ICARDA has been working with partners in Azerbaijan since 1998 and together has developed national research priorities, focusing on germplasm enhancement of wheat, barley, chickpea, and lentil to boost yields, and the promotion of sustainable natural resource management and conservation agricultural practices.

ICARDA's ties with Azerbaijan

Working together for sustainable agricultural development, food security, and better livelihoods

Farmers enjoy income boost from no-till sunflower after winter wheat in the Ter-ter and Barda districts, sites of ICARDA's conservation agriculture projects

Role of agriculture in Azerbaijan

Area
Land area: 86,600 km²
Agricultural area: 48,000 km²
(58% of total land area)

People
Population: 9.5 million
Rural population: 4.5 million
Labor force in agriculture: 38.3%

GDP
GDP per capita: US$10,700
GDP due to agriculture: 6%

Azerbaijan's agricultural sector

Azerbaijan's connection with agriculture is deep rooted, it being among the handful of countries where crops and nomadic cattle husbandry first emerged. Archaeological excavations reveal the practice of growing cereals dates back up to 10,000 years in the region.

Over the past 10 years, the government has given priority to the agricultural sector providing subsidies to help reduce production costs. Since 2001, agricultural producers have been exempt from most taxes, leading agricultural production to increase from US$1.5 billion to US$6.1 billion. These measures have increased the country's self-sufficiency in food production. Crop production and cattle breeding has tripled, and poultry meat production quadrupled. As a result, rural poverty has dropped from 44% in 2002 to 27% in 2005 and nutrition is also improving.
Azerbaijan's potential

Azerbaijan has great potential for growth and a comparative advantage in producing traditional agricultural products with favorable soil-climatic conditions, relatively cheap labor, and access to rail transport. There is also an opportunity for diversifying from cereals to higher-value commodities such as fruits and vegetables, and tapping into export markets to Russia, other neighboring countries, and beyond.

However, land degradation is a major national challenge and a severe constraint to increased productivity. About 43% of Azerbaijan's land area is subject to natural or human-induced erosion. Logging, unregulated grazing, and dilapidated irrigation and drainage infrastructure contribute to ongoing erosion, resulting in increased flooding and landslides. Eroded surfaces cover about 49% of agricultural land and 20% of forests affecting people's livelihoods, increasing vulnerability to natural disasters, and putting at risk species and ecosystems.

National challenges to agricultural expansion
- Land degradation
- Outdated irrigation systems
- Weak agricultural extension
- Low agricultural investment
- Limited market and distribution infrastructure.

Supporting Azerbaijan's germplasm conservation, enhancement, and adaptation

The Central Asia and the Caucasus (CAC) region is the center of origin of a number of economically important crop species and has a rich genetic diversity. ICARDA, along with CGIAR's* Bioversity International and CIMMYT*, has worked with national systems to provide support in the collection, conservation, and documentation of wild and locally adapted cultivars.

Wheat is the most important cereal crop in the region. Since 1998, ICARDA has supported the development of a sustainable national breeding program in Azerbaijan. A large amount of improved wheat germplasm has been provided and promising lines identified. By 2001, the area sown to cereals, especially bread wheat, had significantly increased. Promising new varieties of winter wheat had been developed that showed robust disease resistance against stripe rust and markedly increased yields. Two new varieties introduced in Azerbaijan gave an average increase in yield of around 30%.

Barley is the second most important grain crop in the region. Annually, ICARDA provides access to over 1000 barley lines to Azerbaijan's barley breeders who identify and use promising lines for field testing. The latest improved variety released in Azerbaijan out-yielded the local variety by up to 40%.

After independence, national scientists in Azerbaijan realized the need for crop diversification to provide sustainable cereal-based cropping systems. Legumes, especially chickpea and lentil, were seen to be ideal for these new crop rotations. ICARDA provided improved

Fighting the threat of wheat stripe rust – a devastating crop disease

The CAC region has seen six yellow (stripe) rust epidemics since 1999 – a serious problem with winter wheat cultivation in the region. ICARDA's initiative in the region to fight the disease goes as far back as 1996 when it organized a Wheat Rust Workshop for West and Central Asia in Karaj, Iran, in collaboration with CIMMYT. ICARDA's scientists have helped identify physiological races of stripe rust in Azerbaijan and a regional Wheat Yellow Rust Network now unites the efforts of national breeders, pathologists, and geneticists.

In 2011, farmers in Azerbaijan conducted successful field evaluations on 9 genotypes out of 16 sent by ICARDA breeders for stripe rust resistance and yield performance. Additionally, ICARDA conducted wheat rust surveillance in the country in 2009 and 2011 as part of its proactive strategy to guard against the disease.

ICARDA and its national partners have also stepped up efforts to mitigate the impact of the virulent 'Ug99' strain of wheat stem rust, another likely threat.

* CGIAR: Consultative Group on International Agricultural Research; CIMMYT: International Maize and Wheat Improvement Center
germplasm with on-farm evaluation and demonstrations for farmers. Scientists worked closely with national breeders to identify promising chickpea and lentil varieties. The most promising improved chickpea variety yields about 20% more than the traditional variety.

Livestock is an integral and important part of farming systems where crop production is limited by large seasonal variations in rainfall. Small-scale livestock farmers are the main source of domestic meat and milk in Azerbaijan and are experiencing increasing demand as the market for animal products has increased over the last three years. ICARDA’s breeding program in Azerbaijan is helping develop and produce improved lines of forage legumes. New promising lines of grasspea and vetches have been identified in Azerbaijan and large-scale seed production taken up.

Committed to institutional development, ICARDA has worked with the Azerbaijan Genetic Resources Institute and the Azerbaijan Plant Genetic Resources Conservation program, and assisted in developing seed storage facilities in Azerbaijan.

**Improved varieties boost yields**

In Azerbaijan today improved varieties developed through collaboration with ICARDA and other CGIAR centers account for about 50% of the area under wheat, 6% of the area under barley, and 20% of the area under chickpea and lentil.

**Combating land degradation and promoting sustainable practices**

Since 1993, ICARDA has been active in promoting conservation agriculture (CA) cultivation systems that increase water-use efficiency and help prevent erosion. These practices have resulted in higher crop yields, lower input costs, and have helped improve water and soil conservation.

The expected long-term impact of a regional project carried out by ICARDA and FAO and launched in 2011 is to improve rural livelihoods and food security through increased productivity of irrigated farming systems, using the principles and practices of CA. The project has shown that in Azerbaijan cereals under minimal to no-till cultivation produced yields comparable to (maize) or higher than (winter wheat) conventional cultivation. Raised-bed cultivation reduced seed rates by almost half, increased water-use efficiency and provided higher winter wheat yields than conventional cultivation. In Azerbaijan, trials are currently testing laser land leveling as a basis for improved irrigation practices and cereal-food legume rotations with crops suitable for CA.

Demonstrations, participatory trials and field days have increased farmer confidence in CA. The highest net benefits (US$745/ha, 139% profitability) were obtained with raised-bed planting while conventional cultivation achieved the lowest (US$495/ha). By 2012, CA was being practiced on 1246 ha in Azerbaijan. It is expected that by the end of the project improved water and soil conservation techniques will be sufficiently validated by a core group of farmers and an expanded program will be prepared for farmers in a broader geographic area.

In a separate project supported by the OPEC Fund for International Development, ICARDA tested ways to rehabilitate, intensify, and diversify production in degraded lowland steppes to provide forage for livestock while conserving the environment and biodiversity. An innovative direct-seeding system was shown to be quicker and cheaper than transplanting seedlings.
ICARDA's TIES WITH AZERBAIJAN

Building Azerbaijan's national capacity

ICARDA is committed to building national capacity as part of its agricultural development efforts across the world. In Azerbaijan, ICARDA has prioritized the training of young scientists by providing support for advanced degree work, organizing short-term training courses both in the region and at ICARDA headquarters, and sponsoring participation at seminars and workshops both in Azerbaijan and abroad.

ICARDA's capacity development initiatives in 2010/11 included regional training courses on experimental design and analysis, as well as on writing research manuscripts, held in Uzbekistan, where young researchers from Azerbaijan participated. Researchers from the country also participated in an intensive nine-week course on the use of biotechnology tools for crop improvement.

During 2012 to 2013, ICARDA organized multiple courses and field days on CA in Ter-ter and Barda districts. Discussions on practices overseas and issues such as residue management, improving soil health, and reducing erosion stimulated keen interest from farmers in drill seeded zero tillage summer crops after the winter wheat harvest. Participants included policy makers, officials from the Ministry of Agriculture, researchers, and farmers.

Over the past five years, ICARDA has engaged more than 1000 farmers, researchers, breeders, seed producers, policy makers, journalists, and students in the CAC region through field days, workshops, and training courses, organized in partnership with NARS. Participants learnt about technologies for sustainable land management, crop improvement, and crop and livestock production.

Recent courses held at Azerbaijan Genetic Resources Institute, Baku:
- DNA marker application for crop improvement, April 2011
- Application of modern conventional tools in PGR characterization, pre-breeding and breeding, June 2011

Looking ahead with Azerbaijan

Azerbaijan is gearing up to modernize and boost agricultural production by prioritizing measures such as extending state support for farmers, improving the allocation of subsidies, stimulating intensive production methods and advanced technology businesses, improving the insurance mechanism, and encouraging environmentally friendly goods. As it moves forward, investments in innovations to alleviate and rehabilitate degraded lands should continue to be a top priority. It is also critical for the country to adopt sustainable farming methods, characterized by conservation agriculture which can help unleash the country's food production potential while ensuring sustainable management of its natural resources.

About ICARDA
Established in 1977, ICARDA (International Center for Agricultural Research in the Dry Areas) is one of 15 centers supported by the CGIAR Consortium. ICARDA's mission is to contribute to the improvement of livelihoods of the resource-poor in dry areas through research and partnerships dedicated to achieving sustainable increases in agricultural productivity and income, while ensuring efficient and more equitable use and conservation of natural resources (www.icarda.org).

Regional Program for CAC
ICARDA implements its research activities in the CAC countries under the umbrella of the CGIAR Regional Program for Sustainable Agricultural Development – a partnership of CGIAR research centers and the national agricultural research systems (NARS) of Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. The partnership is convened and hosted by ICARDA (www.cac-program.org).

Regional Coordinator of ICARDA-CAC
Dr. Jozef Turok, Head of CGIAR Program Facilitation Unit and Regional Coordinator, ICARDA-CAC
PO Box 4375, Tashkent 100000, Uzbekistan
Tel: +998-71 2372130, +998-71 2372169
E-mail: j.turok@cgiar.org