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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

Collaboration and sharing of knowledge are integral to the success of the consortium of national agricultural research organizations, seven CGIAR and two non-CGIAR international agricultural research centers working in Central Asia and the Caucasus since 1998. It helps to reach the shared goals of sustainable agricultural production, increased food security and ecosystem resilience in the region. And this work continues to bear fruit. Several developments across the region in the past six months deserve special mention.

For example, a new National Center for Seed Production of Grain Crops was established by presidential decree in Uzbekistan in September 2014 (p. 2). This marks an important milestone in wheat improvement efforts in the country. Not only will the center contribute to improving farmers' access to quality grain seed, but it will also serve as the main link between the national and international research organizations and local farmers. In cooperation with Turkmenistan's Grain Research Institute, a new high-yielding and stress-tolerant winter wheat variety was submitted to the State Variety Testing Commission (pp. 2-3). It is the upshot of four years of international research collaboration and multi-location trials in Central Asia. The new variety called 'Davlatli' boasts resistance to salinity, frost, heat and drought.

A multi-year USAID-funded regional program on integrated pest management (IPM) in Central Asia was successfully completed (pp. 3-4). It helped to promote and implement IPM in the region. For example, more than 1,500 farmers, including women, were trained in ecologically-based IPM practices. The program also established a Central Asia IPM Knowledge Network to ensure continued knowledge transfer and cooperation between national and US institutions, and international agricultural research centers.

An international conference held in Samarkand, Uzbekistan, gave renewed impetus to the wider research cooperation in arid and semi-arid areas (pp. 4-5). The 2nd International Conference on Arid Land Studies (ICAL 2) brought together more than 220 experts, senior scientists from international research organizations, policymakers and other stakeholders from 24 countries to share knowledge and experience in ensuring agricultural development and food security in arid and semi-arid areas; to discuss prevention of salinization and sustainable management of natural resources; and to present best practices and technologies on soil improvement and optimization of crop production systems. Another event highlighted the urgent need to improve vegetable seed production systems in Central Asia and the Caucasus (pp. 5-6). During the Seventh Steering Committee meeting of the Central Asia and the Caucasus Regional Network for Vegetable Systems Research and Development (CACVEG) in Uzbekistan, senior scientists from Central Asia and the Caucasus pointed out that lack of vegetable seed producers is hampering wide adoption of improved vegetable varieties. A regional conference on rural advisory services (RAS) in the Kyrgyz Republic looked at how to bring innovations to farms (pp. 7-8). Participants agreed that there is an urgent need for a continued and systematic way to reach out to farmers and make sure farmers know about and use innovations in the field, thus making agricultural production more resilient.

Capacity-building efforts also continued. Wheat growers and scientists in Tajikistan and Uzbekistan learnt more about quality seed production (pp. 9-10). There is also a growing focus on women farmers in capacity development. For example, 118 women farmers took part in a seminar and a farmer's day on food security and healthy diet in Fergana Region, Uzbekistan (pp. 10-11). And during separate training courses in Andijan and Fergana regions, Uzbekistan, more than 50 farmers, a quarter of them women, and specialists were briefed on theory and practice of potato cultivation and irrigation (p. 11). This work was conducted as part of the global research program on dryland systems, aimed at studying and providing options for reducing vulnerability and managing risk in the production systems characterized by land degradation, severe socio-economic conditions, health risks, and seeking most effective ways of improving the competitiveness of small production systems by sustainable intensification and by diversification.

All this work was possible thanks to collaboration and support from the national and international research and donor communities. As many challenges lie ahead, this support will make it easier to overcome them and help to ensure ultimately better livelihoods for rural populations and more resilient ecosystems in Central Asia and the Caucasus.

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RESEARCH HIGHLIGHTS

New center for grain seed production opens in Uzbekistan

A new National Center for Seed Production of Grain Crops has been established by presidential decree in Uzbekistan. According to the decree, the center will operate under the Ministry of Agriculture and Water Resources. Dr Zokhid Ziyadullaev, a scientist well known in the country and abroad, has been appointed as head of the center.



The new National Center for Seed Production of Grain Crops will facilitate adoption of promising wheat varieties like, for example, 'Bunyodkor' and will be an effective mechanism for mainstreaming research results. Photo by Ram Sharma.

This marks growing attention in the country to agricultural research and development and follows the international conference titled 'The Most Important Reserves of Implementing the Food Program in Uzbekistan', which was held in Tashkent, Uzbekistan, in June 2014. It is a logical continuation of efforts aimed at increasing grain production and a major step towards ensuring food security in the country. Some scientists believe this is an important development for a few reasons.

First, it will improve farmers' access to quality grain seed. Given that seed is the most important input, its quality and availability have a major impact on grain production. It is estimated that quality seeds of improved varieties can increase yields by as much as 20-25 per cent. In particular there is a need for increased production of seed of improved wheat varieties, which are tolerant of diseases like yellow rust or very high

and low temperatures. For example, Central Asia has seen six outbreaks of yellow rust since 1999, with the most recent one in 2014. As controlling the disease with fungicides is costly, growing yellow-rust-resistant varieties is more efficient. In recent years, several yellow-rust-resistant winter wheat varieties have been identified by research institutions in Uzbekistan in collaboration with the International Center for Agricultural Research in the Dry Areas (ICARDA), International Wheat and Maize Improvement Center (CIMMYT) and International Winter Wheat Improvement Program (IWWIP). They include varieties like 'Bunyodkor', 'Gozgon' and 'Yaksart', which also yield more than local wheat varieties, up to 10 tons/ha.

Second, the center will serve as the main link between national and international research institutions and local farmers. Together with their counterparts from international research organizations, national researchers have developed a number of high-quality wheat varieties. As one of the functions of the center is to facilitate adoption of promising varieties, it will be an effective mechanism for mainstreaming research results.

Dr Ram Sharma, of ICARDA, said: "This is yet another milestone in wheat improvement efforts in Uzbekistan. And we feel very optimistic about ICARDA's future cooperation with the center. It will surely contribute to resolving challenges in the agricultural sector, in particular those in seed supply systems."

Researchers identify new wheat in Turkmenistan

A new high-yielding and stress-tolerant winter wheat variety has been submitted to the State Variety Testing Commission in Turkmenistan. This is the upshot of four years of international research collaboration and multi-location trials in Central Asia. According to scientists, the new variety called 'Davlatli' boasts resistance to salinity, frost, heat and drought, which are the main abiotic stresses to winter wheat production in many parts of Central Asia. Turkmenistan's Grain Research Institute has been the key national research partner in the collaborative effort.

The research team is upbeat about the result for two reasons. One is that wheat is a staple crop in the region and its production is directly linked with food security. As the new variety carries genes from *Aegilops squarrosa*, it has a rare combination of tolerance to multiple abiotic stresses (salinity, frost, drought and heat). And this makes 'Davlatli' especially suitable for dryland conditions.

Second, it is a result of a joint research effort in Central Asia led by the International Center for Agricultural Research in the Dry Areas (ICARDA) and funded by the German Federal Ministry for Economic Cooperation and Development through the German Federal Enterprise for International Cooperation (BMZ/GIZ). The germplasm of

the new variety originally comes from the International Wheat and Maize Improvement Center (CIMMYT) in Mexico and selections were made at the International Winter Wheat Improvement Program (IWWIP) in Turkey up to the stage of an advanced breeding line. Further evaluations were made for yield, quality and agronomic traits in Karshi, Uzbekistan, in 2010 and field evaluations for salinity tolerance were carried out in Karshi and Urgench, Uzbekistan, Krasnovodopad in Kazakhstan and Dashoguz in Turkmenistan in 2011. The research team continued their experiments in 2012 and 2013 in Dashoguz, and initial seed multiplication was conducted in 2014. The new variety was also planted for seed multiplication in the 2014-2015 season in an area of 2 ha in Dashoguz.



The new variety called 'Davlatli' boasts resistance to salinity, frost, heat and drought, which are the main abiotic stresses to winter wheat production in many parts of Central Asia. Photo by Ram Sharma.

This development once again shows how important international collaboration and support is in dealing with wheat production constraints affecting food security in Central Asia. It also paves the way for more cooperation in the region. As Dr Ram Sharma, of ICARDA, said: "Cultivation of 'Davlatli' will help not only Turkmenistan to increase wheat production but also Central Asia as a whole. We hope that other countries can benefit from using 'Davlatli' in wheat research and breeding programs."

MEETINGS, SEMINARS AND CONFERENCES

Mainstreaming integrated pest management in Central Asia

When faced with the threat of pest infestation, farmers in Central Asia still count largely on the old method; they use chemicals. But as more and more producers in the region become increasingly mindful of the cost of inputs like pesticides, they start looking for better ways of controlling pests. And scientists try to help farmers to break free from inefficient agricultural practices of the past and increase their awareness of the toll heavy use of pesticides takes on human health and the environment. Limiting use of pesticides as much as possible would also help farmers save more. More importantly, this will contribute to making agriculture in the region more sustainable, a goal shared by national and international research and development organizations.

This idea was also behind a multi-year USAID-funded regional program on integrated pest management (IPM) in Central Asia. Its achievements and results were discussed at a final workshop in Dushanbe, Tajikistan, on 22-24 August 2014. The event brought together some 50 IPM and agricultural scientists from the Tajik Academy of Agricultural Sciences, the Kyrgyz Academy of Science, Michigan State University, University of California, Davis, International Center for Agricultural Research in the Dry Areas (ICARDA) and other organizations.



In the course of nine years, more than 1,500 farmers, as well as many young specialists, have been trained in ecologically-based IPM practices through field visits, workshops and other events, organized under the regional IPM program in Central Asia. For example, a group of young specialists visited a demonstration field in Hisor District, Tajikistan, in June 2011. Photo by Nurali Saidov.

IPM is an ecosystem-based approach to growing healthy crops and minimizing the use of pesticides. It is a set of different management strategies and practices rather than a single method and is considered a pillar of both sustainable intensification of crop production and pesticide risk reduction. The program was launched in 2005 to promote the development of a comprehensive IPM initiative in Central Asia. In addition to national partners, the program collaborators included Virginia Tech University, Michigan State University, University of California, Davis, Kansas State University and ICARDA.

The objectives of the program were twofold: to institutionalize IPM in the region and to develop specific IPM strategies and practices for key food crops. During

the first phase from 2005 to 2009, the program worked to set the scene for wider adoption of IPM in farming. It focused on three components. First, it aimed at enhancing the efficiency and product lines of biolaboratories in the three target countries: Kyrgyzstan, Tajikistan and Uzbekistan. Enhancing biological control of pests through landscape ecology/habitat management, and strengthening IPM outreach and education, were additional key areas of work. Through training, networking and institutional capacity-building, the program helped to increase the use of ecologically-based IPM practices in research, teaching and outreach/extension programs in Central Asia.

The second phase, which started in 2010 and finished recently, aimed to get IPM into the field. Scientists developed ecologically-based IPM strategies and practices for wheat, tomato and potato through collaborative research. In particular, several IPM practices were introduced to farmers and end-users through technology transfer and outreach programs in collaboration with local NGOs and government institutions. These practices included information on plant variety selection for disease and pest resistance, bio-pesticides, pheromone traps, sticky traps, crop rotation and planting dates, and flowering plants which attract beneficial insects for enhancing biological control.

As a result of the outreach and extension component of the program, more than 1,500 farmers were trained (30 per cent of them were women) in ecologically-based IPM practices. A total of 16 IPM specialists from five Central Asian countries completed a short course on Agroecology, Integrated Pest Management and Sustainable Agriculture at Michigan State University. More than 50 publications were developed and around 15,000 copies of extension materials such as leaflets, brochures, proceedings, scientific papers and books on various aspects of IPM in tomato, wheat and potato crops were distributed to various stakeholders in the region. What is more, the program established a Central Asia IPM Knowledge Network to ensure continued knowledge transfer and cooperation between national and US institutions, and international agricultural research centers.

Researchers hope that as more farmers adopt IPM practices, they will be able to keep pests off their fields, contribute to sustainable agricultural production and earn more. Since, unlike in the Soviet past, today it is farmers who bear the cost of production, economic and other benefits offered by IPM are likely to trigger more interest and adoption.

More information on the program can be found at http://www.ipm.msu.edu/international/central_asia_ipm.

International forum gives renewed impetus to agricultural research cooperation in arid and semi-arid areas

Climate change is widely believed to increase desertification globally. This process will have serious implications worldwide for social, economic stability, biodiversity and sustainable development. But drylands, in particular arid and semi-arid areas, home to some 2bn people, are considered to be most vulnerable. As they become degraded, the impact on people and environment can be devastating.

People living in arid and semi-arid areas are already struggling to make an adequate living. Poverty and malnutrition are endemic. And population growth is making things worse. The Central Asian region is facing similar challenges as large swathes of land are classified as arid and semi-arid. By some estimates, over 70 per cent of the lands in the region are arid and semi-arid. Salinity, waterlogging, decreasing productivity of rangelands and reduction of soil productivity are a major concern and primary causes of desertification in the region. And as water gets scarcer, risks are growing. Livelihoods of pastoral and other communities are at stake.

All this calls for prompt collaborative and integrated efforts by policymakers, scientists and international research and development organizations. New approaches and policies are urgently needed. Above all, there is an urgent need for an international platform for exchange of knowledge and experience. And this is what inspired the 2nd International Conference on Arid Land Studies¹ (ICAL 2) on 'Innovations for sustainability and food security in arid and semi-arid areas' in Samarkand, Uzbekistan, in early September 2014. ICAL 2 builds on the outcomes of the International Forum on Desert Technology X and the 1st International Conference on Arid Land Studies (ICAL 1), organized in Japan in May 2011.

More than 220 experts, senior scientists from international research organizations, policymakers and other stakeholders from 24 countries convened on 10-12 September to share knowledge and experience in ensuring agricultural development and food security in arid and semi-arid areas; to discuss prevention of salinization and sustainable management of natural resources; and to present best practices and technologies on soil improvement and optimization of crop production systems. And over half of the participants were young specialists and researchers. As part of the conference agenda, the Eurasian Soil Partnership² (EASP) held its first Plenary and Steering Committee meetings on 10-11 September at Samarkand State University.

¹ For more information on ICAL 2, please visit: <http://cac-program.org/events/ical>

² For more information on the Eurasian Soil Partnership, please visit: <http://www.fao.org/globalsoilpartnership/regionalpartnerships/europe/en/>

During several separate technical sessions, participants addressed a variety of topics, including dryland systems, achieving sustainable dryland agriculture, managing land degradation, enhancing water and land productivity, evaluating and employing bio-resources, policy and economic considerations in degradation of pastures, biomass production for biofuel, developing adaptive measures to global warming, invasive and native trees, and propagation of economically important desert plants. In particular they agreed that increasing water and land productivity in arid and semi-arid areas should be high on the research and development agenda globally. As Dr Shoaib Ismail, of the International Center for Biosaline Agriculture (ICBA), noted, productive and fertile soils are becoming scarce in arid and hyper-arid desert environments globally. And this calls for understanding better the ecosystem, looking at both mitigation and adaptation processes carefully both from environmental and economic perspectives. Dr Dilorom Fayzieva, a member of the Parliament of Uzbekistan, also pointed out that agricultural productivity in the drylands of Central Asia is low because of drought, floods, extreme temperatures, land degradation and other biophysical stress. In this light, participants noted, it is important to take integrated multi-disciplinary approaches to development and conservation of desert environments. However, continued capacity development should be an integral part of any approach or solution.



Scientists believe that salt-tolerant crops like quinoa can contribute to resolving food security issues in arid and semi-arid areas. Photo by Kristina Toderich.

Improving regional and international collaboration was another important issue discussed at the conference. Participants said that it is important to create more dialogue and knowledge-sharing opportunities and establish collaborative projects and approaches. This is necessary, for example, to upscale and mainstream best practices and technologies in the region. Furthermore, participants also proposed collaboration on increasing quantity and quality of data on the severity, extent and trends of salinization of irrigated lands and supporting countries in adopting proactive drought risk management.

The conference gave renewed impetus to efforts aimed at reclaiming and utilizing salinity-affected areas. Moreover, it served as a platform for bringing together donors like the Islamic Development Bank (IDB), the Asian Development Bank, USAID and international agricultural research organizations like ICBA, the International Center for Agricultural Research in the Dry Areas (ICARDA), the International Water Management Institute (IWMI) and others to discuss joint collaboration opportunities. In particular it paved the way for the launch of multi-country collaborative projects on salinity management with FAO and rural development with IDB. It is hoped that all this will help to improve, among other things, cooperation among researchers and between them and policymakers on ways to increase use of biological approaches to soil and water reclamation and sustainable use for improving livelihoods of people in the less favourable arid and semi-arid areas.

Scientists urge more attention to vegetable seed systems in Central Asia, Caucasus

The population in Central Asia and the Caucasus (CAC) is forecast to continue to grow. So is the demand for healthy and nutritious food. This is why countries are increasing both quantity and variety of staple crops, particularly vegetables. Around 40 indigenous and introduced, non-traditional species are currently cultivated in the region.

According to FAOSTAT, the CAC countries produced some 20m tons of vegetables in 2012. More land is also being earmarked for cultivating vegetables. The figure was around 800,000 ha in 2012. This is partly because growing vegetables is an important livelihood for many farmers and rural households. And in some countries agricultural produce is a major export earner. Uzbekistan, for example, exports food, specifically fruit and vegetable, products worth about 5bn dollars a year.

While national governments are paying more attention to the fruit and vegetable processing industry, there are still some difficulties to overcome on the way to increased production. Scientists believe it is important to resolve some issues first.



Seed producers like Izozkhon Matmusayeva, who is involved in producing mungbean seed in Fergana, Uzbekistan, do contribute to increasing vegetable production in the region. Photo by Ravza Mavlyanova.

First, farmers need vegetable varieties adapted to local conditions. National agricultural research institutions work closely with international research organizations on this. A number of strong research partnerships have been established to date. One of them is the Central Asia and the Caucasus Regional Network for Vegetable Systems Research and Development (CACVEG), set up by AVRDC - The World Vegetable Center in 2006. The network fosters research cooperation in the region through, among other things, joint trials of improved varieties, adoption of lines, seed multiplication, and meets every year to review progress. This collaboration has already produced some positive results. A total of 42 new varieties of eight vegetable crops, including tomato, sweet and hot pepper, eggplant, vegetable soybean, mungbean, yard-long bean and cabbage, were released and registered with State Variety Testing Commissions between 2007-2014.

Second, seed production systems need to be improved. While research is moving forward, seed multiplication is lagging behind. Adoption rates are slow as there are not enough vegetable seed producers. Scientists believe more efforts should now be focused on making seeds of improved varieties available to farmers. But most national vegetable seed supply systems are fragmented and limited. So local growers have to turn to imported alternatives. Imported seed is, however, often more expensive and not adapted to local conditions. Farmers using such seed face higher financial risks. During the Seventh CACVEG Steering Committee meeting, held in Tashkent, Uzbekistan, on 21-23 October 2014, Dr Fuad Mammadov, director of Azerbaijan's Research Institute of Vegetable Growing, pointed out a shortage of vegetable seed production farms in Azerbaijan. About six state enterprises are involved in producing vegetable seed in Azerbaijan, he added. While Azerbaijan needs around 450-700 tons of vegetable seed a year, some 20-30 per cent is produced locally. And this situation is similar in other countries too. Only 30 per cent of the vegetable seed is produced in Kazakhstan by five seed production farms (around 3 per cent) for sale and smallholder farmers (around 27 per cent) for personal use, according to Dr Temirzhan Aytbayev, director-general of the Kazakh Research Institute of Potato and Vegetable Growing. Dr Aytbayev added that, in some cases, imported seed is 10-12 times more expensive than locally produced seed. Similarly, in Armenia and Georgia, most of the demand is met by imports. In Armenia imported vegetable seed makes up around 95 per cent, although the demand is around 25-30 tons, according to Dr Gayane Martirosyan, of the Research Center of Vegetable, Melon and Industrial Crops.

Scientists give a few reasons for this. The first is lack of financing. Dr Nato Kakabadze, of Georgia's Department for Agriculture, argues that the sector needs more funding as seed production farms find it hard to make a profit. Second, seed producers often do not have necessary skills and knowledge. So training is important. For example, not many know about integrated pest management, an ecosystem-based approach to growing healthy crops and minimizing the use of pesticides. This could help them cut costs and save more. Third, more government incentives would give the sector a much-needed boost. Dr Aytbayev thinks making getting licenses easier for seed producers would be one way to help.

There are currently renewed efforts under way to restore national seed production systems. And international research organizations are helping too. For example, under the CGIAR research program Dryland Systems, launched in 2013, the International Center for Agricultural Research in the Dry Areas, CIP, AVRDC - The World Vegetable Center, Bioversity International and the International Center for Biosaline Agriculture are collaborating to establish a seed system platform in the region to supply farmers with high-quality seed and planting materials. The CACVEG network has also advocated plans to set up a national vegetable seed center in Uzbekistan. And more such centers would hopefully open in the region in the future. With sufficient funding however, this could happen sooner rather than later. All this would contribute to increasing high-quality vegetable production in the region. This is, however, more likely to happen if the whole chain works well. As scientists point out, there are many good varieties of vegetables. They only need to be mass-produced and delivered to farmers. For that, better seed systems are needed.

Bringing innovations to farms

Expectations of climate change keep agricultural researchers busy the world over. This is especially true for regions where impact is forecast to be high, including in Central Asia and the Caucasus (CAC). Additionally, food security and nutrition is becoming an international issue to address the needs of poor and vulnerable that requires collective actions at regional and national levels and an integrated approach towards enhancing well-being through improving agricultural productivity and improved resilient options. This is why, helped by international agricultural research organizations, scientists in CAC are coming up with and introducing innovations so that farmers can brace themselves. And judging by the number of new technologies and crop varieties developed in the region in recent years, it seems that research, and especially multi-disciplinary research, has a lot to offer to farmers.

However, all this matters if farmers know about and use innovations in the field. There are, of course, knowledge-sharing and capacity-building efforts within bigger agricultural development initiatives. But their reach and scope is often limited.

Making agricultural production more resilient requires a continued and systematic way to reach out to farmers. It is important to ensure farmers have their fingers on the pulse of agricultural research. In many countries, this is the remit of extension and advisory services or EAS for short, which play a significant role in agricultural development for food and nutrition security. EAS contribute to agricultural innovation by developing networks, organizing producers, facilitating access to credit, inputs and output services, convening innovation platforms, promoting gender equality, facilitating knowledge management, supporting adaptation to climate change and disseminating new knowledge through training and demonstrations to farmers. In CAC, however, linkages between research and farming are limited and fragmented, and EAS are still nascent.



Improving rural extension and advisory services in Central Asia and the Caucasus will help farmers to access improved technologies like, for example, this new technology of growing maize, which is used on a farm in Kazakhstan. Photo by Nataliya Shulepina.

Moreover, there is often no legislation governing rural advisory services. The problem gets some episodic attention from donors and international organizations. With this aid, some non-governmental centers and enterprises on EAS have been set up to date. But all this lacks a systematic approach in most countries of the region.

This problem undermines the ability of farmers to access and introduce innovative technologies and practices on their farms, and thus deprives them of innovation-based opportunities to improve their productivity, profitability and livelihoods. In view of this challenge, the Central Asia and the Caucasus Association of Agricultural Research Institutes (CACAARI) and Central Asia and the Caucasus Forum for Rural Advisory Services (CAC-FRAS), an informal regional platform of the Global Forum for Rural Advisory Services (GFRAS), have decided to join forces and undertake collaborative actions towards strengthening rural advisory services systems in the region. The goals are to develop common approaches and coordinate efforts to strengthen agricultural innovation systems. To this end, in collaboration with the Global Forum on Agricultural Research (GFAR), Modernizing Extension and Advisory Services (MEAS), the International Center for Agricultural Research in the Dry Areas (ICARDA), International Food Policy Research Institute (IFPRI) and other partners, CACAARI and CAC-FRAS convened a joint Regional Conference on Rural Advisory Services (RAS) in Bishkek, Kyrgyz Republic, from 17 to 21 November 2014. The conference brought together more than 100 agricultural scientists and practitioners, representatives of ministries, government and non-governmental organizations from the eight CAC countries. The purpose was to draw more attention to the development of a common approach to the planning of joint activities aimed at the development of RAS, current and expected problems caused by the impact of climate change on agro-ecosystems, the establishment and improvement of institutional mechanisms for the exchange of experience and knowledge. In particular participants shared and discussed the results of mapping RAS systems in different countries, as well as models of government policies and support for rural advisory services and their advantages and disadvantages. They also defined foresight mechanisms for agricultural development in the region.

Also, the conference held a side event, that is a CACAARI Steering Committee Meeting where important issues were discussed mainly a plan of work for the CACAARI activities in 2012-2014, presentation of the governance review insights, reviewing the memorandum of agreement and the Bishkek Declaration, member changes in the CACAARI Steering Committee and GCARD3 preparation.

These discussions prepared the ground for a comprehensive assessment of rural advisory services systems in the region. The conference laid the groundwork for inclusive multi-stakeholder policy dialogue. This dialogue will help to support the design of RAS policies and strategies that are conducive to food security and improved nutrition. The RAS policies and strategies will be built on in-depth country RAS assessments as conference follow-up actions. As part of the conference, the Bishkek Declaration³ was drawn up, which calls for a common approach to developing RAS systems in CAC countries. Participants also endorsed an initiative to conduct a systematic annual event equivalent of this conference, and outlined specific ways to strengthen further cooperation. It is hoped that this initiative will give a new lease of life to RAS systems in the region. After all, to make agricultural production sustainable, it is also necessary to make its key element, that is RAS systems, sustainable too. If farmers are kept up-to-date on innovations, they will know how to brace themselves for climate change-related challenges.

International research centers, national partners in Uzbekistan discuss cooperation

The CGIAR Regional Program for Central Asia and the Caucasus has a long history of successful collaboration with national research organizations in Uzbekistan, dating back to 1998. Strong bilateral relations have been built over the years by, among others, Consortium members led by the International Center for Agricultural Research in the Dry Areas (ICARDA), and including the International Water Management Institute (IWMI), AVRDC - The World Vegetable Center, the International Potato Center CIP, the International Center for Biosaline Agriculture (ICBA), Bioversity International, the International Wheat and Maize Improvement Center (CIMMYT), and more recently the International Food Policy Research Institute (IFPRI), and Central Asia and the Caucasus Association of Agricultural Research Institutions (CACAARI). And of late there have been a growing number of new joint initiatives, including the CRP Dryland Systems, which introduced a more integrated research approach among the Centers but also with national agricultural research organizations.

There is, however, still room for not only engaging various national partners more extensively in joint research but also fostering stronger partnerships in the entire agricultural innovation system. And regular dialogue helps to explore new opportunities for collaboration, share knowledge and update national partners on the latest collaborative research-for-development achievements. Meetings with national partners also help to receive straightforward feedback on what is going well and where more attention is needed. Researchers also get a chance to make sure they are on the same page with their local partners and align priorities if needed. This idea was behind a seminar held at Tashkent State Agrarian University on 17 December 2014. It brought together more than 75 people from the Ministry of Agriculture and Water Resources and various national research institutions to discuss and review the Consortium's joint research activities with national partners in Uzbekistan. During a series of presentations, scientists briefed participants on their work in the country and prospects for collaboration. In particular the presentations covered such topics as the Consortium's overall objectives in Central Asia and the Caucasus, results of the CACILM Phase II Knowledge Management Project, AVRDC's activities on vegetable research, CIP's work on improved potato varieties, conservation agriculture efforts, IWMI's work on increasing water use efficiency, Bioversity International's work on saving agro-biodiversity, development of improved varieties of winter wheat and food legume crops through ICARDA collaborations, development of innovation platforms under the CRP Dryland Systems in Central Asia, and CACAARI's vision for future collaboration in the region.



Salinity and land degradation remain a major concern in Uzbekistan. This problem is especially acute in the Aral Sea Basin. For example, the livelihoods of these households in the 40 let Karakalpakstana settlement are being seriously affected by salinity and land degradation. Photo by Kristina Toderich.

The presentations opened up lively Q&A sessions, which revolved around three main themes. First, salinity and land degradation remain a major concern. Some 800,000 ha of the irrigated croplands are estimated to be subject to serious soil erosion in Uzbekistan. As Dr Nasrullo Bobokulov, director of the Uzbek Research Institute of Karakul Sheep Breeding and Ecology of Deserts, said during the seminar, more effort should be put into tackling salinity and land degradation. He also suggested research should focus more extensively on arid and semi-arid areas as they make up a large percentage of the country's territory. It is also important to develop and cultivate plants tolerant of salinity. Prof Igor Belolipov, of Tashkent State Agrarian University, noted that it is necessary to

³ The Bishkek Declaration and other materials from the conference can be found at <http://www.cacaari.org/en.php?/activities/sections/events>

save, breed and cultivate fruit varieties, in particular apple, adapted to salt-affected areas. Mr Rashid Azimov, of Bioversity International, pointed out that considerable work had been carried out to this effect under the project 'In situ/on-farm conservation and use of agricultural biodiversity (horticultural crops and wild fruit species) in Central Asia'. For example, a salinity-resistant form of apple called 'Khazarasp' is now kept at a demonstration site in Khonka district of Khorezm Region. Mr Azimov added that propagation of different apple varieties is also done on a farm in Bostanliq district, Tashkent Region. In a similar vein, Dr Ram Sharma, of ICARDA, said that a new variety of winter wheat called 'Davlatli' had recently been submitted to the State Variety Testing Commission in Turkmenistan, which boasts resistance to salinity, frost, heat and drought. Dr Sharma suggested that the variety could also be grown in Uzbekistan, in particular in Bukhara and Syrdarya regions where salinity is high. He added that salinity is getting more attention also in view of climate change predictions, and new varieties are being developed with tolerance to this stress.

Second, national researchers believe that science should help business. For example, Prof Belolipov said there is interest among businesses in getting lycopene from tomato. But he lamented lack of a specialized lab for analyzing lycopene levels in tomato, which could help companies involved in exporting tomato. Following the presentation on conservation agriculture, Ms Farida Kuldasheva, a lecturer at TSAU, suggested that no-till technology could be turned into a successful business, too. She noted that no-till planters could be produced on a commercial basis for farmers in Uzbekistan.

Last, capacity development was prominent in the discussions. University staff and participants asked for more collaboration between university students and researchers and Centers' scientists. The issue of enhancing collaboration between the Program and the university in terms of student involvement was also raised.

Overall, the event was another step towards building more effective relationships between national and international research institutions. It also showed that there is unflagging enthusiasm among young scientists to work towards increased agricultural productivity, more diversified production and improved livelihoods in rural areas in Uzbekistan.

CAPACITY BUILDING

Helping wheat growers learn more about seeds

Wheat improvement programs in Central Asia have made notable advances in recent years. This is thanks to, in part, continued joint work between national and international research institutions. The International Center for Agricultural Research in the Dry Areas (ICARDA) and the International Maize and Wheat Improvement Center (CIMMYT) collaborate with national partners on wheat improvement. Several new varieties have been released in the region as a result. And a few are on the way. Most recently, researchers identified two winter wheat lines tolerant of medium-level soil salinity and frost in Turkmenistan and Uzbekistan.

While research is making progress, practice in the field still lags behind. Farmers usually lack either knowledge about improved varieties and technologies or do not have access to seeds of the improved varieties. But sometimes they have neither. This means that scientists need to engage more with farmers and train young agronomists who can really help farmers.

First, scientists are now doing more to promote their research findings among farmers and to keep them up to date with best practices. More and more farms are also becoming testing grounds for new technologies and varieties. These farms often serve as examples of the advantages of improved varieties at events like Farmers' Field Days. For instance, ICARDA organized a series of such events in May and early June 2014. Two, held in Chimbay district, Karakalpakstan, and Urgench, Khorezm Region of Uzbekistan, aimed to demonstrate the performance of winter wheat varieties tolerant of frost and salinity. These brought together around 100 participants, including men and women farmers, young researchers, seed producers, and policy makers from the local administrations. Another two were arranged in Fergana, Uzbekistan, and Sughd Region, Tajikistan, to show the performance of yellow rust resistant, high-yielding winter wheat varieties. Some 70 people, including many women farmers, attended both events.

Second, scientists also offer more training to young researchers and farmers. For example, training courses on quality wheat seed production were held in Fergana, Nukus and Urgench from 5 to 9 August 2014, with more than 200 people. It is estimated that quality seeds of improved varieties can increase yields by as much as 20-25 per cent. And wheat farmers in Uzbekistan are widely involved in producing quality wheat seed. So the objectives of the training courses were to make wheat seed-producing farmers aware of different considerations in production of high-quality wheat seed and to help them understand different agronomic practices to be followed in this process.

As it turned out, not all farmers know that growing wheat for grain and seed requires different agro-technologies. Many farmers acknowledged that they use the same technologies for grain and seed production. A different training course on scientific management of field experiments brought together 22 young researchers from 12 national institutions in Tashkent, Uzbekistan, on 3-6 September 2014. The objective was to introduce young researchers to principles and practices of designing, managing and collecting data on field crop experiments.



During a Farmers' Field Day in Sughd Region, Tajikistan, in June 2014, farmers were shown the performance of yellow rust resistant, high-yielding winter wheat varieties. Photo by Ram Sharma.

Lastly, researchers also meet to share their research findings with colleagues from other countries. For example, the 14th International Meeting of the Kazakhstan-Siberian Network on Wheat Improvement (KASIB) was held on 4-6 August, 2014, at the Siberian Research Institute of Crop Production and Breeding in Novosibirsk, Russia. The meeting was attended by some 40 Russian and Kazakh scientists from more than 20 different institutions. KASIB was established by CIMMYT in 2000, and currently unites 19 breeding programs of Kazakhstan, Western Siberia, Ural, Altai, and Volga regions, covering a territory of more than 20 million ha of spring wheat. The main goal of KASIB is to increase efficiency and speed up the process of wheat breeding through active exchange of the best breeding materials and their coordinated evaluation and testing. In particular, the meeting discussed ways of improving

wheat resistance to rust diseases and grain quality through effective collaboration. Drought tolerance, climate change and further KASIB network improvement aspects were also on the agenda.

These knowledge-sharing efforts are expected to contribute to getting the research results into the field. Researchers are willing to share. And as experience shows, farmers are keen to learn. Now they need to put what they already know into practice.

Women farmers in Uzbekistan learn more about dietary diversity

Food and nutrition security go hand in hand. Eating enough is one thing. But eating well is another. Quantity (or energy) should be complemented by quality (or dietary diversity). In Central Asia, where rural populations' culinary preferences revolve around a few staple crops, enhancing dietary diversity is getting more attention from policymakers and scientists alike. In fact this issue cuts across a number of agricultural research-for-development initiatives in the region. For example, the CGIAR Regional Program for Central Asia and the Caucasus works with national partners to develop improved varieties of indigenous crops and introduce non-traditional crops to increase productivity and diversity for improved and balanced diet of people.



During the seminar in Quva District of Fergana Region, Uzbekistan, women farmers also learnt about various types of dish that can be cooked using traditional and non-traditional crops. Photo by Ravza Mavlyanova.

The scientists regularly organize events like seminars and Farmer's Days to promote best practices and improved varieties of traditional and non-traditional crops among local farmers and rural communities. And because it is usually rural women who look after household diets, many efforts are now focused on informing them of how, among other things, they can make healthy choices. A growing number of women are being involved in various training and awareness events. Recently, for example, a total of 130 farmers, including 118 women and 12 men, attended a seminar and a Farmer's Day in Quva District of Fergana Region, Uzbekistan, on food security and healthy diet. The events were organized on 9 September 2014 by the International Center for Agricultural Research in the Dry Areas (ICARDA) and AVRDC - the World Vegetable

Center, two Program member centers, with support of local authorities and the district Water Users' Association. Scientists shared their knowledge on how to address issues relating to food security, cultivation of quality and resource-efficient crops, and ensuring healthy diets for women and children. Invited speakers included Dr Shoira Aripova and Dr Lyubov Kuchkarova, who briefed participants on why family nutrition is important and how healthy

and nutritious food can help to prevent diseases. In particular, participants learnt about the role of healthy food in family diet, potential for growing vegetables on farms and in home gardens, and new AVRDC varieties available for large-scale uptake. Participants also visited a demonstration site on a farm in Quva District to see how AVRDC's new mung bean, soybean and bean varieties are grown and what technologies are used to do that.

During discussions, women said they were keen to have further training and were ready to work more closely with ICARDA and AVRDC and cultivate new varieties of wheat, mung bean and vegetables on farms and in home gardens. Moreover, they also suggested arranging more workshops and training on healthy diet for local women. More importantly, they expressed willingness to spread knowledge in their communities. As experience shows, women farmers are often very active champions of best practices and improved varieties. This means that the more women know about improved varieties, the higher the chances are that rural families eat enough and, above all, well.

Potato growers in Uzbekistan learn water-saving methods

Potato cultivation is a source of livelihood for many smallholders in Uzbekistan. The crop comes third after wheat and rice in the country. The annual per capita consumption rate is estimated to be, on average, 45 kg. According to FAOSTAT (2011), potato was grown in an area of 73,100 ha in 2011. The Ministry of Agriculture and Water Resources of Uzbekistan reckons that the country should increase potato production to meet local demand fully. But worries over water availability bring into question the possibility of increased production. And this raises the priority of producing more with less input, including water. Researchers argue that if stress-tolerant varieties are cultivated and water-saving technologies used, smallholders can increase potato yields by 40 per cent. So indeed farmers are looking for and testing new methods of irrigation and new varieties of potato to improve productivity.

International research organizations work together with national partners and local authorities to help farmers deal with this issue. They collaborate with farmers to combine the latest research with practice by setting up demonstration plots on farms and organizing training events. For example, IWMI, an international water think-tank, and CIP, an international potato research organization, conduct training for local scientists and farmers under various projects. One of them is a 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'. This 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 funded by the German development cooperation instrument of BMZ/GIZ and was launched in 2012.



Demonstration plots in Fergana and Andijan regions, Uzbekistan, set up under the IWMI/CIP research project, are used to show farmers the advantages of water-saving methods like drip irrigation in cultivating potato. Photo by Davron Eshmuratov.

Under this project, IWMI and CIP researchers train local farmers and agronomists in best potato cultivation and irrigation practices. Based on the project results so far, they have also developed a list of guidelines for farmers. Local scientists show a strong interest in drought-tolerant potato varieties and water-saving technologies and farmers are willing to take up solutions to cultivate potato with reduced water supply, and use early potato varieties, which are tolerant of drought and high temperatures.

As a continuation of capacity-building efforts under the project, IWMI and CIP researchers conducted two training courses in Andijan and Fergana regions on 8-9 September 2014. More than 50 farmers and specialists attended the courses. What is more, 25 per cent of the participants in Andijan Region were women farmers. Participants were briefed on theory and practice of potato cultivation and irrigation. During visits to demonstration plots, they also learnt about methods of measuring soil moisture content using different techniques, potato irrigation, water measurement devices etc. Project team members also showed farmers the advantages of water-saving methods like drip irrigation, alternate furrow irrigation and high-frequency irrigation.

The project team hopes that its recommendations will help potato growers to contribute to sustainable use of water on farms and also improve their potato production.

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