

CGIAR COLLABORATIVE RESEARCH PROGRAM FOR CENTRAL ASIA AND THE CAUCASUS

ANNUAL REPORT¹ (2004-2005)

INTRODUCTION

The CGIAR Consortium for sustainable agricultural development in Central Asia and the Caucasus, involving nine CG Centers (CIMMYT, CIP, ICARDA, ICRISAT, IFPRI, ILRI, IPGRI, IRRI, IWMI), is serving the eight National Agricultural Research Systems (NARS) of Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan since September 1998. The key objective of the Consortium is to achieve increased productivity of crops and livestock through generation and transfer of sustainable production technologies, while ensuring protection of natural resources.

The CGIAR Program Facilitation Unit (PFU) for CAC provides need based support to the Consortium partners for their research activities in the region. The PFU is housed by the CAC Regional Office of ICARDA, being the Lead Center of the Consortium, whereas four other CGIAR Centers namely CIMMYT, CIP, IPGRI, and IWMI have established their offices in the region and are expanding their collaborative research activities. Recently, the World Vegetable Center (AVRDC) has joined the Consortium as a new partner and also placed its representative in Tashkent. International Center for Biosaline Agriculture (ICBA), Dubai has also signed the letter of agreement to join the Consortium.

During the last seven years, considerable progress has been made in the following areas of priority:

- (a) varietal improvement and seed production,
- (b) on-farm water use efficiency and new agronomic practices,
- (c) feed and livestock management,
- (d) genetic resource conservation, and
- (e) strengthening of NARS.

This report highlights in brief the various activities undertaken by the Consortium partners during the year 2004-2005.

GERMPLASM ENHANCEMENT

Research activities on germplasm enhancement have focused on testing different crop varieties to identify promising breeding materials with resistance to both biotic and abiotic stresses.

Under this collaborative program, twelve promising varieties consisting of winter wheat (8), spring barley (1), chickpea (1), lentil (1) and lathyrus (1) have already been released in the region based on their superior performance. These varieties have recorded consistently higher yield with superior quality and disease resistance over the local checks.

In addition, more than 56 promising varieties of different crops are presently being tested by the State Variety Testing Commissions (SVTC), and are awaiting decisions for their release and wide scale

¹ Presented by Dr. Raj Paroda, Head, CGIAR-PFU, at the Eighth CGIAR Program Steering Committee Meeting, 2-3 May, 2005 held at Aleppo, Syria

adoption (Annexure I). As is evident, practically in all the 8 CAC countries, the new improved breeding material has been identified, which is used either for crossing with the local breeding lines or for direct selection, multiplication and adoption on farmers' fields.

Winter Wheat Improvement

Wheat is the most important crop for food security in the region. Almost all countries have laid considerable emphasis on increased wheat production. Uzbekistan, Tajikistan, Kyrgyzstan, Turkmenistan and Azerbaijan have lately attained food self-sufficiency, whereas Kazakhstan is traditionally a major wheat exporter in the region.

Present wheat varieties in all the CAC countries are old and were introduced from Russia. Many of these varieties have now become susceptible to yellow rust. The collaborative program on wheat involving Turkey-CIMMYT-ICARDA has provided much needed support for testing of improved germplasm. During 2003-2004, six varieties of wheat: Azametly 95 and Nurlu 99 (Azerbaijan) and Jamin, Zubkov and Azirbosh (Kyrgyzstan), and Bitarap (Turkmenistan) have been released.

Despite being early, newly released varieties Azametly-95 and Nurlu-99 have the potential to produce around 7.0-8.0 t/ha. Seed production of these varieties has been undertaken at the Azerbaijan Research Institute of Crop Husbandry and also on the farmers' fields since 2002. Around 1,500 ha area is presently covered under these two varieties. 20 tons of seed has currently been planted for further seed multiplication.

In Kyrgyzstan, a facultative wheat variety Jamin has been released for mountainous areas in Issyl-Kul and Naryn Provinces. Besides being early maturing and high yielding, Jamin is the first facultative wheat variety released in Kyrgyzstan to replace the most popular variety Intensivnaya, grown presently on 50% of the total area in Kyrgyzstan. Jamin is also resistant to yellow rust.

Recently released variety Dostlik in Uzbekistan, has performed exceedingly well in drier and salt affected areas. Initially, ICARDA procured 5 tons of seed from Turkey and Tajikistan during 2001, which catalyzed the process for its release in 2002 and wide scale adoption. About 5500 tons of seed was produced during 2004 and used for large scale distribution to the farmers in Syrdarya, Djizzak, Samarkand, Bukhara and Khorezm Provinces. This year, Dostlik has covered almost 15,000 hectare area. In addition, two new winter wheat varieties Ravat and Grecum 2002 are likely to be released soon in view of their superior performance and resistance to yellow rust under irrigated conditions of Uzbekistan.

In Georgia, seeds of new variety Mtskhetskaya-1 were produced at six farmers' fields for large scale seed multiplication. Efforts are on to popularize this variety but seed availability is still a constraint.

About 1000 lines of cereals and legume crops are being tested annually by the breeders of Turkmenistan. Under the existing cooperation, a new variety of bread wheat Bitarap has recently been released by the Government in view of its superior performance. It is a selection from the international nursery EYTIR-96 (SN64/SKE/2# 7H) Entry-19. This variety has out-yielded Russian check variety Skifianka by about 10-12% and demonstrated resistance to drought and diseases over the last five years. Average yield of Bitarap is around 5.4 t/ha, as against 4.9 t/ha of the check. Currently, Turkmen Research Institute of Grains has 1200 tons of elite and super elite seed of Bitarap. The area planted under this variety during 2003-2004 was about 610 ha. In addition, one new variety each of bread wheat (Nissa) and durum wheat (Altyn Asr) have been submitted to the SVTC in August 2004.

In partnership with the national programs and other organizations, CIMMYT worked towards enhancing both productivity and stability of wheat through the generation and transfer of system-efficient germplasm and sustainable production technologies. Some of these were:

- The winter wheat breeding and seed network established through the GTZ-CIMMYT regional project continued successful operation resulting in a structured exchange of germplasm, varieties, information, expertise and seed.
- The bed-planting technology of irrigated wheat cultivation has been tested both on-station and on-farm and proved to be very successful especially for seed production. Beside yield increase and water use efficiency, this technology saves seed rate by almost half (around 125 kg/ha instead of 250 kg/ha), thus reducing considerably the production cost for the farmers. New bed-planters designed and build in Almaty have been tested on farmers' fields and found suitable.
- Introduction of zero tillage research and on-farm demonstration under the FAO-CIMMYT project in Kazakhstan showed both the advantages and the challenges of the new technology.

Spring Wheat Improvement

Since 1998, CIMMYT has been working on spring wheat improvement for high latitude environments like Northern Kazakhstan. The objective of this work is to combine the drought tolerance and superior grain quality of the Kazakh and Siberian wheat with the disease resistance of Mexican germplasm. This objective is being successfully achieved through the shuttle breeding, where the crosses between the two germplasm pools go through consecutive selection in Mexico and in Kazakhstan. The adapted germplasm is selected and involved in crosses again. By 2004, the activities have reached F5-F6 stage, when there is obvious improvement in adaptation with combined resistance to leaf rust and other diseases. The shuttle breeding germplasm is distributed to 10-14 breeding locations in the region. Shuttle breeding is also reported to the Kazakhstan-Siberia network, which is very important for the region.

Barley Improvement

Barley is the second important grain crop in the region. It is grown mainly in Kazakhstan, as well as in Uzbekistan, Turkmenistan, Kyrgyzstan and Azerbaijan. In Kazakhstan, even after considerable reduction barley has been grown on area of 1.75 million ha. Usually, barley yields are, on an average, about 15-30% higher than wheat under rainfed conditions.

Annually, more than 1000 entries from five different barley nurseries were supplied by ICARDA for testing. The barley breeders have identified some promising lines. Many of the promising lines have widely been used in breeding programs, as source of valuable traits including quality. Following is a brief account of country wise progress:

Most of barley crop in Kazakhstan is spring type, grown as feed in the steppe, under rainfed conditions having annual precipitation of 250 -350 mm. In North Kazakhstan, varieties Batir-1 and Batir-2 performed well during last four years with yield increase of 20-30% over control Akmolinskaya-25. A new spring barley variety (Birlik-1) has also been selected in 2002. It has out yielded check by almost 40-45%.

In South Kazakhstan, most widespread barley grown is winter barley. Krasniy Vodopad Breeding Station is responsible for winter barley improvement. One of the main constraints is insufficient cold tolerance in existing barley varieties. Therefore, development of cold tolerant varieties is the highest priority. In fall, 2003, a special cold tolerant barely nursery BI05IN-W, including 767 lines, was

provided to Krasniy Vodopad Breeding Station, Kazakhstan and Galla Aral Research Center, Uzbekistan. A few winter barley lines have been identified as cold tolerant. In October 2003, a new variety Zhibek Zholy (Silk Road) was submitted to the SVTC. During the last four years, this variety had out yielded the standard check (Bereke-54) by almost 30% in South Kazakhstan.

Uzbek breeders from Galla-Aral Research Center have also identified three promising lines of barley for rainfed conditions. These are: Arizona 5908/Aths//Avt/; 7028/2759/3/6982//Ds/ and Arar/Lingnee527//Arar/Rhn. These lines have distinct advantage for disease resistance, heat and drought tolerance. They have out-yielded local check Lalmikor by 20-25%. All these varieties have been planted this year for further evaluation and seed multiplication.

The Uzbek breeders have also succeeded in selecting a new barley variety named Pallidum 2002. It gave an average yield of 6.9 t/ha under irrigated conditions, compared to 5.4 t/ha of standard variety. It is also resistant to Helminthosporium, lodging and cold. This variety has been submitted to the SVTC in March, 2003.

Barley breeders in Azerbaijan also identified a new variety called Baharly. During the last 3 years, Baharly has out-yielded the local check Tiklon by 35-40%. Baharly is expected to be released soon in Azerbaijan.

The joint research efforts have resulted in the identification of some promising lines of spring and winter barley in Kyrgyzstan. A promising variety has already been named as Adel (MV-46/Mazurka/3/Roho//Alger/ Ceres), which out-yielded the standard check Osnova by 20-25% in the advanced yield trials. It is being evaluated presently by the SVTC for its release. Another promising variety, which has recently been submitted to SVTC is Nutans-3137 (IFBON-1996-97 Entry-106 /Septore/Lingnee640).

In Turkmenistan, three varieties have shown good performance for disease resistance, heat and drought tolerance, as well as productivity during the last 2 years. Seeds of these varieties: Sonata, Alpha/Dura and Lignee-131 have been planted this year for further multiplication.

Legume Improvement

Food Legumes

Legume crops are important being a significant source of vegetable protein. ICARDA scientists are working in close collaboration with the national legume breeders in the CAC region to identify promising chickpea and lentil varieties. Last 4-5 years have resulted in the identification of some promising breeding materials, details of which are provided here:

Chickpea

Uzbekistan is the main chickpea producer in the region. Legume breeder from Andijan Research Institute of Grain and Legume Crops has succeeded in selecting a new variety of chickpea Zumrad (FLIP-97-95C) and another of lentil Darmon (FLIP-97-4L). Both of them have been selected for winter planting in irrigated areas of Uzbekistan. Chickpea variety Zumrad has high yielding ability and bold seed size. It also has better cold tolerance and resistance to Ascochyta compared with other local varieties Lazzat, Yulduz and Uzbekistanskiy-1. Both these varieties are now being tested by SVTC.

Also at Galla-Aral station, some lines have been selected for rainfed condition. These are: FLIP-88-85, FLIP 93-93, FLIP 97-99, FLIP 87-8, FLIP 95-55. The results showed that FLIP 88-85 and FLIP

93-93 were the best. Variety FLIP 88-85 (Johangir) has already been submitted to SVTC. It out yielded local check Lazzat by 10-12% during the last three years and showed resistance to diseases. Its seed is now being multiplied.

In Kyrgyzstan, new ICARDA materials are being evaluated in Chu valley. Last year, CIEN-S 04 nursery was planted. Two lines of chickpea FLIP-98-121C and FLIP 98-142C have officially been submitted to SVTC in November, 2004 for testing and release.

The Kazakh Research Institute of Grain at Shortandy is the main collaborator for chickpea in Northern Kazakhstan. From ICARDA nurseries, new chickpea lines FLIP-95-65, FLIP-95-54, FLIP-95-55, FLIP-99-38C, FLIP-99-12C FLIP-98-196C, FLIP99-23C, FLIP-98-53C, FLIP 98-79C, FLIP-99-20 and FLIP-97-20C were selected as promising against local checks Jubileiny and Krasnocutsky, both from Russia. Earlier, promising line of chickpea FLIP 97-137 was selected and submitted to State Variety Testing Commission in 2001 as ICARDA-1. Based on results of State Variety Testing Commission, ICARDA-1 has shown better performance over local check Kamila.

Tajik Research Institute of Crop Husbandry is responsible for evaluating ICARDA chickpea materials. From the previous years trials, many promising lines were selected and included in a competitive nursery. Data of competitive nursery showed that ILC-32-79 of chickpea out yielded check Muhtadir by 20-25% over last three years. Recently, this variety has been submitted to SVTC under the name SI-80 to SVTC for release in near future.

A new promising variety of chickpea Narmin (FLIP 95-65) has been selected in Azerbaijan. It has out-yielded control variety Vehovskaya by almost 20% over the last 3 years. It is now being tested by SVTC for release and around 15 ha has been planted this year for seed multiplication.

In Georgia, chickpea variety Elixir was released in 2001. It is a selection from ICARDA breeding lines. Last year, seeds of Elixir were distributed to nine farmers for further seed multiplication. Breeders from Mtskheta station have selected another promising line ILC 3279, which has out yielded check by 18-23% over the last three years. This variety is now proposed to be submitted to SVTC.

In Turkmenistan, promising chickpea lines are: FLIP-98-131, FLIP-82-150C, and FLIP-98-41C. These are also better in disease resistance, heat and drought tolerance, beside their high productivity.

Lentil

In Georgia, another promising line of lentil ILL-1918 has been selected as high yielding with resistance to diseases. Earlier, variety Pablo was released in 2001. 900 kg of Pablo and 85 kg of ILL-1918 seeds were produced and made available to the farmers for further seed multiplication.

In Uzbekistan, Darmon is the second lentil variety selected from ICARDA nurseries and has been submitted to SVTC. Earlier, variety Altyn dan was submitted to SVTC in 2003. This year, 360 kg of Altyn dan and 40 kg of Darmon has been used for further seed multiplication. Darmon matures in 110 days and is high yielding (1.2 t/ha). It can be harvested by combine since the first pod branching is about 25 cm above the ground.

In Northern Kazakhstan, the local check is a Russian variety Vehovskaya. Last year, four trials of lentil were planted (LIEN-S, LIEN-L, LIDTN, and LIEN-E 25). From these nurseries, 39 lines were selected as promising and have been planted this year for re-evaluation.

In Turkmenistan, 2 promising lines of lentil LL-4400 and ILL-6037 have been selected as drought tolerant and disease resistant. 15 kg seeds of each line are being further multiplied in order to submit their release proposals to the State Variety Testing Commission.

Forage crops

Livestock is in an integral part of the farming systems and the problem of forage and feed is quite acute. This can be solved with the introduction of forage legumes in the existing crop rotations. The collaboration of ICARDA with NARS has resulted in identification of some promising materials.

In Georgia, two lines of forage crops have been selected at Mtskheta Breeding Station. These are: *Vicia narbonensis* № 2392 originally from Lebanon, and *Vicia villosa* ssp DASYCARPA-1998 № 2443, originally from Italy and selected from IVAT-VD-1998. Their seed multiplication has been taken up this year at Mtskheta station.

In Kazakhstan, some promising lines of forage legumes have been identified. These are: Sel 2757, Sel 2754, Sel 2746, Sel 2748 and Sel-2750 selected from *Vicia Narbonensis* V.Sativa nursery. Also 14 promising lines of *Lathyrus sativus* were selected, of which three lines are: Sel 439, Sel 535 and Sel 536. *Lathyrus* variety Ali Bar (Sel 554) has officially been released in Kazakhstan recently based on its superior performance.

Breeders from Galla-Aral Station in Uzbekistan have selected vetch lines L-628, L-1004, L-694/1 and L-651/2, *Vicia*-2628 and promising varieties of lathyrus, IFVN-560 and IFVN-562. These lines have shown good yield advantage and are more suited to rainfed condition. These lines are drought tolerant and high yielding. One line of *Vicia sativa* #2628 has been selected from ICARDA trials and submitted this year to SVTC.

At Shorora Station in Tajikistan, forage breeders have selected two lines of Vetch *Narbonensis* namely IFVN-561- Sel2469 and IFVN-556. Seed multiplication of these lines has been taken up currently.

Turkmen breeders have identified three lines of vetch. These are: IFVN 556 Sel 2376 and IFVN 563 Sel 2471 from IVAT-V-N and IFVS 2006 Sel2757 from IVAT-V-S nursery. Also Sel 54, a lathyrus line has been selected as promising.

Groundnut Improvement

During the last five years, ICRISAT has provided germplasm materials of groundnut, including early and medium maturing varieties, with resistance to foliar diseases and drought. Some good confectionery lines were also tested. As a result, a few promising varieties suitable for agro-climatic conditions in the region have been identified for final testing and release. These are: ICGV-86155 (“Salomat”) and ICGV-94088 (“Mumtoz”) in Uzbekistan and Tajikistan, respectively.

In March, 2005, ICRISAT provided to Azerbaijan, Armenia, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan seeds of 12 groundnut varieties for research purpose.

A workshop on groundnut improvement in the CAC Region was organized jointly by ICRISAT and CGIAR-PFU in Tashkent from 13-17 September, 2004. Eight scientists from Armenia, Azerbaijan, Kyrgyzstan, Tajikistan, and Uzbekistan attended the workshop. The workshop reviewed the status of groundnut and identified constraints and opportunities. The participants agreed to seek donor’s support for research and development of groundnut in CAC region.

Support for Rice Research

Since last three years, IRRI has joined the Consortium and has initiated activities to support rice research in the region. Based on constraints identified, priority has been given to germplasm improvement with emphasis on cold and salinity tolerance, early maturity, crop management and capacity building.

New germplasm material has been made available for testing. This included a set of IRTON (International Temperate Rice Observational Nursery with 117 test entries), a set of hybrid rice observation nursery (IRHON, 38 test entries), and the fourth set comprising of 26 medium duration aerobic rice varieties and 8 short-duration lines supplied to Uzbek Rice Research Institute.

Initiatives on Potato Improvement

In the last two years, the International Potato Center (CIP) has activated its program for potato improvement in the region. In 2004, CIP placed a seed production specialist, Dr. Carlo Carli, in Tashkent, Uzbekistan, to integrate the CGIAR Program for Central Asia and the Caucasus and strengthen potato research in the region. CIP's assistance to CAC countries initiated in 1999 with the provision of in-vitro germplasm to Armenia, and continued in 2003-2004 with the distribution of additional in-vitro germplasm and TPS families to some other countries of the region. Out of the in-vitro clones provided, Armenia has selected some promising ones like Primicia-Inta (38.7 t/ha) and Pampeana-Inta (31.5 t/ha). In general, results show that most of the countries do not have adequate capacities to maintain and multiply in-vitro materials.

In 2004, a Regional Workshop held in Tashkent, identified research and development needs for increased potato production in CAC region. Based on the results of the workshop, a research program has been formulated to address the issues relating to biotic and abiotic factors, especially virus pressure and heat, and required infrastructure for in-vitro propagation.

The new breeding strategy will be based on the supply of true seed families for local clonal selection in order to allow NARS to work with better adapted germplasm materials having a larger amount of diversity. This should give more opportunities for feedback on progenitors for future crossing plans. Based on an agreement with FAO Emergency Coordination Unit in Dushanbe, Tajikistan initial true seed family selection under isolation will be carried out to get healthy sets of tuber families for sharing with other NARS. The program will also include advanced clones, supplied in-vitro to some selected countries, resulting from the combination of heat tolerance, high iron content and resistance to viruses. TPS technology will be developed with emphasis on mountain areas.

With regard to research on potato seed systems, the program will initially concentrate in Georgia, characterized by the presence of an informal seed system, and Uzbekistan, where centralized seed system operates.

Seed Production

Production of quality seed of high-yielding varieties is critical for faster varietal dissemination. Hence, special emphasis has been laid on the seed development activities in the region. On-farm trials and demonstration plots turned out to be the most important activity for increased agricultural production. The scientists and farmers are now keen to test new varieties. To have an impact on farmers' fields and for wide spread of promising varieties, efforts have been directed towards seed multiplication in collaboration with NARS partners. Details of the seed multiplied in the region are provided in this report crop-wise and the specific details are given in Annexure III.

Integrated Pest Management

Integrated disease and pest management is an important part of germplasm improvement program. Scientists from ICARDA have studied the overall situation for controlling yellow rust – being the most important wheat disease.

Identification of physiological races of yellow rust was undertaken in Azerbaijan, Kyrgyzstan and Uzbekistan. Data for mapping the distribution frequency of new races and the effective resistance genes to yellow rust have been generated. Recommendations for replacement of varieties susceptible to yellow rust have been made in view of release of new high yielding disease resistant winter wheat varieties in different countries.

In Central Asia, considerable area is affected by the most pestiferous insect Sunn Pest, which decreases yield and spoils grain quality. In partnership with University of Vermont, USA, a biological control method, using fungi collected from affected insects, has been developed and tested with 90-100 % success. The Second International Conference on Sunn Pest was held at ICARDA, during July, 2004 in which scientists from Kazakhstan, Uzbekistan, Azerbaijan and Tajikistan had participated.

For the first time in the region, a Wheat-Cereal Leaf Beetle Nursery (WCLBK03) has been established at Kyrgyz Research Institute of Agriculture and the Galla-Aral Branch of Andijan Research Institute of Grain, Uzbekistan, where 144 selected wheat lines are being tested for their resistance.

A regional training course on integrated pest management was organized in Tashkent, Uzbekistan from 18-23 May, 2004. This course was attended by 22 participants from seven countries. Dr. A. Yahyaoui, Senior Pathologist and M. El Bouhssini, Senior Entomologist coordinated the entire program, including field visits.

Crop Diversification

In spring wheat based cropping systems, there are good opportunities for crop diversification. Field pea, chickpea and lentil are the best food legumes for inclusion into crop rotations with cereals. Buckwheat is good alternative for increased benefit to farmers. Oat, occupying much smaller areas, was found to be higher yielding than barley. Under improved crop production technologies, summer fallow can be replaced by oat or food legumes such as chickpea and field pea.

Adoption of sunflower is now quite successful as an oilseed crop. Its area in northern Kazakhstan increased by 50,000 ha in the last three years. Major reason is that there is internal market for edible oil which is otherwise imported. Sunflower seeds are also being processed on farms and sold. Safflower is another new crop, never sown in the north now covering several hundred hectares. Out of food legumes well known is the field pea which is grown on about 5,000 ha, whereas chickpea is grown on 2,000 ha. During field days, farmers complain about marketing of grain legumes. The other constraint is lack of knowledge among farmers on production technologies.

In rainfed winter wheat based cropping systems, there are now opportunities to diversify crop production. Food legumes are the best option for sustainable and economical farming. The best results were obtained in south Kazakhstan with chickpea, in Kyrgyzstan with field pea and chickpea. Out of spring cereals, oat was found to be most productive in southeast Kazakhstan. Alfalfa is also very suitable for sustainable farming in semi-arid conditions of south Kazakhstan. In rainfed cropping systems, the most successful crop is safflower which now covers around 100,000 ha in southern Kazakhstan. This crop is also becoming popular in Kyrgyzstan. Food legumes like field pea and

chickpea have great potential but not widely adopted because of low market, lack of good seeds and technical knowledge. Area under alfalfa in semiarid regions of southern Kazakhstan increased in 2004 remarkably because of high prices for quality hay associated with increased livestock population in recent two years.

In winter wheat based irrigated cropping systems, there are number of alternatives for more economical and sustainable farming. Most beneficial are food legumes. Successful results were obtained in southeast Kazakhstan on soybean and grass pea, in Kyrgyzstan on field pea, common bean and soybean. Safflower can be grown under supplemental irrigation. Most economical crop in Kyrgyzstan is sugar beet followed by maize and food legumes. Nitrogen and phosphorus fertilizers at the rate of 60 kg/ha provided best returns. However commercial fertilizers are not economical under existing market prices for inputs and outputs in Kyrgyzstan while in Kazakhstan fertilizer application is subsidized.

In southeastern Kazakhstan, most successful alternative crop adopted on large scale under irrigation is soybean. Its area has increased in the last two years from 3,000 ha in 2002 to 35,000 ha in 2004. The major reasons for this are: locally organized market in terms of large scale soybean processing factory. Soybean is also spreading in Kyrgyzstan. Common bean produced on several thousand hectares in Chu valley is being exported to Turkey. Maize area is gradually increasing due to availability of improved hybrid seed in the region.

In irrigated cotton-wheat based cropping system, double cropping using alternative crops after harvest of winter wheat is very profitable under existing price scenario and will remain profitable under the free market economy. Various crops may be profitably used for double cropping including food legumes, melons, forages and vegetables. More preferable are short duration food legumes providing good source of income for farmers and positive influence on soil fertility. Cotton can be used for double cropping after harvest of winter wheat mainly in the south of Tajikistan and Uzbekistan provided adequate conservation practices and the early maturing varieties of both wheat and cotton are used. Best results were obtained when wheat was planted in standing cotton using minimum tillage. In southern Uzbekistan and Tajikistan, cotton was planted after harvest of winter wheat on 20,000-30,000 during the fall of 2003.

In Fergana valley, Uzbekistan most widespread are maize, mungbean, melons and carrots due to their demand in the local markets. Common bean is even marketed to Georgia. Rice is also used for double cropping using drainage water if salinity is not high. In Termez area, southern Uzbekistan, maize and mungbean are widely accepted by the farmers for double cropping covering around 7,000 ha and 5,000, ha respectively. Other alternative crops used by the farmers are sesame, melons, groundnut and vegetables but rather on smaller scale. In Tajikistan, double cropping is widely adopted by small farmers. Maize and mungbean are widespread followed by common bean, soybean, vegetables, buckwheat, millet, tobacco, groundnut, sesame. Rice is also grown where water availability is good.

Crop diversification studies were also initiated in the Caucasus. In Azerbaijan, encouraging results were on soybean and sugar beet in irrigated areas, and chickpea under rainfed condition. In Georgia and Armenia, there is good potential for double cropping using common bean, forages and vegetables.

SOIL AND WATER MANAGEMENT

IWMI Research on Water Management

SDC Project on Integrated Water Resources Management in the Fergana Valley

The project is being implemented for the second phase (2005-2008) in partnership with the Scientific Information Center of the Interstate Commission on Water Coordination (SIC-ICWC), the ministries of Agriculture and Water Resources of Uzbekistan, Tajikistan and Kyrgyzstan, Local Water Management Authorities, and Farmers. Some of the major achievements under the project include:

An immediate result had been the establishment of three new Canal Management Organizations (CMOs) for the Khujabaqirgan Canal in Tajikistan and the Aravan-Akbura Canal in Kyrgyzstan, and the South Fergana Canal in Uzbekistan. The creation of these CMOs, based on a partial restructuring of the concerned rayvodkhozes (district water management organizations), is a new management concept for all countries, initiated by the Project by recognizing the need for managing water resources along hydrographic (basin) boundaries in stead of administrative boundaries. In Uzbekistan, the project experience enabled to have a Decree 320 of July 21, 2003 of the Cabinet of Ministers, announcing water reforms for the entire republic.

Another immediate result was the establishment of Canal Water Committees (CWCs) for each of the three pilot canals. This again is an important water management innovation introduced in the region by the Project as governance mechanism involves public participation. Although the status and mandate of the CWCs are still under discussion, it puts the principle of user participation one step forward in the water resources management hierarchy than the usual WUAs at the former collective farm level. In conjunction with the introduction of user participation at canal and farm levels, more equitable water distribution has been observed in the three pilot areas. As the period of intervention is rather short, the direct link between participation and equitable water distribution needs to be further studied.

This Project has also demonstrated that considerable improvements can be achieved in land and water productivity at the field level. Water savings to the order of 30% are possible, together with an increase in crop yields by 5%, thus confirming the results obtained in other projects.

ICARDA Program on Soil and Water Management

ADB Project on Water and Soil Fertility Management

In June, 2003, the first phase of the ADB project "On-farm soil and water management for sustainable agricultural systems in Central Asia" was completed and the second phase of the project started with effect from 1 January, 2004. An Inception workshop of the project was held in Tashkent from 19-20 February, 2004. The Second Steering Committee of the Project was held on 4 March, 2005 in Ashgabat, Turkmenistan, during which the participants revised the progress made during 2004 and approved the workplan and budget for 2005. Some of the major findings during 2004 were:

Soil Tillage

In rainfed spring wheat based systems of northern Kazakhstan, zero tillage proved to be more profitable and energy saving during four years (2001-2003), provided adequate nitrogen fertilizer was applied. In 2004, however tillage in the fall increased soil water accumulation. This indicates that tillage in the fall must be done in some cases to improve water permeability. No-tillage combined with direct seeding of spring wheat has now been adopted on almost 100,000 ha area.

In rainfed winter wheat production system of southern Kazakhstan, conservation tillage didn't show any noticeable effect on crop yield than traditional practice of deep ploughing but was found more economical. Technology of direct sowing with a combine cultivator-drill was accepted in 2004 by five farmers, after having successfully tested this technology over two years. In Kyrgyzstan, deep conservation tillage in the fall provided better soil moisture accumulation resulting in higher yield of rainfed winter wheat. This technology was adopted on 50 ha during 2004. Under rainfed farming in Galla-Aral, Uzbekistan, direct seeding provided yield increase for the second year in a row due to better moisture accumulation. Adoption of this technology is being encouraged by increased fuel prices but constrained by lack of equipment on market.

In irrigated cotton-wheat systems in Tashkent and Termez provinces, Uzbekistan, broadcasting of wheat seeds under shallow cultivation compared to deep ploughing was found to be economical with no significant difference in grain yield. This practice has now been adopted on large scale in both Uzbekistan and Tajikistan. A newly designed equipment for planting winter wheat into cotton stubble and seedbed preparation for soybean to raise double crop were tested during 2004. Both equipments were found to be good for conservation tillage as compared to traditional technologies based on ploughing. The study further indicated that wheat seed rates and nitrogen fertilization rates can be reduced by 20-25%. In Turkmenistan, during last two years, continuous shallow tillage with disks at 12 cm increased soil compaction resulting in lower crop yield. Therefore, in cotton-wheat rotation, reduced tillage can be practiced for wheat sowing after cotton, for which generally deep tillage is applied.

Raised bed planting system tested in three zones in Azerbaijan and also in southern Kazakhstan allowed reducing seed rates by almost half and provided higher winter wheat yields. At the same time, effective weed management appeared to be critical for the success of this technology.

Water Saving Technologies

Improved furrow irrigation for raised bed planted wheat showed improved water use efficiency in south-eastern Kazakhstan. Under cutback furrow irrigation, soil moisture uniformity increased from 0.52-0.62 to 0.85-0.92 and surface runoff reduced by 16% as compared to traditional practice. Water productivity, using cutback furrow irrigation, increased by 28% using optimal rate of nitrogen fertilizer. In the fall of 2004, this technology was disseminated on 50 ha area of Zhambyl province.

Results obtained at Arys Turkistan site in Kazakhstan during 1999-2004 indicated that yield of raw cotton increased by 11 and 14%, WUE increased by 206-228% using alternate and cutback alternate furrow irrigation as compared to furrow irrigation, respectively. Evapotranspiration from cotton field reduced by 790-825m³/ha or by 12% under alternate furrow irrigation as compared to regular furrow irrigation. This technology is widely disseminated now in Arys Turkistan district.

During 2004, improved furrow irrigation was adopted at three farms of Sokoluk district of Kyrgyzstan on an area of 29 ha. Results obtained indicated increase in yield of maize by 22-44%, of soybean by 41-42%, of watermelons by 48% and of tomato by 41%. WUE of maize increased by 75-109%, of soybean by 69-128%, of watermelons by 116% and of tomato by 87%.

The technology of drain water reuse was adopted on five small farms (area 3.4ha) located in Boykozon "shirkat" farm. Gargets were developed to lift water from a drain to adjacent fields. Farmers used the system for irrigation of potato, tomato, maize and Poplar trees. This way, the demand for canal water reduced by 25-60% and farmers received good yields.

At Pakhtakor site in Djizak Province of Uzbekistan, yield of cotton was 4.74 using alternate furrow irrigation, 5.27t/ha using alternate furrows covered by plastic up to 50% and 5.83t/ha using alternate furrows covered up to 75%. Irrigation rate using alternate furrows covered by polyethylene sheets further reduced by 26% as compared to alternate furrow irrigation. In 2004, this technology was adopted at two farms of Pakhtakor district for irrigation of cotton and groundnut.

During 2004, activity on micro-furrow irrigation technology was initiated in Tursunzadev district of Tajikistan. The studies revealed that micro-furrow irrigation technology on typical sierozem soil with slope of 0.06 increased uniformity of soil moisture from 0.7-0.85, surface runoff reduced from 27% to 11% and soil erosion reduced from 18 to 4t/ha, respectively as compared to traditional furrow irrigation. This technology will be widely disseminated in the farms of Gissar and Tursunzade districts of Tajikistan for irrigation of cotton and wheat.

Hovdan kahriz system in Bakharden district of Turkmenistan was repaired, which increased discharge from 4 to 9 liter per second. The system was repaired in collaboration with local people and scientists and students of Turkmen Agricultural University. Two farmers got benefited from increased water discharge and they grew winter wheat in the rehabilitated kahriz.

Studies at Ter-Ter site in Azerbaijan revealed that micro-sprinkler system reduced irrigation by almost 1.5 times as compared to furrow irrigation. The relative humidity increased by 10% and temperature reduced by 1.40-2.1°C having positive affect on growth and development of soybean. Yield was high when micro-sprinkler irrigation was used along with application of fertilizers and microelements.

During 2004, a few selected activities on soil and water management were initiated in Armenia and Georgia, through special support by ICARDA. These were:

- In Armenia, development of a local remediation technology of solonetzic solonchak soil of Ararat valley was tested. Chemical treatments of these soils have become expensive for small farmers. Through this special device, alkaline and neutral salt solutions contained in the ground water are transformed to acidic, thus to be able to neutralize the saline soil. The saline ground water after remediation was used for soil leaching. The data obtained revealed that concentration of water-soluble salts after chemical remediation reduced significantly. In November 2003, four grape varieties were planted. During spring of 2004, survival rate of grape was 80-90% in the plots with soil leaching compared to 30% in control.
- In Georgia, studies were carried out on soil conservation tillage, double cropping and soil fertility management. Conservation tillage for winter wheat proved to be very efficient to control soil erosion and water conservation, which also resulted in increased grain yield. Some legume forages were tried after the harvest of winter wheat, producing additional 25 t/ha of forage yield. Common beans, inter-cropped with maize, reduced maize grain yield by 0.8 t/ha but provided additional 2.0 t/ha of common beans instead. Most economical grain yield was obtained with the application of 90 kg/ha of each NPK.

Socio-Economic Studies

Research activities under the socio-economic component were focused during 2004 on implementing Participatory Rural Appraisals (PRA) and Farm Enterprise Budgeting. PRA addressed issues concerning general socio-economic situation at the research sites such as access to natural resources, financial resources, internal and external market for farm inputs and outputs, and production constraints. It was found that farmers are constrained by lack of good quality inputs such as seeds and fertilizers, poor or almost no access to financial resources to perform field operations on time, poor

maintenance of irrigation systems and lack of farm machinery services. Findings on the marketing issues and institutional limitations indicated poor and unorganized access to output markets, monopolized input and output markets for strategic and commercial crops like cotton and wheat and low prices for agriculture produce. Farm Enterprise Budgeting activity addressed the issue of cost distribution and profitability of the enterprise such as gross margin per hectare and rate of returns. Enterprise budgets of farmers were compared to those in the experimental sites to create “With” and “Without” technology scenario and generate economic and water use efficiency indicators. It was determined that Returns on crop production varied from country to country and from site to site, depending on prevailing market price of inputs and outputs, amount of field operations performed and local policies for crop production. “With” and “Without” technology scenario revealed obvious gains from adoption of new technologies for certain crops and sites, while for other crops and locations there were not much differences with local practices.

FAO-TCP for Karakalpakstan

The FAO-TCP on “Sustainable agriculture practices in the drought-affected region of Karakalpakstan” was launched in May, 2004, with an Awareness creating workshop. It has been implemented mainly on five pilot farms in Chimbay district, Karakalpakstan by the team of national scientists in collaboration with ICARDA. During the year under report, project activities included: laser land leveling, crop diversification by planting summer crops and winter wheat, comparative study of winter wheat varieties on salinity tolerance as well as site survey and monitoring and establishment of WUA. ICARDA organized two workshops for farmers and local scientists for introducing modern technologies on agronomy and water management and three field days for 35 farmers to demonstrate technologies of land leveling, irrigation, water measuring and accounting.

New ADB project entitled “Enabling Communities in the Aral Sea Basin to Combat Land and Water Resource Degradation Through the Creation of ‘Bright’ Spots”

A joint IWMI/ICARDA/ICBA proposal on “Enabling communities in the Aral Sea Basin to combat land and water resource degradation through the creation of ‘Bright’ spots” has been approved by ADB starting in 2005. A project inception workshop was recently organized in Ashgabat on 4-5 March followed by a Steering Committee Meeting held on 5 March. The project workplan and budget distribution were discussed and approved.

FEED AND LIVESTOCK MANAGEMENT

IFAD Project on Integrated Feed and Livestock Management

This project was implemented by ICARDA in collaboration with NARS of the Central Asia, USAID-GL-CRSP and ILRI during 1999 - 2002. The excellent progress achieved under this project was reported in earlier annual reports of this program. In 2003, a few selected activities were continued on a no-cost extension basis.

The Second Phase

The proposal for the second phase of the project was developed through a sequence of meetings, including the brainstorming held in Almaty with collaborators, farmers, and the scientists. The second phase proposal has been submitted to IFAD, which is under consideration.

GENETIC RESOURCES CONSERVATION

The CAC region is the center of origin of many economically important crop species. It represents very rich genetic diversity of crops with many landraces and their wild relatives. In all, more than 8,100 plant species are recorded in the region, of which 890 are endemic. Here exists one of the world's best collections of fruits, nuts, and melons. Due to financial constraints and breaking of links with the VIR, the leading Russian institution on PGR, the support for genetic resource activities got weakened. Hence, efforts on PGR activities needed to be strengthened. Specific activities undertaken recently by IPGRI, ICARDA, CIMMYT and other centers are reported here:

Joint IPGRI-ICARDA-PFU Initiatives

The Central Asian and Trans-Caucasian Network (CATCN) on PGR, involving all eight countries, is facilitated by IPGRI. It consists of nine working group on different crops, including medicinal plants and forest species. Of these, five working group are served by IPGRI, whereas ICARDA is facilitating the work of three groups i.e. cereals, food legumes and forages and pasture species. PFU has provided technical backstopping to the NARS for the establishment of their PGR centers and the cold storage facilities.

Coordination Meeting of CATCN-PGR

- The Fourth Coordination Committee meeting of the Central Asian and Transcaucasian Network on Plant Genetic Resources (CATCN-PGR) was held on 26-27 August, 2004 in Tashkent. Along with National Coordinators from Armenia, Azerbaijan, Georgia, Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan, representatives of IPGRI (Dr. George Ayad and Ms. Muhabbat Turdieva), CGIAR- PFU (Drs. Raj Paroda and Zakir Khalikulov) and ICARDA (Drs. Jan Valkoun, Kenneth Street and Mr. Jan Konopka) participated in the meeting. Dr. Sergey Alexanian from VIR, Saint Petersburg, Russia also attended as an observer.

The meeting reviewed the progress made by the Network in documentation, conservation and use of plant genetic resources in Central Asia and the Caucasus. Acad. Guram Alexidze presented a regional report on the activities undertaken by the Network during the period 2002-2004. The participants reviewed their national activities and discussed future activities. The Coordination Committee agreed on reorganization of the CATCN-PGR structure by merging current nine Crop Working Groups into eight. It was also suggested to establish a web-based system on national inventories of ex situ conserved germplasm. Acad. Guram Alexidze, National Coordinator, Georgia was re-nominated as Chairman of the Coordination Committee for the next two years (2005-2006).

The participants also visited the upgraded Gene Bank facility at the Uzbek Research Institute of Plant Industry (UzRIPI) to learn more about the gene bank management and ex situ conservation of available crop germplasm. UzRIPI has already regenerated and stored more than 15 000 accessions in medium term storage facility.

Strengthening of Gene Banks

Uzbekistan

The success relating to renovation of Uzbek Gene Bank catalyzed the policy makers at the highest level to improve other seed storage facilities, seeking technical backstopping of ICARDA. President of Uzbekistan has approved renovation of three seed storage facilities at the Uzbek Cotton Growing Research Institute, the Research Institute of Genetics and Experimental Biology of Plants and the

Andijan Research Institute of Grain and Legume Crops. About US \$ 100,000 each has been allocated for the renovation of germplasm storage facility at these three institutes during 2005.

Azerbaijan

Considering the importance of plant genetic resources, the Government of Azerbaijan made a strategic decision to rename its Genetics Institute as Genetic Resources Institute. Subsequently, under the World Bank Competitive Grant Scheme (CGC), a proposal for renovation of the Gene Bank, based on technical suggestion of PFU-ICARDA, was approved for US\$ 50,000. ICARDA provided expert advice on medium and long term storage facilities. This facility is now almost complete.

Tajikistan

A Plant Genetic Resources Center was inaugurated in Tajikistan by Prof. Dr. Adel El-Beltagy during his visit in September, 2002. Since then, ICARDA has provided support for upgrading the facilities at the Center. About 8000 seed containers, electronic weighing scale, computer, shelves, and cooling system have been installed. Also, a Standby Generator was provided. Gene Bank in Tajikistan has started functioning and around 600 accessions have been stored in medium term storage facility.

Kyrgyzstan

Medium term Gene Bank in Kyrgyzstan is in operation. Support for creating the Kyrgyz Plant Genetic Resources Center has been provided by ICARDA and PFU-CGIAR. As many as 5,000 seed containers and an electronic weighing scale have been added to the Center. Cooling system, shelves for seed samples have been installed in storage room. Necessary furniture along with two computers were also provided to document available genetic resources. Officially the Gene Bank will be inaugurated by mid-2005.

Georgia

Upon the request received from Georgian PGR scientists PFU-CGIAR and ICARDA has provided financial support for upgrading the storage facility and purchasing essential equipment for the gene bank storage at the Georgian Research Institute of Crop Husbandry.

At the initiative of Georgian Academy of Agricultural Sciences, ICARDA and PFU-CGIAR initiated step-by-step establishment of Gene Bank and the PGR Center. All three scientists, trained earlier have now functional laboratory facility including computers, necessary equipment for cooling system and shelves for storing valuable germplasm collection. The Gene Bank in Georgia is now in operation.

Turkmenistan

On 1st March, 2005, H. E. Mr. Begench Atamuradov, Minister of Agriculture, Turkmenistan and Prof. Dr. Adel El-Beltagy, Director General, ICARDA jointly opened the Turkmen National Gene Bank (TNGB). It is housed at the newly constructed impressive building of the National Museum of White Wheat (“Ak-Bugday”). Three large rooms were allocated to the TNGB, where it is planned to have reception area, documentation office, lab facilities, including those for seed processing, and cooling storage. For this, partitions will be installed in the largest room, whereas arrangements for insulation will be made for the cooling chamber. As a first step, ICARDA has provided some furniture, laboratory equipment and seed containers to make the Gene bank functional.

Developing Regional Strategy

At the initiative of Global Crop Diversity Trust (GCDT), a regional meeting on development of CAC PGR Strategy was held from 28-29 August, 2004, in Tashkent, Uzbekistan. 22 participants including all eight national stakeholders and representatives of IPGRI, ICARDA and GCDT attended and discussed the plans for the development of a CAC Regional Strategy.

IPGRI Activities

During 2004/2005, major activities of IPGRI in the region were organized through the following projects:

UNEP-GEF Project on Fruit Crops in Central Asia

Five-years UNEP-GEF project on “In situ/on farm Conservation of Agrobiodiversity (Horticulture Crops and Wild Fruit Species) in Central Asia” has been approved by the GEF Council. This project aims to conserve the high diversity of horticulture crops and wild fruit species found in the CA countries, a resource of global significance. The project objective is that farmers, institutes and local communities take advantage of the knowledge, methodologies, and policies to conserve in situ/on-farm horticultural crops and wild fruit species in Central Asia. Conservation of these resources will help farmers to have better production and livelihood throughout the region.

Project “Strengthening community institutions to support the conservation and use of plant genetic resources in Uzbekistan and Turkmenistan” (2002-2005)

The project was initiated by IPGRI in collaboration with IFPRI as a System-wide Program on Collective Action and Property Rights (CAPRI). The project studied changes in land tenure and rural institutions affected conservation and use of plant genetic resources in Turkmenistan and Uzbekistan.

The main outputs of the project were:

- Surveys were conducted in Fergana, Namangan, Samarqand and Tashkent regions of Uzbekistan. 800 households and 186 groups were surveyed representing women, men, experts and old people in 20 villages in Samarqand region and 20 villages in Fergana region. Information thus obtained in being analyzed.
- Household and community survey tools have been developed for use in other PGR related projects.

PGR Initiatives by ICARDA

ICARDA has been playing important role to strengthen PGR activities on cereals and legumes, mainly under the ACIAR project for CAC region.

A number of collection missions were organized in partnership with NARS during last two years with funding support from the Australian Center for International Agricultural Research, Grains Research and Development Corporation (Australia) and the United States Department of Agriculture. The missions were:

- ICARDA organized a collection mission in Tajikistan during July, 2004 in collaboration with Tajik Academy of Agricultural Sciences and VIR. Eight scientists from ICARDA, Tajik Academy of Agricultural Sciences, Tajik Research Institute of Crop Husbandry and Vavilov Institute (VIR, Russia) and the Uzbek Botanic Institute participated. The mission covered around 1700 km. and collected 428 accessions of cereals, food legumes, fodder crops and their wild relatives from 64 collection sites.
- A further mission was organized in Azerbaijan from 28 June – 18 July, 2004, in collaboration with Academy of Sciences of Azerbaijan, Azerbaijan Genetic Resources Institute, ICARDA and the South Australian Research and Development Institute. Six scientists participated in the

collection mission. 715 accessions of food and forage legumes and their wild relatives were collected in the southern region of Azerbaijan.

- ICARDA contributed to a further mission in Armenia during July 2004 in collaboration with the Center for Legumes in Mediterranean Areas (CLIMA – Australia), VIR and the Armenian Botanic Institute. 4 scientists accompanied by 2 support staff participated in the mission. The mission covered 2000 km and collected 358 accessions from 77 sites in provinces south of Yerevan.

Other activities undertaken by ICARDA are briefly mentioned here:

A web-site focused on Plant Genetic Resources activities in Central Asia and the Caucasus has also been launched. The site highlights PGR activities in the region, gives comprehensive information about institutes involved in PGR work as well as contact details for key individuals. In addition to the PGR related content the site also has detailed general information about the countries themselves. The web-site address is: www.cac-biodiversity.org.

STRENGTHENING THE NARS

Details of various Human Resource Development Activities during the period from June, 2004-May, 2005 are provided in Annexure IV. Below are the summarized data on cross-sectional human resource development activities:

All centers have made concerted efforts towards capacity building. It includes various trainings, study tours, participation in international, regional and national scientific meetings and workshops, supply of computers and other research equipment, etc. Since June 2004, the CAC Program has arranged 14 short and long term training courses with participation of 275 scientists, besides about 20 study visits as well as regional and national workshops and international conferences with participation.

Support to Regional Forum – CACAARI

In accordance with the decision of Executive Committee, duly endorsed by the Steering Committee, PFU provided facilitation role to the CAC Regional Forum – CACAARI in order to strengthen partnership among NARS. Following are the important initiatives in this regard:

The Meeting of CAC Regional Forum CACAARI was held in Baku, Azerbaijan, on 8 June, 2004. Besides of the Heads and representatives of seven NARS, Prof. Dr. Adel El-Beltagy, DG, ICARDA, Dr. H. Zandsra, DG, CIP, Dr. E. Frison, DG, IPGRI, Dr. J. Srivastava, World Bank, Dr. R. Paroda, Head of PFU-CGIAR, Dr. B. Kamilov, Executive Director of CACAARI and Dr. Z. Khalikulov, PFU-CGIAR attended the Meeting. Dr. Kamilov made presentation on the activities undertaken by CACAARI. All participants appreciated the progress made, particularly because of the facilitations function of PFU-CGIAR, Tashkent and support of ICARDA to the CACAARI Secretariat. All the DGs present assured of their support for strengthening cooperation for agricultural research in the CAC region.

PFU-CGIAR provided logistic support on behalf of CGIAR for Mr. Yulbek Kushmanov, farmer from Uzbekistan, who represented CAC and ICARDA in the farmer's dialogue organized during the AGM'04 Stakeholder meeting, held in Mexico on 27 October, 2004. He also participated in GFAR Steering Committee meeting.

An Inter-regional Research Network on cotton for Central Asia and North Africa (INCANA) was jointly established by three Regional Fora, AARINENA, APAARI and CACAARI, with support of

ICARDA and GFAR during October, 2002. The Second Meeting of Inter-regional Cotton Network for Central Asia and North Africa (INCANA) was held in Tashkent, Uzbekistan from 6-8 September, 2004. The meeting was organized by PFU and ICARDA-CAC Regional Office under the umbrella of CACAARI. In all, about 35 scientists participated in the meeting, including representatives from Iran, India, Egypt, Syria, Jordan, Greece, Kazakhstan, Tajikistan, Uzbekistan and Azerbaijan. Final recommendations and future plan included: (i) development of INCANA Website; (ii) preparation of a Project proposal for donor support; (iii) bringing out INCANA Happenings on a quarterly basis; (iv) printing of Success Stories on Bt Cotton in India and IPM in Syria; (v) submission of request for further support to GFAR, AARINENA, APAARI, ICARDA and FAO for this inter-regional initiative.

Publication Dissemination

During the year under report a number of publications were brought out by PFU and Consortium partners and disseminated to NARS collaborators. The details are:

- ICARDA-CAC/CGIAR-PFU publishes quarterly a newsletter “CAC News” (both in English and Russian) and circulates to all the Consortium partners. The newsletter covers activities undertaken by CGIAR Program in the region.
- Flyers and posters on different Center activities were also brought out.
- The Soil and Plant Analysis Manual by John Ryan, George Estefan and Abdul Rashid, ICARDA was published in Russian language and distributed to our NARS partners.
- The proceedings of the special Symposium on Agricultural Development in Central Asia, organized at Indianapolis, USA during the Annual Meeting of the American Society of Agronomy in November, 2002 have been edited by Dr. John Ryan, ICARDA, Aleppo, Syria, Dr. Paul Vlek, ZEF, Bonn, Germany and Dr. Raj Paroda, ICARDA-CAC/PFU-CGIAR. Same has been published and circulated to all concerned.
- A publication entitled “CGIAR in Uzbekistan” was brought out covering most of the significant achievements under the program.
- The revised edition of the brochure titled “CGIAR Program for Sustainable Agricultural Development in Central Asia and the Caucasus” was brought out to cover all major achievements under the Consortium.
- The publication titled “Guidelines: Transfer of Irrigation Management Services” produced by IWMI, together with Food and Agriculture Organization (FAO) and German Technical Cooperation has been published in Russian. 100 copies have been distributed so far, and it has also been placed on IWMI’s website.
- IWMI and SIC-ICWC have jointly produced a brochure for farmers in Tajik, Uzbek, Kyrgyz, Russian and English describing the simple guidelines to improve water and land productivity in Fergana Valley.
- The revised edition of the brochure titled “A decade of Partnership – Ties that Bind” was brought out.
- Training Manuals on “Conservation through Sustainable Use of Fruit Genetic Resources in Central Asia” in English and Russian are brought out by IPGRI-Tashkent.
- Russian version of Learning Module “Using Molecular Marker Technology in Studies on Plant Genetic Diversity” was developed and sent to IPGRI HQ for publishing.

- Russian version of “Strategic Action Plan on Neglected and Underutilized Plant Species” was developed and sent to IPGRI HQ for publishing.
- Leaflet on “Central Asia and Biodiversity of Crops” is developed by IPGRI-Tashkent and brought out.
- Leaflet “Come to the rescue of Garrygala Research and Production Centre for PGR in Turkmenistan” is prepared.
- Pamphlet “Strengthening community institutions to support the conservation and use of plant genetic resources in Uzbekistan and Turkmenistan” is published by IPGRI-Tashkent.

Website

The web site of the CGIAR Collaborative Program for CAC is available for consortium partners on the Internet since September, 2001. The site contains the basic information on CG Centers and NARS-CAC involved in the program activities, detailed information on each country of CAC region, texts of the Collaborative CGIAR Program for CAC and the Strategy on its development, and other useful information. The site is also being regularly updated with current program reports and publications covering recent achievements of the collaborative research activities. In future, relevant information will also be posted in Russian language as well. Those interested are welcome to visit our site at: www.icarda.cgiar.org/cac/index.htm.

Also CGIAR website is now covering important information in Russian language and can be accessed at: www.icarda.cgiar.org/cac/rus/index.htm.

Conferences/ Workshops/ Meetings

The first International Caucasian Conference on Cereals and Food Legumes was held from 14-17 June, 2004 in Tbilisi, Georgia to assess current status of cereals and food legume research and production in the region and develop a network for information exchange and cooperation. The conference was held under the aegis of the Georgian Ministry of Agriculture and co-sponsored by CIMMYT, ICARDA, FAO, South Dakota State University, USDA-Georgia Agricultural Quality project, Washington State University, WB-funded Agricultural Research, Extension and Training Project and Asian Vegetable Research and Development Center (AVRDC). The conference was attended by 149 participants from 12 countries.

More than 130 scientists from 23 countries met at ICARDA Headquarters, Aleppo, Syria from 19-22 July, 2004 for the Second International Conference on Sunn Pest on “Enhancing international cereal production capacity for food security”. The conference was co-organized by the University of Vermont, USA, the Arab Society for Plant Protection (ASPP) and ICARDA. It was sponsored by FAO, USAID, USDA, IDB and DFID. Scientists from Kazakhstan, Uzbekistan, Azerbaijan and Tajikistan also participated in the conference and made oral and poster presentations on evaluation and spreading of Sunn pest in their countries.

International Conference “Development of the key directions of agricultural science in Kazakhstan: breeding, biotechnology and genetic resources” was held in Astana, from 4-6 August, 2004. The conference was organized by the Ministry of Agriculture of Kazakhstan, German Technical Cooperation Agency, CIMMYT and ICARDA. It was attended by 120 participants from 15 countries. The objective of the conference was to develop a mid-term strategy for breeding, biotechnology and genetic resources both for field crops and animals.

Kazakhstan-Siberia Network on Spring Wheat Improvement had its annual meeting in Astana, Kazakhstan on 5 August, 2004. The network is coordinated and facilitated by CIMMYT with financial support from GTZ. During the meeting, the results of the germplasm testing in 2003 were presented and the work plan of activities for 2005 was discussed.

Regional Workshop on “Strengthening partnerships for more effective planning, research and development in agriculture in central Asia” was held in Tashkent, Uzbekistan from 23-25 August, 2004. The workshop was organized jointly by Asian Development Bank (ADB) and ICARDA as part of the Eighth Regional Technical Assistance (RETA) Program for the CGIAR. In all, 35 delegates from Central Asia countries and Azerbaijan, including policy makers, representatives of NARS, NGOs, farmers’ organizations and donor agencies participated in the workshop.

The Second Meeting of Inter-regional Cotton Network for Central Asia and North Africa (INCANA) was held in Tashkent, Uzbekistan from 6-8 September, 2004. The meeting was organized by PFU and ICARDA-CAC Regional Office under the umbrella of Central Asian and Caucasian Association of Agricultural Research Institutions (CACAARI). The meeting was co-sponsored by the Global Forum for Agricultural Research (GFAR), Association of Agricultural Research Institutions for Near East and North Africa (AARINENA), Asia-Pacific Association of Agricultural Research Institutions (APAARI) and CACAARI. In all, about 35 scientists participated in the meeting, including representatives from Iran, India, Egypt, Syria, Jordan, Greece, Kazakhstan, Tajikistan, Uzbekistan and Azerbaijan.

A traveling workshop to India was organized from 18-26 September, 2004 as part of agreed workplan relating to the ADB project “Improving rural livelihoods through efficient on-farm water and soil fertility management in Central Asia”. The delegation consisted of 11 scientists from Azerbaijan (2), Kazakhstan (2), Kyrgyzstan (2), Tajikistan (2), Turkmenistan (1) and Uzbekistan (2) led by Acad. Bobo Sanginov, President, Tajik Academy of Agricultural Sciences. The objective of the workshop was to learn from successful examples of improved soil and water management practices in Northern India and to get acquainted with the achievements of Indian scientists in the areas of natural resource management (including crop diversification) as well as germplasm improvement, genetic resource conservation, feed and livestock management and HRD. The participants were highly impressed by the strong linkages between education, research and extension sectors. They got convinced that these linkages, enhanced by partnership with International Agricultural Research Centers and backed by the appropriate policies of the Government would be the driving-force for a similar Green Revolution in Central Asia and the Caucasus.

A workshop on data variables and structure to answer questions that support the conservation and use of crop genetic diversity under the first IPGRI global on-farm project “Strengthening the scientific basis of in-situ conservation of agricultural biodiversity on farm” was held at IPGRI Headquarters, Rome, from 20-24 September, 2004. The partners implementing the project reported on their progress and status of on-farm agrobiodiversity conservation in Morocco, Uganda, Tanzania, Ethiopia, Burkina-Faso, Mexico, Nepal and Vietnam. Uzbekistan participated in this meeting for the first time, as it has recently joined the IPGRI Global On-farm Project. Uzbekistan was represented by Mr. Faizulla Abdullaev, Head, PGR Documentation Unit, Uzbek Research Institute of Plant Industry (UzRIPI) provided a report on “Data variables and variety choice selection, reasons for location and area planted for fruit trees in Central Asia”.

First meeting on Information Management under UNEP-GEF Project “In-situ conservation of crop wild relatives through enhanced information management and field application” took place at IPGRI headquarters from 4-7 October, 2004. The project involves five countries: Armenia, Bolivia, Madagascar, Sri-Lanka and Uzbekistan. The meeting addressed current status, problems and opportunities related to information system on wild relatives of cultivated crops in these countries.

A training course on the “Utilization of Expert Systems in Agricultural research Production” was organized by ICARDA and the Central Laboratory for Agricultural Expert Systems (CLAES) from 4-14 October at ICARDA Headquarters in Aleppo. Eighteen participants from CWANA region attended. The course was designed to introduce expert systems for different NARS scientists for use in their agricultural research programs. From CAC region, Dr. Malik Bekenov, Deputy Director General, center for Agricultural Research and Consulting Services, Kyrgyzstan, and Dr. Kadyrzhan Mukin, Researcher, Scientific and Production Center for Agriculture and Plant Growing, Kazakhstan attended. Both of them felt that the skills acquired during this training, would be very useful for implementation of various projects in their countries. Upon his return, Dr. Malik Bekenov organized a workshop for the principal investigators of the ADB project on soil and water management to explain details concerning utilization of Expert Systems in their research.

A special luncheon meeting for the CGIAR Program for Central Asia and the Caucasus (CAC) was organized in Mexico on 25 October, 2004 during AGM'04. The meeting was co-sponsored by the World Bank, USAID, EU and AREO, Iran. In all, 45 representatives of various CG Centers involved in the Consortium, donor organizations and Science Council as well as CGIAR Secretariat participated. The highlight of the meeting was the signing of MOU between ICARDA/PFU and AVRDC as a new partner of the Consortium.

During 12-13 November, 2004, a National Conference on “Issues of agricultural market development under conditions of liberalized economy” was held in Tashkent, Uzbekistan. It was attended by about 100 participants. Representatives of all stakeholders, including farmers from different provinces, participated in the discussions covering the issues of crop diversification, agricultural input supplies, access of crop diversification, agricultural input supplies, access to market etc. ICARDA was represented by Dr. Mekhlis Suleimenov, who presented a paper on possibilities of successful crop diversification in Central Asia.

Dr. Bitore Djumakhanov, cereal Breeder, ICARDA-CAC participated in the Regional Seed Conference, held in Osh, Kyrgyzstan from 2-5 December, 2004. In all, about 120 scientists, farmers, policy makers and representatives of international organizations participated in the conference as well as Silk Road AGROEXPO exhibition. Dr. Djumakhanov made a presentation on ICARDA activities in the area of germplasm improvement and seed production. He also highlighted the possibility of collaboration between ICARDA and SIDA projects.

A workshop on “Conservation agriculture and water management practices” under FAO TCP on “Sustainable agricultural practices in the drought affected region of Karakalpakstan” was held in Nukus, Karakalpakstan on 6 December, 2004. It was attended by the project’s national consultants, 34 farmers and other stakeholders. The participants discussed the on-going project activities and reviewed project work plan for the next cropping season. Also a field day was organized in Chimbay district on 7 December. It involved 40 farmers of Shokh-arik canal area. Issues such as policy, structure and steering committee of WUA were discussed and approved by the members.

ICARDA, in collaboration with Yale University, USA organized a methodology workshop on the impact of agricultural research on poverty in the dry areas from 14-15 December, 2004 at the Economic Growth Center of Yale University. Ms. Madina Musaeva and Mr. Anvar Nasritdinov represented ICARDA-CAC, and presented their research findings on socio-economic component of the ADB project.

MISCELLANEOUS

Initiatives on Resource Generation

A special luncheon meeting for the CGIAR Program for Central Asia and the Caucasus (CAC) was organized in Mexico on 25 October, 2004 during AGM'04. The Meeting was co-sponsored by the World Bank, USAID, EU and AREO, Iran. In all, 45 representatives of various CG Centers involved in the Consortium, donor organizations and Science Council as well as CGIAR Secretariat participated. Prof. Dr. Adel El-Beltagy in his remark gave the background relating to the initiation of the Program in 1998. He expressed his satisfaction with various significant achievements made by the Program involving 9 CG Centers and 8 CAC countries. Prof. Dr. Adel El-Beltagy was pleased to inform that two international institutions namely AVRDC and ICBA have also agreed to join the Consortium. The Program achievements were presented by Dr. Paroda, Head PFU-CGIAR for CAC and Regional Coordinator, ICARDA. Representatives of donor organizations praised the achievements of the Program, specifically emphasizing that its impact was already visible and it could serve as a model for the system-wide eco-regional initiatives, which can be replicated elsewhere. The donors assured of their continued support to the Program in view of its strategic importance.

A new project on "Enabling communities in the Aral Sea basin to combat land and water resource degradation through the creation of 'bright' spots" was approved by ADB in December, 2004. The project, of which the total budget is US \$ 0.7 million, is being implemented by IWMI, ICARDA and ICBA in Kazakhstan, Turkmenistan and Uzbekistan. An Inception Workshop for the project was held on 5 March, 2005 in Ashgabat, Turkmenistan, where the workplan and budget for the first year were discussed and approved.

A second phase project proposal on "Genetic resource Conservation, Documentation and Utilization in Central Asia and the Caucasus" has been approved by ACIAR. The project will be implemented by ICARDA in all the eight countries of CAC region. The budget of the project is US \$ 420,000 for a period of three years.

The new project on "Establishment of a regional plant genetic resources information network for Central Asia and the Caucasus (CAC) region" has been approved for funding by the Global Crop Diversity Trust (GCDDT), with an outlay of \$98,000. The project is currently being implemented by ICARDA.

Another project on "Inventory of ex-situ collections of Treaty crops in Central Asia and the Caucasus" has also been approved by GCDDT. The project is being implemented by ICARDA with an outlay of US\$ 43,500 and has to be completed within this year.

A project on "In situ Conservation of Crop Wild Relatives through Enhanced Information Management and Field Application", submitted by IPGRI to UNEP-GEF, has been approved for implementation in Armenia and Uzbekistan.

Another project on "In-situ/on farm conservation of Agrobiodiversity (Horticultural Crops and Wild Fruit Species) in Central Asia" has been approved by UNEP-GEF. The Project will be implemented by IPGRI in collaboration with the NARS of all the five countries of Central Asia. The total outlay of the project is US \$ 5.7 million.

Project on "Securing important field collections of apple genetic resources in Kazakhstan and Turkmenistan" has been started by IPGRI in 2005 under support of Global Crop Diversity Trust. The project is aimed to rescue the field collections of apple genetic resources of the Makhtumkuli

Research and Production Center on Plant Genetic Resources in Turkmenistan and the Pomological Garden in Almaty, Kazakhstan. The first Planning Workshop of the project was organized on 28-29 March in Talgar, Kazakhstan.

A new project on “Strengthening socio-economic and cultural institutions to support agrobiodiversity management for development in Tajikistan and the Kyrgyz Republic” has been launched under the support by The Christensen Fund. The total budget outlay is US \$ 250,000 for a period of three years.

FAO provided support to a project “Establishment of a national information sharing mechanism on the implementation of the Global Plan of Action on plant genetic resources for food and agriculture in Kazakhstan”. The project with a total budget of US \$ 15,000 will be implemented by IPGRI during 2005.

A new FAO-Technical Cooperation Program on “Improvement of cereal, leguminous, oil and forage crops seed production” has recently been approved for Uzbekistan with a budget outlay of US\$ 301,000. The technical assistance will contribute to the development of an efficient and integrated seed production system by (i) strengthening the technical capacity of the institutions responsible for varietal improvement program and seed production; (ii) modernizing procedures and regulations for seed quality control; and (iii) improving coordination mechanism for seed industry development. ICARDA will provide technical backstopping to this project.

A regional TCP on “Strengthening seed supply in CAC countries” has been submitted to FAO by the CGIAR Program Facilitation Unit (PFU) in Tashkent through ICARDA. This project aims at seed harmonization activities including hosting of a regional conference on seed development in the region.

A Technical Cooperation Program (TCP) on “Conservation agriculture for diversified cropping systems in Southern Kazakhstan” has been submitted to FAO by the Ministry of Agriculture of Kazakhstan and CIMMYT and its approval is awaited.

A concept note of the project “Providing better livelihood opportunities through improved technological options for sustainable agriculture in mountainous regions of Central Asia” has been submitted by ICARDA to IFAD for funding. The project covers mountain regions of Kyrgyzstan and Tajikistan.

Another project proposal on Mountain Agriculture entitled “Breaking the poverty-land degradation cycle for mountain communities in the Caucasus” is being submitted by ICARDA to UNEP-GEF as a Medium-sized project (MSP). The project will cover both Armenia and Georgia.

A second phase project proposal entitled “Community Action in Integrated and Market Oriented Feed-Livestock Production in the Caucasus and Central Asia” has been submitted to IFAD. The three-year project with an outlay of US \$ 1.2 million is expected to cover also the Caucasus in addition to Central Asian countries.

A concept note on “Sustainable livestock and rangeland biodiversity management to combat natural resource degradation and increase rural community livelihoods in Kazakhstan, Turkmenistan and Uzbekistan”, developed by ICARDA is being submitted to World-Bank-GEF.

Finally, in an effort to widen research opportunities, efforts are being made to get additional funds from potential donors. All the partners in the Consortium are developing proposals to receive donor support for strengthening their activities in the region.

Inter-Center Partnership Strengthened

The Inter-Center Partnership has been further strengthened by having new initiatives, such as varietal improvement of wheat (CIMMYT and ICARDA), crop diversification (ICARDA, ICRISAT and IRRRI), IPM (ICARDA and CIMMYT), soil and water management (ICARDA and IWMI), feed and livestock development (ICARDA and ILRI), plant genetic resources (IPGRI, ICARDA and CIMMYT), and human resource development involving all centers, including CIP, the details of which have been included in this report. PFU is also trying to facilitate the activities of other centers of the Consortium, who do not have their staff located in the region. Specific details of inter-center partnership have been mentioned in this report.

A research collaboration has been strengthened between ICARDA and IWMI, through a joint staff appointment based at ICARDA headquarters, which has led to improvement in implementing joint research projects, especially in the Central Asian region. In addition, IWMI, ICARDA and ICBA, together with SANIIRI, KazNIIRI and Land Management Institute of Turkmenistan have started implementing a new project on soil salinity management funded by ADB.

Partnership with ICBA

- A training course on "Biosaline Agriculture: Principles and Applications, with reference to the Central Asia and Caucasus Region", was organized jointly by the International Center for Biosaline Agriculture (ICBA) and ICARDA, from 2-9 September, 2004 in Tashkent. The training course, involving 35 participants from five Central Asian countries and Azerbaijan, addressed the issues of soil salinity and poor quality water management.
- ICBA has decided to join the CGIAR Consortium for CAC as a new partner. The Memorandum of Understanding has since been signed between ICBA-ICARDA-PFU effective 1st January, 2005.

IFPRI/ ISNAR Initiative

IFPRI is proposing through its ISNAR program to strengthen National Agricultural Research Systems (NARS) in Central Asia and the Caucasus. A Regional Workshop on Policy Research is being planned to be organized later this year involving policy makers and social scientists to have a need assessment for innovative agricultural research management systems for better efficiency and desired impact.

Awards and Recognitions

- The Azerbaijan Agricultural Academy conferred the Honorary Doctorate degree on Prof. Dr. Adel El-Beltagy, Director General, ICARDA and Dr. Raj Paroda, Regional Coordinator ICARDA-CAC on 7 June, 2004.
- Dr. Raj Paroda was invited to deliver a Plenary Lecture in the 4th International Crop Science Congress (ICSC) held in Brisbane, Australia from 26 September to 1 October, 2004.
- Ms. Tamara Jinjikhadze of the Institute of Farming, Tbilisi, Georgia has received a Vavilov-Frankel Fellowships Award for 2004. Under this fellowship, which is managed by IPGRI, she is now studying in Australia, supported by the Grains Research and Development Corporation (GRDC).

- Mr. Sayat Shortan, an economist at the Scientific Production Center of Grain Farming, Kazakhstan, won the prestigious IFAR/Wilfried Thalwitz Scholarship to pursue his research on the socio-economic aspects of crop diversification in Northern Kazakhstan in collaboration with ICARDA.

Important Visitors

- Dr. Hubert Zandstra, Director General of the International Potato Center (CIP), Lima, Peru and Co-Chairperson of the Steering Committee of the CGIAR program for Central Asia and the Caucasus, visited Tbilisi, Georgia on 9 June 2004. Having got convinced about the importance of potato in the region, he has placed a potato seed expert in Tashkent to serve the CAC region.
- Dr. George Kuo, Director for International Cooperation, Asian Vegetable Research and Development Center (AVRDC), Taiwan visited Uzbekistan and Kazakhstan from 17-24 June, 2004. He met with Dr. Raj Paroda, Head, CGIAR-PFU for CAC and discussed about future activities of AVRDC in the region. Dr. Kuo visited Uzbek Scientific Production Center for Agriculture and met with directors and senior scientists of the Uzbek Institute of Market Reforms, Uzbek Research Institute of Vegetables, Melon Crops and Potato, Uzbek Research Institute of Plant Industry (UzRIPI), Tashkent State Agrarian University and Samarkand Agricultural Institute. In Kazakhstan, he visited the Research Institute of Potato and Vegetables and “Agrosemconsult” private company.
- Dr. Francisco Reifschneider, Director, CGIAR along with Mr. Salah Brahimy paid a brief visit to Uzbekistan and Tajikistan and saw various activities undertaken by the nine CG Centers as CGIAR Consortium partners for Eco-regional Program for Sustainable Agriculture Development in Central Asia and the Caucasus. He was quite impressed with the research impact of different technologies generated by ICARDA scientists.
- The group of the World Bank agriculture specialists from the Headquarters and offices in Almaty and Astana, consisting of Drs. J. Srivastava, M. Guadagni, B. Utkelov and B. Sadyk visited FAO-CIMMYT Conservation Agriculture Project site in Astana region on 21 August, 2004. Drs. A. Morgounov and A. Bektemirov from the project accompanied the group. The objective of the visit was to assess the potential of the conservation agriculture technologies in Northern Kazakhstan, their agronomic and economic acceptance by the farmers.
- Dr. Colin Wellings, Plant Pathologist from Plant Breeding Institute (University of Sydney) visited Kazakhstan during 30 August – 5 September, 2004. The objective of the visit was to see the current research work on rusts and to explore opportunities for collaboration between Australia, Kazakhstan and CIMMYT. Dr. Wellings, accompanied by Dr. A. Morgounov, CIMMYT-CAC visited the Research and Production Center of Crops, Kazakh Crop Protection Institute and National Agricultural University in Almaty as well as Kazakh Grain Research and Production center and State Agricultural University in Astana. Two seminars on yellow rust research and wheat production in Australia were organized for the scientists in Almaty and Astana.
- Dr. Carlo Carli, CIP, Tashkent visited Azerbaijan, Georgia and Armenia from 7-13 November, 2004 with an objective to familiarize with potato research and development related issues, accompanied by Dr. Zakir Khalikulov, PFU-CGIAR. This visit indicated that the research on potato is relatively weak in the Caucasus countries. Local staff needs guidance on germplasm management and field trials. There is also a considerable need for human resource development.
- Dr. Arturo Martinez, Chief, Seed and Plant Genetic Resources Service (AGPS), FAO, Rome visited Tashkent, Uzbekistan from 15 – 19 January, 2005. During his visit, he discussed with Dr.

Raj Paroda, Regional Coordinator, ICARDA-CAC and Senior Government Officials on the FAO's initiatives in CAC, with particular reference to Uzbekistan. In addition, Dr. Martinez took advantage of his visit to discuss the proposed regional workshop being planned for the second quarter of 2005. He also had detailed discussions with the First Deputy Minister of Agriculture, Dr. A. Juraev and Dr. Amir Amanov regarding implementation of newly approved FAO-TCP on seed development in Uzbekistan.

List of new wheat varieties submitted to SVTC

Country	Year submitted	CAC Name	Pedigree	Institution
Armenia	2002	ATGF-2	PTZ NISKA/UT1556.170	ATG
	2002	ATGF-2	OK82282//BOW/NKT	ATG
	2002	ATGF-3	ID800994.W/VEE	ATG
	2002	ATGF-5	ECVD12/KAUZ//UNKNOWN	ATG
	2002	ATGF-1	SN64//SKE/2*ANE/3/SX/4/BEZ/5/SERI	ATG
	2002	ATGF-4	093-44/AU//SIHHE	ATG
Georgia	1999	DAGDAS94	093-44/AU//SIHHE	
Azerbaijan	2000	Gobustan	PEG//HD2206/HORK	Azeri ARI
	2001	Shirvan	GUN/ASAD//ARD/3/manati-1	Azeri ARI
Kazakhstan	2001	Egemen	BHR/AGA//SNI/3/TRK13	Kazakh ARI
	2002	Akdan	JUP/4/CLLF/3/II14.53/ODIN//CI13431/WA00477	Red Fall St.
Kyrgyzstan	2002	F-474	F.474S10.1	Kyrgyz ARI
	2002	Keremet	Hatusha/KAUZ//TRK13	MIS
	2002	Zagadka	CHAM6//F134.71/NAC	MIS
	2002	Aychurek	YMH/JAR//KKZ/4/63.122.66.2/NO66//LOV2/3/KVZ/HYS/5/EYS/BEZ	MIS
	2002	Cholpon	PYN/BAU	MIS
	2002	Kauz	JUP/BJY//URES	MIS
	2002	Alesha	KISSA	MIS
	2002	Miscim	FAHAD 82	MIS
Tajikistan	2000	Tacicar	TAST/SPRW//ZAR	Tajik ARI
	2000	Norman	OR F1.158/FDL//BLO/3/SHI4414/CROW	Tajik ARI
	1999	Kauz	JUP/BJY//URES	Tajik ARI
	2002	Alex	PYN/BAU	Tajik ARI
	2002	Ormon	NWT/3/TAST/SPRW//TAW12399.75	Tajik ARI
Turkmenistan	2000	Garagum	TRAKIA/KNR	Turkmen ARI
	2000	Guncha	HYS/7C//KRC(ES84-16)/3/SERI	Turkmen ARI
	2004	Altyn Asr		Turkmen ARI
	2004	Nissa	AGRI/NAC	Turkmen ARI
Uzbekistan	2001	Norman	Armino 4	UzRIPI
	2001	Fahad	FAHAD 82	UzRIPI
	2002	Grecum 2002	8023.16.1.1/KAUZ	Gallyaoral ARI
	2002	Ravat	OK82282//BOW/NKT	Gallyaoral ARI
	2004	Matonat	STAR//KAUZ/STAR	ARI of Grain
	2004	Omad	TURACO/2*BORL95	ARI of Grain

Annexure II.
List of new barley, chickpea, lentil, groundnut and forage legume varieties submitted to SVTC

Country	Year submitted	CAC Name	Pedigree	Available seeds	Institution
Winter barley					
Kyrgyzstan	2002	Adel	MV-46/Mazurka/3/Roho//Alger/Ceres	3.5 ton	KRI of Farming
Kyrgyzstan	2005	Nutans-3137	IFBON-1996-97 Entry-106 /Septore/Lignee640	150 kg	KRI of Farming
Uzbekistan	2003	Pallidum-2002	IEBON-98 (CWB-117-77-9)	750 kg	Galla-Aral ARI
Kazakhstan	2003	Zhibek zholy	IBCB-WT-99	750 kg	Red Fall St.
Tajikistan	2004	Zirotkor-70	Entry 17 Boca/S/3/AC253/	200 kg	Tajik ARI
Tajikistan	2004	Alanda-01	Entry 21 Alanda-01	200 kg	Tajik ARI
Turkmenistan	2004	Sana	Sanata-118	200 kg	Turkmen ARI
Spring barley					
Kazakhstan	2002	Batyr-1		10 ton	Kazakh ARI
Kazakhstan	2002	Batyr-2		12 ton	Kazakh ARI
Kazakhstan	2004	Golozerny	ISBCB Entry 32	750 kg	Kazakh ARI
Chickpea					
Azerbaijan	2001	Narmin	FLIP-95-65	1.8 ton	ARI of Farming
Kazakhstan	2001	ICARDA-1	FLIP 97-137	250 kg	KRI of Farming
Kazakhstan	2004	Zhanalyk	FLIP-94-52C	750 kg	Red Fall St.
Kyrgyzstan	2004	Rafat	FLIP 98-121C	150 kg	KRI of Pasture
Kyrgyzstan	2004	Saira	FLIP 98-142C	150kg	KRI of Pasture
Uzbekistan	2004	Zumrad	FLIP 97-95C	70 kg	ARI of Grain
Uzbekistan	2004	Jahangir	FLIP 88-85C	500 kg	Gallaoral ARI
Tajikistan	2004	SI-80	ILC 32-79	35 kg	Tajik ARI
Lentil					
Uzbekistan	2003	Oltin don		360 kg	Gallaoral ARI
Uzbekistan	2004	Darmon	FLIP 97-4L	40 kg	ARI of Grain
Azerbaijan	2001	Orzy	ILL 6037	170 kg	ARI of Farming
Groundnut					
Uzbekistan	2002	Salomat	ICGV-86155	300 kg	UzRIPI
Uzbekistan	2002	Mumtoz	ICGV-94088	300 kg	UzRIPI
Grass pea					
Uzbekistan	2004	Vostok 85	Vica Sativa Sel 2628	50 kg	Gallaoral ARI
Total 24 lines					

Seed production undertaken of newly released varieties

Variety	Country	Seed Available (tons)
Wheat		
Dostlik	Uzbekistan	5500
Bitarap	Turkmenistan	3000
Mtskhetis-1	Georgia	240
Azametli-95	Azerbaijan	200
Nurlu 99	Azerbaijan	200
Jamin	Kyrgyzstan	25
Zubkov	Kyrgyzstan	10
Azibrosh	Kyrgyzstan	10
Barley		
Mamluk	Armenia	40
Chickpea		
Elixir	Georgia	3.0
Lentil		
Pablo	Georgia	0.9
Lathyrus		
Ali Bar	Kazakhstan	0.03

Various Human Resource Development Activities (June, 2004-April, 2005)

A. Germplasm Enhancement

<i>Date and venue</i>	<i>Organization</i>	<i>Title of event</i>	<i>Participants</i>
June-November, 2004, Los Banos, Philippines	IRRI/PFU	6-months training course on rice breeding and rice production management	Kazakhstan (1), Uzbekistan (1)
30 May – 2 June, 2004, Tajikistan	ICARDA/ CIMMYT/ GTZ	National traveling workshop on “Establishing demonstration trials under on-farm conditions”	60 participants from Tajikistan
22-30 June, 2004, Azerbaijan, Armenia, Georgia	ICARDA	Regional traveling workshop on Food Legumes	10 participants from the region
9-11 September, 2004, Tashkent, Uzbekistan	IRRI/PFU	Training workshop “From seed to market: a system approach to rice improvement in Central Asia”	Kazakhstan (2), Kyrgyzstan (2), Tajikistan (2), Azerbaijan (2), Uzbekistan (5)
13-17 September, 2004, Tashkent, Uzbekistan	ICRISAT/PFU	Training workshop “Groundnut Improvement”	Eight participants from CAC
18 September, 2004, Tashkent, Uzbekistan	ICARDA/ CIMMYT/ GTZ	The third national workshop on “Strengthening wheat program in Uzbekistan”	48 representatives from Uzbekistan

B. Soil and Water Management

<i>Date and venue</i>	<i>Organization</i>	<i>Title of event</i>	<i>Participants</i>
5 May – 10 June, 2004 Aleppo, Syria	ICARDA- JICA	Training course on “Management of Water Resources and Improvement of Water Use Efficiency in the Dry Areas”	Four scientists, including from Kazakhstan (1), Kyrgyzstan (1) and Uzbekistan (2)
19-25 July, 2004, Northern Kazakhstan and Western Siberia	ICARDA-CAC	Travelling workshop on soil tillage and crop diversification in rainfed agriculture of Northern Kazakhstan and Western Siberia	12 participants from Northern and Southern Kazakhstan and Uzbekistan
2-9 September, 2004, Tashkent, Uzbekistan	ICBA - ICARDA	Training course on "Biosaline Agriculture: Principles and Applications, with reference to the Central Asia and Caucasus region "	35 participants from 5 CA countries and Azerbaijan
6-10 September, 2004, Tashkent, Uzbekistan	ICARDA-CAC	Training course “Participatory approach in natural resource management research”, under ADB project	18 participants including from Azerbaijan (2), Kazakhstan (3), Kyrgyzstan (3), Tajikistan (4), Uzbekistan (6).

18-26 September, 2004, India	ICARDA-CAC	Travelling workshop to India as a part of the component on strengthening capacities of farmers and for national research and technology transfer of ADB project	Eleven scientists, including from Azerbaijan (2), Kazakhstan (2), Kyrgyzstan (2), Tajikistan (2), Turkmenistan (1) and Uzbekistan (2)
September, 2004, Tashkent, Uzbekistan	ICARDA-CAC	Training course “Participatory Rural Appraisal”	30 farmers from Uzbekistan

C. Genetic Resource Conservation

<i>Date and venue</i>	<i>Organization</i>	<i>Title of event</i>	<i>Participants</i>
14-20 August, 2004, Aleppo, Syria	ICARDA	Study visit to see research activities of the Genetic Resources Unit (GRU) as well as Genebank and seed processing facilities.	Four scientists, including from Azerbaijan (1), Kazakhstan (2), and Uzbekistan (1)

D. English Language Training

<i>Date and venue</i>	<i>Organization</i>	<i>Title of event</i>	<i>Participants</i>
1 December, 2004 – 1 March, 2005	ICARDA/ CGIAR-PFU	English training course	20 participants