CACnews

№ 55-56
January - June, 2013

Contents

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

The consortium of eleven International Agricultural Research Centers operating in Central Asia and the Caucasus from its main hub in Tashkent, Uzbekistan, continues its efforts towards better livelihoods in rural areas through developing crop varieties with enhanced features, introducing climate-smart technologies and building capacities for research in the region. Over the past six months of 2013, a few multiyear, high-impact projects have been completed and new ones started. And the collaborative efforts with national research partners have produced some positive results.

Two regional water management projects in the trans-boundary Fergana Valley have pioneered a framework for institutionalizing and scaling up cooperation mechanisms on small transboundary tributaries shared between Kyrgyzstan and Uzbekistan, and Kyrgyzstan and Tajikistan (pp.2-3). The concept of Innovation Cycle was also introduced, which makes knowledge produced at the Research Centers easily accessible to farmers. The projects provided farmers in six Water Users Associations with information and training resources, trained them in improved water accounting methods, constructed flow measurement structures, purchased equipment and set up demonstration plots for new technologies. As a result, transparency in water use increased, while conflicts over water went down significantly. This has helped farmers to improve water productivity at field level and consequently increase their profit margins.

A four-year initiative on value-added processing of cashmere, wool and mohair has increased employment opportunities and income options for poor rural populations, particularly vulnerable women in the mountainous areas of Tajikistan and Kyrgyzstan, and Iran (pp. 6-7). Launched in 2009, the initiative targeted specifically rural women artisans and small livestock breeders, and aimed to improve their livelihoods and income through improved production, processing and export of value-added fiber in these three countries.

Recently, an extensive collaborative study, published in Euphytica, resulted in the identification of some high-yielding winter wheat varieties resistant to yellow rust, a disease affecting wheat which is the key food crop in the region (p. 2). What is more, these new lines were put to the test and survived unscathed when Tajikistan and Uzbekistan saw a yellow rust outbreak in the spring of 2013 (p. 5).

The Centers' researchers also work with local scientists, policymakers, farmers and other small land users to ensure higher adoption rates for enhanced varieties and advanced technologies, and shape better policies. For instance, an initiative launched in Uzbekistan aims to increase the effectiveness and impact of wheat breeding research on food security through targeting new technologies better and developing more diverse wheat seed systems (pp. 7-8). A new project undertaken in the context of the Central Asian Countries Initiative for Land Management (CACILM) will streamline the use and creation of useful approaches and good practices on sustainable land management (SLM) in Central Asia (pp. 11-12). It is expected that through this project, knowledge on how to better adapt to climate change in agriculture and rural development will increase. A knowledge platform will be set up that provides up-to-date information on SLM, monitors and assesses the rate of SLM adoption in the region, and provides support for evidence-based policy formulation. And a three-year project on conservation agriculture was started in Tajikistan to help poor rural farmers to tackle soil erosion and degradation (pp. 8-9).

To aid cooperation between researchers and farmers in conservation of plant diversity, researchers and their national partners also developed a set of guidelines and tools, which serve as a framework for governing processes associated with transferring knowledge and information, and genetic resources among various parties (pp. 4-5). In keeping with knowledge-sharing goals, an online portal and central database on fruit crops and wild fruit species in Central Asia was also launched (pp. 5-6).

The Program also continues to forge partnerships between local researchers and their counterparts in other countries. Several scientific exchanges, visits and study tours took place in the region during the first half of the year 2013.

To promote best practices in crop, land and water management, training courses were organized for local scientists and farmers. For instance, farmers in Azerbaijan, Kazakhstan and Uzbekistan learnt how conservation agriculture practices could help them to increase agricultural productivity through improving soil fertility (p. 14). And smallholder farmers and agronomists in Uzbekistan found out about best practices in potato cultivation and irrigation (p. 17), and cost-effective seed potato production (p. 18).

It is important to note that these results could not have been possible without collaboration and support from the national and international research and donor communities. And the Program is committed to forging these partnerships and strengthening them further with the common aim of contributing to a more sustainable future in rural areas for people in Central Asia and the Caucasus and beyond.

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RESEARCH HIGHLIGHTS

Yellow rust-resistant wheat to boost food security in Central Asia

Yellow rust, a disease affecting wheat, remains a serious problem in Central and West Asia. Finding wheat that is both resistant to the pathogen and can bring in good harvests is a daunting task. It has been a focus of winter wheat improvement programs in Central and West Asia for the past several years. Studies show that yellow rust has been the most severe constraint to winter wheat production in the region over the last 12 years. Central Asia alone has seen five disease outbreaks since 1999. In a study on global incidence of wheat rusts over the past 40 years, Morgounov et al. (2012) report epidemic levels of yellow rust between 2001 and 2010 in Central and West Asia, leading to substantial losses throughout the region. Adding to the problem is the cost of fungicides widely used to control the disease. Previous research had attempted to solve the problem but couldn't successfully combine resistance with the required level of productivity in new varieties. Recent research, however, appears to have puzzled this out. In a paper in *Euphytica* (Sharma et al., 2012 [for full reference, see Publications By The Program Staff And Research Partners]), a group of scientists of the International Center for Agricultural Research in the Dry Areas (ICARDA), the International Maize and Wheat Improvement Center (CIMMYT), the International Winter Wheat Improvement Program (IWWIP) and national wheat research programs in Central and West Asia published the results of an extensive study that identified a number of wheat lines that are up to par. Not only do they do better against yellow rust, but also have yields higher than those of locally bred wheat. These wheat lines can yield up to 10 tons ha-1. Seed multiplication of a few such lines is currently under way on 126 ha in Uzbekistan and Tajikistan. There are plans to allocate 2,500 ha for seeds in 2014, and reach the 50,000-hectare mark in 2015. The new lines will help to remove the need for costly fungicides and increase profit margins. The study is proof of how important international cooperation is for agricultural research. In the final analysis, the research results are sure to contribute to food security and improved living standards in rural areas in the region.

New wheat lines can yield up to 10 tons per hectare. Photo by Sherzod Qosimov.

Swiss-funded regional water project meets with success

Water resources management is a key issue in Central Asia, particularly in view of its dependence on agriculture. Water distribution is often on the table at meetings between national government bodies. There are, however, different views on why there is often not enough of this vital resource. While some blame lack of precipitation on the changing climate, others see different reasons behind water shortages. But many scientists agree that inefficient irrigation practices are a significant factor. Using as little water as possible without a negative impact on agricultural production is now probably more important than ever before. The resolution of these challenges calls for more regional engagement and action as some 30 small transboundary tributaries (STT) flow through the Fergana Valley. The area is shared between Kyrgyzstan, Tajikistan and Uzbekistan and has a considerable transboundary water management infrastructure. But water use efficiency still leaves much to be desired.

A number of international aid agencies have been working in the region to respond to this problem. The International Water Management Institute (IWMI) and the Scientific Information Center of Inter-State Commission for Water Coordination (SIC-ICWC) have implemented the Integrated Water Resources Management project in the Fergana Valley (IWRM-Fergana Valley) and the Water Productivity Improvement at Plot Level project (WPI-PL) since 2001. The projects, funded by the Swiss Agency for Development and Cooperation (SDC), have pioneered a framework for institutionalizing and scaling up bottom-up cooperation mechanisms on small transboundary tributaries shared between Kyrgyzstan and Uzbekistan, and Kyrgyzstan and Tajikistan. Both projects have successfully been completed recently. To that end, the SDC office organized a final workshop in Tashkent on 18 February 2013. Researchers from IWMI, SIC-ICWC and other partner organizations from the Fergana Valley (Kyrgyzstan, Tajikistan and Uzbekistan) came together to review the results of the projects and share their thoughts.

One achievement was, the participants agreed, the introduction of an Innovation Cycle. It is a system of making knowledge produced at research centers available to farmers. This will help farmers to increase water productivity and consequently increase their profit margins. Dr Mohan Reddy Junna, head of the IWMI office, pointed out that the Innovation Cycle had actually improved water productivity at field level. Thanks to the system, advanced and up-to-date knowledge can reach farmers faster and they in turn can act on it. He added that to spread knowledge, a set of information and training resources, as well as a repository of research papers and reports had been developed in Russian for wider accessibility. About 1,000 farmers were trained in improved water accounting methods. But he stressed that it was important to maintain the momentum of this process. The WPI-PL project also helped farmers to apply this knowledge. As Dr Reddy Junna said, more than 10 agronomic and water management technologies were set up on demonstration farms. Six Water Users Associations (four WUAs in Uzbekistan, one in Tajikistan, and one in Kyrgyzstan) were fully equipped with new equipment. As a result, transparency

in water use increased, while conflicts over water went down significantly. Above all, farmers now pay less for water after flow meters had been built for Water Users Associations. Importantly, this also raised interest among farmers, and they now construct flow measurement structures using personal funds. An increase in water productivity did not come at the expense of production. On the contrary, crop yields at demonstration sites were higher than those in adjacent areas in the Fergana Valley. As studies show, crop yields and profitability on demonstration and adjacent farms went up.

Water discharge measurement: demonstration and dissemination of technologies for more efficient use of irrigation water, WPI-PL project in Fergana Valley. Photo by IWMI.

But reforming irrigation practices is one thing. What is also needed are institutional reforms. Discussing the IWRM-Fergana Valley project results, Murat Yakubov, national researcher with IWMI, focused on the impact of such reforms implemented under the project on the communities as a whole. He noted that the results of studies into the reforms reflected mainly farmers' needs but not the needs of small-scale users (kitchen gardens).

Dr Jusipbek Kazbekov, regional researcher with IWMI, highlighted in his presentation on cooperation in small transboundary tributaries that a bilateral platform incorporating agricultural water users and different government organizations has been established. He said that this platform serves as a feedback loop between farmers and policymakers and decision-makers. Farmers' suggestions and needs can now be communicated better to relevant authorities.

The research team also came up with a series of recommendations. They suggested creating an enabling legal, policy, institutional and economic environment. In particular the WPI project suggested looking into how sustainable the Innovation Cycle is, exploring ways of information dissemination and irrigation advisory service for farmers through web-based SMS technology and providing partial subsidies to farmers to maintain the current momentum of water flow management. The IWRM project suggested establishing a user-centered institutional platform at WUA level to further integrate village communities and proposed a nationwide assessment of international aid agencies' approaches within the water sector for streamlining interventions and providing clear policy recommendations. Regarding STTs, the next logical step would be linking the established stakeholder platforms with a higher-level legal framework to formalize small transboundary tributaries cooperation in the region. The good thing is that this system can be replicated in other places.

The positive results of the two projects were widely acknowledged. Building on the projects' success, the Swiss development agency announced at the workshop that there will be the next phase of the projects, which will be put out to tender. However, unlike the previous phases, the primary focus will be on national components rather than regional ones.

Uzbekistan on course for more seed potato production

Potato is one of the staple foods in Uzbekistan. According to the national research organization sources, around 111,000 ha of agricultural land is currently used for potato cultivation (up from 65,000 in 2010), and it is expected to increase. But many farmers rely on seed potato imports as 95% of the cultivated varieties are of western origin. This has a negative effect on production costs. A calculation is simply made: to grow one hectare of potato 3.5 tons of seeds are needed, which, at the current price of $US 2,000 a ton reaches a total cost of $US 7,000 including transport at planting time. To at least partially meet the growing demand, an effective seed potato production system would need to be developed. Uzbekistan's annual need for quality seed potatoes is at least 110,000 tons according to some estimates.

Efforts are under way to deal with this challenge. National research organizations and the International Potato Center (CIP) have been working together to this end since 2005. In cooperation with the National University of Uzbekistan, CIP has been carrying out extensive research on seed potato production. A biotechnology laboratory, set up with CIP's support, is successfully operating to propagate disease-free in-vitro potato plants for experiments. It is also home to a collection of advanced CIP potato clones. The laboratory can produce up to 100,000 in-vitro plantlets a year. Furthermore, three aphid-proof screenhouses for in-vitro plant adaptation and minituber production of CIP-bred potato clones have been built on the premises of the National University of Uzbekistan. They provide the necessary help in conducting experiments. Knowledge gained in the laboratory and screenhouses is further applied in the field. A cultivation system for potato seed production was successfully tested at an altitude of 2,600 m in Tashkent Region using potato minitubers produced in the screenhouses. The outcome of this work was that three advanced CIP-bred clones out of 80 were selected and released in Uzbekistan in 2010 and 2011. Most importantly, they are better adapted to long days and abiotic and biotic stresses. They also have more dry matter and are more marketable than other material.

These positive results have received government attention and support. Last year, the Academy of Sciences of Uzbekistan also joined the collaborative efforts on seed potato production by the National University of Uzbekistan and CIP. The government of Uzbekistan has already allocated considerable funds for this work. There are plans to expand the laboratory and increase its capacity to 1.5 million disease-free in-vitro plants and potato microtubers a year. Also, an area of 1.5 ha will be allocated for the construction of a complex of screenhouses for minituber production, storage of seed potatoes, and other research activities. Some 200 hectares

in the highlands at an altitude of over 1,800 m will be allocated for use in experiments and high-quality seed production. As part of joint cooperation, in 2013 there are plans to grow 270,000 plants from 46 in-vitro clones and several thousand genotypes issued from true seeds. All of these will be planted in Jizzakh Region at an altitude of 2,600 m to develop new promising clones. CIP also plans to give its national partners technology for detecting seed and soil-borne diseases and PSTV (potato spindle tuber viroid) to study their incidence in different regions. This research will help to identify the most suitable strategy for seed potato production. CIP is also sharing its experience with the development of dynamic seed potato production enterprises, which are considered to be a very effective channel leading to expected results. There are examples from many countries demonstrating that the dynamic private seed sector can take care of the management of the operations at any stage and be profitable. The recommendations formulated by CIP include the need to adopt proper seed legislation and a certification system consistent with international standards before starting seed potato production activities on a large scale. The endemic presence of a serious disease like PSTV, which is currently not considered in the local list of quarantine diseases, will make the production of good quality seeds risky.

CIP-bred potato clone, registered in Uzbekistan as Sarnav, in field trials. Photo by Durbek Khalikov.

The continued collaborative work with the national research organizations and other stakeholders, in particular with the emerging and dynamic private sector, will contribute to meeting the growing demand for seed potatoes in Uzbekistan. What is most important, farmers will have more access to considerably cheaper seed potatoes, which are well adapted to the local climatic conditions and of high quality.

Guidelines aid cooperation between researchers, farmers in conservation of plant diversity

Fostering cooperation between researchers and policymakers on one side and farmers on the other is important for conservation efforts in Central Asia, as in any other region. This is particularly important in view of the Convention on Biological Diversity, its Nagoya Protocol on Access and Benefit Sharing and the International Treaty on Plant Genetic Resources for Food and Agriculture, which are aimed at supporting conservation and sustainable use of plant diversity, and ensuring mutually beneficial cooperation among parties involved in conservation work globally. While researchers come up with recommendations and policymakers shape strategies, it is farmers who are the key party to any conservation activity. Yet there has been lack of clear procedures on how to best ensure that the benefits arising from such cooperation are properly shared with farmers who conserve genetic resources of plants in situ, as well as among all other parties involved. Easy access to germplasm, knowledge and information can be crucial for conservation of biodiversity in agriculture.

Acknowledging farmers' contributions to research is important for biodiversity conservation efforts. Photo by L. Nikolyai.

Having faced this problem during the project "In situ/ on-farm conservation and use of agricultural biodiversity (horticultural crops and wild fruit species) in Central Asia", a group of researchers from Bioversity International and their national partners developed a set of guidelines and tools to this effect. The project, implemented by the UNEP-GEF and coordinated by Bioversity International, has as one of its main objectives the conservation of the rich diversity of horticultural crops and wild fruit species found in the Central Asian countries, the valuable genetic stocks important to plant breeders, researchers, and local populations who depend on them for their livelihoods.

The team and their national partners identified different benefits and products as a result of the project, possible beneficiaries and the conditions of free and restricted access under which these benefits and products should be shared among project partners and with third parties.

The guidelines and tools, such as model germplasm and planting material transfer, benefit and information sharing agreements serve as a framework for governing processes associated with transferring knowledge and information, and genetic resources among various parties.

They will help to make sure that holders of genetic resources benefit from sharing their knowledge and resources. These model agreements will also help to regulate cooperation between the providers of knowledge and genetic resources and their recipients.

For instance, farmers' contribution will be acknowledged in research output if these tools are used. They can also receive material or non-material benefits for providing genetic resources and knowledge.

What is good, these guidelines and tools can be used by scientists and policymakers alike, and can be adapted to specific needs. They are available online in English at: http://centralasia.bioversity.asia/fileadmin/www.centralasia.net/Resources/TRG/6615-0054.pdf;

and in Russian at: http://centralasia.bioversity.asia/fileadmin/www.centralasia.net/Resources/TRG/6615-0055.pdf.

The availability of such framework is sure to improve cooperation and engagement between researchers, policymakers and farmers.

New winter wheat varieties unscathed by yellow rust outbreak in Central Asia

Yellow rust, a disease affecting wheat, remains a serious problem in Central and West Asia. Studies show that yellow rust has been the most severe constraint to winter wheat production in the region over the last 12 years. Central Asia alone has seen five disease outbreaks since 1999.

The most recent epidemics occurred in 2009 and 2010. And parts of Central Asia, specifically Tajikistan and Uzbekistan, saw another outbreak of yellow rust in the spring of 2013. This continuous scourge of yellow rust has serious implications for food security in the region. So finding wheat that is both resistant to the pathogen and can bring in good harvests has been the focus of winter wheat improvement programs in Central and West Asia. Researchers agree that cultivation of resistant varieties is the most cost-effective and sustainable method to control yellow rust.

New winter wheat variety 'Chumon' in Tajikistan shows no sign of infection in the wake of a yellow rust outbreak in 2013. Photo by Ram Sharma.

Timely monitoring in the fields and use of fungicides helped to contain the disease in Uzbekistan this year. But the same did not happen in Tajikistan. While use of fungicides increased the cost of crop management, its absence resulted in reductions of potential grain yields.

Many leading commercial cultivars such as 'Krasnodar-99' and 'Tanya' have been seriously attacked by yellow rust. But several newly released and candidate varieties have shown high levels of resistance to the fungus. For instance, varieties like 'Buniyodkor', 'Gozgon' and 'Yaksart' in Uzbekistan and 'Chumon' and 'Ormon' in Tajikistan fared well against the disease. Most of them had been selected from international winter wheat nurseries. This underscores the importance and effectiveness of collaboration among national wheat programs in Central Asia and the international centers like the International Center for Agricultural Research in the Dry Areas (ICARDA) and the International Maize and Wheat Improvement Center (CIMMYT), as well as the International Winter Wheat Improvement Program, which is a joint initiative of the Ministry of Agriculture of Turkey, CIMMYT and ICARDA.

While identifying yellow-rust-resistant winter wheat varieties is the first step in the successful combat against the disease, their cultivation by wheat farmers remains the ultimate goal. Together with national wheat improvement programs in Uzbekistan and Tajikistan, ICARDA and CIMMYT have joined forces to accelerate seed multiplication of a number of yellow-rust-resistant varieties through a pilot project funded by CRP WHEAT, a research program of the Consultative Group on International Agricultural Research. Under this initiative, seed multiplication is now in progress of yellow-rust-resistant wheat varieties such as 'Gozgon', 'Yaksart', 'Buniyodkor' and 'Hazrati Bashir' in Uzbekistan, and 'Ormon', 'Alex' and 'Chumon' in Tajikistan.

Database on fruit species in Central Asia goes online

A portal and a central database on fruit crops and wild fruit species in Central Asia are now available on the Internet.

The database contains 2,943 records of morphological data on crops, 1,571 crop descriptors and 258 socioeconomic descriptors, as well as 10,769 records of socioeconomic data. Researchers can sift through some 500,000 items of data on the database.

The portal and database were presented at an international workshop at the headquarters of Bioversity International in Maccarese, Italy, on 12 June 2013. This is one of the results of the collaborative project by Bioversity International and UNEP-GEF 'In situ/on farm conservation and use of agro-biodiversity (horticultural crops and wild fruit species) in Central Asia'.

According to Muhabbat Turdieva, of Bioversity International, the project started in 2006 to respond to threats to the diversity of important horticultural crops in situ (in natural habitat; eg logging and excessive use of forest resources, overgrazing, conversion of forest land to agricultural use etc) and on farm (eg the replacement of local varieties by foreign high-yielding varieties, mechanization, intensification of production, lack of access to planting materials of local varieties etc). Overall, the project aimed to ensure conservation and sustainable use of existing biodiversity of 12 target fruit crops in Central Asia. Its outcomes will also contribute towards increasing the production of farms and farmers' income through the use of local diversity of various fruit crops.

The workshop brought together project representatives and participants from Kazakhstan, Kyrgyzstan, Turkmenistan and Uzbekistan, as well as scientists from Bioversity International, the Food and Agriculture Organization of the United Nations (FAO) and the Archeologia Arborea Foundation, to launch the portal and database. As participants noted, they will make available data on genetic resources of local fruit trees diversity collected under the project to everyone, and most importantly to researchers. According to Simone Mori, a consultant who helped to develop the system, it is easy to access the database, which is available at http://centralasia.bioversity.asia/. Users can get open data by signing up on the website and creating an account. But some limited access data can be obtained by filling in a special application form on the website. The database contains data on crops, morphological traits of varieties, the institutes involved in data collection during the project, socioeconomic data of the households, data on the management of fruit trees etc. There is also information about 258 households where these varieties are grown.

Efforts are under way in Central Asia to conserve fruit crops like this local pomegranate variety Kay Achchik in Uzbekistan. Photo by Mikhail Djavakyantc.

Dr Stephan Weise, Deputy Director General on Research at Bioversity International, noted that the project has great importance for the future of rural communities in both Central Asia and beyond.

It will help to spread the knowledge Central Asian farmers have, facilitate researchers' firsthand access to data on genetic resources which is systematically organized and encourage cooperation among farmers and researchers worldwide.

Better livelihoods, more opportunities for rural women in Central Asia

A four-year project supported by the International Fund for Agricultural Development (IFAD) has increased employment opportunities and income options for poor rural populations, particularly vulnerable women, in Tajikistan, Kyrgyzstan and Iran. Launched in 2009, the initiative targeted specifically rural women artisans and small livestock breeders, and aimed to improve their livelihoods and income through improved production, processing and export of value-added fiber in these three countries.

The mountainous Central Asian country of Tajikistan has the lowest per capita GDP among the 15 former Soviet republics. Lack of employment opportunities at home forces more than one million Tajik citizens to work abroad, almost all of them in Russia, and support their families through remittances. Kyrgyzstan, Tajikistan's neighbor to the north-east, is also a less endowed, mountainous former Soviet country with a dominant agricultural sector. Its economy also depends on remittances from migrant workers.

But these two countries share more than just a border and economies in bad shape. With more than two thirds of the total populations living in rural areas (IFAD and World Bank, 2010), rural poverty is a pressing issue in these two countries. Agriculture plays an important role in Tajikistan's economy. But less than 7% of the country's land area is arable. In Tajikistan about 50% of the population depends on agriculture for a livelihood. Most farmers lack access to adequate resources, technology and markets. Poverty mainly affects rural people who are landless, earn a living on small household plots, as well as subsistence farmers and those who are unemployed or self-employed. However, most of the farmers are poor because their productivity is low. They cannot make an adequate income from their agricultural activities as the land is degraded, irrigation facilities are lacking, and access to improved technologies, inputs and markets is poor. It is a similar picture across the border in Kyrgyzstan. More than half of its population works in agriculture, which is still the backbone of the economy. About two thirds of Kyrgyzstan's population live in rural areas, and most rural households depend on livestock breeding for a livelihood, except for those in a few major valleys. The rural population includes three quarters of the country's poor, who live mainly in remote and mountainous areas and are subsistence farmers and livestock breeders (IFAD and World Bank, 2010).

While large numbers of male workers from rural areas of Tajikistan and Kyrgyzstan migrate to seek employment in Russia and other countries of the former Soviet Union, back home, it is women who run the household and maintain their families. According to figures from IFAD and the World Bank (2009), women make up 44.1% of the total labor force in Tajikistan and 42.2% in Kyrgyzstan.

Many rural women are engaged in processing wool and mohair and making handicrafts from them. These are then sold at local markets and sometimes abroad. This creates employment opportunities for others too. For instance, in northern Tajikistan, thousands of households are engaged in production of mohair and tens of thousands of women are engaged in processing, and hundreds of people are engaged in sales of raw material and semi-finished products. Thus, there are opportunities for livestock breeders, women artisans and handicraft sellers. But women's contributions to the total household income are usually meager in monetary terms. This is so because the price and quality of traditional yarn and products are very low. Yarn sells at USD 10-15 per kg on local markets in northern Tajikistan. Products that women make also have low margins. And women lack access to technology and foreign markets. International researchers and experts believe that improving the quality of wool and mohair and

adding value to finished products can boost rural women's earnings. If livestock breeders supply quality wool and mohair, and women produce more marketable handicrafts, exports will increase. So will profits. Tens of thousands of rural dwellers could lift themselves out of poverty. But they face constraints ranging from insufficient skills to lack of access to marketing channels.

In 2009, IFAD launched a four-year project aiming to help rural populations in Tajikistan, Kyrgyzstan, and Iran. It is nearing completion in September 2013. The project, implemented by ICARDA, targeted specifically rural women artisans and small livestock breeders, and aimed to improve their livelihoods and income through improved production, processing and export of value-added fiber in these three countries (for more information on the project, please visit http://www.cac-program.org/fiber/). A functional chain is now in place that is focused on value-added fiber goat breeding and fiber harvesting, processing and marketing. Besides women artisans and livestock breeders, local researchers also participated in and benefited from this work. They were trained in modern breeding technologies to ensure sustainable breeding populations and improve their interaction with livestock farmers. Farmers in Kyrgyzstan and Tajikistan were encouraged to work with artisan women to see what kind of quality of raw materials they want. Through cross-breeding with new genetic material introduced from Russia and even the USA, farmers supported by researchers managed to improve the quality of their animal populations, which will produce fiber that increases the profits from selling mohair and cashmere. Better quality raw materials also add value to hand-knit products by women. An improved system of mohair processing allows women to produce high quality yarn for export. Artisan groups now see the benefits of value-added production and are keen to produce handicrafts for export. In fact, a first batch of mohair yarn and products is ready to be shipped to the USA. A business hub led by Farhod Kosimov is helping the locals with marketing, communication, international shipping and logistics. As others see the benefits, more will join in. Women are now making fatter profits from selling fiber. They used to sell 1 kg of sheared fiber for USD 2-3. Now they make USD 21 from 1 kg of combed cashgora fiber in the Badakhshan area. But making luxury products good enough for western markets proves challenging for rural women in Tajikistan. That does not seem to be a problem in Kyrgyzstan, where quality new products by artisan women are in demand on local, regional and international markets. In fact, the new version of chair mats designed by locals received an award of excellence from UNESCO. This motivates women artisans to succeed in developing sustainable businesses. They invest their own resources to buy raw materials and to take part in fairs and training. They are also increasing the volume and assortment of products, and their sales in 2012 doubled compared to the figure in 2011.

Many rural women in Tajikistan are engaged in processing wool and mohair, and making handicrafts from them. These handicrafts are then sold at local markets and sometimes abroad. Photo by Liba Brent.

But not everything is smooth. There are a few constraints too. Quality raw materials are hard to come by in both Tajikistan and Kyrgyzstan. Women also find it difficult to produce designer products without any background in design. Making luxury products in remote, isolated communities with no concept of western standards for goods proves challenging. Master courses in traditional design were introduced through this project. Some farmers are failing to invest time and effort in proper livestock breeding practices. In Tajikistan, lack of specific legislation regulating use of rangelands makes livestock breeders uncertain about the benefits of investing more in livestock production. Logistics is a problem too. Tajikistan and to some extent Kyrgyzstan are not well linked to international markets, and it is difficult to ship merchandise to and from these countries. But above all, there are cultural hurdles. In a male-dominated society, building confidence in Tajik women to lead a successful business is challenging. A new project by the Aga Khan Foundation is under way to provide women with small credits and help them run businesses. Rural communities, particularly women, now have options for extra income. It is hoped that the results of this project will help to improve and sustain the livelihoods of rural populations in Tajikistan and Kyrgyzstan. IFAD recently announced another major development program worth USD 30 million in Kyrgyzstan, which will partially build upon the innovations generated by this project.

NEW PROJECTS

New project to assess wheat production in Uzbekistan

Food made from wheat flour comes near top on the menu in Central Asia. Food security is inconceivable without enough wheat. And as demand for wheat is set to grow and supply is at risk globally due to climate change, sending prices up, little wonder adapting wheat to the changing environment is at the forefront of agricultural research for development. Existing agricultural policies in some Central Asian countries are also in need of an overhaul. All this underlines how important it is to take steps in the immediate future.

Uzbekistan, like other Central Asian countries, gives priority to wheat production and food self-sufficiency. Authorities

have been tweaking the agricultural sector since Uzbekistan's independence in 1991 to meet national demand for agricultural produce. According to government figures, the country now produces enough wheat for its needs.

Dr Amir Amanov, First Deputy Director-General of the Uzbek Scientific Production Centre for Agriculture, says that gross grain production reached some 6m tonnes in 2012 after new high-yielding wheat varieties had been introduced to the fields. But most of the wheat varieties are developed from genetic material introduced from other countries. Dr Amanov notes that only 35 per cent of the wheat varieties used in 2012 was locally developed. What is more, imported wheat varieties are not always well adapted to climatic and soil conditions of Uzbekistan. So the wheat industry still has a way to go. Researchers from international agricultural research centers and their local counterparts work together on breeding new wheat varieties that are up to scratch.

Assessing what works and what doesn't in wheat production is important for future action. Photo by Sherzod Qosimov.

But just breeding will not do. What is also needed is widespread adoption of new improved varieties and technologies, which can be encouraged by policies. Wheat growers need stimuli.

That is the main idea behind a new project launched by ICARDA titled "Adoption and ex-post impact assessment of improved wheat technologies and detailed analysis of the wheat seed and grain value chain in Uzbekistan". The project is aimed at increasing the effectiveness and impact of wheat research on food security, poverty reduction, gender equity, and the environment through better targeting of new technologies. But as the seed system is important in the whole adoption and impact cycle, the project also aims at developing more diverse wheat seed systems that will offer farmers quicker access to improved varieties, encouraging broader public and private participation, as well as alternative and innovative seed production and marketing by farmer groups and communities. This should be reinforced by improved policies, strategic analysis, and institutional innovations that strengthen linkages among stakeholders along the wheat input-output value chain.

According to Dr Ahmed Mazid, of ICARDA, only if farmers adopt the technologies developed through agricultural research can research make an ultimate impact on productivity, poverty alleviation, conservation of natural resources, and food security. Since not all research output does certainly fully meet the needs of users, ongoing assessment of the use and impact of research can provide important information. To this end, adoption studies are useful. They help to better understand farming systems and farming communities, and get exact numbers behind adoption of technologies to assess impact, as well as identify varying constraints and work out solutions.

Adoption rates also depend on how efficiently varietal identification and seed multiplication processes work. As Dr Ram Sharma, of ICARDA, argues, it is necessary to speed up these processes and get improved wheat varieties to the end-users (farmers, seed producers) before the useful life span of most new varieties runs out. It usually takes some three years before a new variety is fully evaluated. However, lately this has been reduced to a minimum of two years in Uzbekistan. Still, the process of releasing new varieties and seed production of those varieties needs to be accelerated. Most importantly, increased participation on farmers' side is also required.

But in the end, all this boils down to policy. Or, put it a different way, more stimulating policies. Dr Roberto Telleria, agricultural policy specialist with ICARDA, points out that right seed policies can be critical. Incentives like subsidies can help farmers and get them involved in seed production.

And Uzbekistan makes an interesting example for the project's purpose. First, there is still some room for improvement. Second, the country is also at the heart of Central Asia, characterized by agro-ecological diversity, high wheat consumption rates, and strong national research programmes and partnerships.

All this will give researchers involved in the project data to look at in order to study adoption rates, factors affecting adoption, impact, constraints and opportunities, and offer recommendations based on the study results.

To understand how best to implement the project, an inception workshop was recently organized. The workshop participants gathered in Tashkent from 12 to 14 March 2013 to discuss what and why has worked in Uzbekistan in adoption of different wheat varieties. And what did not work well and why. The scientists also considered prospects for wider adoption in the country, and major constraints. Most importantly, the workshop also proved an opportunity for bringing together scientists from various national institutions involved in wheat breeding and production, ICARDA and other partners, and helping them to find common ground for streamlining research cooperation.

Conservation agriculture project targets rural poor in Tajikistan

Farming plays an important part in the lives of rural people in Tajikistan, one of the most mountainous countries in Central Asia. But soil erosion and degradation pose a risk to their livelihoods. Rugged terrain, frequent heavy showers and weak soil resistance, coupled with strong winds, add to the problem. This highlights the need for technologies that can combat soil

erosion and degradation, and appropriate agricultural systems to improve soil and crop quality.

The technologies and practices associated with conservation agriculture (CA) can provide a solution to the problem. And this thinking is behind a new International Fund for Agricultural Development (IFAD) project "Integrated Crop-Livestock Conservation Agriculture for Sustainable Intensification of Cereal-based Systems in North Africa and Central Asia".

Besides Tajikistan, Algeria and Tunisia are also participant countries to this new project, coordinated by ICARDA. The project aims at enhanced sustainability of natural resources, increased farm profitability, and improved livelihoods of resource-poor farmers through the development and application of integrated Crop-Livestock Conservation Agriculture (CLCA) systems for sustainable intensification of dryland production. The project will address the critical need for active farmer participation in assessing the ecological and socioeconomic constraints in which CLCA technologies can be adapted to and adopted by smallholder farmers.

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.

It will span a period of 36 months, and will be based on the past research experiences of main partners in Algeria, Tajikistan and Tunisia, as well as on the existing and new links established with national partners. ICARDA will undertake monitoring, evaluation, and reporting, while designated national coordinators will be responsible for implementation of the project in each country. The project outcome will be evaluated on the adoption of the CA technology and the speed of that adoption and the economic and environmental benefits that this generates.

The project consists of three main research activities. These are: ex-ante evaluation of CA-based technologies in CWANA (Central and West Asia and North Africa); enhanced crop-livestock integration in CA through optimized stubble grazing strategies and increased fodder availability from forages or fodder shrubs; and site-specific conservation agriculture technology packages, fine-tuned and disseminated for enhanced farm productivity, resource use efficiency and profitability.

As a result of the project implementation, productivity is expected to increase by 10%. At least 1,000 households will be targeted in the selected countries and some 10,000 people, including women in the target communities, are expected to benefit from the project.

The project will also enhance the exchange of experiences and knowledge-sharing between farmers, within the scientific circles and with policymakers. Partners from the national agricultural research and extension systems and policymakers are expected to participate in and benefit from project outcomes. The national research partners will get access to new and innovative information, while policymakers will learn more about the benefits of the new Integrated Crop-Livestock Conservation Agriculture (CLCA) technologies at both district and national levels. It is expected that recommendations will be developed and communicated to stakeholders on the basis of collected data.

A stubble grazing strategy will be optimized, and suitable fodder species for alley cropping will be identified and integrated with CA. Moreover, new varieties for CA will also be identified at experimental stations of involved research institutes in the participant counties.

Farmers will adopt site-specific CLCA technology packages that will have been developed as part of the project.

To discuss how to implement the project efficiently and plan work ahead, a national inception workshop was held from 18 to 19 March 2013 in Dushanbe, Tajikistan. A total of 33 participants representing the Ministry of Agriculture of Tajikistan, Tajik Academy of Agricultural Sciences and its research institutes, and ICARDA gathered at the event to work out a detailed national work plan of the CLCA project in Tajikistan. The concept of conservation agriculture is virtually new to Tajik farmers and researchers. In fact, according to Dr Aziz Nurbekov, of ICARDA, conservation agriculture practices such as zero or minimum tillage, were practically unknown in Tajikistan until recently. But the project and inception workshop have helped to spark considerable interest among Tajikistan's researchers. As Academician Hukmatullo Ahmadov, President of the Academy, said, the idea of introducing conservation agriculture practices in Tajikistan was very promising. It is particularly important for poor people in both rainfed and irrigated rural areas of Tajikistan as they lack adequate resources for farming.

It is hoped that the outcomes of this project will be extended beyond the target areas in the three countries and benefit rural populations.

Climate change adaptation project in Uzbekistan focuses on pollinators

Climate change poses one of the most severe risks to pollinators. But they, specifically wild pollinators, are indispensable for agricultural production of most high-value crops, for 60-90% of all plant species, and for climate change adaptation of agro-ecosystems. This is because cross-pollination increases genetic diversity and thus promotes adaptation of plant species and ecosystem resilience to future climate.

As seasonal weather abnormalities are set to increase, and considering that honeybees can fly only if weather conditions are fine, future horticulture production might depend on, for instance, bumblebees, which are more robust to rough weather conditions than honeybees. But besides climate change, wild pollinators are also threatened by agricultural practices (monocultures, landscape fragmentation, chemicals, tillage etc.). Wild pollinators do not fly far from their nests, only 300-2000 m (whereas honeybees fly up to 5 km). That is why they need nesting areas, forage (flowers producing nectar and pollen during three seasons) and shelter in or close to the field.

Wild pollinators are important for climate change adaptation of agro-ecosystems. Photo by Toshpulat Rajabov.

Such habitat enhancement is not costly. But it does require some additional work and experience. Moreover, improved pollination can increase the yield in economic terms. So there is a potential win-win situation for farmers and the environment.

Resource-poor farmers in developing countries are particularly vulnerable to climate change as they depend on agriculture for their livelihoods. This is also true for Central Asian countries. And helping rural farmers is a priority for international research and donor organizations.

In keeping with its goals, the International Center for Agricultural Research in the Dry Areas (ICARDA) has launched a new project in Uzbekistan, which is funded by the German Federal Ministry for the Environment, Nature Protection and Nuclear Safety under the International Climate Change Initiative. The project is implemented from 15 March 2013 till 31 December 2013, and involves ICARDA's national partners such as the Institute of Zoology; the Samarkand State University; and the Uzbek Scientific Research Institute of Vegetables, Cucurbits and Potato.

According to Dr Stefanie Christmann, of ICARDA, the project is aimed at introducing the practice of "Farming with alternative pollinators (FAP)" to Uzbekistan (Christmann and Aw-Hassan, 2012), which includes habitat enhancement, economic assessment of the total harvest and assessment of pollinator biodiversity. The project will target two main crops - cucumber in Parkent area and cherry in Surkhandarya Region (Boysun district and Termez). Researchers will also gather field data (economic effect, effect on pollinator diversity, outscaling options) to support broad introduction of this new socioeconomic and agro-ecological method.

If successful, this project has potential to help solve similar problems in other Central Asian countries, in the dry areas of other countries, and even worldwide as the risks to pollinators are a global concern.

New project to improve access to plant seeds by smallholder farmers

A new initiative covering five countries has been launched to promote better adaptation of plant seeds production and distribution systems to the needs of vulnerable smallholder farmers. Many smallholder farmers and low-income family farmers in developing countries have limited access to an adequate diversity of plant seeds, which they depend on for their livelihoods. The current international policy framework on plant genetic resources seeks to serve farmers' needs. But it is focused largely on ex situ conservation and formal breeding, and tends to ignore fundamental issues of the availability and use of plant diversity by smallholders. Smallholders often have distinct needs for a wider range of plant seeds adapted to their vulnerable ecosystems. However, they face specific constraints in availability, access and distribution that are not covered by existing programs and institutions.

The new project aims to give smallholder farmers and low-income family farmers in developing countries better access to the diversity of plant seeds. Photo by Mikhail Djavakyantc.

True, there are seeds systems. But the formal seeds sector often does not provide seeds or other planting materials that meet the requirements of smallholders in developing countries, not to mention smallholders living in vulnerable ecosystems. Local seeds systems (including seeds producers), which are essential for smallholders to maintain their planting material and their livelihoods, are gradually losing ground due to the weakening of social institutions and structures at the local level that support and sustain local seeds systems and accompanying informal quality control mechanisms.

Furthermore, there is a need to improve the relevant policy and legal frameworks in order to facilitate the adaptation and evolution of diverse planting materials that communities in vulnerable ecosystems need to respond to the changing economic and environmental/climatic conditions affecting their agricultural production.

So there is an urgent need to enhance diversified seeds production and distribution mechanisms as key links between international development objectives and local results. This needs to be done in a way that allows seeds systems to capture the adaptive and evolutionary capacity of plant genetic resources for smallholders in vulnerable ecosystems.

The new project, funded by the Swiss Agency for Development and Cooperation (SDC), is a response to this need. The project titled "Improving the availability and use of diverse seed and other planting materials to reduce vulnerability and improve food security for smallholders in vulnerable ecosystems" will be implemented by Bioversity International. It aims to reduce the vulnerability of smallholders through enhanced diversification of seeds production and distribution systems, backed by revised and re-aligned policies that promote the availability and adaptive capacity of diverse planting materials in the production systems.

The project builds on the experience gained by Bioversity International over the last 10 years of research and development and knowledge from projects related to on-farm use of plant diversity and ecosystem resilience, and on the national adaptation and implementation of international legal frameworks, particularly the International Treaty on Plant Genetic Resource for Food and Agriculture (ITPGRFA).

The participant countries include Burkina Faso, Uganda, Nepal, Uzbekistan and Bolivia. The project will be implemented within "Water, Soil and Ecosystems", a global research program of the Consultative Group on International Agricultural Research, and will run for 6 years in two three-year stages.

Strengthening knowledge on Sustainable Land Management in Central Asia

A new project to streamline the use and creation of knowledge on sustainable land management (SLM) in Central Asia in the face of climate change has been recently launched during an inception workshop in Bishkek, the Kyrgyz Republic. The initiative aims to improve knowledge on SLM practices in the region, and tailor this knowledge to the needs of local populations and authorities for practical use and the shaping of better informed policies. It lays the groundwork for the second phase of a larger multi-donor investment program called the Central Asian Countries Initiative for Land Management (CACILM), which was created to respond to risks posed by growing land degradation and climate variability to local communities, who are highly dependent on land resources for their livelihoods. In particular, CACILM supports Central Asian countries in the implementation of the UN Convention to Combat Desertification. During the inception phase from 2006 to 2009, it delivered a set of regional and national land management projects.

Some 30 policymakers, researchers and practitioners attended the project inception workshop in the Kyrgyz capital, Bishkek, between the 10th and 12th of June 2013. Participants discussed the project's objectives, expected outcomes and core activities, as well as establishing implementation arrangements and agreeing on a work plan. The event was co-organized by the International Center for Agricultural Research in the Dry Areas (ICARDA) and the German Federal Enterprise for International Cooperation (GIZ).

Scientists, policymakers and practitioners are working on ways to make knowledge on sustainable land management more accessible for local populations and authorities for practical use and the shaping of better informed policies. Photo taken by Farhod Hamraev at the inception workshop of the new IFAD-funded project on knowledge management in CACILM.

The meeting proved timely as there was general agreement about the urgent need for an efficient system to document knowledge on SLM, and disseminate appropriate practices, technologies and options among policymakers, researchers and land users in Central Asia. Although some efforts had been made before, their impacts on farmers' livelihoods, land productivity, and the mitigation of land degradation were not seen as satisfactory. An innovative approach is needed. Under the project, which is supported by a three-year grant from the International Fund for Agricultural Development (IFAD) and coordinated by ICARDA, a knowledge platform will be built to consolidate knowledge generated during the Inception Phase of CACILM. Another problem, the participants said, is that there is a considerable body of documented knowledge available through various platforms such as the World Overview of Conservation Approaches and Technologies (WOCAT). However, existing knowledge management systems lack effective means of reaching policymakers, farmers and land users in general. The Bishkek workshop gave a renewed impetus to the process of sharing useful approaches and best practices in SLM across the region.

Dr Jozef Turok, ICARDA Regional Coordinator for Central Asia and the Caucasus, said: "Our main objectives are to enhance CACILM knowledge management for facilitating the widespread dissemination of sustainable land management (SLM) practices, to make agricultural systems more productive and sustainable, and to promote climate change adaptation."

Yet, according to researchers, the main question is how to reach farmers and land users, and how to influence their decisions in a way that brings benefits and sustainability. They believe that this requires, among other things, raising the awareness of policymakers to encourage mainstreaming SLM in land use policies, training extension services, and distributing knowledge in a

way that reaches land users. The initiative will also produce recommendations on how SLM interventions can be best scaled-up. Researchers will work with target groups, including policymaking units responsible for SLM in each country; non-governmental organizations and rural development agencies; extension agencies, farmers and farmer organizations; universities; and the international donor community active in Central Asia.

Finally, supportive policies need to be in place for these efforts to succeed. Policies should be designed in a way that promotes the use and adoption of SLM practices.

As Dr. Theib Oweis, Director of ICARDA's Water and Land Management Program, which spearheads the effort, explained: "Knowledge management is essential to understanding and disseminating innovative SLM approaches and technologies that have high potential for implementation in the different agro-ecosystems of Central Asia. The evaluation of how these technologies perform in farmers' fields is needed to tailor interventions to specific needs. And the choice of interventions needs to be accompanied by enabling policies and institutional arrangements for each agro-ecosystem."

It is expected that, through this project, knowledge on how to better adapt to climate change in agriculture and rural development will increase. A knowledge platform will be created that displays up-to-date information on SLM, monitors and assesses the rate of SLM adoption in the region, and provides support for evidence-based policy formulation. The project will target four main agro-ecosystems: rainfed cropland; irrigated agriculture; mountain ecosystems; and rangelands. ICARDA will work closely with the CACILM Strategic Partnership Agreement (SPA), a multi-donor partnership, which includes IFAD, GIZ, ICARDA and other organizations.

The inception workshop for this new IFAD-supported project concluded by making a strong commitment to harnessing best practices in SLM so that vulnerable populations in Central Asia are ready for, and better adapted to, climate change.

MEETINGS, SEMINARS AND CONFERENCES

Uzbek researchers learn about India's experience in groundwater use for agriculture

The prospect of water shortage for agricultural irrigation is a worry in parts of Central Asia. Yet water management practices in the region need an overhaul. Agricultural lands are irrigated using surface water. Given current concerns over water scarcity and unpredictable fluctuation in water resources, the risk of periodic lack of surface water for irrigation in the near future seems to be inevitable. But there is a resource, whose potential appears to be untapped yet. It is groundwater. It can be particularly useful for rural populations that rely on farming for their livelihoods and do not have access to sufficient water resources for irrigation.

There is evidence suggesting availability of groundwater in large parts of Central Asia. In particular Uzbekistan's renewable groundwater resources are estimated at 18.5 km3 and extraction is at 5.43 km3, of which 42% for household use, 25% for agriculture, and the rest for other uses. As the figures show, there is potential for increasing groundwater use for agricultural purposes.

True, this solution is not without disadvantages of its own, such as the risks of negative impact on sustainability, quality of water tables and availability of energy for pumping groundwater. Overuse can have an adverse effect. But if groundwater is used in a sustainable and targeted way, it can contribute to tackling the problem of water shortage for agricultural use in rural areas.

Boreholes represent a simple technology of groundwater irrigation on small pilot farms in Uzbekistan. Photo by Dr Akmal Karimov.

In Uzbekistan, groundwater is still used mainly for drinking and industrial purposes. However, the potential for agricultural uses is quite high.

IWMI, an international water think-tank, works in Central Asia, and in Uzbekistan in particular, to help to resolve such water-related issues through putting research into action and fostering knowledge-sharing between local scientists and their counterparts from other countries and international organizations.

In keeping with its goals, the IWMI office in Tashkent organized a meeting on India's experience of using groundwater for agriculture at the Uzbek Research Institute of Hydrogeology on 22 April 2013.

Dr Tushaar Shah, a senior research fellow with IWMI, who was visiting Uzbekistan, met Uzbek scientists to share and discuss the results of his case study on groundwater use for agriculture in India. Among those present were also Dr Arslon Mavlonov, deputy chair of the Committee of Geology of Uzbekistan, and Dr Botir Abdullaev, director of the Research Institute of Hydrogeology. Dr Shah's presentation was received well and raised the participants' interest in the potential agricultural uses of groundwater in Uzbekistan.

Overall the event helped to raise awareness of Uzbek researchers about the potential use of groundwater for farming in rural areas where there is lack of water. India's experience could help to solve similar problems in other Central Asian countries too.

Vegetable crop varieties as solution to healthy nutrition, environmental problems

Unhealthy nutrition and various diseases it causes are a global concern. Like in many other countries, authorities and researchers in Uzbekistan take action against this problem and educate the public about benefits of healthy food and lifestyle. A healthy population is a boon for the economy, after all.

But as the country's population grows, so does food consumption. This in turn puts additional strain on land and water resources, leading to soil degradation and other environmental ills. So researchers face the challenge of working out integrated approaches to sustainable agricultural development and production of healthy foods.

This issue was the focus of a large seminar in Tashkent, Uzbekistan, on 15 May 2013. Scientists, food and beverages producers, and farmers met to talk over how best to forge synergies along the research-production-consumption continuum. At the event titled "Integration for the development of the food industry in Uzbekistan", which was organized by the Ministry of Agriculture and Water Resources, the AVRDC (the World Vegetable Center), ICARDA (the International Center for Agricultural Research in the Dry Areas), the Association of Chefs of Uzbekistan, ZarExpo and a few other organizations, the participants looked at the state of nutrition and food production in the country and how well new raw materials and technologies are adopted by the food industry. As it turned out, there is considerable untapped potential. Businesses were keen to find out about new opportunities. And researchers had quite a few things to offer to business people and farmers. A number of new crop varieties were presented.

New vegetable crop varieties can contribute to solving healthy nutrition and environmental problems. Photo by Julia Kopilova.

As researchers suggest, introducing new varieties of traditional crops and alternative crops that are healthy for consumers and profitable for farmers and producers is a way to go in ensuring healthy nutrition and sustainable agricultural development. New crops could also help to tackle soil degradation and salinization, which are major problems in large parts of Central Asia.

For instance, researchers from AVRDC, ICARDA and ICBA (the International Center for Biosaline Agriculture) have been working on this issue together with their national and international partners for a number of years. And some results are already out.

New varieties of legumes like vegetable soybean and mung bean, which increase soil fertility and are good for crop rotation, and the Jerusalem artichoke (or topinambour or girasol) are 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.

Vegetable soybean, which is not widely cultivated in Uzbekistan, can be a cheap alternative source of nutrition to animal meat and make for affordable diet at schools and universities. Soya products are healthier too. Products like soya milk and yoghurts are already available, though not widely. Mung bean, on the other hand, is a popular ingredient in Uzbek cuisine. The newly released varieties of mung bean take only 70 to 95 days to ripen and have upright stems and bushes, making mechanized harvesting possible. Of the three crops, the least known to the local population is the Jerusalem artichoke. But, being a multi-purpose crop, it has got most potential. Its roots can be used for food and other products, and green mass for fodder. The newly released varieties of this crop take 180 days before they can be harvested, and yield 35-60 t/ha of green mass and 40-70 t/ha of tubers. And they take very little to cultivate. What is more, these varieties do well on salt-affected soils. In fact they help to reduce soil salinity and improve soil structure.

Local researchers have managed so far to make from topinambour such products as inulin, flour, yeast, ethanol and cellulose. A factory in Uzbekistan has managed to industrially make paper from topinambour. And having realized the potential uses of this crop, authorities and researchers have set up an Innovation Center for Topinambour at the Tashkent State University of Economics.

But take-up rates are still low as a whole and there is still a way to go for wider use of these crops by farmers and producers. And promoting these crops among consumers is also important. For instance, topinambour is cultivated in about 100 ha of farmland. And vegetable soybean is planted in around 50 ha of land.

There are, however, two issues that need to be dealt with for such efforts to be successful. Making the production-consumption chain more effective is the first. As some pointed out at the seminar, consumers would buy healthy alternatives to existing products, but those were not widely available. This is partly so because farmers do not know if there is enough consumer interest. Farmers also often lack access to information on new alternative crops that are introduced to the country

and developed by researchers. Second, there are few partnerships between farmers who grow or could grow new crops and companies. Some producers do not know potential suppliers, and vice versa.

So the seminar proved invaluable in that it gave companies, farms and research organizations an opportunity to form those business links. Similar events in future may offer more networking opportunities.

Researchers meet in Uzbekistan to discuss winter wheat improvement

As the world's population continues to grow, demand for wheat, the main food crop in Central Asia, is set to increase. But in the face of climate change and other risks to wheat production, there are concerns about maintaining balance between supply and demand. Researchers and policymakers are working to address these concerns at national, regional and international levels. Collaborative international initiatives are under way to make wheat farming systems more productive, deal with wheat diseases, and help wheat farmers in developing countries.

Researchers from a number of countries visited experimental sites and research institutions in Uzbekistan during a travelling workshop in May 2013. Photo by Shakhodat Bobokulova.

One of them is the International Winter Wheat Improvement Program (IWWIP). IWWIP is a joint enterprise between the Government of Turkey, the International Maize and Wheat Improvement Center (CIMMYT) and the International Center for Agricultural Research in the Dry Areas (ICARDA). This program aims to develop winter/facultative wheat germplasm for the region of Central and West Asia, and facilitates the winter wheat germplasm exchange for the global breeding community. It works with partners in different countries on winter wheat improvement and provides accessions of wheat from Turkey's Ministry of Food, Agriculture and Livestock, CYMMIT and ICARDA. Most importantly, it serves as a platform linking winter wheat researchers globally and thus promoting an exchange of experience and knowledge.

Every two years IWWIP arranges a winter wheat travelling workshop in different countries with the aim of bringing together research partners. Scientists visit breeding nurseries, exchange ideas and discuss further cooperation. In the past, such workshops were held in Turkey (2007), Ukraine (2009), and Turkey, Bulgaria and Romania (2011). This year it was Uzbekistan's turn to play host to the event, organized by the IWWIP program in cooperation with the Uzbek Agricultural Research and Production Center and the Food and Agriculture Organization of the United Nations (FAO). In late May about 50 researchers took part in the travelling workshop and visited experimental sites and research institutions in Uzbekistan. The aim of the travelling seminar was to show the researchers how varieties obtained from the joint program are doing in Uzbekistan. And there were quite a few results to present. For instance, researchers in Uzbekistan had identified and developed winter wheat varieties that are resistant to diseases and pests, and are of high quality. These varieties are being either tested or grown.

This event helped the visitors see the results of work being done by their counterparts in Uzbekistan, as well as exchange ideas and experiences. The participants were impressed with the research activities at Kashkadarya Research Institute of Grain Breeding and Seed Production of Cereal Crops and the Gallaral branch of the Research Institute of Grain and Legume crops on irrigated lands. The seminar also coincided with the 100th anniversary of the Gallaral branch.

Non-conventional salt-tolerant crops can help to tackle salinity problem in Uzbekistan, say officials and researchers

Sustainable management of salt-affected and marginal lands in Uzbekistan for agricultural purposes should be a priority and can help to find new avenues of agricultural production, researchers and policymakers believe.

Scientists from local and international research organizations point to the urgent need to find ways of using salt-affected lands and low quality water resources by introducing non-conventional salt-tolerant crops into agricultural production, which could reduce significantly pressure on freshwater resources and optimize productivity of agricultural lands in the country.

Some 60 participants including Members of Parliament of Uzbekistan (Oliy Majlis), scientists, journalists, and representatives of environmental and health NGOs, and international organizations gathered in Tashkent, Uzbekistan, on 24 June 2013 at the seminar under the title 'Problems and achievements of biosaline agriculture in Uzbekistan', organized by the Ecological Movement of Uzbekistan, the International Center for Biosaline Agriculture (ICBA) and the International Center for Agricultural Research in the Dry Areas (ICARDA). Officials and scientists discussed how to exploit the agricultural potential of salt-affected ecosystems and thus ensure sustainable use of natural resources. The meeting looked at what research projects have achieved so far and how sustainable development in dry areas can be ensured. The participants agreed that salt-affected areas present an opportunity for research and can help to find answers to issues ranging from decreasing salinity and preserving biodiversity to managing natural resources. What is necessary, though, is to show potential value of the vast salt-affected dry areas and saline low quality water for production of traditional and non-traditional fodder, technical and medicinal plants and crops. This

would be very beneficial for the environment, sustainable ecosystems and facilitate economic growth. And research results should be transferred to local populations (farmers, livestock owners, households).

Current scientific knowledge on existing salt-tolerant crops and domesticated halophytes and the need for new and/or alternative management systems suitable for agricultural purposes in saline environments can help to develop, agree on and distribute information about using innovative technologies of biological reclamation in degraded areas, the meeting heard. However, there is a serious lack of fundamental and applied research taking into account biological, physical, economic and social factors in the arid and semiarid salt-affected ecosystems.

Marginal lands affected by salinity can be put to use if non-conventional salt-tolerant crops are introduced into agricultural production, scientists believe. Photo by Kristina Toderich.

Officials and scientists agreed that an integrated approach to this problem should reflect the link between local and regional transboundary ecosystems and long-term sustainable agricultural development in salt-affected areas. Researchers pointed out that stimulating institutional policy is also required. And the participants also discussed what legislation is needed for promoting innovative approaches to sustainable agriculture in salt-affected and degraded areas.

This event helped to increase participants' awareness about the problem of soil and water salinity in Uzbekistan and what they can do to support efforts to tackle and manage this phenomenon. What is more, researchers showed that salt-affected areas can be used for agricultural production of non-traditional crops. Some Members of Parliament have expressed a keen interest in pursuing the debate further.

CAPACITY BUILDING

Farmers learn how to improve soil fertility under conservation agriculture

Soil fertility remains a key problem in parts of Central Asia and the Caucasus. In such areas, lack of soil nutrients and water often results in low crop production. These problems directly affect the livelihoods of many farmers in the region. Burning crop residues and ploughing also contribute to soil degradation as they reduce the organic matter of soil and destroy soil structure. Increasing agricultural productivity through improving soil fertility using conservation agriculture practices is, therefore, widely considered to be a priority in the region. A series of training courses were organized in February 2013 by ICARDA and its national partners in Azerbaijan, Kazakhstan and Uzbekistan.

Soil fertility remains a key problem in parts of Central Asia and the Caucasus. Photo by Aziz Nurbekov.

These were conducted within the GCP/RER/030/TUR project "Conservation Agriculture in Irrigated Areas of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan". This project is funded by FAO within the framework of the FAO/Turkey Partnership Programme.

The first training course entitled Soil fertility management under conservation agriculture was organized in close collaboration with the Agrarian Scientific Center in Azerbaijan. It was held at the experimental station in Ter-ter. A total of 45 researchers, farmers and district-level policymakers gathered at the event to discuss some of the problems of soil fertility improvement under conservation agriculture. Many districts in Azerbaijan suffer from the loss of soil fertility and farmers cannot afford fertilizers in recommended amounts, which causes low crop productivity. Production is also constrained by improper crop rotation, soil and water management. All this means that CA can be an effective tool for soil fertility improvement and sustainable agriculture in general. And these issues were covered at length in the presentations on soil fertility improvement by Mr Seymur Safarli, of the Research Institute of Soil Erosion and Irrigation; Dr Zulfi Ismailov, of Azerbaijan Information Center (AIM); Dr Imran Jumshudov, of the Azerbaijan Research Institute of Farming; Dr Kamil Fataliev, of the Azerbaijan Research Institute of Agromechanika; and Dr Aziz Nurbekov, project coordinator of ICARDA-CAC. Following the presentations, the participants said that such training courses should be organized again as there is a need to learn more about how to improve soil fertility at farm level. Bagirov Maharram, a farmer from Barda district, said that the training course would benefit from visits to sites where CA was being used.

Land degradation, decreasing soil fertility and a high population density have increased pressure on irrigated land in south Kazakhstan. These problems were addressed during the training course on soil fertility improvement in Chimkent, Kazakhstan, held on 7 and 8 February. A total of 48 local officials, researchers, students, farmers and scientists convened at the meeting hosted by the South-West Kazakhstan Research Institute of Livestock and Crop Production (SWRILCP). The aim of the training course was to discuss new approaches to soil fertility improvement under conservation agriculture. In his opening remarks, Prof Dossymbek Sydyk, deputy director of the SWRILCP, expressed his gratitude to ICARDA for productive cooperation on the conservation agriculture project. He noted that an integrated approach used for designing the project will ensure good results. He also pointed out interest among farmers in participatory research activities of the project. The training sessions discussed a variety of topics related to soil fertility management, fertility improvement, crop rotation and salinity management. The course participants heard a number of presentations by national consultants on agronomy, water management and mechanization. They were also introduced to theoretical aspects of soil fertility improvement. The course ended with the preparation of action plans for the project execution.

The final two-day training course on soil fertility improvement was conducted on 18-19 February in Karshi, Uzbekistan. This formal training course brought together key public and private sector representatives, including farmers, national consultants, specialists, and students from the Karshi State University to share ideas on the issue. In total, 55 people attended the event. The objective of the course was to provide training to agriculture officials and scientists of research institutes and agricultural universities, and improve their skills in the area of soil management under conservation agriculture and show them live demonstrations and experiments on improved soil fertility management practices. Some presentations on soil fertility and water management were given during the training course. Dr Aziz Nurbekov made presentations on “Conservation agriculture in Uzbekistan”, “Living soils” and “Management and improvement of soil fertility”, whose main conclusions were that under reduced tillage and direct seeding systems soil biota can build; maintain soil pore networks; create a stable soil habitat; and that crop rotation is an important step towards soil management under conservation agriculture. National consultant on irrigation Dr Ravshan Boyirov presented his views on irrigation practices used in Uzbekistan and what should be done to improve water management. He emphasized that there is no shortage of water. Moreover, it seems there is a surplus of water because water use rates for irrigation are very high. To deal with this problem, he added, improved land leveling and irrigation practices were introduced at the project demonstration site. The second day was dedicated to live demonstrations and experiments on conservation agriculture practices on improved soil fertility management. A field trip was organized for the participants to show them soil fertility improvement techniques at work. During the two days of intensive discussions, the training course provided participants with a clear understanding of soil fertility management under conservation agriculture. It can be said that the training course met its objective in terms of creating awareness about conservation agriculture and the key elements for its development, formulation and implementation.

CA is still not widely practised among the farmers in the irrigated areas of the lower parts of Azerbaijan, Kazakhstan and Uzbekistan. Current activities are mainly concentrated in research institutes to integrate CA principles and practices into existing production systems. In fact, the potential of CA for sustainable agricultural development has been demonstrated in the region. No-till and raised-bed planting practices tested in the countries proved technically and economically suitable for local conditions, and can provide similar or higher crop yields while saving considerable production resources and costs, including fuel, seeds and labour. Conservation agriculture research results from the irrigated areas showed that crop residue retention improves soil organic matter and soil nitrogen content. These practices are ready to be disseminated more widely in the region. So building the technical and scientific capacity of national partners will be essential for moving to widespread CA adoption and uptake.

Researchers improve skills under project to save agrobiodiversity in Central Asia

Central Asia is well-known for its luscious fruits, and there is no shortage of choice. But today that appears to be at risk. The genetic diversity of fruit species is under threat due to a plethora of environmental problems such as overgrazing, deforestation and use of uniform high-yielding varieties. As a result, traditional diversity-based farming systems as a whole are in decline. To make matters worse, laws and policies in Central Asian countries on biodiversity conservation are not well-suited to support conservation of fruit species. Adding to the problem is the fact that knowledge farmers and researchers have about wild and cultivated fruit genetic resources is dispersed and fragmented, out of date, and lacks the benefits of modern technologies.

Training young researchers is important for maintaining continuity in conservation efforts. Photo by Aleksandr Sindyashkin.

Dealing with all these issues has been behind the Bioversity International/UNEP-GEF Project titled “In situ/on-farm conservation and use of agrobiodiversity in Central Asia” (http://centralasia.bioversity.asia). Since 2006 the project has been helping to ensure in situ/on-farm conservation and use of horticultural crops and wild fruit species for sustainable agricultural development, food security, and environmental stability. One of the

project objectives is to provide farmers, local communities, and institutions with knowledge and policies to conserve in situ/on-farm horticultural crops and wild fruit species in Central Asia and make sure they use them in a sustainable way. What is more, the project seeks to offer better options to policymakers to improve laws and policies on conservation and use of fruit genetic resources.

Training farmers and researchers, and various support activities, also form an important part of the project. So Bioversity International and its partners periodically arrange training courses. One such event was recently organized in Uzbekistan. The training workshop, Use of information resources in scientific research, took place on 12 March 2013 at the Tashkent State Agrarian University and 14 March 2013 at the Samarkand State University. The training sessions, led by Maria Garruccio, Manager at the Information and Research Support Services of Bioversity International, briefed participants on ways to work with web search engines, web databases, open information resources, and to manage information and use social media tools in research. In particular the course participants learnt about such specialized search engines as Scirus and Google Scholar, and Mendeley, which is the biggest crowd-sourced catalogue on the web. More than 60 postgraduate students and university lecturers attended the course. This workshop was a continuation of efforts directed at conservation and sustainable agricultural development. No doubt increasing research potential of local scientists will aid in conservation efforts and add up to improved policies and conservation practices.

Potato growers in Uzbekistan learn water-saving practices

Potato is a major crop and a staple food in Uzbekistan, coming third after wheat and rice. According to FAOSTAT (2011), the potato cultivated area, which is entirely irrigated, increased by more than 40% from 2000 (52,200 ha) to 2011 (73,100 ha). The annual per capita consumption rate is estimated to be, on average, 32 kg. The Ministry of Agriculture and Water Resources of Uzbekistan estimates that the country should produce an additional 1 million tonnes of potato to meet local demand fully.

Ensuring water efficiency is a priority for farmers in Uzbekistan. Photo by Timur Abdurakhmanov.

Yet, with an irrigated area of about 4.3 million hectares, Uzbekistan is highly dependent on water resources. This requires that farmers increase water efficiency while maximizing crop production. Helping local farmers and researchers to deal with this challenge forms part of work by IWMI, an international water think-tank, and CIP, an international potato research organization, in Uzbekistan.

The CIP and IWMI regional offices train local farmers and agronomists in best potato cultivation and irrigation practices. As part of their continued capacity-building and knowledge-sharing efforts, CIP and IWMI specialists arranged recently a two-day training course for farmers and agronomists at the training center of the Fergana Basin Water Management Organization. It was organized under a three-year BMZ/GIZ-funded project. Some 60 farmers and agronomists from Andijan and Fergana attended the course on 28 and 29 March 2013. The training sessions were led by Dr Carlo Carli, Regional Science Leader with CIP, and Kahramon Jumaboev, of IWMI, who briefed the participants on subjects ranging from preparing land for potato to calculating required water amounts.

Having learnt how to figure out how much water they need, the potato growers can now contribute to sustainable water management. That will also save them money.

This is sure to contribute to knowledge sharing among a larger population of farmers and agronomists in the Fergana Valley. What is more, such training courses help to deal with problems in the field and achieve considerable impact.

Young researchers from Azerbaijan, Uzbekistan hone wheat breeding skills

Ensuring wheat self-sufficiency is high on the agricultural agenda in Central Asia. Along with national partners, international research and donor organizations assist the countries working towards this goal. But in view of diseases like yellow rust and abiotic stress caused by very high and low temperatures in the region, knowing concepts and methods in breeding wheat, among other things, can be crucial for production in general. Spreading knowledge forms part of the activities by the International Center for Agricultural Research in the Dry Areas (ICARDA) in Central Asia and the Caucasus (CAC). ICARDA improves local researchers' knowledge and skills in wheat breeding and contributes to capacity-building efforts in the region. Its scientists regularly organize short training courses and

Budding researchers from Azerbaijan, Uzbekistan improve their knowledge in wheat breeding. Photo by Shakhodat Bobokulova.

workshops for young local researchers in all areas of wheat production.

In keeping with their mission, ICARDA and Kashkadarya Research Institute of Grain Breeding and Seed Production organized recently a training course in Karshi, Uzbekistan. The objectives of the course, held from 23 April to 3 May 2013, were to brief the participants on the concepts of wheat breeding and the use of traditional and modern methods in crop breeding. It was held as part of ongoing research project "Utilization of wild relatives of wheat in developing salinity tolerant winter wheat with improved quality for Central Asia", implemented in Central Asia by ICARDA and funded by Germany's Federal Ministry for Economic Cooperation and Development (BMZ). Ten young researchers from Uzbekistan and Azerbaijan attended the course led by Dr Ram Sharma and Dr Zakir Khalikulov, of ICARDA-CAC, and Dr Saidalim Gaybullaev (Gallaral Research Institute). As part of the practical training, the participants also had a chance to complete wheat hybridization and visit wheat breeding fields at Kashakadarya Research Institute, Gallaral Research Institute, the Uzbek Research Institute of Plant Industry in Uzbekistan and Krasnovodapad Breeding Station in Kazakhstan.

Cost-effective seed potato production to boost smallholder farmers' income in Uzbekistan

Potato is an important food and cash crop in Uzbekistan. Growing and selling potato makes up a big part of income for smallholder farmers in rural areas. But there are many factors that reduce farmers' margins and make potato cultivation less attractive. Potato production in Uzbekistan mainly depends on imported seed potatoes, which are quite expensive for farmers and account for about 50% of the cost of production. The imported seed potatoes cost around 2,400 UZS (slightly over 1 USD at the exchange rate) and more per kg in 2012. Moreover, not many can afford hiring agricultural machinery during the planting season. So many farmers end up using the same seed potatoes for two or more seasons, and often collect much less harvests because of seed-borne diseases accumulated in seed potatoes selected by farmers.

Smallholder farmers in Uzbekistan learn a cost-effective way of producing seed potatoes. Photo by Durbek Khalikov.

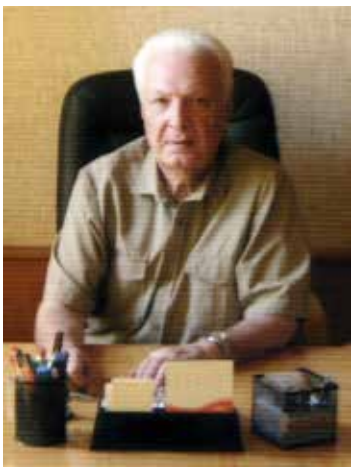
This problem made the CIP regional office in Uzbekistan come up with a cost-effective solution, which is valid for smallholder farmers. To this end, CIP, an international potato research organization, started a project on positive selection of seed potatoes in 2012 in Tashkent Region. Normally, farmers start sorting out potatoes, which are later kept in the cellar, at the end of winter: the largest ones are for sale or personal consumption, while the smallest ones are used as seeds in the next season. This method is deeply flawed and contributes to increasing the spread of diseases. The selection of seed potatoes must be done in the field by choosing the healthiest and most vigorous plants when they are about 25 cm high, and continues until plants close the rows. This selection technique is called "positive selection", as opposed to "negative selection" that involves removing plants showing signs of a disease.

In positive selection, the selected plants are marked with wooden stakes and harvested by hand before the others. Seed potatoes must be kept in the store or cellar separately for the next season. These steps are repeated in the following year. Seed tubers from the selected plants must be always planted in separate fields. This very simple technique helps farmers to ensure continuity of healthy seeds and good yields over subsequent seasons. With this in mind, CIP specialists trained a group of farmers in positive selection in May 2012. In fact this training is part of the activities being carried out within the CIP-led global CGIAR Research Program on Roots and Tubers. Following the training, the farmers selected some seed potatoes using positive selection. These selected tubers were harvested in October 2012 and kept separately from those harvested from the other plants until next season. In early May 2013 these seed potatoes were planted in two separate land plots, one with seeds from positive selection and the other with seeds selected traditionally. This was done to show farmers the difference between their traditional methods and positive selection. In the course of the season, all the plants will be screened using Enzyme-linked immunosorbent assay (ELISA) so as to show farmers the better value of positive selection compared with traditional seed multiplication methods due to the decreased amount of viruses in the selected plants. ELISA is used in, among other things, agriculture to detect potato viruses.

True, it will take some time before positive selection is adopted widely. But this is surely the first step towards greater positive impact on the livelihoods of smallholder farmers in rural areas. It will save farmers money and increase their income. What is more, if potato cultivation gains more appeal, it could contribute to more employment opportunities for young people too.

MISCELLANEOUS

Noted Georgian scientist celebrates 80th birthday



On 21 May 2013 leading Georgian scientist Academician Shota Chalaganidze turned 80.

A graduate of the Agricultural University of Georgia, Acad. Chalaganidze has had a remarkable career spanning several decades. During his lengthy professional career, he worked in different roles as director-general of the Research and Design Institute of Agricultural Engineering; a professor at Agrarian and Technical Universities; head of department; state committee chairman; and minister. Acad. Chalaganidze holds a PhD in engineering, and is a member of the international and Georgian academies of engineering; and a member of the Academy of Agricultural Sciences.

His meritorious services and commitment to scientific excellence have won him many honors. He is a recipient of an honorary title of 'Engineer of the Year'; a title of 'Honored Engineer' of Georgia; and received a state award in science and technology. He is a holder of an Order of the Friendship of Nations and an Order of Honor.

For several years he was the president of the Academy of Agricultural Sciences of Georgia. He is on the board of the Georgian Association of Scientific and Engineering Societies and the council of the Engineering Academy of Georgia. Acad. Chalaganidze is also a prolific scientist and writer. He is the author of over 200 articles, books and inventions.

Acad. Chalaganidze has been associated with the CGIAR Regional Program for Central Asia and the Caucasus since 2008. He has also been the national coordinator and head of the National Agricultural Research System in Georgia since 2008.

On behalf of the CGIAR-CAC Program we would like to congratulate Acad. Chalaganidze on his birthday and wish him success in his work, happiness and a long life.

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