



# CACnews

№ 57-58

July - December, 2013



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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.

## EDITORIAL

There were notable developments in the field of agricultural research-for-development in Central Asia and the Caucasus (CAC) in July-December 2013. Joint work by the Regional Program that brings together international centers with national partners in eight CAC countries gave a fillip to regional cooperation. And this cooperation produced some good results.

In the light of soil salinity and frost, which affect winter wheat production in parts of the region, the findings of an extensive German-funded study were particularly welcome. Scientists from Turkmenistan's Grain Research Institute and ICARDA identified two improved winter wheat lines tolerant of medium-level soil salinity and frost (pp. 3-4). This success follows several years of trials of an initial set of 120 improved varieties in Dashoguz province of Turkmenistan. And in Uzbekistan, ICARDA and local researchers continued testing selected facultative wheat varieties for tolerance to heat stress during flowering (pp. 9-10). This research is part of a larger, multi-disciplinary CGIAR Research Program on climate change, agriculture and food security, and will run until August 2015.

Another multi-disciplinary, multi-year research program called the CGIAR Research Program on Dryland Systems, or DS CRP for short, received a new impetus following planning sessions in Fergana, Uzbekistan, in August 2013 (pp. 5-6). Researchers, development practitioners, and decision makers came together to fine-tune a series of planned regional activities and outline priority areas for taking the Program forward over the short to medium term, and beyond. As a result, on-farm adaptive trials were established, land degradation processes mapped and baseline surveys conducted in the three Action Sites selected for this Program in the 'flagship' region of Central Asia. Furthermore, as part of preparations for a new three-year Russian-funded program on Agricultural Policy and Food Security in Central Asia, a team of researchers from the International Food Policy Research Institute toured Kyrgyzstan, Tajikistan, and Uzbekistan in October 2013 (pp. 8-9).

During this period, a number of other regional events also took place to foster vegetable research collaboration, promote adoption of salt-tolerant crops like pearl millet and sorghum, and encourage farmers to exploit marginal lands. For example, the Central Asia and the Caucasus Regional Network for Vegetable Systems Research and Development, whose mission is to facilitate development of market-oriented vegetable production systems and promote enhanced vegetable research strategies, convened in November 2013 in Tashkent, Uzbekistan (pp. 12-13). In particular participants discussed ongoing collaboration and planned further research and development of sustainable vegetable production in CAC. Centers' scientists also worked closely with national partners to promote new and alternative crops in the region to deal with such issues as land degradation and soil and water salinity. As part of this work, the International Center for Biosaline Agriculture (ICBA) and ICARDA organized a field event in Karakalpakstan in July 2013 to show local farmers and researchers the ways and benefits of integrating pearl millet and sorghum into local crop-livestock feeding and farming systems (pp. 4-5). Researchers also continued efforts to encourage farmers in Kazakhstan, Tajikistan and Uzbekistan to exploit marginal lands through crop diversification. To this end, a travelling training workshop was held in August 2013 (pp. 10-11).

Training for partners and farmers was arranged in a variety of areas. During an ICARDA-organized workshop in July 2013 in Dushanbe, Tajikistan, a group of researchers learnt surveying skills and improved knowledge about principles and practices of conservation agriculture (p. 14). Under a different project, a group of young specialists from Kyrgyzstan, Tajikistan and Uzbekistan attended a regional training workshop organized by Bioversity International in Tashkent, Uzbekistan, in August 2013. They learnt how samples of fruit trees should be collected (p. 15). And as part of efforts to advance vegetable grafting technology in Uzbekistan, AVRDC - The World Vegetable Center organized in November 2013 a training course on tomato grafting for 40 leading women farmers from Jizzakh, Syrdarya and Tashkent regions (pp. 15-16). Vegetable grafting is considered as an easy way to improve plant tolerance to biotic and abiotic stresses.

All this, however, once again underlines the importance of collaboration and support from the national and international research and donor communities. And our Program is committed to working together to do and achieve more.

**Dr Jozef Turok,  
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ICARDA Regional Coordinator**

# FEATURE

## Empowering women in Central Asia

Working women are a boon for the economy. As studies by the United Nations, World Bank, and International Monetary Fund show, their economic integration has many long-term benefits for the labor force and job creation. This research also indicates that more women at work means a boost to enterprise development and GDP growth.

Women's economic activity, however, remains low in many developing countries. Economists believe it is a missed opportunity. Data from the Organization for Security and Cooperation in Europe (OSCE) shows that in most Central Asian countries, less than a quarter of all small and medium enterprises are owned or managed by women. According to World Bank Indicators (2009), women make up 44.1% of the labor force in Tajikistan and 42.2% in Kyrgyzstan. So there is still considerable untapped potential. A few reasons are often given. One is that doing business requires knowledge, skills and financing, which women often lack. They also have more difficulty setting up and running businesses than men. And this partly explains why they are underrepresented. Some economists view this as a market failure since increasing women's involvement benefits the economy as a whole, and small and medium businesses run by women are often more profitable than those managed by men. But considering that a high percentage of the population in Central Asia lives in rural areas, it is rural women who are mostly economically inactive. Employment opportunities for them in particular can spur further economic development.

International research, donor and development organizations are now paying more attention to this issue. As a result, a number of initiatives have been launched in recent years to boost women's role in the economy and public life. Much effort is focused on rural women in Central Asian countries. For example, all new programs, including the Dryland Systems, of the Consultative Group on International Agricultural Research (CGIAR) have a clear strategy on gender and youth.

Rural women, most of whom are stay-at-home mothers, mainly work in farming or make homemade knitwear and woven products for sale at local markets and occasionally abroad. But their earning power is limited. Women artisans, for example, lack skills and access to markets to increase their incomes. And sometimes raw materials of poor quality make things worse. A recent four-year project funded by the International Fund for Agricultural Development (IFAD) and implemented by the International Center for Agricultural Research in the Dry Areas (ICARDA), is one of the efforts to have addressed this problem. It was launched in 2009 and targeted rural women artisans and small livestock breeders in Tajikistan, Kyrgyzstan and Iran. The project increased employment opportunities and income options for poor rural populations, particularly women, by introducing improved production, processing and export of value-added fiber. The outcome is that women artisans' profits rose nearly sevenfold in some cases. What is more, marketing channels are now in place to sell raw and finished products abroad. Two US-based companies Knit Outta the Box and Clothroads help local suppliers to reach buyers in the USA and Europe. Products like high-quality mohair yarn, blankets and carpets have already found their first customers. SPINNA, a UK-based non-profit organization, has also been working with a UN project in Tajikistan and Kyrgyzstan to increase the competitiveness of the clothing and textiles sector since 2009. It helps women entrepreneurs in the fashion and textiles industry. Seeing much potential in the region, SPINNA plans to establish hubs in each Central Asian country, as well as Afghanistan.

In rural households, however, many women also either run or work on farms. Women employed in farming face problems of their own. Most know little or nothing about best practices and sustainable management in agriculture. So training women farmers and helping them in other ways such as accessing finance is important. Better policies and more government incentives are also needed. For example, in some countries land rights are still an issue. UN Women, an organization dedicated to gender equality and the empowerment of women, puts much effort into dealing with this. The organization has been working to ensure women's access to land since 2001 and has since expanded through a number of programs in Kyrgyzstan, Tajikistan, and Uzbekistan. A land reform project by the USAID, a US development agency, also assists ten legal aid centers that provide farmers, mainly women, with information on their rights through training and workshops in Tajikistan. This helps them to protect their rights



*Many rural women in Tajikistan, most of whom are stay-at-home mothers, make homemade knitwear and woven products for sale at local markets and occasionally abroad. Photo by Liba Brent.*

through advisory, mediation and representation services on land-related disputes.

Success in one place could and should be replicated in another. Central Asian countries have a lot in common and would benefit from increased regional cooperation. More networks of women groups and organizations need to be established. In July 2011, the US Department of State and a number of other organizations held the Strategies for Success: Central Asia and Afghanistan Women's Economic Symposium in Bishkek, Kyrgyzstan. The event helped to kick off a regional initiative, which aims to increase women's economic opportunities and expand cross-border cooperation between women in Central Asia and Afghanistan. As a result, a Steering Committee was elected from businesswomen and civil society experts from the region to help coordinate ongoing support by the US government, national governments, and donor and private sector partners. And a number of follow-up activities in Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, such as grants and study tours to the US, were worked out.

One of them is a one-year program funded by the US embassy in Uzbekistan. CACAARI, the Central Asia and the Caucasus Association of Agricultural Research Institutions, started implementing this program in 2013 in partnership with the Ministry of Agriculture and Water Resources (MAWR) of Uzbekistan, the Uzbek Scientific Production Center for Agriculture, and Tashkent State Agrarian University. The program targets specifically women farmer groups, and aims to establish information and advisory extension centers, which will serve as hubs of information and professional skills development for women farmers in Uzbekistan and other Central Asian countries, as well as the Caucasus. The program team recently helped to set up one such center at Tashkent State Agrarian University. Women farmers and entrepreneurs can now get free qualified advice and consultation on issues ranging from improving farming businesses and expanding production to entering new markets in the region. For tech-savvy women, the center maintains regularly updated websites at [www.agrowebcee.net/awuz/](http://www.agrowebcee.net/awuz/) and [www.agriculture.uz](http://www.agriculture.uz). The center also offers training tailored to specific needs. Following an extensive survey of women farmers' needs on 450 farms in Uzbekistan, CACAARI, ICARDA and MAWR arranged the first training course for 40 leading women farmers at the center on 20-21 November 2013. These women are expected to train over 120 other women farmers in their regions. The program intends to organize courses like this in Fergana and Samarkand, Uzbekistan. CACAARI is now planning more similar programs in the region to disseminate this experience. After all, the ultimate goal is to replicate success in other countries and foster regional cooperation between women farmers and entrepreneurs. The good thing is that these farmer women are keen to learn and develop. What they need is a little help.

## RESEARCH HIGHLIGHTS

### Researchers identify new salinity, frost-tolerant winter wheat in Turkmenistan

Soil salinity and frost remain two main abiotic stresses to winter wheat production in many parts of Central Asia. They affect yields and farmers' income. So much of international research effort in the region is focused on identifying and developing improved winter wheat varieties resistant to these factors. For a few years now, researchers from Turkmenistan's Grain Research Institute and the International Center for Agricultural Research in the Dry Areas (ICARDA) have been jointly evaluating improved germplasm of winter wheat from ICARDA, the International Winter Wheat Improvement Program (IWWIP) and other sources in Dasoguz region of Turkmenistan. This research effort started in 2010 as part of an ongoing project 'Utilization of wild relatives of wheat in developing salinity-tolerant winter wheat with improved quality for Central Asia', undertaken in Central Asia by ICARDA with financial support from the German Federal Ministry for Economic Cooperation and Development/the German Federal Enterprise for International Cooperation (BMZ/GIZ).

A set of 120 improved varieties and advanced breeding lines of winter wheat was evaluated in the 2010-2011 crop season on medium saline soil in the research field of the Dasoguz branch of the Grain Research Institute. A total of 12 superior lines were selected from the 120 experimental varieties. These 12 lines along with another 10 winter wheat varieties from other sources were again evaluated in 2011-2012 on medium saline soil. Based on



*A new variety of winter wheat, which is planned to be submitted to the State Variety Testing Commission of Turkmenistan, during the maturity stage. Photo by Ram Sharma.*

the performance in 2011-2012, seven lines were selected and further evaluated in 2012-2013 on saline soil. In December 2012, winter wheat crop in Dasoguz region was severely affected by frost. Five of the seven lines suffered from frost to various degrees. However, two lines fully survived frost, which also showed better yield and agronomic performance compared with the local varieties during all three years of experimenting. And one of these two lines is being prepared for submission to the State Variety Testing Commission of Turkmenistan. The identification of these improved winter wheat lines, which are tolerant to medium-level soil salinity and frost, once again demonstrates how important international collaboration and support are in dealing with wheat production constraints affecting food security in the Central Asian region.

## New crops can help farmers in north Uzbekistan adapt to climate change, say scientists

Combating land and water degradation, and increasing agricultural productivity have been key issues in agricultural research for development in Central Asia. Every year tens of thousands of hectares of agricultural land in the Aral Sea Basin become unsuitable for farming and livestock production and move into the category of marginal, low productive. There are a number of causes, including negative consequences of the Aral Sea desiccation, climate change and irrational use of natural resources for intensive agricultural production.

There are strong indications that secondary salinization, waterlogging, soil erosion, loss of organic carbon, and reduced biodiversity are resulting in yield losses, and declining soil fertility is leading to higher production costs. Together with limited water resources and high soil salinity, these are the major constraints to crop-livestock production in Karakalpakstan (northern Uzbekistan). Adoption of crop species adapted to salinity, drought, extremely hot and cold environments, and further enhancement of their yield potential and grain quality is regarded as a sustainable solution to meet food, feed and fodder needs of rural households and farmers in the region.

In an effort to introduce non-conventional salt-tolerant crops such as pearl millet and sorghum, the regional offices of the International Center for Biosaline Agriculture (ICBA) and the International Center for Agricultural Research in the Dry Areas (ICARDA) in Uzbekistan, together with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and national partners, continue to assess ways and benefits of integrating pearl millet and sorghum into local crop-livestock feeding and farming production systems in diverse agro-ecological zones. Both crops have high water consumption efficiency, and are highly tolerant to drought, heat and soil salinity. These features make sorghum and pearl millet especially suitable for crop diversification and crop-livestock productivity enhancement in saline and drought-prone areas.

To show the advantages of these crops to local farmers and researchers, a Field Day was held on 19 July 2013 on Shortanbay farm in Karakalpakstan under the ICBA-ICRISAT-ICARDA project 'Sorghum and Pearl Millet for Crop Diversification, Improved Crop-Livestock Productivity and Farmers Livelihood in Central Asia'. At the event the results of experimental trials of sorghum and pearl millet varieties were presented to about 30 participants, including farmers and researchers from the Karakalpakstan branch of the Uzbek Rice Research Institute (KBURRI); the Nukus branch of Tashkent State Agrarian University; Karakalpakstan Institute of Crop Husbandry; government officials and women leaders from NGOs.



The participants heard that despite an exceptionally dry season and lack of water for irrigation this year, 13 entries of pearl millet had reached panicle emergence and flowering stages. The fields were irrigated only once in July 2013. 'Hashaki-1', a locally released early-maturing variety, performed particularly well on medium saline soil, which makes it possible to adopt for wider cultivation as a main crop in early spring or as a second crop after wheat harvesting.

*During trials on Shortanbay farm in Karakalpakstan, locally released early-maturing variety of pearl millet 'Hashaki-1' has performed particularly well on medium saline soil. Photo by Tulkun Yuldashev.*

Officials and farmers from different districts of Karakalpakstan noted that a major challenge to wider cultivation is ensuring the availability of seeds of improved lines of non-conventional salt-tolerant crops. However, efforts are under way to establish specialized farms for multiplication of good quality seeds of this high-yielding variety

in Uzbekistan. Participants agreed that large-scale seed multiplication of high-yielding varieties of sorghum, pearl millet and alfalfa, which had shown good performance on salt-affected soil on Shortanbay farm, should start to meet the growing demand of farmers.

Scientists pointed out the importance of including both sorghum and pearl millet in crop rotation and crop diversification through introduction of grain legumes (mungbean, soya bean and alfalfa). Incorporation of these crops into a biosaline farming system is considered as the only source of income for many poor rural families, who live far away from markets. There is considerable knowledge in the region about the preparation of various types of food products from proso millet, and hence the use of pearl millet grains for livestock feed and various types of food products should be a rather easy and quick process.

## From planning to action: multi-year dryland systems research program set in motion

Farmers in Central Asia and the Caucasus face considerable challenges - from severe soil degradation to the poor availability of new technologies and increasingly variable climate patterns. Efforts to tackle these constraints received recently a new impetus as researchers, development practitioners, and decision makers came together to fine-tune a series of planned regional activities under the auspices of the CGIAR Research Program on Dryland Systems (DS CRP).

Consistent with Intermediate Development Outcomes (IDOs), a series of objectives that guide the implementation of all CGIAR Research Programs, these activities aim to reduce vulnerability, mitigate risks and sustainably intensify production systems in several research areas throughout Central Asia and the Caucasus.

The planning sessions, which took place at the Target Region Implementation and Partnership (TRIP) workshop in Fergana, Uzbekistan, on 12-14 August 2013, outlined priority areas for taking the Program forward over the short to medium term, and beyond. These included efforts to ensure that women and children in vulnerable households had year-round access to a greater quantity and diversity of food sources - these demographic groups are often neglected in agricultural research for development initiatives.

On-farm adaptive trials will be established to identify and introduce stress-tolerant, high-yielding and improved quality varieties of various crops in pure and mixed plantations. Priorities for the different Action sites were identified - including winter wheat, potatoes, vegetables, food legumes, fodder and horticultural crops - and milestones were outlined to develop improved varieties, particularly those demonstrating resilience to drought, heat, and salinity. Plans for the establishment of a seed system platform that could more effectively supply farmers with high-quality seed and planting materials were also discussed at length.

Emphasis was also placed on establishing more integrated and connected service delivery institutions to improve the resilience of farming systems and intensify production. Moving forward, Program partners expressed their preference for extension systems that were self-financed, citing the example of Water User Associations using membership fees to pay for the services of agronomists and other advisors. To ensure that poorer farmers could also participate in similar schemes, local government subsidies were perceived as a potential means of extending participation to the most vulnerable.

Meeting participants discussed alternative land use options for improving land productivity and livelihoods through sustainable management of the marginal land resources. Research will be pursued in order to develop these options further. Potential policy options related to land tenure and property rights were also explored - including those related to pastoralist livelihoods, rangeland activities, and other forms of agricultural systems in the Aral Sea Region, one of the three Action Sites in Central Asia.

It was also acknowledged that a Strategic Innovation Platform (SIP) should be established to facilitate collective action for large-scale impact. Being identified as one of the key outcomes of DS CRP during the inception phase



*Farmers from the Water Users Association in Quva, Fergana Region, Uzbekistan, meet with researchers during the Dryland Systems CRP implementation workshop. Photo by Jozef Turok.*

the Innovation platform should integrate four strategic elements: (i) perspectives, knowledge and actions of all DS CRP stakeholders; (ii) innovative partnership for implementing collective actions; (iii) analysis, identification and justification of actions and changes across the economic, social, environmental domains, as well as livelihoods and welfare of end users and consumers; and (iv) technology, institutional and policy options towards reducing vulnerability, improving productivity and setting in place innovations.

As the Program proceeds, these and other activities will be implemented in a series of research sites initially across Central Asia, and later also in the Caucasus countries. Already identified during the Program's inception phase, the geographic focus is on the Aral Sea Region, the Fergana Valley and the Rasht/Kyzyl-Suu Valley. In the Fergana Valley, activities will start in Sughd province in Tajikistan; Andijan and Fergana provinces in Uzbekistan; and parts of Kyrgyzstan. Once research activities are underway, efforts will be made to extend new technologies and practices to other dryland areas - throughout Central Asia, the Caucasus and beyond.

For more information, please visit [www.drylandsystems.cgiar.org](http://www.drylandsystems.cgiar.org) and [www.cac-program.org/crp.asp](http://www.cac-program.org/crp.asp).

## Climate change challenges smallholder potato growers in Central Asia to use less water

Resource-poor smallholder farmers in Central Asia often struggle to make a profit out of their agricultural activities. On the one hand, they lack skills and technologies to tackle effects of climate change such as water shortages, which are a reality. On the other hand, lack of improved crop varieties suitable for the local conditions makes them even more vulnerable to the vagaries of the weather.

Many smallholder farmers in Uzbekistan and Tajikistan make a living by growing potato, a key food and cash crop in the region. Its traits make it well suited to the needs of local smallholders. Potato yields more food per unit of water than other crops. And its 'nutritional productivity' is especially high: for every cubic meter of water applied in cultivation, potato produces 5,600 calories of dietary energy, compared to 3,860 in maize, 2,300 in wheat, and just 2,000 in rice. Scientists believe that an increase in the proportion of potato in the diet would alleviate pressure on water resources. Potato is also among the crops with the greatest potential for food security and income generation in Central Asia. If stress-tolerant varieties are cultivated and water-saving technologies are used, smallholders can increase potato yields by as much as 40%.

To make this happen, it is important that with the help of researchers farmers learn about improved, robust crop varieties and water-saving technologies. It is also necessary to involve farmers together with researchers in agricultural experimentation to accelerate the development and adoption of innovative technologies. What is good, local scientists show a strong interest in drought-tolerant potato varieties and water-saving technologies. And farmers are increasingly looking for solutions to cultivate potato with reduced water supply, and early potato varieties suited to drought and high temperatures.

Helping local researchers and farmers in this is the goal of the three-year project 'Improved potato varieties and water management technologies to enhance water use efficiency, resilience, cost-effectiveness, and productivity of smallholder farms in stress-prone Central Asian environments', funded by the German development cooperation instrument of BMZ/GIZ. Launched in 2012, the project is aimed at increasing potato productivity and competitiveness, and family income of resource-poor farmers in stress-prone areas of Central Asia, specifically in Uzbekistan and Tajikistan. It is expected that national agricultural research institutions, Farmers' Associations, individual farmers, and policymakers will use and apply participatory research methods to disseminate improved stress-tolerant potato varieties, and cost-effective water management technologies.

Recently, the project team met in Tashkent, Uzbekistan, to discuss progress so far. From 3 to 5 September 2013 about 20 participants gathered at the annual project meeting to look at the results during the first and second years of the project implementation and discuss how to re-adjust protocols for laboratory and field experiments. Representatives from IWMI, University of Hohenheim (Germany), ICARDA, national research partners from Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan,



*A water-saving technique known as partial root zone drying is being tested on a potato plot in Zangiota District in Tashkent Region, Uzbekistan. Photo by Durbek Khalikov.*



as well as CIP's scientists, also discussed the joint preparation of scientific articles based on the results of two-year experiments and formulated recommendations on future needs and actions. At the end of the meeting participants visited the laboratory of cellular technologies at the Institute of Bio-organic Chemistry in Tashkent to see an ongoing experiment on photoperiod/day neutrality. They also toured fields of the Institute of Vegetables, Melon and Potato, and private farms where experiments on water use efficiency, crop performance and varietal trials are under way.

It is expected the project will ultimately benefit farmers in Central Asia by making available new parental genetic materials and tools to breed water-efficient potatoes and develop cost-effective irrigation practices that will cut water consumption and production costs. Farmers will be able to produce more reliable and larger quantities of marketable potatoes, and consumers will enjoy more stable food prices free of the vagaries of international markets that typify staple grains. Researchers, regional authorities, and policymakers will benefit from the availability of more scientific data.

## NEW PROJECTS

### New boost to conservation of endangered fruit, nut tree species in Central Asia

A multi-year project has recently got under way to study the diversity of some fruit and nut tree species in Central Asia and threats facing this richness in the region, and to tailor more effective conservation measures.

Central Asia is widely regarded as the center of origin of many fruit and nut tree species. In fact, many of the globally important temperate fruit and nut crops were domesticated here. Among them are almond, apricot, apple, pear, pistachio, cherry, plum, walnut, pomegranate, quince, hazelnut, azarole, Cornelian cherry, Russian olive, grapevine, chestnut and mulberry. But land degradation, over-grazing in forest stands and other adverse human activities are posing threat to this diversity. The region has seen a substantial reduction in biodiversity, including populations of valuable tree and other plant species, in the past few decades. For several years, local and international researchers have been working to reverse the trend. A number of conservation projects have been carried out in the region. And there are some positive results. Researchers and farmers have established better links and work together on *in situ* and on-farm conservation of fruit and nut tree species. Considerable knowledge gleaned from the previous projects is available on an online database at <http://centralasia.biodiversity.asia/>. But more work is needed.

The new initiative 'Conservation for diversified and sustainable use of fruit tree genetic resources in Central Asia' aims to better understand the levels and patterns of genetic diversity and what the threats are. It is a research study involving the Centre de Recherche Public Gabriel Lippmann (CRPGL), based in Luxembourg, Biodiversity International, and national research partners in Kyrgyzstan, Tajikistan and Uzbekistan. Apple, apricot and walnut were selected for the study because of their value locally and globally. The three species also provide good examples of the domestication gradient from wild populations to local semi-domesticated varieties, to commercial, fully domesticated varieties, all coming from the same wild progenitors that are still found in the region. Moreover, all of the wild resources are locally or globally threatened.



*An old-growth, natural walnut forest in the western Tian Shan mountains. More needs to be done to understand and conserve unique genetic diversity in forests like this. Photo by Jozef Turok.*

The project will analyze, describe and document nutrient composition of wild populations and selected varieties of apple, apricot and walnut and associate the distribution of phenotypic or chemical characteristics with patterns of genetic diversity using genomic markers associated with those traits. Researchers will carry out nutritional and DNA analyses of varieties of apple, apricot and walnut. They will also use a combination of technologies to understand patterns of phenotypic variability in nutrition and their associated genetic diversity, identify locations of valuable genetic resources and threats to them, and eventually recommend approaches and guidelines for their conservation.

Most importantly, scientists will gain a deeper understanding of the current and historic social and cultural factors influencing distribution and use of diversity of fruit tree varieties. Cultural practices and perceptions concerning fruit tree diversity and domestication will be studied to understand how knowledge and actions by rural women and men influence management and maintenance of wild and semi-domesticated populations of these species.

At the end of the study, a catalogue of varieties will be published, which will build on data obtained in previous projects. The catalogue will be made available to farmers, researchers, and other potential users. Conservation approaches and guidelines will be developed, published and disseminated based on knowledge generated by the project through genetic analyses, spatial analyses of diversity and threats, and assessment of traditional knowledge about the target species.

But the ultimate goal is that local researchers and farmers take the lead in improving conservation work and reducing threats to wild populations of the three species. This calls for more interest and capacity among research institutes in the region. And rural people will also take action to sustain and enhance wild populations and semi-domesticated varieties of fruit and nut tree species for the benefit of future generations.

Recently, the project team gathered in Tashkent, Uzbekistan, to discuss how best to fulfill the project objectives. From 3 to 6 September 2013 some 25 researchers and practitioners, including PhD students from the three project countries, looked at what had been done so far and what measures should be taken to boost conservation efforts in the region. Participants also heard presentations on current status of genetic resources of apple, apricot and walnut in Kyrgyzstan, Tajikistan and Uzbekistan respectively. They also reviewed ongoing studies, as well as discussed and approved the project work plan.

## International food policy think-thank team tours Central Asia on scoping mission

A team of researchers from the International Food Policy Research Institute (IFPRI) in Washington, DC, traveled to Kyrgyzstan, Tajikistan, and Uzbekistan from 7 to 19 October 2013. This was the first IFPRI mission under its new Agricultural Policy and Food Security in Central Asia program, which is funded by the Russian Federation through its contribution to Consultative Group on International Agricultural Research (CGIAR) Fund. Two CGIAR Research Programs (CRP) – Policies, Institutions and Markets (PIM, CRP2) and Agriculture for Nutrition and Health (A4NH, CRP4) – also participate in supporting this research and capacity strengthening program. The activities under this program will cover a wide range of issues related to food security, including economic growth and investment options, agriculture and structural transformation, climate change impacts, food safety and value chains, agriculture-nutrition linkages, and labour migration and remittances.

In the implementation of this three-year program, IFPRI is planning to collaborate with the Eurasian Center for Food Security at Moscow State University, and regional and national research institutions in Central Asia. During the recent mission, the IFPRI team met with diverse stakeholders in the region, including government agencies, national research institutions, international organizations, and local governments and farmers. The goals of these meetings were to assess the agricultural development and food security landscape in the region, and determine where IFPRI can make meaningful contributions to fill existing knowledge gaps related to agricultural development and food and nutrition security. IFPRI is planning to establish mutually beneficial partnerships with regional and national research institutions in Central Asia to make contributions to strengthen their capacity in economywide modeling, analysis of the impact of climate change on agriculture and food security, and applied econometric analysis.

In Tajikistan, the IFPRI team held meetings with the Ministry of Agriculture, Agency on Statistics under the President, Tajik Academy of Agricultural Sciences, Institute of Agricultural Economics, Research Center ‘Sharq’ and several development partners, such as Food and Agriculture Organization (FAO), World Food Programme (WFP), US Agency for International Development (USAID) and the German Society for International Cooperation (GIZ), involved in agriculture and food security activities in the country. The team also traveled to Khatlon Region in the south of the country, where it visited two local *jamoats* (communities), water users association, and local marketplaces and met with local farmers.

In Uzbekistan, the IFPRI team met with the Ministry of Agriculture and Water Resources, as well as two national economic research institutes, including the Institute of Forecasting and Macroeconomic Research (IFMR) and Center for Economic Research (CER). It also met with representatives of the World Bank, United Nations Development Programme (UNDP), International Center for Agricultural Research in the Dry Areas (ICARDA), International Water Management Institute, Central Asia and the Caucasus Association of Agricultural Research Institutions (CACAARI), AVRDC - The World Vegetable Center, and the US Embassy. The team also traveled to Kashkadarya Region in the south of the country with ICARDA’s Dr Aziz Nurbekov, where they spent a day at the Scientific Research Institute for

Breeding and Seed Production for Cereal Crops, visiting its research facilities, touring trial farm sites, and meeting with local farmers. IFPRI is currently in talks with the Institute of Forecasting and Macroeconomic Research about the next steps in moving its research and capacity strengthening activities forward.



*The IFPRI team visits a farmer on his land in the Kyrgyz Republic. Photo by Kamiljon Akramov.*

In Kyrgyzstan, the IFPRI team had meetings at the Prime Minister's office (Agro-industry, and Economics and Investment divisions), Ministry of Agriculture, Ministry of Economy, National Committee on Statistics, and the National Academy of Sciences. The team also met with representatives of the University of Central Asia, the World Bank and Japan International Cooperation Agency (JICA). It also spent one day outside of Bishkek, meeting with local government officials and water users association representatives, visiting crop and livestock farmers, and touring a health clinic.

The Program Facilitation Unit of the CGIAR Regional Program in Tashkent, Tajik Academy of Agricultural Sciences, and Center for Science Methodology and Social Research of the National Academy of Sciences of the Kyrgyz Republic provided organizational and logistical support for the IFPRI mission. Currently, the IFPRI team is working with various research institutes and individual researchers in Central Asia to develop detailed research plans. It is also discussing opportunities for capacity strengthening and training activities with selected institutions in the region.

## Climate change makes heat tolerance a must-have trait for wheat in Central Asia

Heat stress is a major worry for farmers in large parts of Central Asia, and Uzbekistan in particular. After all, agricultural production is affected. And climate change is making things worse. Like some other crops, wheat, a staple food in the region, is susceptible to temperature variations. And it is particularly vulnerable during flowering. In Uzbekistan, local scientists and their counterparts from international research organizations work on possible solutions. They introduce, test and evaluate enhanced winter wheat lines for tolerance to heat and other stresses. A number of projects in the field have been carried out in the past, and a few are under way. For instance, a recent study called 'Adaptation to Climate Change in Central Asia and People's Republic of China', funded by the Asian Development Bank and conducted by the International Center for Agricultural Research in the Dry Areas (ICARDA) and the International Food Policy Research Institute (IFPRI), showed that a rise in air temperature in spring, and corresponding heat stress during flowering, is the main factor affecting winter wheat productivity in Central Asia. The results of this extensive research have been recently published in *Agriculture, Ecosystems & Environment* (available at: <http://dx.doi.org/10.1016/j.agee.2013.06.011>, or <http://www.sciencedirect.com/science/article/pii/S0167880913002168>).

Building on this research effort, ICARDA started another project in 2012. It is called 'Testing of selected facultative wheat varieties for tolerance to heat stress during flowering'. The project brings together researchers from ICARDA and Kashkadarya Research Institute of Grain Breeding and Seed Production of Cereal Crops. The study itself is part of a larger, multi-disciplinary CGIAR Research Program on climate change, agriculture and food security, and will run until August 2015.

The project is now in its second year. Researchers are conducting field trials at experimental sites of the Institute. One is under way in Kojar village of Karshi district, Kashkadarya Region. Scientists are assessing the potential of different crop management practices (best sowing time) along with screening of improved heat-tolerant winter (facultative) wheat germplasm. They are trying to identify varieties that can resist or cope with heat stress during flowering, and to assess yield losses associated with heat stress. The project team is also doing soil and crop laboratory analyses to distinguish heat stress from other factors influencing productivity. Furthermore, crop modeling and biophysical research is ongoing in cooperation with laboratories of the Uzbek Cotton Research Institute.



*Winter wheat, a staple food in the region, is particularly vulnerable during flowering. Photo by Tulkun Yuldashev.*

During this year, the project partners did pre-sowing soil sampling and analysis of soil physical properties and chemical composition, soil moisture and soil salinity in mid-October, and planted eight varieties of facultative wheat ('Hazrati Bashir', 'Bunyodkor', 'Gozgon', 'Jaihun', 'Elomon', 'Humo', 'Sanzar 4', 'Saidaziz') on 20 October 2013 (optimal planting). The data assessed in the field will be further fed into CropSyst, a crop modeling application. There are now plans to start late and spring planting of these wheat cultivars in mid-November 2013 and mid-February 2014 respectively.

## MEETINGS, SEMINARS AND CONFERENCES

### Researchers encourage Central Asian farmers to exploit marginal lands

Rising soil and water salinity are a big concern in parts of Central Asia, particularly in the area around the Aral Sea where large swathes of land are lost for agricultural use every year. And this problem is drawing more and more attention from international research organizations working in the region like the International Centre for Biosaline Agriculture (ICBA), ICARDA and the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT). Researchers work on solutions to prevent degradation of soil and water resources in Kazakhstan, Tajikistan and Uzbekistan. Increasing agricultural productivity is also an important priority. One of the promising avenues that scientists pursue is diversification, or cultivation of alternative salt- and drought-tolerant crops, to exploit marginal lands. This is, they believe, a sustainable way to meet growing demand for food and fodder in rural areas. And crops like sorghum (*Sorghum bicolor*) and pearl millet (*Pennisetum glaucum*) fit the requirements. They can help to solve two problems at once. First, if adapted to local conditions and widely cultivated, they can produce enough fodder for local livestock. Second, their cultivation will help to prevent land degradation and improve soil fertility. These qualities make sorghum and pearl millet particularly good for saline and drought-prone areas.

Researchers from ICBA, ICARDA, ICRISAT and their national partners continue to promote these crops among farmers and facilitate higher adoption rates in the region. This work has been mainly carried out under an Islamic Development Bank-funded project called 'Sorghum and Pearl Millet for Crop Diversification Improved Crop-Livestock Productivity and Farmers Livelihood in Central Asia', coordinated by ICBA. The project team arranges workshops and field visits for farmers and other partners in research for development. A travelling training workshop on 'Participatory evaluation of trials and identification of productive cultivars and appropriate crop management practices' was organized on 26-31 August 2013 by ICBA, ICARDA and ICRISAT. The main goal was to involve farmers and partners from different research organizations in the evaluation and identification of characteristics of high-yielding varieties of sorghum and pearl millet in field trials.



*A local pearl millet variety called 'Hashaki-1' is planted in summer under a canopy of mung bean in Tashkent Region, Uzbekistan. Photo by Kristina Toderich.*

Two field visits were also organized to two farms in Sughd Region (northern Tajikistan) and the Zangiota site, Tashkent Region (Uzbekistan). More than 45 participants from Kazakhstan, Tajikistan and Uzbekistan took part in the workshop. Participants, including women and young specialists, were trained in methods of seed production, seed multiplication, seed quality control, storage, packaging and seed delivery systems for pearl millet and sorghum.

Seed multiplication at the national level is key to successful and wide adoption of these two salt- and drought-tolerant cereals. During one of the workshop sessions, Dr Abdullah Al-Dakheel, of ICBA, pointed to lack of extension systems in seed production of these crops. He suggested that national partners should review the existing procedures on seed multiplication of new crops that had already been naturalized in the region since 2005. Judging from success of collaborative work in other countries, especially northern Africa, he is convinced that sorghum and pearl millet can be considered as promising dual-purpose crops for increasing productivity of marginal lands in Central Asia.

During the workshop, participants also noted that it is necessary to continue capacity-building efforts in sorghum and pearl millet cultivation. They pointed out that a brief manual on sorghum and pearl millet in local languages would be very helpful. Dr Auezkhan Kurbanbaev, of the Uzbek Scientific Production Center for Agriculture, said training courses for farmers and women, as well as field days and travelling workshops, should be organized at least two or three times a year. Following the discussions, participants worked out action plans for future activities, which will serve as a basis for the development of a new regional proposal on extension for sorghum and pearl millet. More attention is also to be paid to farmer-based seed production and distribution among farmers. One of the objectives of the new proposal will be setting up a regional network for dissemination of results of work. As Dr Zakir Khalikulov, Deputy Regional Coordinator at ICARDA-CAC, noted, the regional network on sorghum and pearl millet is necessary to improve exchange of germplasm between countries as each locally released variety should become available for use by other member countries. This will help to ensure higher adoption rates and ultimately more uses for marginal lands. When devising the proposal, Dr Kristina Toderich, regional representative of ICBA-CAC, said, more research should be focused on development of technology packages taking into consideration landscape characteristics; climatic variables and traditional farming-livestock systems in target marginal areas. Future attention will be given to the processing, extension services, value chains and marketing of these two and others dual-purpose crops.

## Adopting marketing standards in Uzbekistan to aid agricultural exports, say experts

Fruit and vegetable production is an important source of income for small farmers in Uzbekistan. Local growers supply fruits and vegetables to the domestic markets and abroad. Agricultural produce is a major export earner. So the government pays attention to the industry and increases areas for the cultivation of fruits and vegetables. As of 1 January 2013, the total orchard area was estimated at 250,300 ha, and that of vineyards at 127,000 ha. On average, farmers collected 10.47 t/ha of fruits, and 10.86 t/ha of grapes. By some estimates, gross production of fruits stood at 2,052,000 tons, and of grapes at 1,204,600 tons. The government is projecting an increase of 30 per cent in fruit and vegetable production by 2015.

Intensive gardening is gaining momentum too. A total of 8,300 ha of areas were allocated for intensive orchards in 2013. International donor, research and development organizations are also supporting this. For example, a project on development and management of intensive orchards is being implemented in Uzbekistan by the German Federal Enterprise for International Cooperation (GIZ). The project operates intensive orchards at three sites.

These efforts help to ensure there are enough fruits and vegetables on the local markets. But increasing agricultural exports could boost farmers' incomes further and benefit the economy as a whole. Doing that, however, requires that better marketing and other standards are in place, and farmers grow agricultural produce with qualities specifically suited to packaging, processing and long-haul transport.



*Uzbekistan is well-known for luscious fruits like this local pomegranate variety. Photo by Mikhail Djavakyantc.*

These and other issues were at the centre of discussions at a scientific conference 'Expansion of market-oriented produce in horticulture, olericulture, beekeeping and floriculture' on 20 November 2013 in Tashkent, Uzbekistan.

Over 100 national and international experts, farmers, scientists and business people attended the event, organized by the Trade and Industry Chamber of Uzbekistan, the International Center for Agricultural Research in the Dry Areas (ICARDA), AVRDC - the World Vegetable Center and other organizations.

One of the issues on the table was lack of procedures to ensure quality of agricultural produce. Experts point to inconsistencies between marketing standards in Uzbekistan and other countries, which makes it difficult to export agricultural produce. There is also a need for improved and consistent standards in agricultural production in Uzbekistan. Deputy director of the Uzbek Research Institute for Horticulture, Viticulture and Wine, Dr Ravshan Abdullaev, says agricultural produce should be marketable and appealing to customers, which will help local producers to compete with imported varieties in the first place. This opinion is also shared by Dr Rafik Khakimov, director of the Uzbek Research Institute of Vegetables, Melon Crops and Potato. He argues that increasing exports calls for a number of measures. He believes it is necessary to grow high-quality varieties of fruits, which should be appealing to customers, be of standard shape, size and weight, and suited to long-haul transport. Agricultural produce for exports should also be packaged according to international standards. As market forces dictate product qualities, it is also necessary to strengthen marketing research services to study what standards and requirements there are for vegetables and melon crops, he adds. Honey production is one area where proper regulation could help. Participants voiced concern over honey products sold at local markets. They called for new legislation to regulate the sale of honey products. Participants also agreed on the need to work out international standards and train farmers and producers to ensure high quality of products.

Another way to boost exports and increase competitiveness of local agricultural produce, experts believe, is to introduce new varieties. In addition to being highly marketable, new varieties, Dr Abdullaev argues, should also be resistant to cold, heat, drought and pests, and produce high yields. Dr Khakimov echoes his colleague's opinion, but thinks more greenhouses also need to be built and effectively used. Non-traditional crops should also be introduced, argues Dr Ravza Mavlyanova, AVRDC - the World Vegetable Center coordinator for Central Asia and the Caucasus. She says that new varieties of legumes like vegetable soybean, mung bean and yard-long bean, which increase soil fertility and are good for crop rotation, and the Jerusalem artichoke (or topinambour) are already being taken up by farmers in Uzbekistan. What is good, these varieties are early-maturing and well adapted to the country's soil and climatic conditions. They also do well on salt-affected soils and even help to reduce soil salinity and improve soil structure.

Participants agreed that increasing exports of tinned fruit and vegetable is also important. Dried fruit can also be easily packaged and transported to international markets. But experts point out that the food processing industry has to grow fast to cope with increasing demand. Local companies should also introduce advanced innovative processing technologies to catch up. More cold storage facilities would also help. According to Mr Mumin Isamiddinov, an expert with a USAID AgLinks Plus project, there is a need for additional cold storage capacity of 1 million tons in Uzbekistan to ensure consistent supplies of agricultural produce throughout the year. All this shows that there are opportunities for growth. More government incentives, however, could facilitate the process. Sustainable livelihoods of small farmers and households, after all, is all rural areas need.

## Central Asian, Caucasus researchers ponder vegetable research cooperation

In Central Asia and the Caucasus (CAC), vegetable production is still on the road to becoming fully market-oriented. Local researchers and farmers try to keep up with consumer needs and make sure high-quality vegetables are available all year round. But producing enough is one thing. It is, however, also important to ensure vegetable production is sustainable. Also, new varieties are needed that are more high-yielding, resistant to biotic and abiotic stresses and marketable.

Helping this happen is the mission of the Central Asia and the Caucasus Regional Network for Vegetable Systems Research and Development (CACVEG). CACVEG was established by AVRDC - The World Vegetable Center in 2006 to facilitate development of market-oriented vegetable production systems and promote enhanced vegetable research strategies. The network fosters research cooperation in the region through joint trials of improved varieties, adoption of lines, seed multiplication, adoption of tomato grafting technology, workshops, capacity building, and collection of baseline data on vegetables.

Every year CACVEG partners gather at an annual event to review progress of collaborative work and make plans for the future. Tashkent, Uzbekistan, hosted the Sixth Steering Committee Meeting on 26-28 November 2013. Some 35 participants, including national coordinators on vegetable research and development and specialists from eight CAC countries, convened. During the three-day discussions, participants assessed ongoing collaboration, discussed current problems and put forward suggestions for further research and development of sustainable vegetable production systems in CAC. Special attention was paid to capacity building. The meeting looked at measures to strengthen the

capacity of national agricultural research institutions in the development of strategies necessary for crop diversification, food security, and year-round production of vegetable crops.

National coordinators on vegetable research and development presented reports on collaborative activities with AVRDC - The World Vegetable Center and problems facing sustainable vegetable production. They also shared results of regional varietal trials for their respective countries. And 2013 seems to be quite productive. In 2013, 38 varieties of 14 crop species, including tomato, sweet and hot pepper, eggplant, cucumber, vegetable soybean, mungbean, snap bean, pisum pea, custard squash, marrow, lettuce, basil and celery were submitted for state variety trials in CAC countries. Moreover, four new varieties of three crops were released, including tomato varieties 'Zolotaya businka' (CLN 2071D) and 'Solnechnaya jemchujina' (CLN 2070C) in Kazakhstan, sweet pepper variety 'Sabo' (PP0437- 7031, Bell, LYO-Y) and eggplant variety 'Feruz' (S00691) in Uzbekistan. And researchers in Kazakhstan obtained



*Participants also visited a greenhouse at Tashkent State Agrarian University, Uzbekistan. Photo by Julia Kopilova.*

patents for two sweet pepper varieties 'Bayan Sulu' (0037-7645) and 'Kaz-Tai' (PBC-762sel), and hot pepper variety 'Piquant' (9950-5197). All of these new varieties have excellent morphological traits and marketability. These numbers add to the list of 35 varieties of eight vegetable crops, including tomato, sweet and hot pepper, eggplant, vegetable soybean, mungbean, yard-long bean and cabbage that have so far been released and registered with the State Variety Testing Commissions across the region. To demonstrate these achievements and share experience and knowledge, CACVEG partners also organized Farmers' Days throughout the year.

During the sessions, participants pointed out the issue of seed multiplication. More seed of promising and released vegetable varieties should be made available to farmers, they said. Moreover, successful technologies in one country should also be introduced in other countries. For example, Armenia followed Uzbekistan's suit and adopted tomato grafting technology in 2013. Other countries could also benefit from this technology.

At the end of the meeting, in recognition of CACVEG partners' efforts, AVRDC - The World Vegetable Center presented certificates of honor for contribution to agricultural research to: the Scientific Center of Vegetable, Melons and Industrial Crop, Armenia; the Azerbaijan Research Institute of Vegetable Growing, Azerbaijan; the Institute of Farming of Agricultural University of Georgia; the Research Institute of Potato and Vegetable Growing, Kazakhstan; the Kyrgyz Research Institute of Crop Husbandry, Kyrgyzstan; the Institute of Horticulture and Vegetable Growing, Tajikistan; the Research Institute of Crop Husbandry of Turkmenistan; the Uzbek Research Institute of Vegetable, Melon Crops and Potato, Uzbekistan; the Uzbek Research Institute of Plant Industry, Uzbekistan; Tashkent State Agrarian University, Uzbekistan; and Samarkand Agricultural Institute, Uzbekistan.

# CAPACITY BUILDING

## Researchers to survey farmers in Tajikistan under conservation agriculture project

Researchers in Tajikistan will survey farmers and rural households under a new three-year project supported by the International Fund for Agricultural Development (IFAD) and coordinated by the International Center for Agricultural Research in the Dry Areas (ICARDA), which started in the spring of 2013 and covers Algeria, Tunisia and Tajikistan.

Titled 'Integrated Crop-Livestock Conservation Agriculture for Sustainable Intensification of Cereal-based Systems in North Africa and Central Asia', the project seeks to improve soil fertility and agricultural productivity and thus the livelihoods of resource-poor farmers through conservation agriculture (CA) practices such as keeping the soil covered and planting through the mulch, and the development and application of integrated Crop-Livestock Conservation Agriculture (CLCA) systems.



*Conservation agriculture practices like zero tillage can help to tackle soil erosion and degradation in Tajikistan, and thus improve the rural populations' livelihoods. Photo by Aziz Nurbekov.*

Current CA experimental activities are mainly concentrated in the country's research institutes and try to introduce CA principles and practices into existing production systems.

The project will also address the critical need for active farmer participation in assessing the ecological and socio-economic constraints in which CLCA technologies can be adapted to and adopted by smallholder farmers.

The adoption of conservation agriculture raises a number of questions. In order to understand the specific constraints, an ex-ante analysis will be conducted in the project countries. This analysis will identify farming situations where CA practices are economically feasible and situations where CA practices are not feasible, and further identify what adjustments would be required to the farming

system to encourage adoption. Under this project, researchers will survey rural households and farmers in three regions of Tajikistan. As part of preparations for the survey, ICARDA organized a training workshop from 1 to 3 July 2013 on the premises of the Tajik Research Institute for Agricultural Economy (TRIAE) in Dushanbe, Tajikistan. Its purpose was to brief the project team on ways of conducting the survey of farmers and rural households and train the survey interviewers from TRIAE and other research institutes in the principles and practices of CA. Their adoption will be monitored through follow-up surveys, and constraints and determinants of adoption will be established. This survey will help to identify potential farmers, representing different farming conditions, who would be involved in identifying constraints and testing suggested management options for CA.

Dr Aziz Nurbekov, who led the workshop, told the participants about global trends in conservation agriculture, main principles and requirements for its promotion, its status in Central Asia, and CA adoption results in Azerbaijan, Kazakhstan and Uzbekistan. Dr Tanzila Ergasheva, TRIAE, explained the work plan and the survey questionnaire. The selected sites were reviewed with participants of the workshop. It is expected that approximately 150 farmers/households will be interviewed in each of the three sites, where 75 interviews will be conducted with farmers subsisting by only growing crops and the other 75 will focus on farmers involved in integrated crop-livestock farming. The survey will cover farms with land areas of between 10 and 20 ha.

Following discussions, the project team decided to start the survey after 25 July 2013 when winter wheat harvesting ends and farmers have more free time.



## Getting to the core of fruit trees conservation challenge in Central Asia

Central Asia is the home of many fruit and nut tree species. A rich diversity of apple, pear, peach, apricot, walnut, almond, mulberry and grapevine can be found in the wild here. But this richness is under threat today. The forest area in Central Asia has shrunk by approximately 75% since the 1960s. Deforestation, overgrazing and overharvesting of fruits and nuts are the main reasons. The region has seen a substantial reduction in biodiversity, including populations of valuable tree and other plant species.

There have been a number of collaborative efforts to address the problem in recent years. The conservation of genetic diversity is important as these wild species may provide clues to selecting and breeding varieties resistant to drought, cold, pests and diseases. To do that, more precise knowledge is still needed on how rich the diversity exactly is and what other threats there are. This is the purpose of the new project 'Conservation for diversified and sustainable use of fruit tree genetic resources in Central Asia'. It is a research initiative between the Centre de Recherche Public Gabriel Lippmann (CRPGL), Luxembourg, and Bioversity International, also involving national research partner institutions in Central Asia. The project, which started in 2012 and will run until 2016, aims to advance the conservation of genetic resources of three fruit and nut tree species in Kyrgyzstan, Tajikistan and Uzbekistan.



*Under the new project, researchers will carry out nutritional and DNA analyses of selected varieties of apple, apricot and walnut. A local walnut variety is shown in the picture. Photo by Evgeniy Butkov.*

Researchers will carry out nutritional and DNA analyses of selected varieties of apple, apricot and walnut. They will use a combination of technologies and approaches to understand patterns of phenotypic variability in nutrition and their associated genetic diversity, identify locations of valuable genetic resources and threats to them, and recommend approaches and guidelines for their conservation. A catalogue of varieties will be published and made available to farmers, researchers, and other potential users. Scientists will also study cultural and historical contexts that have influenced the distribution of diversity to design workable conservation approaches.

Capacity-building is also an important component of the project. Graduate students at local universities will be regularly trained in sampling and analytical techniques. A group of young researchers from Kyrgyzstan, Tajikistan and Uzbekistan attended recently a regional training workshop organized by Bioversity International in Tashkent, Uzbekistan. From 5 to 7 August 2013 the participants learnt in-depth about the objectives of the project, and how samples of fruit trees should be collected.

An important project outcome will be a review of the conservation status and threats to genetic resources of wild populations and related semi-domesticated varieties of the three fruit and nut tree species based on genetic analyses and spatial distribution and threat analyses combined with traditional knowledge gleaned from previous studies. What is more, cultural practices and perceptions will be documented on fruit tree diversity and domestication and the role of knowledge and actions by rural women and men managing and maintaining wild and semi-domesticated populations of the three tree species. Above all, it is hoped that rural people will be more interested in sustaining and enhancing wild populations and semi-domesticated varieties of the fruit trees.

## Women farmers in Uzbekistan learn vegetable grafting

Soil-borne diseases and other stress factors are a challenge for farmers in Uzbekistan. They reduce vegetable production and quality, and thus income. And researchers from AVRDC - The World Vegetable Center and their local counterparts work together to breed through selection new stress-resistant varieties. But they also teach vegetable growers simple and cost-effective ways of dealing with the problem. For example, grafting is one of the solutions they promote among farmers. Vegetable grafting is an easy way to improve plant tolerance to biotic and abiotic stresses. A three-year AVRDC-led study on tomato grafting at Tashkent State Agrarian University (TSAU) found that grafted tomato plants produce up to 30-90% more fruits of better quality and larger size. The study identified four highly promising varieties for greenhouse cultivation and confirmed that grafting is good for plants in many ways and increases their resistance to soil-borne diseases, including *Fusarium oxysporum*.



*Bakhtiyor Karimov, a research assistant, explains tomato grafting technology to women farmers. Photo by Julia Kopilova.*

As part of efforts to advance this technology in the country, AVRDC organized on 21 November 2013 a training course on tomato grafting for 40 leading women farmers from Jizzakh, Sirdarya and Tashkent regions at TSAU's Innovation Center, established jointly by ICARDA and AVRDC in 2012. Participants heard a presentation by Dr Ravza Mavlyanova, AVRDC coordinator for Central Asia and the Caucasus, on prospects for vegetable grafting in Uzbekistan. They also took part in practical sessions led by Bakhtiyor Karimov, a research assistant. At the end of the course, each participant was given a manual on how to cultivate new varieties, as well as some seeds of vegetable soya bean, green beans and sweet corn. They also received clear answers to their questions. Women farmers were enthused by the course and advantages of grafting as was clear from their suggestions to arrange more courses like this in future.

## MISCELLANEOUS

### Leading Uzbek scientist passes away at 62

A brilliant Uzbek scientist, Dr Zakir Khalikulov, deputy regional coordinator of ICARDA-CAC, died at his home in Tashkent, Uzbekistan, on Friday night, 21 February 2014, at the age of 62.

To many of his friends and colleagues he was a humble man and a bright mind. But perhaps what would describe his personality best are his humility, passion for knowledge and extraordinary skill of making friends with people. He was both a real diplomat and a devoted scientist. And it is probably these very qualities that propelled him into a lifelong career in science and international development cooperation.

He earned an MSc in Agronomy degree with a distinction from Tashkent State Agrarian University (previously Tashkent Agricultural Institute) in 1979. But a few years later he went on to study for a PhD in plant genetics when his academic journey had taken him to N. I. Vavilov Research Institute of Plant Industry in Saint Petersburg, Russia (formerly the All-Union Research Institute of Plant Industry named after N. I. Vavilov). For a man from a humble background, it was an impressive achievement in olden days to enroll at one of the most respected seats of learning in agriculture.

Following graduation, he set out on a lengthy career journey that would see him work in senior scientific roles in different institutions. Starting as an agronomist at the State Variety Testing Commission in Uzbekistan in 1979, he had risen through the ranks to head the laboratory of maize and cereal crops at the Uzbek Research Institute of Plant Industry by 1993.

He was a plant genetics man all his life. So he would not miss an opportunity to go on collecting expeditions or work himself in the field with wheat, maize, millet and sorghum. This helped him to gain extraordinary firsthand knowledge of the peculiarities of local soil and climatic conditions in Central Asia and the Caucasus (CAC). It would prove very important and useful later in his life. But it was his stint as a visiting scientist at the International Center for Agricultural Research in the Dry Areas (ICARDA) office in Aleppo, Syria, from 1989 to 1990 that would define his future career. Later on, he also benefited from having worked with the Ministry of Foreign Affairs of Uzbekistan as second secretary at the Uzbek consulate in Bangkok, Thailand, from 1996 to 1998 and then as first secretary of the Department for UN and International Organizations Affairs since 1998.

He was a man with an indomitable work ethic and determination to succeed. He had exemplary discipline and rightly expected the same of his junior colleagues. A teacher and mentor for a great many, he cared about what he did and worked tirelessly. It is arguably very much his dedication that contributed to a large extent to turning a small Tashkent-based office into the go-to research organization in Central Asia and the Caucasus. What started as a regional office of ICARDA in the mid-1990s has grown into a consortium of eight National Agricultural Research Systems (NARS), eight CGIAR centers and three advanced research institutions, and has come to be known as the Regional Program for Sustainable Agricultural Development in Central Asia and the Caucasus. All this, however, followed several years of regular interaction with senior officials and international research centers. He was convinced that the region needed very much cooperation with international agricultural research organizations. And he managed to convince local authorities of that too. These efforts resulted in the signing of an agreement between the government of Uzbekistan and ICARDA in 1998, thus making it the first international agricultural research center to open a regional office in Central Asia and the Caucasus. And other CGIAR centers followed suit shortly afterwards. They all came together under the umbrella of the CGIAR Regional Program. This work helped beyond measure to put Central Asia and the Caucasus on the map and thus drew the attention of the global agricultural research community.

Dr Khalikulov believed strongly in sharing knowledge and capacity building. He was very enthusiastic about bringing international scientists to CAC countries for training courses for young local researchers. He often lamented that young specialists lacked English-language skills and would raise the issue of capacity-building with donors and partners at every opportunity. As international funding decreased for these purposes, he started encouraging national partners to take up the slack. And many research institutions began investing their own funds for training and development.



As a plant genetics scientist, he was also concerned about saving unique biodiversity in the region. During his time at ICARDA's regional office, he was very much involved in helping to set up and develop gene-banks in all eight CAC countries.

But besides being a dedicated scientist, he was a devoted family man. He is survived by his wife, three children, a son and two daughters, and two grandchildren. Probably following in his father's footsteps, his son launched into a similar career. After some time working with the International Potato Center (CIP) in Tashkent, he is now studying for a PhD in agricultural economics at Michigan State University.

A close friend and colleague, Dr Ram Sharma, said of Dr Khalikulov: "He was a decent human being, a loving and caring family person, a trustworthy friend, and a dedicated professional, who helped and brought happiness to others who came in his contact." His passing is a big loss for his family, friends and colleagues. But it is equally so for the scientific community. His legacy will continue in all the work he did for the farmers in Central Asia and the Caucasus.

## Book on vines in Caucasus, Northern Black Sea wins coveted award

An international team of scientists has received a prestigious award for their book detailing grapevine varieties in the Caucasus and the Northern Black Sea.

Every year the Paris-based International Organisation of Vine and Wine (OIV), a 45-member intergovernmental organization, hands out OIV Awards for the best works published over the previous two years. The works need to be exceptional in that they provide an original and relevant contribution of international significance. At the awards ceremony at the OIV headquarters in December 2013, this year's top award in viticulture was carried off by Drs David Maghradze, Laura Rustioni, Jozef Turok, Attilio Scienza and Osvaldo Failla for their book mapping selected native grape varieties in the Caucasus and the Northern Black Sea region (Maghradze, D., Rustioni, L., Scienza, A., Turok, J. and Failla, O (eds). 2012. Caucasus and Northern Black Sea Region Ampelography. *Vitis*, Special Issue, JKI - Julius Kühn-Institut, ISBN: 9783930037889, 488 pp.).

The book came out of a project called 'Conservation and sustainable use of grapevine (*Vitis vinifera* L.) genetic resources in the Caucasus and Northern Black Sea region', implemented by Bioversity International in 2004-2008 in Armenia, Azerbaijan, Georgia, Moldova, Russia and Ukraine. The book offers in-depth information on some fifty varieties, including endangered ones, from each country. Every variety is described not only in terms of its morphological traits, but its historical background, agronomic features and qualitative traits, and its importance today and in the past.

It is the first voluminous ampelography publication on the Caucasian and Northern Black Sea region grapevine varieties in English. As one of the book's

authors, Dr Jozef Turok, noted: "Our goal was to promote the conservation and sustainable use of autochthonous grapevine genetic resources in the region. By publishing this book, we hope to encourage on-farm conservation of the germplasm varieties in the native countries." After all, this diversity is a source of useful genes for grapevine breeding efforts on quality improvement, diversification and resistance to biotic and abiotic stresses.

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### Ghrubela Kartlis G.

**Synonyms**  
Unknown.

**Meaning of the name**  
Ghrubela = Goubi, Kartlis = from Kartli (Kartli is the name of a province in Eastern Georgia).

**Historical notes and cultural importance**  
Ghrubela Kartlis is found only in Georgia and it is similar to ancient autochthonous varieties in some morphological traits. The variety is spread as single vines within the old vineyards of the Kartli region in Eastern Georgia.

**Taxonomy and intra-variety variability**  
*Vitis orientalis subsp. cuneata* Sieber.  
No phenotypic variations have been revealed so far.

**Essential ampelographic characteristics**  
The tip of the young shoot and the first two distal leaves are covered with dense white hairs.  
The mature leaf is medium size and large, oblong, seldom rounded, medium three-lobed. The upper leaf venes are distinct. The petiole veins are marked. The teeth are straight, triangular with rounded or pointed tops. The lower leaf blade is hairless. The petiole is shorter than the main vein.  
The flower is hermaphrodite.  
The bunch is medium size or large, conical, seldom cylindrical-conical, is ingod, medium dense, sometimes loose.  
The berry is medium size or large, ovate, grey-green to violet. The skin is thin, easy to peel off. The flesh is juicy and colorless.

**Phenology**  
Time of bud burst: first or second ten days of April  
Time of flowering: first ten days of June  
Time of venison: second half of August  
Time of ripening: end of September

**Vegetative and yielding characteristics**  
Age of onset growth: medium and high  
Buds fertility: 1-2  
Shoot fertility (cluster per shoot): 1-2  
Fruiting shoots: 70.0-74.0 %  
Bunch weight: 270-275 g  
Yield: high (9.5-12.0 t ha<sup>-1</sup>)

**Climate and cultivation requirements**  
Ghrubela Kartlis has good cold resistance.

**Resistance to diseases and unfavorable weather**  
The variety is very susceptible to *Erysiphe necator* and less susceptible to *Plasmopara viticola*.

**Juicy characteristics**  
Sugar: 17.0 %  
Total acidity: 5.0 g L<sup>-1</sup>

**Wine and grape characteristics**  
Ghrubela Kartlis is used to blend to make ordinary table wines.



An ampelographic description of a local Georgian grapevine variety from the book.

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