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New Climate Change Project launched for Central Asia

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CGIAR Collaborative Research Program for Sustainable Agricultural Development in Central Asia and the Caucasus



CGIAR Collaborative Research Program for Sustainable Agricultural Development in Central Asia and the Caucasus is being implemented in the region since 1998. The goal of the Program is to contribute to achieving the overall goal of food security, economic growth, environmental sustainability and poverty alleviation in the countries of Central Asia and the Caucasus. Its immediate objective is to assist the CAC countries in achieving sustainable increases in the productivity of crop and livestock systems through development, adoption and transfer of production technologies, natural resource management and conservation strategies, by strengthening agricultural research and fostering cooperation among the CAC countries and international agricultural research centers.

WELCOME MESSAGE

Vegetable Diversity adds to life in the CAC region and Worldwide



Malnutrition due to imbalanced diets is the most chronic and pressing agricultural and human health problem of the 21st Century – and it affects both rich and poor alike. Under-nutrition, micronutrient malnutrition and unbalanced over-nutrition with excessive consumption of carbohydrates and fats negatively affect the longevity and quality of life of at least a third of the world's population.

Similar changes in diet are occurring in much of the world that are damaging to human health. As incomes rise above a critical level, people consume more calories from energy-dense foods such as cereals, meat, fats and oils. The same negative trend towards carbohydrate dominated diets also occurs where poverty reduces incomes below the critical threshold for food security.

A balanced human diet is a diverse diet, and most diets in the world today are imbalanced due to inadequate consumption of vegetables. As our most important source of vitamins and minerals, vegetables can also supply considerable amounts of dietary protein and carbohydrates. A balanced diet usually includes both plant and animal products and should include a diverse range of the five

major food groups—grains, vegetables, fruits, dairy and meat—to supply the nutrients necessary to sustain and support healthy growth and activity.

As the typical contents of diets worldwide converge and become less diverse, the need to encourage and promote dietary diversification becomes more urgent and necessary. Rapid social change, the loss of traditional diets and increasing urbanization contribute to the growing similarity and reduced diversity of diets across the world, but the issue is also generational. Particularly for younger generations under 35 years of age, the lessons of good nutritional understanding associated with the mid 20th century global conflict and austerity appear to have been forgotten.

Improving vegetable consumption will only happen when vegetables are readily available and affordable, and improved production begins with well-adapted varieties. Since the founding of the Central Asia and Caucasus Regional Network for Vegetable Systems Research and Development in 2006 our partners across the region have been rigorously testing improved varieties of vegetables; many derived from the breeding programs of AVRDC- The World Vegetable Center. Several varieties have now been officially released, and improved production methods have been promoted through training programs, farmers' field days and information dissemination activities. We look forward to continuing and expanding this work on market oriented vegetable production to ensure that new vegetables not only improve the incomes of the farmers that grow them, but will also positively impact the health and quality of life across the region.

Dr. J.D.H. Keatinge
Director General
AVRDC - The World Vegetable Center

IMPORTANT EVENTS

New Climate Change Project launched for Central Asia

In December 2009, ICARDA together with NARS partners launched a new multi-disciplinary project titled “Impact of Climate Change on rural livelihood in Central Asia”. The aim of the project is to assess the impact of climate change on wheat production and productivity and thus the vulnerability of some major agro-ecosystems and the people living therein. The project has three subcomponents: biophysical assessment, GIS addressing the regional downscaling of global circulations models that predict the impact of climate change, and the socio-economic assessment of rural livelihood as affected by climate change. The study will be carried out in a joint effort of scientists from the four countries (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) and ICARDA on the basis of integration of research work done previously at ICARDA with that in regional/country programs.

The biophysical assessment sub-component entitled “Assessing the vulnerability of selected agro-ecosystems in Central Asia to threats resulting from climate change – production and productivity of winter-wheat” was presented during the Final Workshop of the Sustainable Land Management Research Project (4-5 August 2009, Tashkent). The stakeholders in Central Asia were informed about the study objectives, expressed outcomes and planned activities.

In the framework of the project a training course on “Crop Simulation Modeling using CropSyst” was held in Tashkent, 7-11 December 2009 in order to familiarize the NARS partners with the model to be used for the biophysical assessment of climate change impact. Collection of the data required for the model calibration and validation started in December in the countries participating in the project. Therefore, part of the project team, namely Dr. Mariya Glazirina and Mr. Tulkun Yuldashev from ICARDA-CAC, visited Uzbek Cotton Research Institute (Akkavak, Uzbekistan) and Ministry of Agriculture of Kyrgyzstan (Bishkek, Kyrgyzstan) to select potential sites and provide



Dr. Bekenov, head of the Department of Ministry of Agriculture of Kyrgyzstan, (right) and Dr. Glazirina (left) are selecting Kyrgyz sites for the project implementation

necessary guidance to the national scientists for compiling model datasets.

Dr. M. Glazirina and Mr. T. Yuldashev
“Impact of Climate Change on rural livelihood in Central Asia” project

Constituent Meetings of the Consortium of Non-Governmental Organizations of Central Asia and South Caucasus (CNGO-CAC) under CACAARI

Constituent Meetings of the Consortium of Non-Governmental Organizations of Central Asia and South Caucasus (CNGO-CAC) and the Consortium of Farmer Organizations of Central Asia and South Caucasus under CACAARI (CFO-CAC) were held on October 14 and 15 2009 in Business Center “Poytakht”, Tashkent, Uzbekistan. About 20 participants attended the two meetings chaired by the CACAARI Chairperson Acad. Hukmatullo M. Ahmadov. The purpose of each meeting was to gather all concerned agricultural organization representatives throughout the CAC region around the table and discuss issues relating to agricultural research for development in the region. Participants also were able to provide their inputs into the GCARD process. Last, but not the least, the founding Charters of the Consortia were discussed and approved at the meeting.

The two meetings had identical programs, but with different participants each day. The CACAARI Chairperson Ahmadov gave introductory presentations on CACAARI to the participants. Among other things the presentations focused on the necessity of expanding the membership of CACAARI to include NGOs dealing with agriculture, farmer organizations, educational and private sector institutions. Following the Chairperson’s presentation, Dr. Zakir Khalikulov, Acting Head of Program Facilitation Unit of the CGIAR Program for Sustainable Agriculture in CAC (CGIAR-CAC) and Acting Regional Coordinator of ICARDA-CAC made a presentation on the CGIAR-CAC Program. He briefed participants on Program’s aims, main activities and achievements. Dr. Ajit Maru, Senior Officer from GFAR (Global Forum on Agricultural Research) talk-



Constituent Meeting of the Consortium of Non-Governmental Organizations of Central Asia and South Caucasus (CNGO-CAC)

ed to the participants about changes in agriculture globally, as well as about changes in the way agriculture was researched and financed. The presentation on the GCARD process in CAC was made by Dr. Surendra Beniwal, Lead Consultant for CACAARI. Dr. Beniwal's report included the highlights of the Regional Review of Key Agricultural Issues in CAC, the e-consultations. Mr. Anvar Rahmetov, Assistant Executive Secretary of CACAARI, made a presentation on the future perspectives for each Consortium. Thereafter, he presented the draft version of each Charter for discussion by the relevant participants of that day.

After the presentation, the participants were given the opportunity to go together through the whole Charter clause by clause, for either approving it or proposing modifications. At the end of the meeting the participants adopted the Charters of CFO and CNGO, and agreed on the future steps of the Consortia. More information on the presentations and the Resolution on Consortia Charters, as well as the Minutes of the meetings are available through the CACAARI Secretariat (a.rahmetov@cgiar.org) or the website www.cacaari.org

Mr. Anvar Rahmetov
CACAARI

GCARD CAC Face-to-Face Consultations

A Face-to-Face consultation meeting, organized by CACAARI in Tashkent, 16-17 October 2009, was attended by about 90 participants that represented research and educational institutions, farmers and farmer organizations, NGOs, policy makers, and private organizations.

The opening speech by the CACAARI Chairperson Acad. H.M. Ahmadov was followed by presentations on CGIAR Strategy Research Framework by Dr. Mohammad Roozitalab representing the CGIAR, GCARD Process by Dr. Ajit Maru of GFAR, and the Regional Review and Results of e-Consultation by Dr. Surendra Beniwal, the Lead Consultant for CACAARI for the CAC region. Following these presentations the group work under two sessions were initiated. A guideline to the facilitators was provided to steer the group work which had seven groups in each session.

The participants actively contributed to the discussions around these topics in both groups which were exciting. The group discussions and plenary sessions where the group discussion results were presented with follow up discussions took more than 75 per cent of the time of Workshop. The discussions on the various topics continued during tea/coffee breaks, lunches, bus trips to the venue and during reception and dinner.

A matrix of issues, as identified during the regional review phase and e-consultations for various categories of farmers as the subject of development and various objects around commodities that farmers produced were listed for discussion about their importance, the priorities for research to be undertaken based on their importance and the time by which the research should make an impact were sought to be identified.

The results on priority commodity areas/commodities and researchable areas were identified for different groups of farmers. For crop producers mixed crop/livestock production was recognized as a very common practice. Important crops considered were cereals (wheat, barley, maize), potato, vegetables and fruit crops, whereas cattle and sheep were important livestock. Cotton was considered as important for small-medium-large farmers. Forage crops were considered as important as animal feed.

Among priority researchable areas for mixed crop/livestock production system were access to inputs (seeds/saplings/breeds, fertilizer, credit, farm machinery, etc.), pest management, productivity increases at whole farm/ production system level, water/soil management, post-harvest processing, access to markets, access to knowledge and favourable policies for agricultural development.

For pastoralists important researchable issues considered were livelihoods analysis improved technology for animal production, feed and forage supply, breed improvement and insemination, water access, preventive health care, processing and marketing of milk/meat



Participants of GCARD CAC Face-to-Face Consultations

products, organization of animal producers into cooperatives. Also considered important were use, renewal and conservation of rangelands including biodiversity conservation, innovation technologies and effective extension linkages.

For smallholder farmers in mountains mixed crop/livestock farming was considered important as well as the access to inputs (seed/saplings/breeds, farm machinery, soft credit), land tenure and erosion, soil conservation, conservation agriculture on sloppy lands, post-harvest processing, access to markets, capacity building and extension services.

For forest dwellers soft and hard timber and non-timber products, rangelands and livestock, forest ecosystem and tourism and favourable forest development policies were considered important commodities. Among researchable issues, reforestation, integrated forest/livestock/fisheries production systems, access to improved seeds/saplings, harvesting, post-harvesting and marketing of non-timber products, indigenous knowledge, land degradation, capacity building and education through an improved extension system were considered important.

The seven group discussions provided good insights into the important researchable issues of different cross-cutting issues. The results of each group discussion were presented in Plenary Session which was followed by general discussion. The information on researchable issues was included in the exercise on the final voting.

The final Plenary Session of the Workshop was based on voting on the key researchable issues identified during the two working groups using 16 flip charts and a sticker-based voting system where each participant was given 8 votes to choose farmer categories and themes, and 14 votes to choose from more than 100 researchable issues. These votes were counted and results summarised by the CACAARI Secretariat. Further information and details of the Face-to-face consultations are available with the CACAARI Secretariat (a.rahmetov@cgiar.org) or through the website www.cacaari.org

Mr. A. Rakhmetov
CACAARI

The Third Steering Committee Meeting on Central Asia and the Caucasus Vegetable Research and Development Network

The Third Steering Committee Meeting on Central Asia and the Caucasus Vegetable Research and Development Network (CACVEG) held in December 10 – 11, 2009, in Tashkent, Uzbekistan. The CACVEG regional network was formed in 2006. This network's goal is to improve the livelihood and increase income in the CAC countries through the development of sustainable vegetable production and market systems by enhancing capacities of both public and private sectors with synergistic partnership.

Thirty participants, including the National Coordinators on R&D and specialists of eight CAC countries (Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turk-



The Third Steering Committee Meeting on Central Asia and the Caucasus Vegetable Research and Development Network

menistan and Uzbekistan), AVRDC – The World Vegetable Center and PFU – CAC participated on this meeting.

The national reports on the activities within CAC Regional Vegetable R&D Network were presented during the meeting by National Coordinators of every country. Collaborative discussion was focused on existing activity, status and problems. Also, during the meeting the way of the further strengthening of capacity of NARS on vegetables in CAC region was discussed. It was resolved to pay an emphasis on strengthening of collaboration with other international networks.

Dr. R. Mavlyanova
AVRDC

RESEARCH HIGHLIGHTS

Status of the project “Enhanced food and income security in Southwest and Central Asia (SWCA) through potato varieties with improved tolerance to abiotic stress”

The Project funded by BMZ/GTZ started in January 2008 and has three-year duration. Fundamental research is conducted at CIP-HQ in Lima, Peru, the centre of origin of potato, and in Germany, at the Institute on Stress Resistance and Tolerance, Federal Research Center for Cultivated Plants – Julius Kuehn-Institute, near Rostock. Partially fundamental and applied research is implemented in the South, West and Central Asia (SWCA) region, namely in the following countries: Bangladesh, India, Tajikistan and Uzbekistan.

Initial situation

Potato is an important staple and cash crop for Central Asia, but its productivity is still low. Long dry spells, soil salinity and heat constitute major production constraints while expensive imported seed lacks adaptation to the local conditions. In South West Asia (SWA), where potatoes are grown mainly as a cash crop, off-season production represents a good income for resource-poor farmers, but drought and high temperatures restrict the cultivation period thus limiting potential benefits to poor farmers.



Clones supplied under the GTZ project and multiplied under screenhouse conditions at the National University, Tashkent, Uzbekistan

Approach of the project

The project is essentially demand-driven and participatory. In a multidisciplinary collaboration between CIP scientists and stakeholders in Bangladesh, India, Tajikistan and Uzbekistan, the project will build upon and exploit genetic stocks, molecular tools and research methods identifying the tolerance traits that farmers need and facilitating strategic exchange and testing of advanced breeding products. Multilocation trial data will be recorded using integrated geographic information systems (GIS) and statistical analysis conducted to help identify varieties with specific or broad adaptation.

Major results achieved

The scientists of CIP found several traits that allow the plant to survive and produce under water stress conditions. The most important ones are: improved water use efficiency, enhanced root growth under drought, increased capacity for plant regeneration after wilting and higher harvest index. The physiological basis of these traits consist of balanced control of stomatal conductance, osmotic adjustment in form of solute accumulation in plant cells resulting in lower osmotic potential and maintained turgor under water stress. The candidate genes involved with the expression of these traits have been identified. Trials implemented in SWCA confirmed these hypotheses.

Expected impact

At least 200,000 farm families will benefit from abiotic stress tolerant varieties that boost production and reduce



CIP-Lima: Drought tolerance trial in the greenhouse. Some potato clones, such as Aranyalma, have the capacity to regenerate after prolonged water stress (on the left) in contrast to susceptible clones (on the right)

risks of crop loss. National Agricultural Research Systems (NARS) will have the materials and tools to speed up breeding process. Producers will harvest more reliable and larger quantities of marketable potatoes and consumers will enjoy stable food prices. The geo-referenced risk maps and growth models validated by the project will be available to researchers, regional governments, extension services and policy makers for vulnerability analysis and decision support.

Specific outputs include:

- Improved access of smallholder farmers to new, early maturing potato varieties adapted to stress-prone environments;
- Plant growth models, screening methods and marker systems for key traits of abiotic stress tolerance adapted and applied for stress tolerance breeding;
- Dynamic maps and models depicting and characterizing stress-prone agroecologies at present and under future climate change scenarios available to NARS, regional governments and extension services;
- Stress tolerance traits and genes identified and combined in new biodiverse parental material;
- Quality seed of biotic stress tolerant and early bulking varieties for diversified cropping systems produced and disseminated to farmers.

CIP collaborating Institutions: Institute for Plant Physiology & Genetics, Dushanbe, Tajikistan; Bioorganic Chemistry Institute of the National University of Uzbekistan, Academy of Sciences, and Institute for Vegetables, Melon and Potato, Tashkent, Uzbekistan; Tuber Crops Research Institute (TCRI), Bangladesh; Central Potato Research Institute (CPRI), Shimla, India.

Dr. C. Carli
CIP

Two years of intensive Sustainable Land Management Research



Land degradation is particular acute and widespread in the Central Asian countries Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan, and is evidenced in rising groundwater tables, increasing land salinization, erosion and loss of soil fertility. This is particularly precarious in the context of global warming and climate change, which affects the Central Asian region above average along with more frequently occurring seasonal droughts. Research efforts in the frame of the Central Asian Countries' Initiative for Land Management (CACILM) have been made to develop sustainable land management options as strategic platform to combat land degradation, and increase the livelihoods of the poor farming population.

The Sustainable Land Management Research (SLMR) project, financially supported by the Global Environmental Facility (GEF), is part of the framework of the



Maize intercropped with mung beans increases farmers' income and food security

Central Asian Countries' Initiative for Land Management (CACILM), a 10-year program where all 5 Central Asian countries with the support of several international donors engage in combating land degradation and improve rural livelihoods in the region.

The SLMR project with its focus on research for development was commissioned in five Central Asian countries from July 2007 to August 2009 not only to promote sustainable land management research, but also to contribute to restoration, maintenance and enhancement of the productive functions of land to improved the economic and social well-being of the population while preserving the environmental functions of these areas.

Covering rainfed and irrigated agriculture, mountain areas and rangeland/pastures, 12 research sites were selected where sustainable land management options were tested in close collaboration with the national research institutions of the five Central Asian republics.

Laser-assisted land leveling, irrigation with plastic chutes and conjunctive use of drainage and irrigation water were tested and showed to increase water productivity by 15-25% in Kyrgyzstan, Turkmenistan and Uzbekistan. Raised-bed seeding improved seed germination rates, halved (wheat and rice) seeding rates, reduced water use by 10%, and allowed for diversifying the cropping geometry in Kazakhstan, Kyrgyzstan and Uzbekistan. Intercropping of cotton with legumes, maize with legumes, or sainfoin with barley proved highly profitable for farmers in Kyrgyzstan, Tajikistan and Uzbekistan.

Also planting into standing stubble, or applying mulch were tested, and especially in the mountainous regions of Kyrgyzstan and Tajikistan, residues on sloped land and terraces successfully reduced erosion and increased soil moisture content in the topsoil. Rangeland productivity and fodder availability could be increased by planting suitable salt-tolerant fodder crops such as alfalfa, Sudan grass, triticale and sorghum, and licorice. Saxaul and other halophyte species were found to be highly suitable for diversifying the rangeland plant population and increase the pasture quality for the livestock herds. Different sources of income generation for the livestock farmers in the region could be encouraged. Using GIS-based similarity



Grapevine branches kept on the terraces in Tajikistan as residues to protect the soil from erosion and increase the soil moisture content

analyses environments similar to the SLMR project sites could be identified for potentially outscaling of the developed technologies.

The results have thus abundantly demonstrated that adoption of improved technologies of soil and water management could enhance productivity, resulting in higher rural incomes and household food security, and contribute to the conservation of natural resources and the sustainability of agricultural production in the region.

However, the adaptation of sustainable land management practices and modifying conventional crop production technologies has to be considered an innovation process by itself. This requires not only a shift in the local research paradigms but also demands the support of extension-type structures for awareness creation among the population and trainings for the successful implementation of improved land management practices with benefits for people and nature alike.

All field-research related activities that were part of the SLMR project had been finalized by the end of September. The final SLMR project report summarizes the research activities and results of the time period January-October 2009 (www.icarda/cac/slmr_documents.asp) and the results of the project were presented to the donors including ADB, GTZ, GM, UNDP, UNEP, GEF at the 4th CACILM¹ Steering Committee Meeting in Tashkent, Uzbekistan, on December 01-02, 2009. All participants highlighted the outstanding activities and results of the project and their importance for the CAC region.

Continuation of the project is now the subject to the new funds, so the SLMR team is intensively engaging in the proposal writing.

Dr. K. Kienzler
SLMR

Winter Crop Trials Planted

Like previous years, many International Nurseries comprising improved germplasm and advanced breeding lines of wheat, barley, chickpea, lentil, faba bean and grass-pea

¹CACILM stands for Central Asian Countries' Initiative for Land Management



Planting of International Trials in Kashkadarya Research Institute

were received in the region from ICARDA, Aleppo and the International Winter Wheat Improvement Program, Turkey, and planted by NARS partners in different countries in CAC. The trials have already well germinated and would be evaluated in spring and summer in 2010. These nurseries are major sources of introduction of improved germplasm of wheat, barley, chickpea, lentil, faba bean and grass-pea in the CAC region.

Dr. R. Sharma
ICARDA

Rearing *Amblyseius* spp. under biolaboratory conditions

The predator mites *A. mckenziei*, and *A. cucumeris* as oligophages have been successfully developed on flour mites *Acarus farris* (Oud.) in Uzbek Scientific research Institute for plant protection. The method of mass rearing of *Amblyseius*es contained the following actions: predator mite and its prey flour mites rearing process take place in the plastic containers (3-5l, 25 cm of height in size consisting dewy brains), or 3 l glass jar covered with fabric tissue which are placed in the bigger plastic containers or in iron baths, where water is poured up to 1/4 level of the dish volume. Both containers are covered with cellophane film to create inside greenhouse effect and keep the relative humidity up to 65% in laboratory room condition where temperature is 27-28° C and RH 70-75%.

During the experiment it was estimated that for flour mites colonization the fresh bran should be mixed with 7-8 days old stock culture of *Acarus farris*, where in two parts of fresh bran was one part of that with flour mites. During the *Amblyseius* rearing process in the laboratory it was revealed that in spring and autumn time optimal parameter for predators rearing is 15 days culture of flour mites to be mixed with 10 days culture of *Amblyseius* under which predator: prey correlation should be 1:3. After this at 25-27°C and 65-75% RH in two weeks the *Amblyseius* number will be reached to 40-50 females per 1 sm³.

Laboratory study of rearing of *A. cucumeris* in winter time on plant pollens revealed that species of *Amblyseius* being raised with native plant and bee pollens lived longer and developed more rapidly than those reared on *A. farris* as a food prey and can be survived during winter time in laboratory conditions. Comparative survival ability developmental times and number of eggs produced by each female on pollens were also evalu-



Look-seeing under the microscope at *Amblyseius*'s development on artificial diet in Petri dish

ated as food sources for the predacious mites. It was found also that not any pollens can positive effect on predators development. Pollens from mallow plant appeared to be neutral as food source for development or egg laying by *A. cucumeris*.

At present time in the laboratory of Uzbek Research Institute for Plant Protection with assistance of scientists of IPM project has been conducting research work on production of predator mite *Amblyseius* sp. in different artificial diets. There were 3 kind of artificial diets were prepared and marked as AD1, AD2 and AD3, where AD 1 consists of 1 kg bran, 0.05 kg yolk, 0.01 kg sucrose, 0.001 kg of vitamin mixture and 0.003 kg streptomycin sulphate. Medium AD 2 is nearly the same but instead of yolk it was added yeast autolysate. And AD 3 consists of 1 kg of mixture bran with flour 0.3 kg of sugar, 0.15 kg of margarine and 0.2 l of milk.

The study shows that *Amblyseius*es can be developed successfully from egg to adult on different artificial diets. At the present time the duration of the immature and adult stages, survival rates, mean eggs/female/day and oviposition ratios that are going to be obtained in the next quarter period of time have been studying. During the research time it has been noticed that the effects of different artificial diets of the various stages of the adult female of *Amblyseius*.sp. are different. At the present, the best diet is AD 3, where female longevity of *Amblyseius* sp. is 55 days, which is twice longer than on a natural diet. Eggs showed no abnormalities; larvae fed on diets had normal development, and adults were comparable in size to individuals reared on a natural diet. The experiment is carried on.

Dr. B. Tashpulatova
IPM-CRSP project

Promising mungbean variety Durdona

In Uzbekistan selection of early maturing varieties of various crops is important for cultivation of agricultural crops during spring and repeated terms of sowing. During the past years, the interest of farmers in vegetable legumes crops has increased and the demand on new yielding varieties has also increased.

In 2010, the new mungbean variety Durdona developed in the Uzbek Research Institute of Plant Industry in col-



Probation of mung bean variety Durдона

laboration with AVRDC – The World Vegetable Center has been recognized as promising variety for a releasing by the State Variety Trial Commission of Uzbekistan.

This is early-maturing variety and the first harvest of matured beans is conducted in 40 – 45 days after emerging of seeds. Biological maturity reaches in 55 – 58 days. This variety has upright stems (30-40 cm) and beans (25-30 cm) are formed on the top of a bush, which makes it significantly easy to harvest. Seeds have a large size and their yield is higher than 3.0 t/ha.

Durдона variety is effective as intermixture in a crop rotation with vegetable and cereals and producing high yield at crowded sowing and improving soil fertility. This variety is suitable for both spring and summer sowing and generates a full yield. Green mass of plant is a good nutrient feed for the livestock. Introduction of the new variety Durдона is creating the opportunity to increase production and demand of farmers.

Dr. R. Mavlyanova
AVRDC

A brief review of the most important potato pathogens in CAC

In the CAC region, Late Blight (LB) (caused by *Phytophthora infestans* Mont. de Bary) represents a serious threat only in the Caucasus. In Central Asia its appearance is very limited and occasional because of the arid climate during the main growing season: it has been observed by CIP specialist in Tajikistan, Kyrgyzstan and Uzbekistan. The selection of LB resistant clones is, therefore, considered a priority for Armenia, Azerbaijan and Georgia due to the presence of aggressive strains of the fungus, particularly in the region of Ajara, a sub-tropical area in the western part of Georgia where airstreams from mainland and Black Sea often gather together towards the month of July-August with consequent rainfalls and severe late blight infection. The Institute of Immunology based in Ajara identified 59 pathotypes in the Georgian population of the pathogen that are characterized by a high level of polymorphism, equivalent to 94% (Nogaideli et al., 1997). In spite of some scientific work, no integrated disease management (IDM) strategy to control LB is implemented in the Caucasus countries. In fact, it is very common to see potato crops cultivated in the flat without proper ridging



Late blight (*Phytophthora infestans*). Lesions on the leaves

that is considered in our view as one of the most important causes of tuber blight, especially in the Akhalkalaki plateau, in the South-West of Georgia. Limiting the control of the pathogen through frequent fungicide sprays does not represent a far-sighted strategy for the negative implications that such fungicides could have on the environment in a country having numerous and uncontaminated sources of mineral water and health spas. Georgian scientists estimate that, if late blight was controlled effectively and safely through the use of stable resistant varieties, the value of potato production would increase as much as 40-50% with a correspondent significant reduction in the use of pesticides. This would lead to increased farmer incomes and reduced environmental risks due to the decreased pollution of groundwater and human exposure to fungicides.

Among the other diseases affecting potato in the region, viruses represent a serious threat everywhere except for the highlands (>2,000 masl), mainly because of the tendency of farmers to use their own saved seed for more generations than it would be recommended. Aphids, the main virus vectors, constitute a serious threat in the plains and in areas where cotton, tobacco, vegetables (especially those of Solanaceae family such as tomato, eggplant, pepper) and fruit trees of the *Prunus* spp. like peach, plum, apricot, cherry and almond, are intensively cultivated. The aphids commonly colonizing on potatoes are the green peach aphid (*Myzus persicae*), potato aphid (*Macrosiphum euphorbiae*), buckthorn aphid (*Aphis nasturtii*) and potato aphid (*Aulacorthum solani*). Among them, green peach aphid represents the most viruliferous aphid species. Although *Aphis fabae* and *Aphis gossypii* are considered less efficient vectors of PVY than the above colonizing aphid species, they are both reported as occasional potato virus vectors, being extremely polyphagous (Foster et al., 1997; Kennedy et al., 1962; van Hoof, 1980). Because virus-infected potato plants cannot be cured, as is the case for potatoes infected with fungi, strategies for virus disease control must focus on preventive measures such as the choice of isolated sites in the highlands, use of resistant varieties, the control of insect vectors, early haulm killing in seed production and the detection and elimination of contaminated plants and seed, all components of the so-called “Integrated Disease Management”. Potato farmers frequently buy seed grown at higher elevations or in isolated locations that are relatively free of viruses and the insects that transmit them. But poorer farmers



Tuber blight (*Phytophthora infestans*). Common symptoms on the tuber. Tashkent, May 2007

cannot always purchase seed. Nor do western companies that export seed to developing countries normally breed for virus resistance because it is a very expensive job. In fact, the experience shows that seed companies are not eager to provide developing-country farmers with virus-resistant varieties.

Ring rot (*Clavibacter michiganensis* subsp. *sepedonicus*), which was considered endemic in the former Soviet Union, is a serious bacterial disease whose presence has been reported in many environments of CAC, but, unfortunately, like in the case of *Rhizoctonia solani* and Potato Spindle Tuber Viroid (PSTV), little attention is given to its eradication and control.

Rhizoctonia disease of potato, often referred to as black scurf, is caused by the fungus *Rhizoctonia solani* Kühn. Currently, there is no completely effective control of this disease, but there are practices that will reduce the severity of it like, for instance, good crop rotation that will considerably reduce both the incidence and severity of the disease, and harvest when soil temperature is above 10°C. The potato spindle tuber disease has been normally detected in Russia and occurs in other parts of the world and even in Uzbekistan, as it was observed in a recent virus survey conducted by CIP in September 2009. It is transmitted mechanically, by contact and cutting the seed as many farmers do in the CAC region. It is a very dangerous disease, so harmful that in the USA, in the 30's, the whole country was put under quarantine conditions obliging everybody to destroy any potato. The Potato spindle tuber viroid (PSTVd) was the first viroid to be identified. It also attacks tomato.

Finally, potato stolbur phytoplasma, transmitted by leafhoppers, is a disease which causes the formation of aerial tubers and reddish, rolled leaflets on the top of plants. It is considered of increasing importance in Central Asia, especially in Tajikistan and Uzbekistan.

A number of cultural and storage practices are available in view of ensuring better control of potato diseases at farmer level. However, under certain circumstances their application may encounter some difficulty due to the small size of farmers' fields which makes a practice like rotation, for instance, difficult to implement.

Implications to seed potato production

It is known that the major constraints existing in potato seed production are soil and seed-borne diseases, among them viruses, and some abiotic factors such as heat. For this reason pre-basic and basic seed production of potato up to the Elite category, are often conducted under remote and isolated conditions, in altitude and in presence of mild temperature conditions. Alternatively, in the absence of high altitude levels, windy and mild temperature conditions may make the difference (as in the northern part of Holland). Based on these aspects, some countries of the region appear more suited than others to produce basic seed of potato. In these countries, therefore, development of potato seed production could be envisaged from the early stages, while the other countries could possibly multiply imported basic seed from the previous countries for two to a maximum of three generations.

Dr. C. Carli
CIP

Monitoring on potato pests and diseases in Issik-Kul region in Kyrgyzstan

For the last quarterly period of 2009, field observations were conducted with the help of the farmers in Issik-Kul region. Issik-Kul is the region with very optimal conditions for potato production, therefore, potato is one of the main cultivating crops for Issik-Kul farmers. During the analysis of soil and potato grown and harvested in the field, I have noticed that the main fungi diseases are following: *Macrosporium* leaf spot, *Alternaria* leaf spot, *Septoria* blight, *Rhizoctonia* root and stem rot, late blight upto 30-50% on potato leaves. Late blight is especially problem for the farmers. These fungal diseases basically occurred in more humid weather conditions and they are non-observed by the farmers in optimum irrigation. But if it is flooded in the border of a potato field, 60% of rotten tubers are possible. The farmers experiencing the occurrence of these strains of fungal diseases do not use fungicides, but they use elementary mixture of lime and copper cuprous (Bordeaux mix) liquid. Before storage, 80% of the farmers do not treat potato seeds, and 20% of them use a chemical method. But concerning the biological control of diseases and use of microbiological preparation trichodermin or Baikal M-1, they do not know about these methods and never hear about them, or do not trust these methods of control. The other basic pests were identified are Colorado bugs; they cause a huge damage to farms. The area of their distribution increase in a hot weather; their population in the region increase by giving 3 full generations in the season, but earlier they gave a maximum of 2 full generations. For control on these pests, farmers actively use a very dangerous preparation made in China - GAUCHO. Also, the other pests were identified in the Issik-Kul region. They are wireworm and nematodes, which can cause harm effect to a potato fields.

Dr. M. Aitmatov
IPM project

MEETINGS/CONFERENCES

“Regional Awareness Meeting on Wheat Rusts for the Central Asia and the Caucasus Countries”

FAO organized “Regional Awareness Meeting on Wheat Rusts for the Central Asia and the Caucasus Countries” on 23-25 November, 2009 in Baku, Azerbaijan, which was participated by senior wheat breeders, pathologists, seed scientists and extension specialists from all CAC countries (except Armenia), ICARDA and FAO.



Participants of “Regional Awareness Meeting on Wheat Rusts for the Central Asia and the Caucasus Countries”

Dr. Ram Sharma from ICARDA-CAC Regional Program participated in the meetings and highlighted wheat improvement for rust resistance in the CAC region. The meeting drew attention at the highest levels in policy making in these countries towards the threat posed by wheat rusts, and potential threat of Ug99. Regional and national plans were outlined and discussed among CAC participants and ICARDA and FAO experts.

Dr. R. Sharma
ICARDA

The meeting of National Coordinators of Central Asian and Transcaucasian Network on Plant Genetic Resources

The meeting of National Coordinators of Central Asian and Transcaucasian Network on Plant Genetic Resources was held on 8-9 December, 2009 in Tashkent, Uzbekistan. The meeting was attended by National Coordinators on Plant Genetic Resources of Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, and Uzbekistan, by representatives of Bioversity International and the Global Crop Diversity Trust. The main objectives of the meeting were discussing of country reports on Network activities on PGR conservation (coordination at the national level, financing, documentation system, PGR collections in the institutions, stored crops, size of collections and the aims of conservations of samples in collections, updated information on progress. Agreement on country and its ratification, an update on the development of national strategies on PGR, needs, priorities and future plans, etc.); review of existing National Strategies on PGR ;discussion and approval of work plan of the Network for 2010-2012;. appointment of Chairman



Participants of the meeting of National Coordinators of Central Asian and Transcaucasian Network on Plant Genetic Resources

of the Coordination Committee of the Central Asian and Transcaucasian Network on Plant Genetic Resources for the period 2010-2012.

During the discussion the following decisions were made:

- Achieve ratification of international treaties on PGR;
- Provide consultative support to countries by international organizations on implementation of international treaties;
- Achieve information zone increase;
- Improve the database and evaluation data;
- Create a database for assessment of climate change influence to PGR of the region;
- Accept the possibility of projects development;
- Develop a national strategy on PGR on the basis of a regional strategy.

On the second day of the meeting a visit was organized to Genome Laboratory of the Institute of Genetics and Plant Experimental Biology, where the participants had an opportunity to get acquainted with the current status, work and anticipated projects of the laboratory.

All goals and targets set at the meeting were successfully achieved.

Ms. N. Fazilbekova
Bioversity International

Association of partners - IWMI and SIC-ICWC - organize meetings with farmers in the Fergana Valley to discuss water productivity issues

On December 12-18, 2009, in the Fergana valley regional team consisting of IWMI and SIC-ICWC specialists conducted series of farmer meetings to assess the farmers' satisfaction and adoption of proposed technologies under the project «Water productivity improvement at the plot level». This assessment made possible to draw some conclusions on analysis of achievements and omissions in the organization of extension, training and technology demonstration activities, which will allow taking the corrective actions in a future. The meetings with farmers were conducted in Kyrgyzstan, Tajikistan and Uzbekistan. Farmers mentioned the importance of the project in terms of advice



Participants of the farmers' meeting in the Fergana Valley

and training they have get, transfer of knowledge, dissemination of materials and their usefulness and diversity, since crop cultivation is a complex and multi-factorial process. Farmers noted the relevance of issues and topics presented to and discussed with them which were well-timed, seasonal and essential.

The proposed system of water measurement and transfer to the system of payment on volumetric basis, organizing the water user groups, improving the contractual relations and effective water use at the field level in Kyrgyzstan, resulted in the high replication interest. For example, in the Osh province (in Uzgen, Karasu and Aravan districts) farmers from 5 neighbouring outlets, who obtained information from project demonstration sites are planning to adopt this system next cropping season at their own cost, therefore, they were asking the project for the advisory assistance. The system of improvement of contractual relations and adoption of water measurement system on the basis of actually used water in Tajikistan have raised unprecedented interest of farmers who pay high water charges due to absence of the measuring. For example, 53 farmers are planning (from J. Rasulov, B. Gafurov, Spitamen, Zafarabad and Matcha districts) the construction of hydro-posts at their expense. Farmers requested trainings on monitoring and water accounting and guidance in straightening the contractual relations with water providers.

The outcomes of the discussions with farmers showed that conducted advisory work among farmers is showing the high impact and interest from other farmers, in some places high returns and benefits to the farmers who used advisory services at their will Farmers gladly accept newsletters/leaflets and other materials in local languages but it remains unknown whether and to what extent they were used, and for this purpose it is necessary to develop technique to monitor the impact of the consultation and extension materials.

Dr. J. Kazbekov, IWMI
Dr. Sh. Mukhamedjanov, Dr. L. Averina, SIC

International Conference on Horticulture in Bangalore, India

Dr. Ravza Mavlyanova (AVRDC-CAC) participated in the International Conference on Horticulture (ICH-2009) in Bangalore, India on November 09-12, 2009 which was at-

tended by 750 participants from 40 countries. Dr. Mavlyanova contributed the presentation on the "Vegetable systems in Central Asia and Caucasus: Research and development to improve livelihood security".

During the Technical Cooperation among Developing Countries (TCDC) Session of Conference, the Executive Council of the VEGINET was formed with the nomination of new members. Dr. Prem Nath is the Chairperson, Head of P.N. Agricultural Science Foundation, India and the advisor of FAO is Ms. Alison Hodder. Five Regional Vice Chairpersons voted, including Dr. Ahmed T. Moustafa (ICARDA), Dr. Michael Boehme, (Germany), Dr. J. S. Dias (Portugal), Dr. Ravza Mavlyanova (AVRDC) and Dr. Usha R. Palaniswami (USA).

Dr. Ravza Mavlyanova will present Central Asia and the Caucasus region.

Dr. R. Mavlyanova
AVRDC

WORKSHOPS/TRAININGS

Final Regional Workshop of the IFAD-funded "Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia" Project

The Final Regional Workshop of the IFAD-funded "Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia" project was held in Tashkent on 10-11 December 2009. This workshop was hosted by the ICARDA Regional Office for Central Asia and Caucasus located in Tashkent, Uzbekistan. Ms. Laura Puletti, IFAD Focal Point, Grants Program, Gender and Knowledge Management, Asia and the Pacific Division, took part on behalf of IFAD. Dr. Barbara Rischkowsky, Project Coordinator and Director of the DSIPS Program, Dr. Aden Aw-Hassan, Principal Investigator on Socioeconomics and Director of the SEPR Program and Dr. Mounir Louhaichi, Principal Investigator on Rangelands, represented ICARDA Headquarters. The Workshop was also attended by the collaborating scientists from Pakistan, Central Asian NARS, and scientists from ICARDA Regional Office for CAC in Tashkent. Selection of the workshop participants was based on the abstracts sent by all collaborators for assessment by the project management.

In the welcome address, Dr. Zakir Khalikulov, Acting Regional Coordinator of ICARDA-CAC, greeted the workshop participants, expressed his appreciation for the work done under the integrated feed and livestock project, and emphasized that the climate change creates many problems. He highlighted that in the livestock production sector, the most challenging issue is breeding of small ruminants that can better adapt to the new conditions. In her opening statement, Ms. Laura Puletti, IFAD, pointed out that visibility and dissemination of the project results is the most important part of the work that



Participants of the Final Regional Workshop of the IFAD-funded “Community Action in Integrated and Market Oriented Feed-Livestock Production in Central and South Asia” Project

can make sure the success stories reach all the stakeholders. In this regard, Ms. Puletti invited the participants to join the ENRAP regional platform to share the outputs and to better understand the needs of beneficiaries.

In the introductory presentation, Dr. Barbara Rischkowsky informed the participants that the specific objectives of the Final Workshop included presenting a representative collection of readily analyzed scientific results from all research sites and themes; discussion of lessons learnt for each country and across countries; discussion of options for follow-up/continuation or dissemination of project interventions and feasibility of adoption by a larger group of farmers.

During the workshop, the participants were introduced to the research results on socioeconomics, rangelands and forage production, and livestock production. Selected abstracts will be published in January 2010 for further dissemination of the project outputs.

Dr. A. Nurbekov, Dr. H. Hamdamov, Mr. N. Nishanov
ICARDA

Training course on “Crop Simulation Modeling”

A training course on “Crop Simulation Modeling using CropSyst” was held in Tashkent on 7-11 December 2009. The course is a part of ICARDA's newly launched multidisciplinary project on the “Impact of Climate Change on rural livelihood in Central Asia”. It was attended by 13 participants from nine institutions, namely ICARDA-CAC, Kazakh Institute of Soil Science and Agro-chemistry, Kyrgyz Biotechnology Institute, Tajik Research Institute of Soil Sciences, Central Asian Research Institute of Irrigation (SANIIRI), Uzbek State Uzgipromeliovodkhoz Institute (UZGIP), Research Hydro-meteorological Institute (NIGMI), ICBA and ZEF-UNESCO project. Lectures were delivered by Dr. Rolf Sommer, Soil Fertility Specialist (Integrated Water and Land Management Program, ICARDA, Syria). The theoretical part of the course covered different aspects of crop growth, effect of weather, soil hydraulic properties, soil salinity, soil organic matter, nitrogen and management on crop growth and yield. During practical

exercises, the participants had the opportunity to familiarize with the CropSyst model (<http://www.bsyste.wsu.edu/cropsyst/>) and carried out their own simulations.

During the last day of the course, various aspects of the project's sub-component on the “Assessment of the vulnerability of selected agro-ecosystems in Central Asia to threats resulting from climate change – production and productivity of wheat” were discussed. The goal of this sub-component was well received by the participants, who expressed their willingness to take up the challenge and to join hands for a fruitful collaboration with ICARDA.

Dr. M. Glazirina, Mr. T. Yuldashev
“Impact of Climate Change on rural livelihood in Central Asia” project

Workshop on Review and Planning Meeting on Vegetable Variety Selection and Adoption in Central Asia and the Caucasus

Vegetable production is important branch of agriculture in Central Asia and the Caucasus to ensure a food security and to increase farmers' income. AVRDC's regional varietal trial of vegetable crops supports to develop of new higher yield and better quality varieties for introduction into vegetable production.

AVRDC' workshop on “Review and Planning Meeting on Vegetable Variety Selection and Adoption in Central Asia and the Caucasus” was held in Tashkent, Uzbekistan in December 7 – 9, 2009. Over 40 participants from Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, AVRDC-The World Vegetable Center and PFU-CAC participated in this workshop.

The review of varietal trial in each country of CAC region was conducted through oral presentations by specialists from partner institutions. During 2005 – 2009, AVRDC provided the region 1300 new accessions of 15 vegetable crops' species. Today, all CAC countries have achievements on varietal trial. The results show that fifty promising lines of ten vegetable crop species selected in previous years in eight CAC countries were tested in competitive varietal trials in 2009. In total, there are 28 varieties of 6 crop species, including tomato, sweet and hot pepper, eggplant, vegetable soybean, mungbean and bean varieties are under state variety trials in Armenia, Kazakhstan, Tajikistan and Uzbekistan. The new hot pepper variety “Uchkun” has been included in the State Register in Uzbekistan in 2009. During 2009, Farmers' Days were organized in every country to demonstrate promising and released varieties.

The participants of the meeting decided that AVRDC' Regional Varietal Trial should be continued in the coming years as well. The status, existing problems and constraints and ways for further collaboration were discussed during this meeting.

Dr. R. Mavlyanova
AVRDC

ANNOUNCEMENT

Young Researchers Seminar in Montpellier, France

The French Initiative for International Agricultural Research (FI4IAR: a joint venture of Inra and Cirad) in collaboration with Agropolis Foundation and with the support of the Young Professionals' Platform for Agricultural Research for Development (YPARD) is organizing its first biennial seminar for young researchers working in developed and developing countries from the 25th-30th March 2010.

Dr. Kirsten Kienzler, BEAF/GTZ Post doctoral Scientist at ICARDA has been selected to participate in the Young Researcher's Seminar in Montpellier 2010 during the GCARD/GFAR conference as one of the 40 selected candidates.

This seminar is targeted at young doctoral and post doctoral fellows. Its aim is to provide an opportunity for young researchers from the North and the South to exchange experiences on their research projects, and raise awareness about the stakes for agricultural research in the different regions of the world. It also aims at raising awareness among the researchers of the North regarding the problems of the South, as well as at identifying synergies and complementarities together and building links.

Senior discussants from different parts of the world will also be invited to be actively involved during the seminar and bring a new point of view to bear on research projects.

They will highlight aspects of the research project they find attractive and innovative.

STAFF CHANGES

Consultant for "Impact of Climate Change on rural livelihood in Central Asia" project



Dr. Mariya Glazirina joined ICARDA-CAC office in Tashkent on 1 December 2009 as Consultant for the new project entitled "Impact of Climate Change on rural livelihood in Central Asia". Having graduated from the Mechanical and Mathematical Department of the National University of Uzbekistan, she worked previously in Research Hydrometeorological Institute of Uzhydromet and took part in a number of local and international scientific projects. In 2005, she obtained PhD degree in techniques for the investigation concerning assessment of the response of Central Asian Rivers Runoff to predicted climate change based on mathematical modeling of natural processes. The colleagues in ICARDA-CAC office wish Dr. Glazirina all the success in her new position.

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DISCLAIMER: While every effort has been made to ensure the accuracy of the information, the Program Facilitation Unit (CGIAR-CAC) cannot accept any responsibility for the consequences of the use of this information. The Newsletter provides a brief overview of agricultural research and other activities of the Program during the last quarter .