

---

# Central Asia and ICARDA

---

Ties that Bind



**International Center for  
Agricultural Research in  
the Dry Areas**

## About ICARDA

Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is governed by an independent Board of Trustees. Based at Aleppo, Syria, it is one of the 16 centers supported by the Consultative Group on International Agricultural Research (CGIAR), which is an international group of representatives of donor agencies, eminent agricultural scientists, and institutional administrators from developed and developing countries who guide and support its work.

The mission of the CGIAR is to promote sustainable agriculture to alleviate poverty and hunger and achieve food security in developing countries. The CGIAR conducts strategic and applied research, with its products being international public goods, and focuses its research agenda on problem-solving through interdisciplinary programs implemented by one or more of its international centers, in collaboration with a full range of partners. Such programs concentrate on increasing productivity, protecting the environment, saving biodiversity, improving policies, and contributing to strengthening agricultural research in developing countries.

In the context of the challenges posed by the physical, social and economic environments of the dry areas, ICARDA's mission is to improve the welfare of people in the dry areas of the developing world by increasing the production and nutritional quality of food, while preserving and enhancing the resource base. ICARDA meets this challenge through research, training, and dissemination of information in partnership with the national agricultural research and development systems.

ICARDA serves the entire developing world for the improvement of lentil, barley and faba bean; all dry-area developing countries for the improvement of on-farm water-use efficiency, rangeland and small-ruminant production; and the West Asia and North Africa region for the improvement of bread and durum wheats, chickpea, and farming systems. ICARDA's research provides global benefits of poverty alleviation through productivity improvements integrated with sustainable natural-resource management practices.

Much of ICARDA's research is carried out on a 948-hectare farm at its headquarters at Tel Hadya, about 35 km southwest of Aleppo. ICARDA also manages other sites in Syria and Lebanon, where it tests material under a variety of agroecological conditions. However, the full scope of ICARDA's activities can be appreciated only when account is taken of the cooperative research carried out with many countries in West Asia and North Africa and elsewhere in the world.

The results of research are transferred through ICARDA's cooperation with national and regional research institutions, with universities and ministries of agriculture, and through the technical assistance and training that the Center provides. A range of training programs is offered extending from residential courses for groups to advanced research opportunities for individuals. These efforts are supported by seminars, publications, and specialized information services.

# **Central Asia and ICARDA**

**Ties that Bind**

**No. 12**



**International Center for Agricultural  
Research in the Dry Areas**

© 1997 The International Center for Agricultural Research  
in the Dry Areas (ICARDA)

All rights reserved

ICARDA encourages the fair use of this material.  
Proper citation is requested.

**Citation:** ICARDA. 1997. Central Asia and ICARDA. Ties that  
Bind, No. 12. ICARDA, Aleppo, Syria, 20 pp. En.

ISBN: 92-9127-066-0

**AGROVOC Descriptors:** basic needs; cereals; seed production;  
plant production; animal production; germplasm; biodiversity;  
rangelands; resource conservation; training; research projects;  
research networks; international cooperation; international organiza-  
tions; CGIAR; Kazakstan; Kyrgystan; Tajikistan; Turkmenistan;  
Uzbekistan.

### **Headquarters**

International Center for Agricultural Research in the Dry Areas  
(ICARDA)

P.O. Box 5466, Aleppo, Syria

Tel.: (+963) (21) 213433, 213477, 225112, 225012

Fax: (+963) (21) 213490, 225105, 219380

Telex: (492) 331208, 331263 ICARDA SY

E-mail: ICARDA@cgnet.com



# Central Asia and ICARDA

## The Region

Central Asia is an enormous area: the five Central Asian republics—Uzbekistan, Kazakstan, Kyrgyzstan, Turkmenistan and Tajikistan—have 400 million hectares. Wheat and cotton are important. So is livestock: about 260 million hectares are rangeland. The share of agriculture in the region's economy is twice as high as that in the rest of the developing world: 30% compared with 15%, and the rural population is 57% of the total. The environment is comparable with ICARDA's traditional region in West Asia and North Africa (WANA)—low rainfall; extremes of temperature; and the landscape a mixture of mountain, desert and steppe.



Gus Gimzburger

*A local market in Uzbekistan, showing a wide range of dairy and other products. Market economies are developing rapidly in the Central Asian republics as a result of economic liberalization.*



*December 1995: ICARDA Director General Prof. Dr Adel El-Beltagy (right) with the President of the Uzbekistan Academy of Sciences, Academician Dr S. N. Usmanov (center) and Dr Z. Khalikoulov of the Uzbekistan Ministry of Foreign Affairs*

In the Soviet era, the region covered by the five Central Asian republics was essentially a commodity-producing component of a larger system, importing inputs from elsewhere and exporting its produce back. Each republic now faces the challenge of developing a 'stand-alone' economy, a process that will require enormous diversification of agricultural production. This will be a good idea for environmental as well as economic reasons. Central Asia faces levels of yields and production that are well below those of other countries. Also, annual productivity and production show great variation, partly due to the harsh and variable climate and short growing seasons.

But the region also has strengths. The agricultural potential is great, and there are enormous intellectual resources in agricultural research, built on a long history of agricultural research in Central Asia. There are many institutes and research farms, often very large, for example, the Karakul Sheep Institute in Samarkand. The NARS

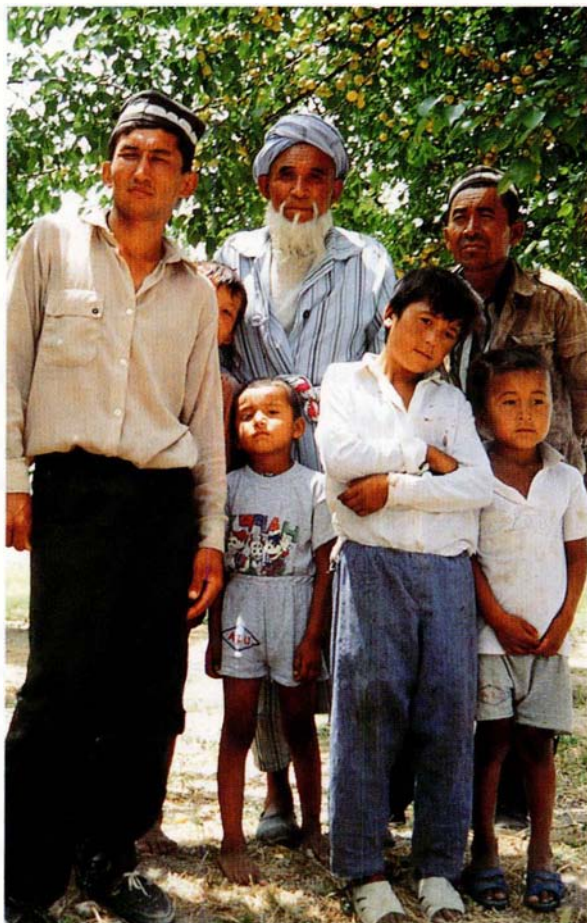
*Three generations of an Uzbek farming family in their orchard an oasis in the middle of a stretch of range-land.*

(national agricultural research systems) in Central Asia are experienced and long-established. But their scientists face new challenges posed by the dismantling of the USSR's central research system.

Central Asia has diverse agriculture. A brief comparison of the five republics demonstrates this.

## **Kazakstan**

Kazakstan has a population of 17.5 million. It is similar to much of WANA—more than 80% of the land is steppe and desert. The climate is dry and continental with hot summers and very cold winters. Rainfall distribution is unequal: although the plains generally receive 300–400 mm per year, the rest of the country makes do with less than 100 mm. Total area is 271.3 million hectares, but only 35.7 million hectares is arable; 2.2 million is irrigated. Important crops are wheat, barley, millet, rye, oat, potato, cotton, and vegetables.



Tom Nordham

Arguably, however, the most important agricultural activity is livestock; there are 33.5 million sheep.

## **Kyrgyzstan**

Kyrgyzstan has a population slightly larger than that of Turkmenistan—4.5 million. But the total area is much smaller—19.85 million hectares. Of this, 50% is situated between 1000 and 3000 meters altitude—one-third is over 3000 m. Pasture covers about 44% of the land area, and there are about 9 million sheep. The climate is continental and dry, and rainfall ranges between 100 and 1000 mm. Only 1.4 million hectares of land is arable; 1 million hectares is irrigated. Main crops are forage and fodder crops, barley, wheat, maize, potato, and cotton; vegetables are also important.

## **Uzbekistan**

Uzbekistan is just 44.8 million hectares, but it has a population of 23 million. Like Kazakhstan, it is characterized by steppe and flat land. Only 4.5 million hectares of land is arable; 4 million hectares is irrigated. The climate is dry and continental; desert or semi-desert covers 70% of the country. Rainfall is below 100 mm in 40% of the area and 80–200 mm in the plains. But the mountains receive 400 to 600 mm—and can have up to 1600 mm. The main crop is cotton; other crops are wheat, barley, rice, maize, and potato. Fruits and vegetables are also important. There are 8.6 million sheep.

## **Turkmenistan**

Turkmenistan has a population of about 4 million and a land area of 47 million hectares. Of this, 32.4 million hectares is classified as agricultural land according to FAO (Food and Agricultural Organization of the United Nations), but only 1.4 million hectares is arable land, and nearly all of this is irrigated—suggesting that the country may face problems typical of WANA, with the need



to protect rangeland and guard against the environmental problems that come with inappropriate and excessive irrigation. Turkmenistan has been hit particularly badly by the loss of inputs from the former Soviet Union. Nonetheless, cereal area and production have greatly increased in recent years. Wheat is much more important than barley. Fruit production has been increasing for many years, but that of apple in particular since 1990; peach is becoming more important. There are 5.4 million sheep.

## **Tajikistan**

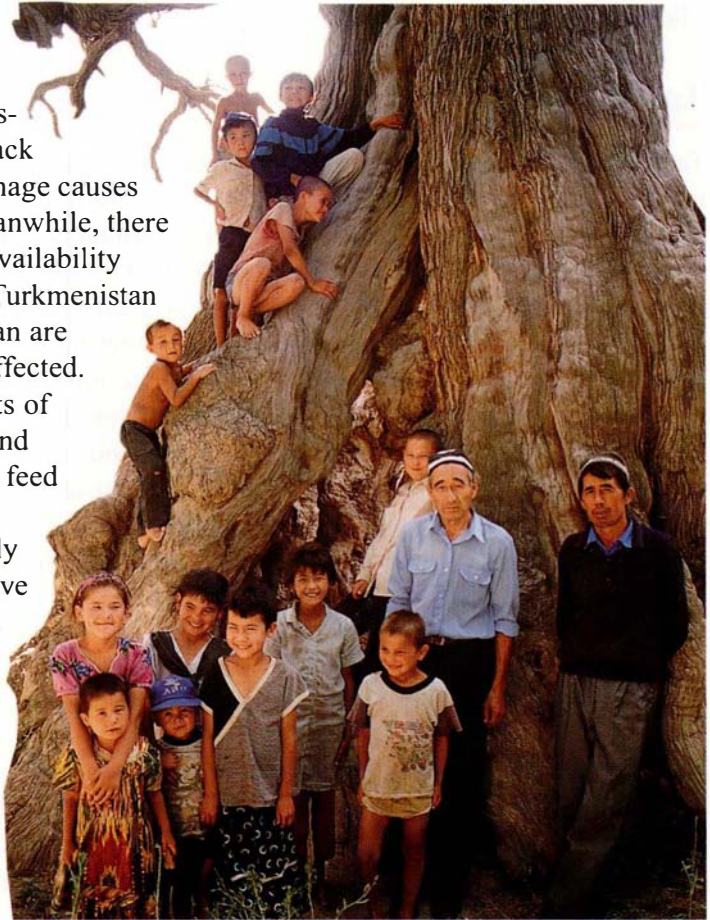
Tajikistan, like Kyrgyzstan, is characterized by mountains. It is physically the smallest of the five republics at 14.3 million hectares, but supports a large population—5.9 million—from an agricultural area of 4.4 million hectares, of which just 810,000 hectares is arable. Once again, most of this (718,000 hectares) is irrigated. The area planted to cereals has continued to increase in recent years, although there are some signs that this trend is coming to an end; wheat is much more important than barley. Cotton remains a key crop. However, diversification is taking hold: apple and cotton areas have shot up since 1990, as have, to a lesser extent, the areas for peach, plum, watermelon and apricot. Some tobacco is now being grown, and there is an increasing area devoted to oilcrops. The sheep population is 2.5 million.

## **The Challenge**

**F**ood imports, unlike in the past, no longer supplement production in Central Asia, and this has led to a drive for food security and thus a concentration on domestic production of cereals. This is being done by intensification, and expansion of area; the first has caused monoculture without adequate use of fertilizers that has damaged soil fertility, while the second has reduced crop diversity. Uzbekistan has increased its wheat area by 25% since 1990, but it is now trying to

diversify its production, and to increase feed and forage supply. Kazakhstan is fortunate in that it produces three times its domestic needs in cereals, but yields are low and, again, there is a need to diversify; the country aims to reduce its cereal area while increasing yields, so that land can be used for other crops.

Environmental damage has been aggravated by, for example, excessive monoculture of cotton. Inadequate crop rotations cause reduced soil fertility and increased pests and diseases, and lack of land drainage causes salinity. Meanwhile, there is reduced availability of inputs—Turkmenistan and Tajikistan are especially affected. In some parts of Kazakhstan and Kyrgyzstan, feed and fodder supply problems have resulted in a decline in livestock numbers.



*Villagers with their unique juniper tree, in Tim-Karnap, Samarkand Province, Uzbekistan.*

# Development of Partnerships

Although ICARDA has had linkages with the Central Asian republics for a long time, through exchange of germplasm and scientific visits, the Center's first scientific mission to the region visited Kazakhstan in 1987, and laid the foundation for increased collaboration. After a scientific mission to the region by ICARDA scientists in May 1995, the Center took the initiative of organizing a workshop, *Identification of Needs for Agricultural Research and Seed Production for the Newly Independent Republics of Central and West Asia*, in collaboration with GTZ/BMZ (German Assistance Agency/German Ministry of Technical Cooperation) and the Uzbekistan Academy of Agricultural Sciences. The workshop took place between 5 and 9 December 1995, in Tashkent.



*ICARDA had contacts with Central Asia long before the break-up of the Soviet Union. Here scientists from the Center are seen with colleagues in Kazakhstan in 1987.*

In addition to a team of key ICARDA scientists and managers, the workshop was attended by representatives of the eight newly-independent republics of Central and West Asia, and three other CGIAR (Consultative Group on International Agricultural Research) Centers—CIMMYT (Centro Internacional de Mejoramiento de Maíz y Trigo), ISNAR (International Service for National Agricultural Research) and IFPRI (International Food Policy Research Institute)—as well as GTZ and BMZ; the Agha Khan Foundation of

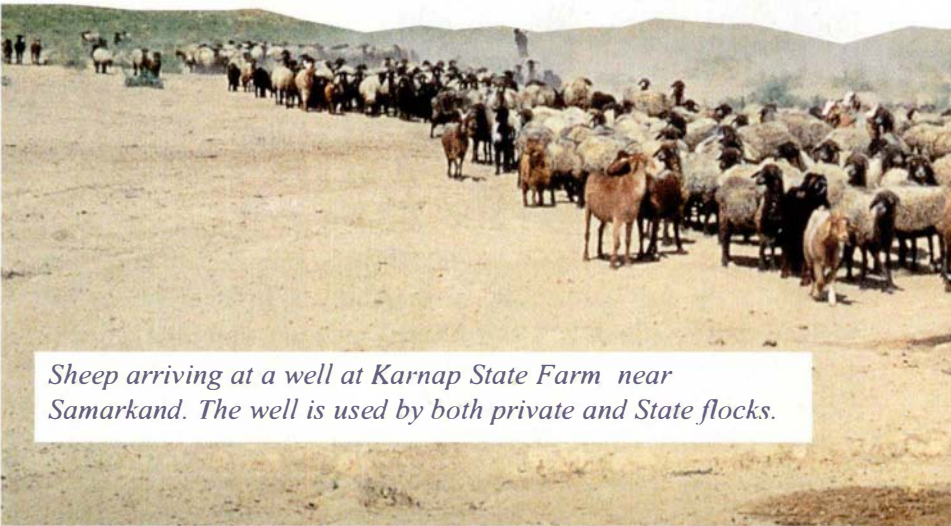


Tajikistan, and TACIS (Technical Assistance for the Commonwealth of Independent States) supported Cereals Project in Turkmenistan.

The workshop identified agricultural research needs, including research on: water-use efficiency in irrigated systems; salinity control; control of water erosion and development of mountain slopes; the effects of the transition process away from centralized state farms to private farms—especially how the changes in ownership and management can affect soil and water management; seed production, and livestock and range management.

Further initiatives from ICARDA for the five republics of Central Asia continued in 1996 through its Highland Regional Program (HRP) based at Ankara, Turkey. Exchange of germplasm, information and scientific visits increased. Scientists from Central Asia were provided support to attend regional and international conferences.

With livestock being a key agricultural commodity in the region, another meeting on *Regional Assessment of Animal Production in Central Asia*, was organized in Tashkent between 27 February and 1 March 1996 in collaboration with the SR-CRSP (Small Ruminant—Cooperative Research Support Program of the USAID—United States Agency for International Development), the University of



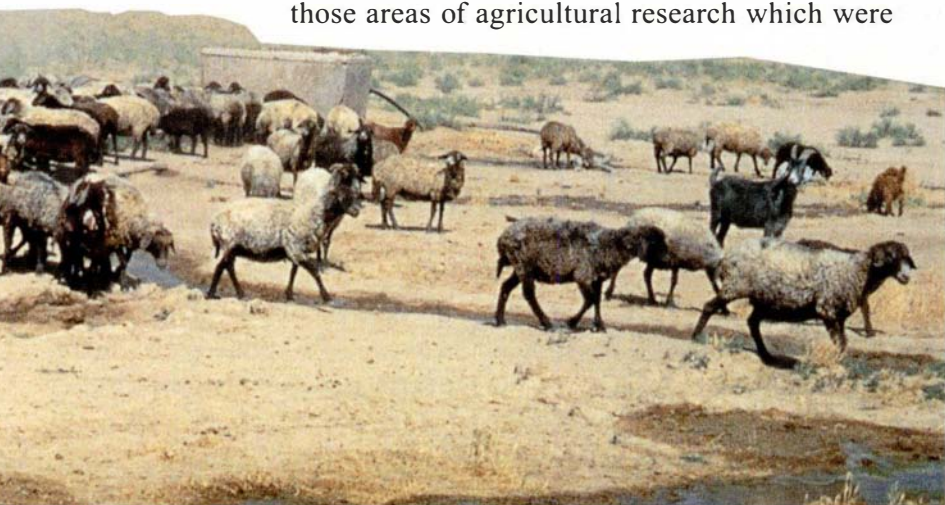
*Sheep arriving at a well at Karnap State Farm near Samarkand. The well is used by both private and State flocks.*



California, Davis, and UAAS (Uzbekistan Academy of Agricultural Sciences). This meeting was attended by animal scientists, pasture and range specialists, and socioeconomists from the five Central Asian republics, the USA, the United Kingdom's Department for International Development (then the Overseas Development Administration), and ICARDA.

This meeting led to the identification of important research activities under two themes: livestock and environment; and policy and economics. Participants agreed to develop a regional network on livestock activities, with ICARDA having a significant role. Also, a committee was formed, with one representative from each of the five Central Asian republics, to coordinate action at the regional level.

In view of ICARDA's comparative advantage in Central Asia—because of its prior contacts in the region—the CGIAR Task Force on Central/Eastern Europe and the Former Soviet Union asked ICARDA to assist it in organizing a consultation meeting between the CGIAR and the Central Asian and Transcaucasian republics, in Tashkent, 5–7 September 1996. This was done in collaboration with UAAS. In addition to CIMMYT, ISNAR, and IFPRI that attended the December 1995 meeting, several other CGIAR Centers were present in this consultation meeting. The consultation reinforced the need for collaboration in those areas of agricultural research which were



identified in the December 1995 meeting. Based on this consultation, the Task Force recommended to the CGIAR to support agricultural research and human resource development in this region. The CGIAR approved this recommendation at its International Centers Week 1996 in Washington, DC and encouraged the Centers to develop partnerships with the NARS in Central Asia in the areas of their research mandate. The only condition was that resources for these linkages should be found in addition to those approved by CGIAR for the agreed research agenda of each Center.

Implementing this recommendation, ICARDA has spelled out in its Medium-Term Plan 1998-2000 its strategy and mechanism for forging strong research partnerships with the NARS in Central Asia. In doing so, the Center has benefitted from the consultations mentioned above. Central Asia, which is geographically and agroecologically a continuum of WANA—ICARDA's traditional area of regional responsibility—is a partner of ICARDA in the same way as its five regional programs within WANA. As is done with other regional partners, ICARDA organized the *First ICARDA/Central Asia Coordination Meeting* in Aleppo, 12-16 September 1997, to develop frameworks for a number of project proposals building on priority areas as identified in the previous meeting, besides reviewing the past and current research collaboration. Twenty-five senior scientist and research managers from five Asian Republics attended this Coordination Meeting.

## Current Collaborative Research Activities

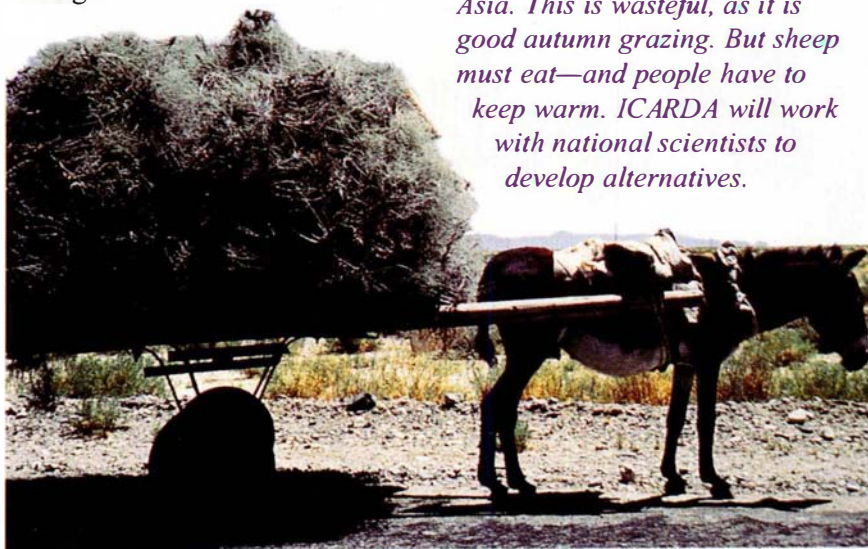
**I**CARDA and the Central Asian republics are now collaborating in a wide range of research areas, in partnership with other CGIAR Centers, ICARDA's West Asian collaborators in its Highland Regional Program, and donor agencies such as BMZ/GTZ (Germany) and USAID.

## On the Range

Rangeland is a valuable natural resource. Permanent pasture accounts for a huge percentage of Central Asia. The region has nearly as much steppe area as the WANA region: 260 million hectares as against 270 million. The local Karakul sheep is an important part of the farming system.

ICARDA collaborates with Central Asian NARS on a number of projects working on rangeland management and livestock production. GIS (Geographic Information Systems) is being used to assess the basic natural resources and productivity in the Central Asian rangeland. Studies are also underway to assess the role of rangeland vegetation in carbon sequestration, which could have implications for global climate change.

*Mining the range: harvesting of artemisia for firewood in Central Asia. This is wasteful, as it is good autumn grazing. But sheep must eat—and people have to keep warm. ICARDA will work with national scientists to develop alternatives.*



A socio-economic model is being used to assess the potential impact of various policy options—under the changing social and ecological situations—on the sustainable development of the range-

lands. The researchers will also test the feasibility of technology designed to improve productivity.

Participatory Rapid Rural Appraisal surveys have been carried out in Samarkand and Dhizhak districts of Uzbekistan in order to understand the practices and problems of integrated livestock, range and crop management. Based on these surveys, technologies for improving production will be designed and tested on farm.

## Seeds for the Future

A mission to three of the Central Asian republics by a senior ICARDA seed specialist in 1994 identified the need—and the great potential—to develop and overhaul their seed production systems. The constraints to efficient seed production identified included lack of adequate funds for crop breeding and quality seed production;

non-availability of spare parts for equipment used for breeding and seed production, and lack of credit to buy production inputs. There is a need for staff training, for processing and seed-testing equipment, and for the development of a marketing system. And there is a need for regional coordination among the republics to make available the results of each others' breeding pro-

Majed Khattib



*An ICARDA headquarters seed health specialist (center) gives a demonstration in the field to trainees from Kyrgyzstan, May 1997.*



grams, share elite seed of regional varieties, and exchange breeding and seed-production information. This regional coordination is of particular importance as the alternative—each republic fully engaging itself in all seed program activities—is too expensive, and will not result in the efficient use of scarce resources. Possibilities for effective regional cooperation in the seed-sector do exist and the following have been suggested.

- Regional breeding, i.e. one country could be responsible for breeding work (including variety maintenance) in a certain crop.
- A regionally-coordinated evaluation system of crop varieties and promising lines developed within the region or introduced from outside.
- Cooperation on activities such as seed-health testing, tissue culture, and meristem culture.
- Standardization across countries for seed certification and testing procedures, seed laws, quarantine regulations, variety testing and release procedures.
- Establishment of a regional seed committee that would meet regularly to discuss seed matters.
- A regional training center to train staff from the region.

ICARDA has suggested that the republics join the WANA Regional Seed Network, which is hosted by ICARDA, to fully benefit from its information network and other activities. It also recommended the setting-up of a regional seed center to address the seed-sector problems of Central Asia as a whole.

A proposal has been developed and submitted to BMZ to support a seed production project in Uzbekistan. If approved, ICARDA will join hands with GTZ to initiate the preparatory phase of the project. There are good prospects for similar collaboration with GTZ on a seed production project in Tajikistan, and these are being explored. In the meantime ICARDA, in collaboration with TACIS, organized a course on seed production for 11 researchers from Kyrgyzstan in Aleppo, Syria, in May 1997.

## A Biodiversity Network

Conservation of agrobiodiversity is of particular importance in harsh environments. Decades of monocropping for high output of cereals and cotton, as well as environmental damage through excessive use of water on cropped areas and overgrazing of rangeland, can lead to a serious loss of wild relatives of crops as well as locally-adapted landraces.

ICARDA, IPGRI and partners in Central Asia, have established a plant genetic resources network to coordinate conservation of Central

Asia's genetic heritage. Known as the *Central Asian Plant Genetic Resources Network*, it emerged from a meeting in Tashkent in October 1996, which was attended by three-member delegations from each of the five Central Asian republics, along with participants from the Vavilov Institute of Plant Industry (VIR, based in St Petersburg, Russia), ICARDA, and IPGRI. The network is an exciting new collaboration, because the potential for exchanging germplasm is immense.

Constraints to biodiversity conservation in the region, highlighted by the October meeting, included inadequate storage facilities; lack of computer support in the documentation and information system; insufficient contacts and germplasm exchange within the region and with VIR; lack of training opportunities and funding, and insufficient interaction with the international community.



Jan Valkoun

*Dr Anna Filatenko (right) of the Vavilov Institute in Syria in 1990.*



In order to tackle these constraints, the new network has established five working groups: field crops; industrial crops; range, pasture and forage crops; horticultural crops; and forest trees. It will also make an early start on training with a course on genetic resources conservation and documentation. This will be conducted jointly by ICARDA and IPGRI.

Central Asia also has its own expertise in biodiversity conservation—the Uzbek Institute of Botany holds more than one million herbarium items from the Central Asia region, and the Uzbek Institute of Plant Industry, with approximately 55,000 germplasm accessions, is the largest genetic resources center in the whole region. The latter is only one part of the renowned VIR collection; but the collection is seriously endangered because of limitation of funds for multiplication and storage.

Future collaboration between ICARDA, VIR and Central Asian NARS involves the repatriation and use of germplasm in the Vavilov collection, and may be supported by a grant from Australia. The VIR database will be upgraded and harmonized for compatibility with those in ICARDA and institutes in Australia. ICARDA will multiply and characterize seed from the collections for VIR—which cannot multiply all types at St Petersburg because of environmental con-

straints, it is too far north—and for use in the Central Asian republics. There are also plans to undertake five strategic cereal and legume collection expeditions in the Central Asian republics, and for national scientists to receive training in genetic resource documentation, evaluation and management.

## Opportunities for Scientific Interaction and Training

---

ICARDA strongly believes in providing training and scientific interaction opportunities to the scientists of the NARS. In addition to attending the two workshops, organized in Tashkent in 1995 and 1996, scientists from the Central Asian republics have been able to attend international events such as the *International Wheat Conference* in Ankara, the *Regional Workshop for Wheat Rusts* in Karaj, Iran, the international conference on *In-situ Conservation of Plant Genetic Resources* in Antalya, Turkey, and the workshop on the *Use of Forage Shrubs in Rehabilitation of Rangelands* in Tunis, Tunisia.

Two Uzbek scientists visited ICARDA's headquarters in November 1996 to see ICARDA's research on forage, pasture and rangeland management, and they discussed possible areas of collaboration between Uzbekistan and the Center. Another Uzbek scientist was sent to the USA for eight weeks of training at the USDA-ARS (United States Department of Agriculture– Agricultural Research Service)/Utah State University, Logan, Utah, where he learnt techniques of measuring carbon-dioxide fluxes. He will apply this training in research in the rangelands of Uzbekistan, as part of a collaborative project between USDA-ARS, ICARDA, and Uzbekistan.

In May 1997, wheat breeders from Uzbekistan, Kazakstan, Turkmenistan, and Kyrgyzstan began long-term training in winter/facultative wheat improvement in Turkey under the joint



CIMMYT/ICARDA Winter Wheat Improvement Program. And eight scientists—a wheat pathologist and a wheat breeder each from Uzbekistan, Kazakstan, Turkmenistan, and Tajikistan—attended a two-week training course on wheat-rust networking, 19–31 May, in Karaj, Iran, which was jointly organized by Iran, ICARDA, and CIMMYT.

## Future Collaboration

Building on the work already done, and the earlier meetings between representatives from ICARDA and the Central Asian republics, scientists at the ICARDA/Central Asia Coordination Meeting in September 1997 identified priority research areas and developed draft project proposals for collaborative research.

In the field of genetic resources, germplasm improvement and seed production, proposals are being developed for research on collection, conservation and use of agricultural biodiversity; understanding adaptation to drought and temperature stress with application of molecular-marker techniques, and seed production for small holders.

In the field of natural-resource management and production systems, proposals are being developed on feed and livestock systems (use of feed resources including forage and fodder crops, and crop residues) and on animal breed characterization and breeding management. The aim is to improve the productivity of livestock in the Central Asian republics, without damaging the natural resources of the rangelands. Proposals are also being developed on soil and water management—particularly enhancing on-farm water-use efficiency—and agroecological characterization.

Agroecological characterization acts like an umbrella over all natural-resource management work; it enables site-specific results and achievements to be transferred and adapted to other areas with similar agroecologies. Central Asian scientists emphasized the importance of this research at the September 1997 meeting.

Preliminary assessment of the possibilities for agroecological characterization has been particularly encouraging. In Kazakhstan, for example, contact has been established with several institutes, notably the Institute for Land Management, the Institute for Cartography, the Kazakhstan Weather Bureau and the Kazakh Institute for Monitoring of Environment and Climate, which have outstanding datasets of relevance to agroecological characterization. Excellent maps exist on vegetation cover, land degradation, soils, and geomorphology. Given such information sources and appropriate integration tools (GIS models), extremely useful planning information could be generated.

ICARDA is joining hands with other CGIAR Centers and stakeholders in Central Asia to foster effective partnerships in agricultural research and development in the region. To create these intra- and inter-country linkages, ICARDA is making good use of its experiences in developing national and regional collaborative programs in WANA. And, to ensure the successful implementation of these collaborative activities, ICARDA has appointed a Liaison Scientist who will be based in Central Asia.



Participants in the First Central Asia/ICARDA Coordination Meeting. The head of the delegations from the Central Asia Republics are (front row): Acad. J. Akimaliev of Kyrgyzstan (third from right): H.E. D. Karadurdiev of Turkmenistan (fourth from right): Acad. S. Usmanov of Uzbekistan (sixth from right): Acad. B. S. Sanginov of Tajikistan (seventh from right) and Acad. A. Satybaldin of Kazakhstan (third from left).



*This 2.5-m high statue at the Karakul Sheep Research Institute in Samarkand depicts the Karakul sheep, long the mainstay of pastoralists in Central Asia. It represents a proud past—and a prosperous future.*