



Armenia



Azerbaijan



Georgia



Kazakhstan



Kyrgyzstan



Tajikistan



Turkmenistan



Uzbekistan

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the Caucasus

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Abbreviations

CAC	Central Asian and the Caucasus
CACILM	Central Asian Countries Initiative for Land Management
CIMMYT	International Wheat and Maize Improvement Center
CIP	International Potato Center
FAO	Food and Agriculture Organization of the United Nations
GIS	Geographic Information System
ICARDA	International Center for Agricultural Research in the Dry Areas
ICBA	International Center for Biosaline Agriculture
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
IPRs	Intellectual Property Rights
ITPGRFA	International Treaty for Plant Genetic Resources for Food and
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
IWMI	International Water Management Institute
MSU	Michigan State University
NARS	National Agricultural Research Systems
SLMR	Sustainable Land Management Research
SVTC	State Varietal Testing Commissions
SWEP	Systemwide Ecoregional Program
TCP	Technical Cooperation Program
UNCCD	United Nations Convention on Combating Desertification
WVC	World Vegetable Center
ZEF	Center for Development Research, University of Bonn

Introduction

The Central Asian and the Caucasus (CAC) Regional Program of International Center for Agricultural Research in the Dry Areas (ICARDA) was established in 1998, covering Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan in Central Asia and Armenia, Azerbaijan and Georgia in the Caucasus. The regional office of the CAC program is located in Tashkent, Uzbekistan. In 2007, a sub-regional office of the Program for the Caucasus was opened in Tbilisi, Georgia, to further strengthen the activities the Program in the three Caucasus countries. ICARDA's regional office in Tashkent, Uzbekistan, also hosts the Program Facilitation Unit (PFU) of the CAC System-wide Ecoregional Program of the Consultative Group on International Agricultural Research (CGIAR) under whose umbrella eight CGIAR centers¹ (Bioversity International, CIMMIT, CIP, ICRISAT, IFPRI, ILRI, IWMI) and three other international organizations (WVC, ICBA, MSU) conduct their research activities in the region as a consortium, convened by ICARDA. Since its inception, the CAC Program has established strong research collaboration with the National Agricultural Research Systems (NARS) and has been strongly contributing to the development of agriculture and agricultural research in the region in a wide range of areas such as plant genetic resources, germplasm enhancement and seed production, integrated pest management, crop diversification, land and water management, livestock and fodder production, socioeconomic and policy research, human resource development and information dissemination.

The year 2008 was significant as it marks the 10th anniversary of the CAC program. This is a milestone for the program which provides all program stakeholders with the opportunity to take stock of achievements in the Program and develop future strategies. One of the most important program points in this year was the External Review of the CGIAR Program for CAC, carried out by a Panel of eminent international scientists: Prof. Elias Fereres, acting as Chairman for this Panel, Dr. Gurdev Khush, World Food Prize winner and rice breeder, and Dr. Mohammad Roozitalab, expert in institutional aspects of agricultural research. The CGIAR Program in CAC was very positively evaluated in the External Review. The Review Panel concluded in its report: *"The Panel found the CAC Program to be productive and highly important for the region. It is a Program that definitely needs to be continued and efforts must be undertaken at various levels of the CG system to ensure its future sustainability."*

During the reporting period, significant progress has been achieved in all Program activities. Several projects were successfully completed, such as the "Soil and Water Management Project" the "Bright Spots Project", the Project on "Sustainable Agricultural Practices in Drought-Affected Region of Karakalpakstan", and a PGR study in Georgia and Armenia. Also, new projects have been initiated, such as the one on "Sustainable Land Management Research", while several new project proposals have been developed and submitted to donors for funding, and new coalitions for collaboration have been

¹ For full names of the organizations, please see "Abbreviations" on page iii.

forged by ICARDA with partners such as the Ministry for Agriculture of the Republic of Kazakhstan, the Georgian State Agrarian University in Tbilisi, The Center for Development Research (ZEF) of the University of Bonn, and, among the donors, the Asian Development Bank, to name only a few.

Several staff changes took place during 2007. Dr. Raj Paroda, for many years the Head of PFU and Regional Coordinator of the ICARDA-CAC Program, relocated to ICARDA Headquarters as Assistant Director General for International Cooperation. Between April and December 2007, the PFU was led by the Acting Heads Dr. Surendra Beniwal and, later, Dr. Raj Gupta. In the last days of December 2007, Dr Christopher Martius joined as the Head of PFU and Regional Coordinator of the ICARDA-CAC Program.

This report briefly describes the major highlights of the Program's research, capacity building and other activities during the period of May, 2007-September, 2008.

Plant Genetic Resources

The CAC region is extremely rich in plant genetic resources (PGR), representing a 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. The region is the center of origin of many economically important crop species. Due to financial constraints and breaking of links with the Vavilov Research Institute in Saint Petersburg, the leading Russian institution on PGR, the activities on collection, conservation and documentation in the region had been considerably slowed down. Fully conscious of the critical importance of conservation of plant genetic resources in the region, the initiators of the CAC program enabled the program since 1998 to make a significant contribution to this effort. In total, 18 collection missions were organized and 4,876 valuable accessions were collected. The documentation of *ex situ* and *in situ* collections of plant genetic resources is being continued. All countries of the region have now functional gene banks. The CAC-PGR Network was established, and eight PGR groups are functioning. The Regional PGR strategy was developed and approved by NARS partners.

During the reporting period, ICARDA and FAO have been successful in conducting two studies on national integrated PGR strategy in Armenia and Georgia. The results of the studies have started an important policy dialogue in these countries. They were discussed with researchers, farmers, civil society organizations, donor agencies and policymakers during multi-stakeholder consultations and policy dialogue workshops in both countries (Table 1). The participants in these dialogue meetings approved the results of the studies and policy recommendations. They also provided their inputs for the suggested project proposals on capacity building for a National Integrated System of Use and Management of PGR.

Main policy issues on conservation and rational utilization of plant genetic resources for food and agriculture were studied and discussed together with the scientists and policymakers from the CAC countries during the workshop organized jointly with FAO on 16-18 July, 2007, in Tashkent Uzbekistan (Table 1). Following the recommendations of the workshop, factsheets on the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA) were translated into Russian and widely disseminated among the national partners. A Concept Note was developed to organize a regional workshop to share international experience on utilization of intellectual property rights (IPRs) in plant breeding and raising awareness of importance of IPRs among policy-makers.

To support the gene banks in the region through direct assistance, 11 deep freezers for seed conservation, two air-conditioners, one thermostat for seed germination, and small furniture were provided to the Genebank of Krasnyi Vodopad Research Station in Kazakhstan, the Genebank of the Research Institute of Plant Industry in Uzbekistan, and the Genebank of the Research Center of Farming and Plant Industry in Kazakhstan.

The “International Day of Biodiversity” was celebrated on 22 May, 2008, in Tashkent, Uzbekistan, jointly with several national organizations and CGIAR-CAC Program partners (under leadership of Bioversity International). During the event, in which about 80 farmers participated, several presentations were made on the importance of protecting biodiversity, and samples of Uzbekistan’s rich biodiversity were exhibited. The event was transmitted by national TV and radio news channels.

Considering the region’s unique wealth of biodiversity and its global importance, these efforts will be continued and further strengthened. For this purpose, new project proposals in this thematic area are being developed and donor funding needs to be attracted.

Germplasm Enhancement, Integrated Pest Management and Seed Production

In the reporting period, ICARDA and its national partners have been extremely successful in their germplasm enhancement activities in the region (Table 2). In total, 12 new varieties of winter wheat (3), barley (2), chickpea (3), lentil (2), and triticale (2) were released by the State Varietal Testing Commissions (SVTCs) of various countries, thus, bringing the total number of varieties released in the region by ICARDA to 33² (Table 3). In addition, nine new varieties of wheat (3), barley (2), and chickpea (4) were submitted to the SVTCs for evaluation and subsequent release. Finally, seven new varieties of wheat (1), barley (2), chickpea (2), and lentil (2) have been selected from international nurseries due

² Altogether, CGIAR CAC Consortium members released 40 new varieties of wheat (14), barley (5), triticale (4), chickpea (7), lentil (3), lathyrus (1), soybean (2), mungbean (2), and groundnut (2) in the region.

to their superior performance as compared to local checks and are expected to be soon submitted to the SVTCs. To achieve more rapid adoption by farmers and enhanced impact, special efforts are now being undertaken for seed multiplication of the newly released varieties (Table 3).

Assessing and appropriately managing the risks of contamination of the local biodiversity with genetically modified (GM) crops is of critical importance for the CAC region, which is a center of origin of many economically important crops. This was the key topic of a regional workshop organized by ICARDA and FAO on 16-19 June, 2008, in Tashkent, Uzbekistan. The participants of the workshop from the CAC countries, as well as from Russia and Syria, highlighted that CAC region has a high probability of unintentional and uncontrolled introduction of GM crop varieties due to lack of technical capacities for analysis for presence of GMOs, a lack of experts trained in GMO detection and risk analysis, methodological guidelines, and the low public awareness of plant genetic resource management. Therefore, efforts need to be made on training human resources and building infrastructures for managing and preventing the risks of GMO contamination.

ICARDA, FAO and CIMMYT have stepped up their efforts on preventing the possible spread and impact of UG99, a highly virulent strain of wheat stem rust which drastically reduces wheat yield, into Central Asia and the Caucasus. Preliminary testing has shown that although the rust is presently not detected in the region, the region is lying on its route, and it may only be a matter of time for the rust to gain foothold. This is a dramatic risk, as this disease might affect 95% of all currently planted cereal grain varieties in CAC. Sixteen researchers from the CAC countries have been trained on-the-job in the use of Global Positioning System (GPS) for cereal rust monitoring in June, 2008, in Tashkent. It is expected that these researchers will actively contribute to the Global Cereal Rust Monitoring System, currently being established by FAO, ICARDA and CIMMYT. This system will be based on information collected during further field surveys, to be carried out by the training participants in their respective countries, and therefore will provide geo-referenced data on the incidences of stem rust infections.

A FAO Regional Technical Cooperation Program (TCP) on Strengthening Seed Supply in the countries of Economic Cooperation Organization³ (ECO) is being implemented by ICARDA in close collaboration with FAO and ECO Secretariat in Iran. One of the main outputs of the project is the harmonization of regulations with particular emphasis on variety release mechanisms, seed certification schemes, quarantine procedures and international seed trade. Recently, in July 2008, in the context of this project the establishment of a Regional Seed Trade Association was initiated to promote regional seed trade among the ECO countries.

³ The member countries are Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Turkmenistan and Uzbekistan

Crop Diversification

The importance of crop diversification for raising incomes and improving the overall agroecosystem productivity is widely acknowledged. In Central Asia and the Caucasus, where soils are highly negatively affected by long heritage of mono-cropping practices, crop diversification also holds a key to improving soil fertility. For this reason, ICARDA and CAC NARS have been actively conducting research to identify crop diversification options in different agro-ecosystems of the region since the very inception of the CAC program.

Under the Soil and Water Management Project, completed in August, 2007, the studies showed that in the Fergana valley of Uzbekistan, maize, mungbean, melons and carrots can be grown with high economic profitability as double crops after harvesting of winter wheat. In spring wheat-based cropping systems in northern Kazakhstan, field pea, chickpea, lentil and buckwheat are the best options for inclusion into existing rotations. In rainfed winter wheat-based cropping systems, out of spring cereals, oat was found to be most productive and with highest water use efficiency in southeast Kazakhstan. Alfalfa is also very suitable for sustainable farming in semi-arid conditions of south Kazakhstan. Under rainfed conditions, the most successful crop appeared to be safflower, area under which has increased significantly (up to 150,000 ha). In winter wheat-based irrigated cropping systems, a number of alternatives have been identified for more economical and sustainable farming. The most profitable are food legumes. Successful results were obtained in southeast Kazakhstan with soybean, in Kyrgyzstan with field pea, common bean and soybean. Safflower can also be grown under supplemental irrigation. In Kyrgyzstan and south-eastern Kazakhstan, sugar beet and maize are also good alternatives for crop diversification. In south-eastern Kazakhstan, most successful crop for diversification is soybean. Its area has increased recently from 3,000 ha in 2002 to more than 50,000 ha in 2007. The major reason: a locally organized market in view of establishment of soybean processing plants.

The crop diversification activities under the Sustainable Land Management Research Project in Tajikistan indicated that inter-cultivation of beans, red beets with summer maize planted on 60 cm wide raised beds can significantly improve the total system productivity. Initial results suggest that growing trees of apricot, ailanto, poplar, and peach may prove promising in the Kyzylkum desert, Uzbekistan. In addition, fodder availability during harsh winters of the Kyzylkum desert can be substantially improved by growing pearl millet, licorice and *Kochia scoparia*, highly tolerant to drought and salt stresses.

ICARDA, ICBA and ICRISAT, in close collaboration with NARS partners, have been working since 2007 on the evaluation of pearl millet and sorghum adapted into the local crop-livestock feeding and farming production systems under diverse landscape and agro-ecological zones in Uzbekistan, Turkmenistan and Kazakhstan. Dual-purpose (grain and fodder) nutritious cereals (sorghum and pear millet) with limited irrigation were taken up as second crops after early

legumes, winter wheat and barley. Introduced pearl millet germplasm from ICBA and ICRISAT are more water-use efficient, highly tolerant to salt and drought, and do not require preparatory soil leaching before planting. Furthermore, pearl millet could become a possible and economically interesting alternative for reclamation of un-utilized marginal drylands, reducing the summer fallow practices by increasing the land use ratio that will improve biodiversity and generate alternative flexible options for improved livelihoods of poor farmers. Currently, also options to introduce sweet-stem sorghum as an alternative land use on salinized dryland soils is being studied by ICARDA with collaborators in Karakalpakstan, Uzbekistan. Sweet-stem sorghum is a source for bio-ethanol production and could thus be a viable alternative to produce biofuels without entering into competition with food crops, which cannot longer be grown on the marginal lands. Results will be made available by the end of 2008.

Land and Water Management

The extent of problems originating from unsustainable use and management of land and water resources in the CAC region is extremely vast. Secondary salinity, waterlogging, water and wind erosion, desertification, and other types of land degradation, all now further exacerbated by the impact of climate change, are directly threatening the agricultural productivity and people's livelihoods. Therefore, ICARDA has put a special emphasis on developing and disseminating environmentally sustainable and economically profitable technologies and practices of sustainable land management for the CAC region.

During the reporting period, three projects directed at developing and disseminating such technologies have been successfully completed, namely, the ADB-funded project on "Improving Rural Livelihoods through Efficient On-Farm Water and Soil Fertility Management in Central Asia", the FAO Technical Cooperation Project (TCP) on "Sustainable Agricultural Practices in Drought-Affected Region of Karakalpakstan", and Joint IWMI-ICARDA-ICBA project on "Bright Spots", which was looking at out-scalable examples of good agricultural technologies developed by farmers in the region. In addition, two new activities have been taken up in this thematic area. In 2007, ICARDA together with NARS partners developed the Sustainable Land Management Research (SLMR) Project, as a part of the Central Asian Countries Initiative for Land Management (CACILM) program, and in 2008 ICARDA has teamed up with ZEF/UNESCO Khorezm Project on Change-Oriented Research for Sustainable Innovation in Land and Water Use, in its Phase III, which is carried out in Uzbekistan and integrates ecology, economics and social sciences to develop options for land use in the Aral Sea Basin.

Under the three completed projects, ICARDA has developed and disseminated more than 50 different agricultural technologies of soil and water management, fine-tuned to various agro-ecologies of the region such as water-wise cost-effective technologies, bio-drainage for control of ground water table, conjunctive use of saline and drainage effluents, resource conserving zero till

and raised bed technologies, phosphogypsum application for amelioration of magnesium rich sodic soils, crop diversification practices, mulching and conjunctive use of different quality waters, fertilizer use as a management option to mitigate the effects of saline water irrigation, productivity enhancement of fodder-based cropping systems through the use of saline drainage water, and others. The zero till and raised bed technologies, as well as crop diversification practices have been found to be especially promising. Lack of local manufacturing of zero till and raised bed planters is serving to be a bottleneck for dissemination of these technologies. As a follow-up to the FAO-TCP project, a manual on "Conservation Agriculture in Uzbekistan" was produced in Karakalpak, Uzbek, Russian and English languages.

The implementation of these projects through farmer participation helped raising the farmers' awareness and allowed for a hands-on technology development and transfer process which takes up the farmers concerns and suggestions to develop more adapted technologies. In this regard, the main approach for action applied in the "Bright Spots" project is noteworthy. The project identified the "bright spot" farmers who are performing better than others in spite of growing salinity problems in the region. Then, coping strategies and management mechanisms used by these farmers were analyzed. To boost these successful practices, on-farm experiments were conducted on new salinity management technologies. Finally, the results of the project were out-scaled through "learning alliances" which regrouped farmers, researchers, local administrations and policymakers.

The collaboration between ICARDA and the ZEF/UNESCO Khorezm Project (Phase III) on Change-Oriented Research for Sustainable Innovation in Land and Water Use has been agreed upon through a Memorandum of Understanding between ICARDA and University of Bonn recently in 2008. The integrated approach pursued by this project in Khorezm, Uzbekistan, is expected to develop an avenue to achieve sustainability of innovations with regard to sustainable agriculture, by addressing the technological, economic and institutional aspects of technological change. The project started in 2001 and has an expected duration until 2011.

In July, 2007, ICARDA initiated a new ADB-funded project on Sustainable Land Management Research (SLMR) as a part of the Central Asian Countries Initiative for Land Management (CACILM) program. Under this project, research on direct seeded rice technology was initiated in Kyzylorda, Kazakhstan, in order to save on irrigation water, seed and to reduce the cost of cultivation. The observations indicate that the rice crop under direct seeding has germinated well. New forage crop species were introduced in dry pasturelands of Djambul province in Kazakhstan to improve the availability of forages for livestock production. Some newly introduced forage species are performing exceedingly well in spite of serious drought conditions in the areas. Laser land leveling technology was introduced in Uzbekistan, Kyrgyzstan and Turkmenistan. Researchers, farmers and tractor operators have been trained and efforts are being made to put all winter trials precisely leveled land. Field observations indicate that land leveling

has saved 15-20% of water during the first irrigation. Plastic chutes were introduced to control irrigation induced soil erosion in sloping areas in Kyrgyzstan. Farmers' feedback has been highly positive as this technology has not only promoted controlled irrigation supplies but also reduced soil erosion and saved irrigation water up to 10%. In all the countries of Central Asia, new prototypes of planting machines (multi-crop zero-till cum raised-bed planter) was introduced to plant crops such as wheat, cotton, mungbean, maize, barley, etc. Encouraged by the performance of new Dashmesh raised bed planter brought in from India, farmers have already started planting maize outside the research area (out-scaling). In Kyrgyzstan, zero-till spring wheat crop has performed better than conventional tilled wheat crop. Studies on similarity mapping for the research sites under the project using Geographic Information System (GIS) identified that the ten project sites in five countries represent nearly one-fourth (24%) of all the agro-climatic conditions in Central Asia. The project also resulted in the development of a "Research Prospectus", i.e. a research framework for the Central Asian region that was developed jointly with NARS partners and other consortium members and which represents the common view on problems to be addressed by CG research in the context of the UNCCD efforts on fighting desertification which are supported by the CACILM initiative funded by ADB. This is a considerable step forward in uniting efforts at achieving sustainable land improvement in Central Asia.

Livestock and Fodder Production

Livestock is an important source of income in Central Asia, but often natural resources are not used productively. The research in the IFAD-funded project on "Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia" is being conducted by ICARDA and national institutions in Kazakhstan, Kyrgyzstan and Tajikistan.

Under this project, an initial feed survey of 90 households in 12 selected villages in three Central Asian countries (Kazakhstan, Kyrgyzstan and Tajikistan) showed that all of them store forage in the winter months. The most common and popular forage crops, among households and farmers of the selected villages, are maize and alfalfa. Harvested feed is an economic disadvantage in the households when livestock prices are low and labor, machinery, and fuel costs are high and increase from year to year. Also, the yield potential of planted forage crops is very low. Therefore, farmers need the higher yielding varieties of forage crops. In addition, the length of the grazing season and the efficiency of grazing management need to be optimized with the available forage crops. The majority of the respondents were interested in cultivation of forage crops such as sorghum, millet and forage beet. Sorghum and pearl millet can be successfully grown in households and farmers' field in the Khojand site, Tajikistan, as grain for animal feeding and for seed multiplication of improved varieties.

The initial estimation of this feed survey point at the need for practical techniques which clarify and demonstrate the concept of profitable grazing

management. Livestock improvement demands the efficient use of available feed resources. Under the prevailing scenario of increasing fuel prices and decreasing area under fodder crops, salinization of irrigated lands, drought and heat problems, and low priority to fodder production and preservation, no significant change is envisaged in the years to come, unless urgent actions are taken to remedy this situation.

Overstocking of rangelands near settlements can decrease available feed resources in the region. It seems that the shortage of feeds and fodders will be a great challenge to the future livestock production in the project demonstration sites. In this regard, it is expected that the research activities of ICARDA's Sustainable Land Management Research Project under CACILM, which involve production of alternative fodder and legume crops using conservation agriculture practices and resource conserving technologies in various agro-ecologies of Central Asia, with special emphasis on productive use of marginal lands, will provide Central Asian farmers and pastoralists with much needed technology packages to address this growing concern.

In the livestock productivity component of this project, the following activities have been undertaken. Concentrated food (barley, cotton cake, corn) was used for feeding of experimental groups of animals during the severe winter period. Vaccines and veterinary medicines against widespread diseases were provided to farmers. Additional feeding was organized in the improved farms and an optimal ratio of available forage was proposed. Simplified systems of the individual estimation (grading) of goats and flock circulation were developed and introduced among farmers in Khojand, Tajikistan.

Experiments on early lambing and weaning were successfully continued in Kazakhstan. All ewes involved in this activity were inseminated by artificial insemination. Good progeny was obtained. Physiological conditions of ewes and lambs are being monitored. Product diversification options in sheep production were developed in Shymkent site and include Brynza (a brined white sheep's-milk cheese) preparation technology; Kurut (hard dried balls of fermented milk or milk curds) and dried fruits preparation technology; Chechil (dried 'brynza' (low-fat) cheese) preparation technology; homemade sausage preparation technology. Training of farmers was conducted on milk processing and preparation of homemade sausages.

Similarly, activities on value addition and local processing of goat fibers by women in research sites in Tajikistan are being continued successfully. Market for Angora wool of different colors and production of its processing was studied. Yarns from Takli village, Tajikistan, conquered good reputation in Wisconsin, USA, and are receiving good orders from customers there. The women involved in these activities were provided with spinning machine tools manufactured in New Zealand.

Socioeconomic and Policy Research

During the reporting period, socioeconomic research has been conducted under five projects, on "Soil and Water Management", "Bright Spots", "Livestock

and Fodder Production”, “Sustainable Land Management Research” and a small pilot study on “Assessment of information and communication needs of institutions and stakeholders of the national agricultural research and extension system of Kyrgyzstan”. Socio-economic research is also being performed in the ZEF/UNESCO project.

Under the Soil and Water Management Project, Participatory Rural Appraisals showed 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. Similarly, cost-benefit analyses of improved technologies to assess the economic viability of useful options for better livelihood of farming communities under this project were carried out. They revealed that many of the technologies developed and disseminated under the Project have considerable advantage over those currently practiced by the farmers in Central Asian countries. The economic assessment of technologies was based both on quantitative and qualitative methods of analysis. Among those technologies, the application of phosphogypsum for remediation of magnesium-rich soils, raised bed planting of winter wheat and of diversification crops, inclusion of legumes in cropping systems, improved irrigation methods such as cutback and alternate furrow irrigation, application of rock phosphates for increasing soil fertility, conservation tillage technologies, etc. were found to be highly promising for increasing farmers’ income and improving their livelihoods.

Socioeconomic research under the joint IWMI-ICARDA-ICBA “Bright Spots” Project was conducted to characterize the impact of salinity on the livelihoods of rural populations in Central Asia as well as to evaluate the feasibility of the salinity management technologies. The research showed that impact of salinity on rural livelihoods is highly negative. Livestock production and to a lesser extent provision of machinery rental services are one of the key livelihoods strategies that farmers in Uzbekistan are applying to supplement their decreasing incomes.

Under the Livestock and Fodder Production Project, it was identified that low density markets and the frequency of the market days adversely affect rural producers’ income. It was observed that low share of farmers in the retail price for lamb was mainly because they do not practice fattening of animals. Thus compared to the smallholders in rural areas, fatteners in urban areas who do fattening in 4-5 weeks have more opportunities for income generation. The research results in Tajikistan demonstrated that there is a big gap in prices (up to 30%) between the regions with good natural resources endowments, where conditions for animal production are satisfactory and supply is the highest, and those with low natural endowments. Lack of standards and quality consideration of mohair goat fiber production, storage, marketing and export does not allow householders in Tajikistan to benefit from mohair production.

Under the Sustainable Land Management Research Project, situational analysis and policy reviews on systemic interactions of causes, pathways and impact of land degradation on livelihoods have been initiated. The livelihoods survey instrument has been developed and pre-tested in the research sites in Uzbekistan, Kyrgyzstan and Tajikistan. During the pre-surveys it was observed that low fodder availability is a serious concern for the survival and productivity of the livestock - the mainstay of the people in the range and pasture lands.

A pilot study on "Assessment of information and communication needs of institutions and stakeholders of the national agricultural research and extension system of Kyrgyzstan" was launched in January, 2008. The objectives of the pilot study was to identify policy and legal frameworks, institutional set-up in agricultural research, extension/advisory services, education, farmer organizations, their linkages, their information and communication needs in order to serve farmers' and agribusiness' needs in their orientation to markets. Under this pilot study, the surveys were conducted with 24 key agricultural research, extension/advisory services, education, and farmer organizations, as well as the Ministry of Agriculture and Water Management and Processing Industry of Kyrgyzstan. The results of the survey indicate that lack of ICT infrastructure and skills is hindering the effective communication between the stakeholders of the agricultural sector in Kyrgyzstan, especially in rural areas.

It is also noteworthy that socio-economic research in the ZEF/UNESCO project led to the publication of a book on socio-economic and institutional analyses of land and water use in rural Uzbekistan, based on research carried out in the project region Khorezm (Wehrheim, Schoeller-Schletter and Martius, 2008).

Recently, two new socioeconomic and policy research projects, to be implemented jointly with IFPRI, were approved for funding by ADB. They are "Livelihood Options for Sustainable Land Management in Central Asia, Pakistan and China" and "Economic Analysis of Sustainable Land Management Options in Central Asia".

Capacity Building and Networking

The Program continued putting high emphasis on capacity building during 2007-2008 through organizing trainings, study tours, the participation in international, regional and national scientific meetings and workshops, etc. During this period, in total 39 training courses, workshops, and farmer field days were organized where 887 researchers, farmers, policymakers and other stakeholders participated. Thus, the total number of people benefiting from the capacity building events of the ICARDA-CAC program has now reached almost 12,000 people since 1998. The list of capacity building events organized by ICARDA-CAC during the period of June, 2007 – August, 2008 are given in [Table 1](#).

In addition to this, the Regional office of ICARDA for CAC has also been contributing to establishing and strengthening the linkages between the CAC NARS and international agricultural research community. Recently in 2008, the

Government of Kazakhstan, encouraged by the results of collaborative activities with ICARDA and other CGIAR Centers under the frameworks of CGIAR's Systemwide Ecoregional Program (SWEP) for CAC, expressed its strong desire to officially join the CGIAR. Thus, investments made by the CGIAR into the development of sustainable agriculture in the region are starting to pay off. The participants of the 11th Steering Committee Meeting of the CGIAR-CAC Program organized on 21-23 June, 2008, in Astana, Kazakhstan, welcomed and supported the intention of the Government of Kazakhstan to join the CGIAR in the Astana Declaration adopted during the meeting.

Moreover, constant efforts are being made at strengthening the relationship of the Program with key partners in the national systems, including policymakers, in order to further increase the ownership of the Program's outputs and their incorporation into the national programs. Recognizing the contributions of the ICARDA-CAC Program to the development of agricultural research in the region, HE Dr. Akylbek Kurishbaev awarded ICARDA, as well as other Centers of the CGIAR-CAC Program, with Honorary Certificates for contribution to the agricultural development in Kazakhstan during 11th Steering Committee Meeting of the CGIAR Program for CAC, held on 21-23 June, 2008, in Astana, Kazakhstan. Recognizing ICARDA's contributions to capacity building in the region, the Saken Seifullin Kazakh Agro-Technical University awarded Dr. Mahmoud Solh, Director General, ICARDA, with the title of "Honorable Professor".

Information Dissemination

In the reporting period, a large number of publications, scientific papers, booklets, brochures, leaflets, policy briefs has been produced and disseminated among farmers and NARS partners by PFU and all Consortium partners, both in English and Russian. Based on the needs and requests of national partners, greater emphasis is being laid on producing these publications also in local languages for better and easier impact among farmers. The CAC News is quarterly Newsletter published in English and Russian for circulation among all the Consortium partners and other stakeholders. It covers various activities of the CGIAR Program in the region. So far, 36 issues of this Newsletter have been published. During the reporting period, close to 40 different publications ([Annex 2](#)), including articles in refereed journals, brochures, guidelines, books and book chapters have been produced. Thus, the total number of publications by ICARDA-CAC since 1998 reached 450.

Presently, efforts have been initiated on producing, on a quarterly basis, three series of publications: 1) policy briefs, 2) technical bulletins and 3) farmer brochures, using a single recognizable format. This initiative will be realized jointly with ADB-Tashkent office.

In addition, the web site of the Program is located at <http://www.icarda.org/cac> since September, 2001. It contains relevant information on all the members of the CGIAR-CAC Consortium. Major efforts on updating and re-designing the website

to further increase its user-friendliness and information content have been undertaken since the beginning of 2008.

Resource Mobilization

Sustained funding is the key element of successful continuation of the Program's activities. Presently, the Program is conducting 13 projects, of which 11 restricted and two core funded projects (Table 4).

To ensure the future financial sustainability of the Program, significant resource mobilization efforts have been undertaken during the reporting period. Recently, two new socioeconomic and policy research projects, to be implemented jointly with IFPRI, were approved for funding by ADB. They are "Livelihood Options for Sustainable Land Management in Central Asia, Pakistan and China" and "Economic Analysis of Sustainable Land Management Options in Central Asia"

Among the submitted project proposals, the following are currently being considered by donors for funding:

- A project proposal on "Resource conserving technology (RCT) platforms for crop diversification and improved livelihoods of small farm-holders in Uzbekistan" with the requested funding of 1.4 mln USD was submitted to the ADB country office in Tashkent, Uzbekistan.
- A project proposal on "Promoting sustainable, renewable and decentralized energy production in Central Asia" with the requested funding of 2.45 mln Euros for five years, covering Kyrgyzstan, Tajikistan and Uzbekistan, has been submitted to the European Commission.
- Several Concept Notes on Rangeland Management, Sunn Pest, Seed Production, Regional Gene bank, have been developed and submitted to FAO-ECO Food Security Program

Several project proposals are ready for submission to donors:

- Conservation Agriculture in CAC (ICARDA-CIMMYT-ZEF/UNESCO)
- Crop Diversification in CAC (ICARDA-CIMMYT-ICBA-AVRDC-CIP)
- Tropical Cereals for Crop Diversification and Farmers' Livelihood Improvement with special reference to salinity-affected areas in Central Asia (ICRISAT, ICARDA, ICBA)

In addition, in view of increased opportunities for national funding of the projects, efforts are being undertaken to develop new project proposals together with NARS partners for submission for national funding, especially in Kazakhstan and Uzbekistan.

Annexes

Annex 1. Tables

Table 1. The List of Workshops, Seminars and Training Courses (June, 2007 - September, 2008)

Title	Date and Venue	Number of participants
Inception Workshop of the Sustainable Land Management Research project	02-04 July, 2007 (Uzbekistan)	45
A Farmer Field Day on minimum/reduced tillage practices	12 July, 2007 (Almaty, Kazakhstan)	25
A Regional Workshop on “Strengthening National Plant Breeding and Related Biotechnology in Central Asia and the Caucasus Countries through Policy Advice”	16-18 July 2007 (Uzbekistan)	20
A Farmer Field Day on minimum/reduced tillage practices	28 July 2007 (Syrdarya, Uzbekistan)	31
A Round Table Meeting on Bright Spots	16 August, 2007 (Tashkent, Uzbekistan)	25
Final Workshop of the FAO-TCP project on "Sustainable Agricultural Practices in Drought-Affected Region of Karakalpakstan”	4-5 September 2007 (Chimbay, Uzbekistan)	30
First Regional Workshop and Steering Committee Meeting of the Project on “Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia”	12-13 September 2007 (Issyk-Kul, Kyrgyzstan)	24
A Farmers' Field Day and Roundtable Meeting on the Use of Phosphogypsum for remediation of high magnesium sodic soils in irrigated areas	27-28 September 2007 (Kazakhstan)	200
National multi-stakeholder workshops on the national studies on “Elements of National Integrated Strategy for Plant Genetic Resources Management and Use”	October, 2007 (Armenia and Georgia)	106
A three month intensive English training course	1 November, 2007 – 21 January, 2008 (Dushanbe, Tajikistan)	25
A Round Table Meeting on ‘Rehabilitation of Degraded and Abandoned Lands’	06 November 2007 (Turkmenistan)	14
A methodology training workshop on the socioeconomic research activities	26-30 November, 2007 (Tashkent, Uzbekistan)	20
Policy Dialogue workshops on the national studies on “Elements of	November, 2007 (Armenia and	50

National Integrated Strategy for PGR Management and Use”	Georgia)	
On-job training course on the use of EM38 Soil Conductivity Meter	15-24 December, 2007 (Uzb)	1
A three month intensive English training course	5 January – 5 April, 2008 (Tashkent, Uzbekistan)	24
Regional Training Workshop on Optical Sensors (Green seekers) for Monitoring NDVI/ biomass	3-7 February, 2008 (Tashkent, Uzbekistan)	26
Sustainable Land Management Research Prospectus Workshop	8-9 February, 2008 (Tashkent, Uzbekistan)	38
A workshop on “Poverty assessment and mapping in dry areas: implications for better targeting the impact of agricultural R&D investments”	25-26 February, 2008 (Aleppo, Syria)	3
Socioeconomic Livelihoods Survey Trainings (on-job)	13-15 May, 2008 (Syrdarya and Kyzylkum, Uzbekistan)	4
Socioeconomic Livelihoods Survey Trainings (on-job)	22-24 May, 2008 (Daniyar and Kenenbay, Kyrgyzstan)	3
Trainings on Direct dry seeding rice technology	May, 2008 (Uzbekistan and Kazakhstan)	12
Trainings on Multi-crop raised-bed/Zero till-ferti-seed planters	April-June, 2008 (Uzbekistan, Turkmenistan, Kyrgyzstan and Kazakhstan)	31
Trainings on Laser Land Leveling	April-June, 2008 (Kyrgyzstan, Uzbekistan and Turkmenistan)	21
An International Workshop “Water Management for Improved Water Use Efficiency in the Dry Areas with special focus on Irrigated Environments”	4 may – 5 June, 2008 (Aleppo, Syria)	2
A field day on new introduced crops and new packages of crop management	10 June, 2008 (Tajikistan)	41
“Regional GPS Training Course for Cereal Rust Monitoring in Central Asia and Caucasus countries”	9-12 June, 2008 (Tashkent, Uzbekistan)	20
A field day on demonstration and participatory evaluation of Awassi sheep production	14 June, 2008 (Kyrgyzstan)	12
A workshop on “Risk assessment and risk management of GM crops in the Central Asia”	16-19 June, 2008 (Uzbekistan)	9
A field day on new introduced crops and new packages of crop management	20 June, 2008 (Kyrgyzstan)	25
TOTAL NUMBER OF PARTICIPANTS		887

Table 2. New crop variety releases, submissions to SVTC*, and selections in CAC in 2007-2008

Crops	Released	Submitted to SVTC	Selected
Wheat	Egemen (Kazakhstan)	Ak bosh (Turkmenistan)	Fergana (Uzbekistan)
	Norman (Tajikistan)	Karakulshik Turkmensky (Turkmenistan)	
	Alex (Tajikistan)	Armik (Armenia)	
Barley	Jybek Joly (Kazakhstan)	Kuralai (Kazakhstan)	Nutans-3418 (Kyrgyzstan)
	Sona (Turkmenistan)	Ehson (Tajikistan)	Syr Aruy (Kazakhstan)
Triticale	Norman (Uzbekistan)		
	Farhad (Uzbekistan)		
Chickpea	Zumrad (Uzbekistan)	Miroz (Uzbekistan)	FLIP- 97-49 (Armenia)
	Djahangir (Uzbekistan)	Asilbek (Uzbekistan)	Selkani (Georgia)
	Janalyk (Kazakhstan)	Lusik (Armenia)	
		Ahal (Turkmenistan)	
Lentil	Darmon (Uzbekistan)		ILL-6037 (Armenia)
	Oltin don (Uzbekistan)		Aragvi (Armenia)

*SVTC: State Variety Testing Commission

Table 3. New variety releases by ICARDA in CAC region (1998-2008)

<i>Country</i>		<i>Name of variety</i>	<i>Available seed</i>		<i>Released year</i>	<i>Area covered</i>	
			2006	2007		2006	2007
Wheat							
1	Georgia	Mtskheta-1	100		2002	500	
2	Armenia	Armcim	24		2006	90	
3	Azerbaijan	Azametli 95	1800		2004	170 000	185 000
4	Azerbaijan	Nurlu 99	680		2004	50 000	55 000
5	Azerbaijan	Qobustan	50		2006	500	7 000
6	Kyrgyzstan	Djamin	50		2004	420	
7	Kyrgyzstan	Zubkov	30		2004	200	
8	Kyrgyzstan	Azibrosh	60		2004	500	
9	Turkmenistan	Bitarap	15 772		2004	9 038	10 000
10	Uzbekistan	Dostlik	15 000		2002	20 000	4 500
11	Kyrgyzstan	Almira	5		2005	25	
12	Kazakhstan	Egemen			2007		
13	Tajikistan	Norman			2007		
14	Tajikistan	Alex			2007		
Barley							
1	Armenia	Mamluk	1000	1100	2002	5000	6500
2	Azerbaijan	Bakharly			2005		
3	Kyrgyzstan	Adel	6	5	2006	30	50
4	Turkmenistan	Sona				2007	
5	Kazakhstan	Zhibek Zholy				2007	
Triticale							
1	Kyrgyzstan	Alesha	1	3	2005	100	100
2	Kyrgyzstan	MISCIM	1	4	2005	100	100
3	Uzbekistan	Norman				2007	
4	Uzbekistan	Farhad			2007		
Chickpea							
1	Azerbaijan	Narmin	3	20	2005	43	1 000
2	Georgia	Elixir	8	16	2001	25	32
3	Kazakhstan	ICARDA-1	3	6	2005	15	40
4	Kyrgyzstan	Rafat	0.3	0.2	2005	2	2
5	Uzbekistan	Zumrad				2007	
6	Uzbekistan	Djahangir				2007	3
7	Kazakhstan	Janalik				2007	30
Lentil							
1	Georgia	Pablo	2.6	3.2	2001	8	12
2	Uzbekistan	Oltin Don				2007	4
3	Uzbekistan	Darmon				2007	0.3

Table 4. The List of on-going projects (September, 2008)

№	Project Title	Duration Period	Funding (mln USD)	Donor
1	CGIAR Collaborative Program for Sustainable Agricultural Development in Central Asia and the Caucasus: Program Facilitation Unit (PFU)	on-going	~ 0.3 annually	WB/CGIAR
2	PFU/ICARDA/CIMMYT Caucasus Sub-office	on-going	~ 0.04	PFU/CIMMY/ICARDA
3	Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia	2006-2009	1.2	IFAD
4	Sustainable Land Management Research Project	2007-2009	0.8	ADB
5	Ecologically-based Participatory and Collaborative IPM Research and Capacity Building Program in Central Asia	2005-2009	0.27	USAID
6	Livelihood Options for Sustainable Land Management in Central Asia, Pakistan and China	2008-2010	0.77	ADB
7	Economic Analysis of Sustainable Land Management Options in Central Asia	2008-2009	0.1	ADB
8	ZEF – Uzbekistan Conservation Agriculture**	2007-2010	~ 0.07	BMBF/ZEF
9	Economic and Ecological Restructuring of Land- and Water Use in the Region Khorezm (Uzbekistan)***	2008-2011	~ 0.96	BMBF/ZEF
10	ZEF – Uzbekistan Livestock component*	2008-2010	~ 0.03	BMBF/ZEF
11	Emergency Seed Relief to Tajikistan and Kyrgyzstan	2008	0.5	USAID
12	CAC Crop Diversification	core	~ 0.07 annually	ICARDA core
13	ICARDA Regional Program for CAC	core	~ 0.17 annually	ICARDA core

*The budget: 22,000 Euros. ** The budget: 44,775 Euros. *** The budget: 639,501 Euros.

Annex 2. List of Publications

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