Patentability criteria based on test results.

If selection attainment meets patentability criteria, and its name complies with established requirements, specialized organization shall prepare official description of selection attainment, and the Patent Department shall make a decision on issuing a patent.

If selection attainment does not meet patentability criteria, the Patent Department shall make decision on refusing to issue a patent.

The applicant may appeal to decision of the Patent Department in the Board of Appeal within three months. The appeal shall be considered by the Board of Appeal within two months from the date of its receipt, if there is no necessity for additional testing of selection attainment.

Decision of the Board of Appeal may be disputed in court within six months from the date of its pronouncing.

Article 24. Withdrawal of patenting application

Patenting application may be withdrawn by written petition of the applicant before making decision on patenting or refusal in patenting.

In case of several joint applicants patenting application may be withdrawn only with the consent of each of them.

Article 25. Registration of selection attainment

The Patent Department shall register selection attainment in appropriate register after the decision on patenting.

Article 26. Official publication of information about selection attainment

Information about patenting applications received, registered selection attainments, legal actions of the Patent Department, complete descriptions of selection attainments, registered agreements on concession of rights and licensing, and other information related to selection attainments, shall be published in the official bulletin of the Patent Department.

Article 27. Issuing a patent

Patent shall be issued by the Patent Department on behalf of the Republic of Uzbekistan.

Any person may submit objection against issuing of a patent within six months from the date of publishing information about registration of selection attainment.

Objection against issuing of a patent shall be considered by the Board of Appeal with participation of representatives from appropriate specialized organizations, within six months from the date of submitting an objection.

The Patent Department shall carry out patenting after expiration of six months from the date of publishing information about registration of selection attainment, if objections against issuing of a patent have not been submitted or objections have been rejected.

One patent shall be issued for persons jointly applied for patenting.

The form of a patent and structure of information, indicated in it shall be established by the Patent Department.

Obvious and technical mistakes in issued patent shall be corrected by the Patent Department on request of the Patenter.

The Patenter shall deposit necessary material on protected selection attainment after obtaining the patent.

Article 28. Preservation of selection attainment

Patenter shall maintain variety, breed during validity of the patent so that the characteristics specified in the official description of variety, breed, compiled at the date of their registration in appropriate register, will be preserved.

Patenter shall, on inquiry of specialized organizations and/or the Patent Department, supply seeds of a variety or breeding material for realization of control testing and allow to carry out on-site inspection.

Article 29. Patent fees

Fees shall be collected for submitting patenting application, examinations and tests of the declared selection attainment, issuing of a patent, validity maintenance, and taking others legal actions related to legal protection of selection attainment. Patent fees shall be paid to the Patent Department.

Amount and terms of paying patent fees, basis for exemption from paying fees, reduction of amount or repayment, and order of use of patent fees shall be established by the Cabinet of Ministers of the Republic of Uzbekistan.

Patent fees shall be paid by the applicant, patenter and other interested person.

Payment of patent fees for validity maintenance may be carried out six months later in case of additional patent fee is paid.

If patent fee for validity maintenance and additional patent fee have not been paid during preferential term, then the patent shall be invalid from the date of non-payment of patent fee within the established term.

IV. Patenter's right

Article 30. Exclusive right of the Patenter

Patenter shall be entitled for exclusive right of use of selection attainment at his own discretion.

Any interested person shall obtain permission from the Patenter to carry out the following actions regarding seed, planting or breeding material of protected selection attainment:

- production and reproduction (propagation);
- adjustment to varietal or breeding condition;
- offer for sale;
- sale and other kinds of marketing;
- export from the Republic of Uzbekistan;
- import to the Republic of Uzbekistan;
- storage for above mentioned purposes.

Patenter may at his own discretion stipulate any conditions and/or restrictions in granting of permission.

The right of the Patenter shall be distributed on vegetative material, produced from seeds of varietal planting material or on industrial animals, produced from pedigree animals, entered into transaction without permission of the Patenter.

Any person shall obtain permission of the Patenter for actions specified in paragraph two of this Article, regarding seed, planting material of a variety or pedigree material of a breed, which:

- essentially inherits characteristics of protected variety, breed, except for case when this protected variety or breed is not a variety or breed essentially inheriting characteristics of other variety or breed;
- has not obvious difference from protected variety or breed in accordance with Article of 10 this Law;
- require numerous use of protected variety or breed.

Variety or breed shall be admitted as essentially inheriting characteristics of other variety or breed (initial), if they:

- inherit the most essential characteristics of an initial variety or breed, which inherit the most essential characteristics of other initial variety or breed, preserving basic characteristics, reflecting genotype or combination of genotypes of an initial variety or breed;
- obviously differ from an initial variety or breed and correspond to genotype or combination of genotypes of an initial variety or breed, except for deviations caused by use of various methods – selection of natural or induced mutant, selection of separate mutant from plants or animals of an initial variety, breed, backcross, modification of variety or breed by methods genetic engineering.

Mutual relations in use of selection attainment, protected by the patent belonging to several Patenters, shall be defined by agreement between them. In case of absence of such agreement every patenter may use protected selection attainment at his own discretion, but may not issue exclusive license or concede the patent to another person without the consent of other Patenters.

Article 31. Exceptions from the Patenter's right

The following actions taken with protected selection attainment shall not be considered as violations of the Patenter's right:

- use for personal and non-commercial purposes;
- use for experimental purposes;
- use as initial material for creation of other varieties or breeds;
- use of varietal or breeding material received from the Patenter by an enterprise, farm for reproduction purposes in this enterprise or farm within two years.

Article 32. Exhaustion of the Patenter's right

The Patenter's right shall not applied to actions in relation with any material of a protected variety or breed after their entering into transaction by selling or other way of marketing in the Republic of Uzbekistan by the Patenter or by his consent, or by exporting for the processing and consuming purposes to countries, where varieties or breeds of the appropriate botanical or zoological kind are not protected.

Clauses of paragraph one of this Article shall not be applied to varieties or breeds, if selling and other way of marketing are directed for further propagation of the given variety or breed or related to exporting of vegetative material of a variety or pedigree material of a breed with the propagation purpose in countries, where varieties or breeds of the appropriate sort either kind are not protected.

Article 33. Violation of the Patenter's right

The following non-authorized actions shall be considered as violation of the Patenter's right:

- production and reproduction (propagation) of selection attainment;
- adjustment of selection attainment to varietal or breeding condition;
- offering for sale, sale and other marketing of a product, created with use of protected selection attainment;
- storage, import, export;
- disclosing of information, representing commercial secret about selection attainment, except for cases, when information is disclosed to the Board of Appeal or a person, performing official procedures for protecting the applicant's or Patenter's rights.

V. Cancellation of the patent

Article 34. Cancellation of the patent

The patent may be disputed and cancelled during its validity period in cases, if:

- on the date of patenting, selection attainment was not in compliance with novelty or distinctness;
- the patent was issued on the basis of uncorroborated information on homogeneity and stability of selection attainment, submitted by the applicant.

Any person may appeal to the Board of Appeal to cancel the patent in accordance with paragraph one of this Article.

The Board of Appeal shall send a copy of the appeal to the Patenter, which shall give well-reasoned answer within three months.

The Board of Appeal make decision on the appeal within six months, if there is no necessity for additional tests of selection attainment.

Decision of the Board of Appeal may be disputed against in court within six months from the date of its pronouncement.

Article 35. Pre-term cancellation of the patent

Validity of the patent shall be cancelled in the following cases:

- non-payment of due patent fees for validity maintenance of the patent;
- submission to the Patent Department of the patent waiving application by the Patenter.

Information about pre-term cancellation of the patent shall be published in the official bulletin of the Patent Department.

Article 36. Annulment of the patent

The patent shall be annulled, if:

- selection attainment does not meet homogeneity and stability to criteria now;
- Patenter, on inquiry of specialized organizations or the Patent Department, has not supplied seeds, planting, breeding material, documents and information necessary for check of integrity of selection attainment, or not afforded an opportunities to carry out on-site inspection for these purposes;

- name of selection attainment was annulled and the Patenter has not offered other suitable name.

Information on annulment of the patent shall be published in the official bulletin of the Patent Department.

Article 37. Waiver of the patent

Patenter by written application may waive the patent.

Waiver of the patent by one of several patenters shall not result in termination of the patent.

Waiver of the patent comes into effect from the date of receipt of by the Patent Department of written application from Patenter.

Patenter shall inform author on intention to waive the patent. In this case author has the right of priority on possession of the patent.

If the patent is object of the licensing agreement, waiver of the patent shall be possible only with the consent of the owner of the license, if other is not stipulated by the agreement.

VI. Final provisions

Article 38. Transfer of the rights on selection attainment

The right to obtain the patent, rights implied by registration of patenting application in the Patent Department, and rights implied by the patent, may be transferred to any legal entity or natural person.

Transfer of the rights may be accomplished on the basis of agreement on concession of the rights or licensing agreement, and by inheritance in accordance with legislation.

Agreement on concession of the rights on selection attainment and licensing agreement shall be registered in the Patent Department.

Article 39. Granting of the right for using selection attainment

Variety or breed, on which the patent has been issued, may be subject of licensing agreement.

Any legal entity or natural person, not being a Patenter, may use selection attainment protected by the patent, only after permission by the Patenter on the basis of licensing agreement.

Patenter may submit to the Patent Department the application on granting to any person the right of using selection attainment (open license). In this case patent fee for validity maintenance of the patent shall be reduced to fifty percents.

Application of the Patenter for granting open license may not be withdrawn.

Any person willing to obtain open license, shall conclude a licensing agreement with Patenter.

Patenter may transfer the right of using selection attainment, granting exclusive or non-exclusive (ordinary) license.

According to exclusive license the Licensee shall be entitled for exclusive use of selection attainment in limits, stipulated by licensing agreement, with reserving the right on use of selection attainment in part, not transmitted to the licensee by the licensor.

According to non-exclusive (ordinary) license the licensor, while granting the right of using selection attainment to the licensee, shall reserve all rights implied by the patent, including granting license to other persons.

Article 40. Compulsory license

If a patenter does not use selection attainment in the Republic of Uzbekistan within three years from the date of issuing a patent and refuses to grant a licensing by agreement and if disuse of the given selection attainment affects public interests, any person willing to use this selection attainment, may initiate legal action in court with the petition to grant compulsory license for him.

Compulsory license shall be granted as non-exclusive (ordinary) license and allows its holder to obtain from the Patenter initial seed, planting or breeding material.

Compulsory license shall be granted only to a person that may ensure the use of selection attainment with a permissible way and in accordance with license.

Compulsory license shall not interfere the Patenter in using protected selection attainment or granting license to other person.

Article 41. Use of selection attainment

Selection attainment shall be considered as used, if produced, reproduced, adjusted to varietal or breeding condition or subsequent propagation of seed, planting or breeding material by morphological, physiological and another characteristics complies with information, contained in the official description of the protected selection attainment.

Article 42. Patenting of selection attainment in others countries

Legal entities and natural persons of the Republic of Uzbekistan may patent selection attainment in other countries in order established by the legislation.

Article 43. The rights of foreign legal entities and natural persons

Foreign legal entities and natural persons shall be entitled for the rights, stipulated by this Law, equally with legal entities and natural persons of the Republic of Uzbekistan or on the basis of reciprocity principle.

Article 44. Dispute resolution

Disputes in the field of creation, legal protection and use of selection attainment shall be resolved in order, established by the legislation.

Article 45. Responsibility for violation of legislation on selection attainment

Persons, violating legislation on selection attainment, shall bear responsibility in accordance with established order.

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List of new varieties being tested by SVTC⁶

#	Name of variety and crop	Originator	Under test since
WHEAT			
1	Mars-1	URIGLCI ⁷	2002
2	Bukharai-Sharif	Bukhara Branch URIGLCI	2001
3	Babur	URIGLCI	2000
4	Selyanka	Ukraine	2002
5	Shavkat	Gallyaral Branch URIGLCI	2003
6	Krasunyya	Ukraine	2003
7	Nikoniya	Russia	2001
8	Zamin-1	Tashkent Branch URIGLCI	2001
9	Selyanka	Russia	2000
10	Andijan-3	URIGLCI	2000
11	Bayavut-1	Sirdarya Branch URIGLCI	1999??
12	Khasan-Orif	Sirdarya Branch URIGLCI	1997??
13	Durdana	URIGLCI	2002
14	Navbakhor	Gallyaral Branch URIGLCI	1997??
15	Andijan-1	URIGLCI	2000
16	GulDU	Sirdarya Branch URIGLCI	1999??
17	Denov-1	Surkhandarya Branch URIGLCI	2003
18	Denov-2	Surkhanadrya Branch URIGLCI	2004
19	Saykhunobod	Institute Genetics	2001
20	Gavkhar	Namangan Branch URIGLCI	2000
21	Yangiovul	Tashkent Branch URIGLCI	1998
22	Ishonch-98	Gallyaral Branch URIGLCI	1998
23	Oltinkul	URIGLCI	1999
24	Aral-96	Gallyaral Branch URIGLCI	1996
25	Zafar	Bukhara URIGLCI	2002
26	Emir	Institute Plant Genetics and Experimental Biology	2003
27	Norin	Namangan Branch URIGLCI	2001
28	CIMMYT-112	Institute Plant Genetics and Experimental Biology	2004
29	Ravat	Gallyaral Branch URIGLCI	2002
30	Genetic	Institute Plant Genetics and Experimental Biology	2003
31	Olmos	Gallyaral Branch URIGLCI	2003
32	Omad	URIGLCI	2005
33	Matonat	URIGLCI	2005
34	Bozkala	Khorezm	2000
35	Ok-yor	URIGLCI	2001
36	Bakhmal	Gallyaral Branch URIGLCI	1997??
37	Bakhodir	Gallyaral Branch URIGLCI	2000
38	Gallyaral-92	Gallyaral Branch URIGLCI	1992??
39	Nurli Kuyosh	Tashkent Branch URIGLCI	2001

⁶ Source – State Variety Testing Commission

⁷ URIGLCI – Uzbek Research Institute for Irrigated Cereal and Legume Crops

40	Masha	Krasnodar Research Institute of Agriculture Russia	2004
41	Shodlik	URIGLCI	2005
42	Bereket	Kyrgyz Institute of Crop and Land Management	2001
43	Saykhun	Institute Plant Genetics and Experimental Biology	2000
44	Tamara	Gallyaral Branch URIGLCI	2003
45	Otrada	Krasnodar Research Institute of Agriculture Russia	2002
46	Yatpulyanka	Krasnodar Research Institute of Agriculture Russia	2003
47	Kranodarskiy-99	Krasnodar Research Institute of Agriculture Russia	2002
48	Katalin	Krasnodar Research Institute of Agriculture Russia	2000
49	Kuyhganyor	URIGLC	2003
50	Shalola	Namangan Branch URIGLCI	2005
SORGHUM			
1	H-83	Karakalpak Research Institute of Crop and Land Management	2002
2	Daulet	Karakalpak Research Institute of Crop and Land Management	2003
3	Soliyarus	Karakalpak Research Institute of Crop and Land Management	2004
4	Artabon	France	2004
5	Frigo	France	2003
LEGUMES			
Green bean			
1	Jasur-98	Gallyaral Branch of URIGLCI	1998
Cheek pea			
1	Bakhmal-1	Gallyaral Branch of URIGLCI	1996
2	Iroda	Gallyaral Branch of URIGLCI	1996
3	Jakhongir 98/85	Gallyaral Branch of URIGLCI	1998
4	Umid	Gallyaral Branch of URIGLCI	2001
LENTIL			
1	Oltin don	Gallyaral Branch of URIGLCI	2004
2	Darmon	URIGLCI	2004
Vetch			
1	Vostok-85	Gallyaral Branch of URIGLCI	2003
OIL CROPS			
SUNFLOWER			
1	Jakhongir	Uzbek Research Institute Plant Industry	2002
2	KK-1	Karakalpak Research Institute of Crop and Land Management	2003
3	Alzan	France	2002
4	Telya	France	2003
5	Senluka	France	2003
6	Filya	France	2004
7	Alisson	France	2003

8	Pomar	France	2004
SOY BEAN			
1	Genetics 1	Institute Plant Genetics and Experimental Biology	2003
2	Issidor	France	2004
3	Leonor	France	2003

List of released varieties of wheat in Uzbekistan (2005)

#	Name of variety	Country	Year of release
Winter bread wheat			
1	Andijan 2	Uzbekistan	2003
2	Andijan 4	Uzbekistan	2004
3	Baltazar	France	1999
4	Bozsuv	Uzbekistan	2002
5	Gayrat	Uzbekistan	2002
6	Gvadelupa	France	2005
7	GK-Kata	Hungary	1999
8	Grekom 439	Uzbekistan	1983
9	Delta	Russia	2002
10	Dostlik	Uzbekistan	2005
11	Zumrad	Uzbekistan	2001
12	Intesivnaya	Kyrgyzstan	1981
13	Krasnovodapadskaya 210	Kazakhstan	1980
14	Kukbulak	Uzbekistan	2001
15	Kupava	Russia	1999
16	Krasota	Russia	2003
17	Knyajzna	Russia	2000
18	Kroshka	Russia	2000
19	Marjon	Uzbekistan	1996
20	MV-16	Hungary	1999
21	Ak-bugday	Uzbekistan	1993
22	Polovchanka	Russia	1999
23	Sanzar 4	Uzbekistan	1990
24	Sanzar 6	Uzbekistan	1991
25	Starshina	Russia	2004
26	Suasson	France	1999
27	Tezpishar	Uzbekistan	1980
28	Torakurgan	Uzbekistan	2005
29	Tribor	France	2000
30	Uzbekistan 1	Uzbekistan	2003
31	Unumli bugday	Uzbekistan	1983
32	Umanka	Russia	2000
33	Chillaki	Uzbekistan/Russia	2002
34	Khosildor	Uzbekistan	1996
35	Echo	Russia	2002
36	Ugtina	Russia	2002
37	Yanbash	Uzbekistan	1995
Winter durum wheat			
1	Aleksandrovka	Uzbekistan	1991
2	Istiklol	Uzbekistan	2002
3	Karlik 85	Uzbekistan	2000
4	Leukurum 3	Uzbekistan	1976
5	Leukurum 7	Russia	2000
6	Marvarid	Uzbekistan	1998
7	Makuz 3	Uzbekistan	2000
Spring bread wheat			

1	Giza 163	Egypt	1997
2	Sads	Egypt	1997
3	Surkhak -5688	Tajikistan	1942
Spring durum wheat			
1	Neodur	France	1997
2	Tetradur	France	1997

List of Uzbek and foreign registered varieties of cereals, legumes, oil and forage crops in Uzbekistan⁸

#	Name of crops	Number of varieties			Local (%)
		Total number variety	Local varieties	Foreign varieties	
Cereals					
1	Winter bread wheat	37	19	18	51.3
2	Winter durum wheat	7	6	1	85.7
3	Spring bread wheat	3		3	0
4	Spring durum wheat	2		2	0
5	Winter barley	12	12		100
6	Spring barley	1		1	0
7	Triticale	3	2	1	66.7
8	Spring Rye	1		1	0
9	Winter oat	3	3		100
10	Spring oat	1	1		100
11	Maize	22	8	14	36.4
12	Sorghum	8	8		100
13	Rice	12	12		100
14	Millet	1		1	0
	Subtotal	113	70	43	62
Legumes					
15	Chick pea	4	3	1	75
16	Mung bean	4	4		100
17	Green bean	4	3	1	75
18	Soy bean	4	4		100
	Subtotal	16	14	2	87.5
Oil crops					
19	Ground nut	1	1		100
20	Flax	1	1		100
21	Sunflower	4		4	0
22	Safflower	1	1		100
23	Sesame	1	1		100
	Subtotal	8	4	4	50
Forage crops					
24	Alfalfa	9	9		100
25	Clover	2	2		100
26	Sudan grass	2	2		100
27	Sainfoin	1	1		100
28	Fodder beat	2	2		100
	Subtotal	16	16		100
	Total number of varieties	153	96	57	62.7

⁸ Source – State Variety Testing Committee

Approved
 Director of Plant Quarantine Inspection
 of the Republic of Uzbekistan

 M.Jumaniyazov

2002 "26" November

LIST OF QUARANTINE OBJECTS

N	Latin name	Uzbek name	Russian name
I. PROHIBITED QUARANTINE OBJECTS IN UZBEKISTAN			
A. Pests			
1	<i>Spodoptera litura</i> Fabr	Осиё гуза тунлами	Азиатская хлопковая совка
2	<i>Hyphantria cunea</i> Drury	Америка ок капалаги	Американская белая бабочка
3	<i>Unaspis citri</i> Comst	Апельсин калкондори	Апельсиновая щитовка
4	<i>Icerya purchasi</i> Mask	Австралия тарновсимон курти	Австралийский желобчатый червец
5	<i>Pantomorus leucoloma</i> Boh	Ок хошияли кунгиз	Белокаемчатый жук
6	<i>Tetradacus citri</i> Chen	Катта мандарин пашшаси	Большая мандариновая муха
7	<i>Pseudacoccus citriculus</i> Green	Шарк унсимон курти	Восточный мучнистый червец
8	<i>Unaspis yananensis</i> Kuw	Шарк цитрус калкондори	Восточная цитрусовая щитовка
9	<i>Nimonia pyrivorela</i> Mats	Нок парвонаси	Грушевая огневка
10	<i>Spodoptera littoralis</i> Boisd.	Миср гуза тунлами	Египетская хлопковая совка
11	<i>Ceroplastes rusci</i> L.	Анжир мумсимон сохта калкондори	Инжировая восковая ложнощитовка
12	<i>Pthorimaea operculella</i> Zell.	Картошка куюси	Картофельная моль
13	<i>Callosobruchus chinensis</i> L.	Хитой донхури	Китайская зерновка
14	<i>Diabrotica virgifera virg</i> Le Conte	Гарб маккажухори кунгизи	Западный кукурузный жук
15	<i>Carposina niponensis</i> Wlsg.	Шафтоли мевахури	Персиковая плодоярка
16	<i>Ceratitis capitata</i> Wied.	Уртаерденгизи мева пашшаси	Средиземноморская плодовая муха
17	<i>Pseudaulacaspis pentagona</i> Targ	Тут калкондори	Тутовая щитовка
18	<i>Viteus vitifolii</i> Fitch.	Филлоксера	Филлоксера
19	<i>Pectinophora gossypiella</i> Saund.	Гуза куюси	Хлопковая моль
20	<i>Pseudococcus gahani</i> Green.	Цитрус унсимон курти	Цитрусовый мучнистый червец
21	<i>Caulophilus latinasus</i> Say.	Кенг хартумли омбор узунбуруни	Широкохоботный амбарный долгоносик
22	<i>Agrilus mali</i> Mats.	Олма тилла кунгизи	Яблонная златка

23	<i>Popillia japonica</i> Newm.	Япония кунгизи	Японский жук
24	<i>Ceroplastes japonicus</i> Green.	Япония мумсимон сохта калкондори	Японская восковая ложнощитовка
25	<i>Lopholeucaspis japonica</i> Ckll.	Япония чупсимон калкондори	Японская палочковидная щитовка
26	<i>Rhagoletis pomonella</i> Walsh.	Олма пашшаси	Яблонная муха
27	<i>Caryeden gonagra</i> L.	Ер енгок донхури	Арахисовая зерновка
28	<i>Zabrotes subrasciatus</i> Boh.	Бразилия донхури	Бразильская зерновка
29	<i>Diaphorina citri</i> Kuway.	Шарк еки Осие барг бургаси	Восточн.или азиатск.листоблошка
30	<i>Dacus dorsalls</i> Hend.	Шарк мева пашшаси	Восточная плодовая муха
31	<i>Lecantum deltae</i> (Lizeri)	Учбурчакли сохта калкондор	Дельтовидная ложнощитовка
32	<i>Bruchidius incarnatus</i> Boh.	Миср нухат донхури	Египетская гороховая зерновка
33	<i>Callosobruchus</i> (sp.sp.)	Дуккаккли экинлар донхури	Зерновка бобовых культур
34	<i>Sinexilon conigerum</i> Gerst.	Аррасимон пустлок кемирувчи кунгиз	Капюшонник зубчатый
35	<i>Liriomyza trifolii</i> (Bur.)	Америка йунгичка минери	Американский клеверный
36	<i>Rhizoecus Kondonis</i> Kuw.	Илдиз курти	Корневой червец
37	<i>Scrobipalopsis solanifera</i> Pav.	Косторика картошка куяси	Косториканская картофельная моль
38	<i>Aonidiella aurantii</i> Mask.	Кизил померанц калкондори	Красная померанцевая щитовка
39	<i>Dinoderus bifoveolatus</i> Woll	Сохта пустлок хаммахури	Лжекороед многоядный
40	<i>Pinnaspis strachani</i> (C ooley.)	Кичик корсимон калкондори	Малая снежная щитовка
41	<i>Ceratitis rosa</i> Walk.	Наталия мева пашшаси	Натальская плодовая муха
42	<i>Pseudoparlatoria parlatoroides</i> Coms	Орхидея калкондори	Орхидная щитовка
43	<i>Nipaeococcus nipae</i> (Mask.)	Пальма курти	Пальмовый червец
44	<i>Paralipsa gularis</i> Zell.	Уруг парвонаси	Семенная огневка
45	<i>Phthorimaea lycopersicella</i> (Busck)	Помидор куяси	Томатная моль
46	<i>Trogoderma simplex</i> Jayne.	Трогодерма симплекс	Трогодерма симплекс
47	<i>Trogoderma angustum</i> Sol.	Трогодерма ангустум	Трогодерма ангустум
48	<i>Trogoderma ballfinchus</i> Beal.	Трогодерма балфинхус	Трогодерма балфинхус
49	<i>Trogoderma longisetosum</i> Chao et Lee.	Трогодерма лонгисетозум	Трогодерма лонгисетозум
50	<i>Trogoderma grassmani</i> Beal.	Трогодерма грассмани	Трогодерма грассмани
51	<i>Trogoderma sternale</i> Jayne.	Трогодерма стернале	Трогодерма стернале
52	<i>Trogoderma ornatum</i> Say.	Трогодерма арнатум	Трогодерма арнатум
53	<i>Aceria sheldoni</i> (Ewing).	Цитрус куртак канаси	Цитрусовый почковый клещ
54	<i>Chrysomphalus rossi</i> (Mask.)	Кора араукарий калкондори	Черная араукариевая щитовка
55	<i>Chlonaspis furfure</i> Fitch.	Тангасимон калкондор	Чешуйчатая щитовка

56	<i>Aleuracanthus woglumi</i> Ash.	Кора цитрус окканоти	Черная цитрусовая белокрылка
57	<i>Aleurothrixus floccosus</i> Mask.	Юнгли окканот	Шерстистая белокрылка
58	<i>Dysmicoccus wistarial</i> (Green).	Япония курти	Японский червец
B. Plant diseases			
Fungus			
1	<i>Glomerella gossypii</i> (South)Edgerton	Гуза антракнози	Антракноз хлопчатника
2	<i>Tilletia indica</i> Mitra	Хинд бугдой коракуяси	Индийская головня пшеницы
3	<i>Phymatotrichum omnivorum</i> (Soh)Duggar	Техас илдиз чириш касали	Техасская корневая гниль
4	<i>Didymela chrysanthemi</i> (Tassi)Gar et Gull	Хризантема аскохитози	Аскохитоз хризантем
5	<i>Puccinia horiana</i> P.Henn	Хризантема окзанг касали	Белая ржавчина хризантем
6	<i>Mycosphaerella linorum</i> Carsia Rada	Зигир пасмоси	Пасмо льна (масличного)
7	<i>Synchytrium endobioticum</i> Percival	Картошка рак касали	Рак картофеля
8	<i>Helminthosporium maydis</i> Nisicado	Маккажухори жанубий гельминтоспориоз	Южный гельминтоспориоз кукурузы.
9	<i>Phoma andina</i> Turkensteen	Анд фомоз касаллиги	Андийский фомоз
10	<i>Angiosporium solani</i> Thirum et Brien	Картошка коракуяси	Головня картофеля (клубней)
11	<i>Diplodia macrospora</i> Earle	Маккажухори диплодизи	Диплодиз кукурузы
12	<i>Cercospora kikuchii</i> Mats et Tom Gard.	Соя кизилпушти церкоспориози	Пурпурный церкоспороз сои
13	<i>Diaporthe phaseolorum</i> (Cke et Ell)	Соя пояси раки	Рак стеблей сои
14	<i>Phomopsis viticola</i> Sacc.	Узум сулиш касаллиги	Увядание виноградной лозы
15	<i>Phialophora cinerescens</i> (Wr)van Bryna.	Чиннигул фиалофороз касаллиги	Фиалофороз гвоздики
16	<i>Diaporthe helianthis</i> (Phomopsis helianthi) Mynt	Кунгабокар поясининг кулранг догли касаллиги	Фомопсис (серая пятнистость стеблей) подсолнечника
17	<i>Eutura armeniaca</i> Han of et Caf	Узумнинг эутипоз касали	Эутипоз виноградной лозы
Nematodes			
1	<i>Globodera rostochiensis</i> (Woll)M.et St	Картошка олтин нематодаси	Золотистая картофельн.нематода
2	<i>Globodera pallida</i> (Stone)Mulvey et Stone	Картошка нимранг нематодаси	Бледная картофельная нематода
3	<i>Nacobbus aderrans</i> Golden et al.	Сохта шиш нематодаси	Ложная галловая нематода
4	<i>Radopholus similis</i> Cobb.	Пармаловчи нематодаси	Норовая или сверлящая нематода
Bacterial			
1	<i>Erwinia stewartii</i>	Маккажухори вилти	Бактер.увядание (вилт) кукурузы
2	<i>Pseudomonas caryophili</i>	Чиннигул вилти	Вилт гвоздики
3	<i>Xsanthomonas campestris hyacinthi</i>	Гиацинт сарик касали	Желтая болезнь гиацинтов
4	<i>Erwinia amilovora</i>	Мевали дарахтлар куйдиргиси	Ожог плодовых деревьев

5	<i>Xanthomonas campestris</i> pv.citri	Цитрус рак касали	Рак цитрусовых
6	<i>Xanthomonas campestris</i> pv.oryzicola	Шолининг бактериал чизик касали	Бактериальная полосатость риса
7	<i>Xanthomonas ampelina</i>	Узумнинг бактериал сулиши	Бактериальное увядание винограда
8	<i>Xanthomonas campestris</i> pv.oryzae	Шоли бактериал куйдиргиси	Бактериальный ожог риса
9	<i>Corynebacterium tritici</i>	Бугдойнинг сарик шиллик бактериози	Желтый слизист.бактериоз пшеницы
Virus			
1	Andean potato virus	Картошканинг Анд вируси	Андийский вирус картофеля
2	Rose wilt disease	Атиргул вилти	Вилт розы
3	Potato yellow dwarf virus	Картошканинг сарик паканалик касали	Желтая карликовость картофеля
4	Potato vein yellowing virus	Картошка барг томирларин.саргайиши	Вирусное пожелтен.жилок картофеля.
5	Grapevine flavescence doree (micoplasma)	Узум баргларининг заррин саргайиш касали	Золотистое пожелтение винограда
6	<i>Chrysanthemum stunt viroid</i>	Хризантеманинг паканалик касаллиги	Карликовость хризантем
7	Plum line pattern virus(American)	Олхурининг чизикли АКШ касали	Линейный узор сливы (амер)
8	Peach mosaic virus (American)	Шафтолининг курама касали	Мозаика персика (американ)
9	Plum pox virus	Олхурининг чутир касали	Оспа (шарка) слив
10	Citrus tristeza virus	Цитрус тристеца касали	Тристеца цитрусовых
11	Barley stripe mosaic virus	Арпанинг чизикли курама касали	Штриховатая мозаика ячменя
C. Weeds			
1	<i>Iva axillaris</i> Pursh.	Сассик Америка какраси	Бузинник пазушный (Ива многол)
2	<i>Solanum elaeagnifolium</i> Cav.	Чизикбаргли итузум	Паслен линейнолистный
3	<i>Solanum rostratum</i> Dun	Тиканли итузум	Паслен колючий (клювовидный)
4	<i>Solanum carolinense</i> L.	Каролина итузуми	Паслен каролинский
5	<i>Solanum triflorum</i> L.	Учгулли итузум	Паслен трехцветковый
6	<i>Heliantus californicus</i> D.C.	Калифорния кунгабокар	Подсолнечник калифорнийский
7	<i>Heliantus ciliaris</i> D.C.	Киприкли кунгабокар	Подсолнечник реснитчатый
8	<i>Heliantus petiolaris</i> Nutt.	Барг бандли кунгабокар	Подсолнечник черешчатый
9	<i>Heliantus scaberrimus</i> Benth.	Тукли кунгабокар	Подсолнечник шероховатый
10	<i>Striga</i> (sp.sp.)	Стригалар	Стриги (все виды)
11	<i>Ambrosia trifida</i> L.	Учбулакли амброзия	Амброзия трехраздельная
12	<i>Ambrosia psilostachya</i> D.C.	Куп йиллик амброзия	Амброзия многолетняя
13	<i>Cenchrus pauciflorus</i> (tribuloides) L.	Камгулли ценхрус (лангарсимон)	Ценхрус малоцветковый (якорцев.)
14	<i>Acanthospermum hispidum</i> D.C.	Каттик юнгли тиканмева	Акантосперим хиспидум
15	<i>Aeshynomene indica</i> (L.) BSP	Хинд Аесхиноменаси	Аесхиноменэ Индика

16	<i>Aeshynomene virginica</i> (L.)	Вержиника Аесхиноменаси	Аесхеноменэ вержиника
17	<i>Bidens bipinata</i> L.	Биденс бипината	Биденс бипината
18	<i>Cassia occidentalis</i> L.	Гарб кассияси	Кассия западная
19	<i>Cassia tora</i> L.	Тора кассияси	Кассия Тора
20	<i>Croton capitatus</i> Michx.	Тупгулли кротон	Кротон головчатый
21	<i>Diodia terres</i> Walt.	Жувасимон диодия	Диодия вальковал
22	<i>Emex australis</i> Stein.	Жанубий эмекс	Эмекс австралийский
23	<i>Emex spinosa</i> L.	Тиканли эмекс	Эмекс колючий
24	<i>Euphorbia marginata</i> Michx.	Хошияли сутли ут	Молочай окаймлённый
25	<i>Euphorbia dentata</i> Michx.	Аррасимон сутли ут	Молочай зубчатый
26	<i>Ipomoea hederacea</i> (L.) Yacq.	Печаксимон ипомея	Ипомея плющевидная
27	<i>Jacquemontia tamnifolia</i> L.	Юраксимон баргли Жакомент ути	Джакемонтия
28	<i>Polygonum pensylvanicum</i> L.	Пансильвания сув мурчи	Горец пенсильванский
29	<i>Raimania laciniata</i> Hill (Oenotera)	Раймания	Раймания рассечённая
30	<i>Sesbania macrocarpa</i> Muhl ex Rafin	Йирик дуккакли сесбания	Сесбания крупноплодная
31	<i>Sesbania exaltata</i> (Raf) Cory	Майда дуккакли сесбания	Сесбания возвышенная
32	<i>Sicyos angulata</i> L.	Бурчагбаргли ковоксимон ут	Сициос угловатый
33	<i>Sida spinosa</i> L.	Тиканли сида	Грудника колючая

II. RESTRICTED QUARANTINE OBJECTS IN UZBEKISTAN

A. Pests

1	<i>Grapholitha molesta</i> Busck.	Шарк мевахури	Восточная плодоярка
2	<i>Quadraspidiotus perniciosus</i>	Калифорния калкондори	Калифорнийская щитовка
3	<i>Trogoderma granarium</i> Ev.	Капр кунгизи	Капоровый жук
4	<i>Leptinotarsa decemlineata</i> Say.	Колорадо картошка кунгизи	Колорадский картофельный жук
5	<i>Dialeurodes citris</i> Ashm.	Цитрус ок каноти	Цитрусовая белокрылка
6	<i>Pseudococcus comstocki</i> Kuw.	Комсток курти	Червец комстока
7	<i>Callosobruchus maculatus</i> F.	Турт догли донхур	Четырехпятнистая зерновка
8	<i>Phyllocnistis citrella</i> Stain.	Цитрус инли куяси	Цитрусовая минирующая моль

B. Weeds

1	<i>Cuscuta</i> sp.sp.	Зарпечаклар	Повилики (все виды)
2	<i>Acroptilon repens</i> D.C.	Судралувчи какра (пуштиранг)	Горчак ползучий (розовый)
3	<i>Ambrosia artemisiifolia</i> L.	Эрмонбаргли амброзия	Амброзия полыннолистная