
Highland Research Regional Network

From its early days and until mid 2004, ICARDA managed its regional highland activities through the Highland Regional Program, that included countries of North Africa, West Asia, and CAC where major highland areas of CWANA are located. Because those countries fall within the geographic mandate of other ICARDA Regional Programs, it was decided to address the problems of highland agriculture within the framework of a Highland Research Regional Network (HRN). The goal of HRN is to contribute to improving the welfare of rural populations in the highlands of CWANA through the identification and adoption of strategies and technologies that ensure a sustainable improvement of agricultural productivity in those areas. ICARDA project staff are located in Iran and Afghanistan, while work in Turkey is handled from the headquarters.

Afghanistan

Introduction

ICARDA formally started its outreach program in Afghanistan during 2002 and since then it has significantly contributed towards the rebuilding of agriculture, as a lead agency of the Future Harvest Consortium to Rebuild Agriculture in Afghanistan (FHCRAA). Agricultural production capacity and food security in Afghanistan were greatly damaged by more than three decade of civil strife and extended drought. Given that more than 80% of Afghan families depend upon agriculture for their livelihoods, re-establishing viable livelihoods for the people of Afghanistan is a high priority.

Achievements

- As already indicated under MP6, to jump-start seed production for the 2002 spring planting season, about 3500 MT of high quality wheat seed was distributed to Afghan farmers for seed production. More than 5000 MT of wheat seed produced (in-country) and fertilizer were distributed for 2002 fall planting. Besides wheat, small quantities of seed of other crops was also distributed. Fifty three metric tonnes foundation seed of different crops (bread wheat, durum wheat, barley, lentil, chickpea and vetch) and varieties were shipped from ICARDA's Headquarters to Afghanistan for on-station testing, large-scale evaluation and pre-release multiplication in the fall season. Seed of improved potato varieties was imported from India and Pakistan for multiplication. The Ministry of Agriculture was helped in developing a Seed Law and National Seed Policy; and the Government was assisted with rehabilitating seed testing laboratories in Kabul, Nangarhar, Kunduz, Herat and Baghlan.
- Several research stations (Kabul, Baghlan, Kunduz, Taghar, and Jalalabad) and sub

stations were rehabilitated and farm equipment provided. Six meteorology stations were established in different regions. Seed samples of 41 barley land races and 250 kg seed of several cereal and legume land races conserved in ICARDA Gene Bank were returned to the country.

- More than 120 Afghan researchers were trained at ICARDA's central research facilities at Aleppo; and over 1,500 researchers, extension workers and farmers were trained through organizing in-country training courses. The Afghanistan Ministry of Agriculture Communications Office for Radio was re-equipped, staff was trained and more than 50 radio programs were produced and broadcasted.
- With an overall aim of providing sustainable agricultural development and facilitating adoption and diffusion of improved varieties. ICARDA established 718 demonstrations on improved varieties of wheat, rice, cotton, peanuts, mung bean, potato, tomato, onions, and okra, ICARDA demonstrated the yield potential of improved varieties and associated agro-practices in five target provinces (Ghazni, Helmand, Kunduz, Nangarhar and Parwan). Through organization of 58 field days farmers were trained in best-practices to grow the above crops. Improved varieties and crop management practices resulted in 30 - 70 % higher yields than the farmers' traditional management practices. These results catalyzed a high adoption of the improved varieties and associated technologies. An adoption rate survey is in progress to assess the diffusion of project's activity. More than 40 radio programs were developed to propagate the improved varieties and best practices associated with their cultivation. These were broadcasted by more than 50 private/ Government radio stations to an estimated 15 million listeners.
- To provide rapid access to quality seed of most profitable available crop varieties, ICARDA established 21 Village Based Seed Enterprises (VBSEs) by providing organizational, technical and material support in the form of basic seed and agricultural equipment, like tractors, seed cleaners, threshers etc. Each VBSE consisted of 10-20 progressive farmers who pooled their land, and/or rented lands to grow seed. ICARDA trained VBSE members in seed production, processing and marketing in a profitable manner; and in developing and executing their respective business plans. VBSEs have played very important role in creating consciousness among farmers about the difference of "grain" and "seed". These VBSEs collectively produced 100 MT of quality seed of wheat and some other crops; and sold the seed earning more than 200-300 % profit over the grain. The success of the VBSEs attracting more and farmers to join the existing ones and/or to establish new VBSEs. The VBSE system is expected to form the backbone of the Afghan seed sector.
- ICARDA introduced Protected Agriculture (PA) technology that offered an opportunity for vertical expansion and for generating returns per unit of land and of water from the production of high value cash crops as an attractive alternative to the cultivation of poppy. ICARDA and the Ministry of Agriculture, and Animal Husbandry and Food (MAAHF) established a Protected Agriculture Center (PAC) comprising of four greenhouses, and a Greenhouse Manufacturing Workshop that was used as a training and production facility, respectively. Technicians from ICARDA, other aid

agencies, and from private workshops were trained in production of greenhouse skeleton. The PA project installed 42 greenhouses on-farm and for MAAHF, which allow profitable production of vegetables. Farmers, extension workers, NGO personnel and MAAHF staff were trained in installation and maintenance of greenhouses; and in integrated crop production and protection methods. Success and adoption of the technology is evident by the fact that more than 200 farmers have requested ICARDA to provide greenhouses and technical support.

- Potato is a staple crop in many areas of Afghanistan. ICARDA collaborated with CIP on healthy potato seed production, multiplication and marketing. The high-yielding improved varieties Kufri Chandramukhi (KCM) and Desiree were introduced for potato production in Afghanistan in 2002 that resulted in 30% increase in potato in five provinces in Afghanistan as a result of project's activities to increase seed supply to local farmers and provide rapid access to quality seed of profitable potato varieties. Potato cultivation was also introduced into Helmand, Kunduz and Takhar provinces as a viable alternative livelihood. Technical assistance on seed production, multiplication and maintenance allowed farmers to produce and distribute over 3,000 tonnes of quality seed. As a sustainable alternative to cold storage, 33 country stores with a capacity of 20 tonnes per store were constructed in five target provinces. The project encouraged farmers to grow potatoes under rain-fed conditions in the Northern provinces. More than 4000 farmers, research and extension staff were trained in improved sweet potato production and marketing methods.
- A 3-year program, Research in Alternative Livelihoods Fund (RALF), financed by DFID (UK), and managed by ICARDA was launched in January 2004. RALF circumvents the lack of institutional capacity in Afghanistan by involving research institutions outside Afghanistan such as other CG Centers, UK and US universities, the international NGO's, as well as the Afghan Ministry of Agriculture, Animal Husbandry and Food (MAAHF) and Afghan universities. A competitive mechanism for funding was put in place. Project selection was made through an autonomous Project Review Panel. Through two phases of selection, eleven projects were selected out of a total of 41 proposals. A *website* and an electronic database for the RALF program were created. A RALF Steering Committee consisting of DFID, ICARDA and MAAHF was established, and workshops on 'Medicinal Plants: Research, Cultivation, Conservation, Processing and Marketing' and "Markets, Marketing, Market Processes: National and International Perspectives" were organized in November 2005.

Current Activities

ICARDA-Afghanistan has six ongoing projects. As some of these projects are coming to completion, new project proposals have been developed/submitted to donors, and others are under preparation.

Future Plans

ICARDA in collaboration with MAAHF, members of the FHCRAA and other national and international partners will work on on-farm demonstration of improved crop and livestock production, post-harvest handling and marketing options to facilitate rapid adoption and diffusion to improve the livelihoods of the rural poor.

Iran

Introduction

A significant part of the highlands of the CWANA region is in Iran. The Iran-ICARDA office was established in Tehran in 1994 to contribute to agricultural development and integrated natural resources management through the development of appropriate technological packages and approaches, in collaboration with different Iranian research institutions, as well as the provision of requested training and technical backstopping. The technologies and approaches developed in collaboration with NARS will be of high relevance to other regions with similar climatic conditions and agricultural constraints.

Achievements

- Iran achieved self-sufficiency in wheat production in 2004 after an extensive effort of technology transfer of developed varieties and agronomic packages, and the government decision to guarantee the purchase of the production.
- More than 150,000 ha of rapeseed are cultivated for the first time in the dry areas.
- ICARDA continued its efforts in strengthening the Dryland Agricultural Research Institute (DARI), which doubled the number of experiment stations to reach 12; these stations are distributed across major ecologies and farming systems. More than 23 promising lines of wheat, barley, food legumes and oil seed crops have been presented for release. Cold tolerant chickpea varieties and *Vicia* species accessions were identified for the first time.
- As part of the collaboration with the Seed and Plant Improvement Institute (SPII), wheat and barley germplasm were supplied for irrigated conditions in different environments. ICARDA has also helped the Seed and Plant Certification Research Institute (PVR-SPCRI) in strengthening the formal seed production through intensive training, the establishment of seed health laboratories and the drafting of national legislation and by-laws for registration of varieties and certification of seeds. The rapid adoption of the released varieties and of improved agricultural packages is partially responsible for the wheat self-sufficiency enjoyed by Iran since 2004.
- With the help of the expertise of SPII, assessment and monitoring of the epidemics and virulence of rusts (mainly yellow rust) in Iran and in the neighboring countries has been done.

- Sunn pest populations were monitored and the effectiveness of entomo-pathogenic fungi control method was tested in pilot sites.
- ICARDA has introduced, in collaboration with the University of Tehran, spineless cactus technology in Iran and has organized several traveling workshops to successful project sites in CWANA region for the staff of the Ministry of Agriculture and for farmers of Iran.
- During the last two years and through its projects, ICARDA has strengthened significantly the capacity building and the multi-institutional collaboration in Iran along with the involvement of a national NGO (CENESTA).

Current Activities

ICARDA continues to provide direct expertise in breeding of cereals, food and feed legumes, and oil seed crops for both DARI and SPII. Several regional initiatives are underway:

- ICARDA and the NARS have succeeded in getting two projects within the Water & Food Challenge Program for Karkheh River Basin, one on improving water productivity and the other on the livelihood resilience. These projects are expected to introduce community participation and integrated natural resource management approaches.
- A regional program is launched in Dezful on Irrigated Spring Wheat Improvement for Lowlands focusing on the development of wheat germplasm enhancement and the introduction of raised bed planting technique.
- Monitoring activities continue for Sunn pest, rusts and viruses.

Future Plans

The commitment of Iran to support regional initiatives in breeding for cold areas and irrigated conditions will add momentum to the agricultural development in CWANA region. ICARDA will consolidate its relations with DARI, SPII, PPDR and SPCRI, and will develop partnerships with other research institutions based on the workplan developed for the 2006-2010 period. Talks have been initiated between ICARDA, CIMMYT and SPII to develop a regional program for Winter/Facultative Wheat Improvement for irrigated areas. More research will be conducted on water use efficiency in irrigated areas, conservation tillage in the dry lands, watershed management, and rangeland rehabilitation.

Turkey

Introduction

Highlands cover a large proportion of the cultivated area in Turkey. Because of their harsh environments and poor accessibility, there has been limited research on highland agriculture. Constraints to agricultural production in the highlands that impact negatively on the livelihoods of the rural farmers include low and uncertain rainfall, severe winters, isolation, low-yielding crop varieties, and a host of pests and diseases. Winters are often long and cold, and the cropping seasons are short, resulting in stressful growing conditions. Livelihoods of farmers in such areas are thus negatively affected. To improve agricultural production and livelihoods of the farmers in the highlands, Turkey's Ministry of Agriculture, CIMMYT, and ICARDA joined forces to conduct research on winter wheat through the International Winter Wheat Improvement Program (IWWIP). ICARDA's research programs are also collaborating with various national research institutions and agricultural universities in conducting other relevant research, technology transfer and training for sustainable development of agriculture in dry highland areas of Turkey.

Achievements

- Partnerships to improve crop production were strengthened. Turkey's crop improvement programs in cereals and legumes were strengthened, and a multidisciplinary and multi-institutional approach to research was progressively adopted. A number of improved cultivars of wheat, barley, lentil, chickpea and vetch were released with yield improvements of 10-25%. Several varieties derived from ICARDA germplasm were adopted by farmers in the GAP project, including the durum wheat variety 'Gidara 2,' chickpea varieties 'Gokce' and 'Diyar 95,' and the lentil variety 'Firat 87'. ICARDA provided technical backstopping to establish a seed technology center, including a processing plant for cleaning and treating seed, at Decle University.
- Capacity of Turkish NARS to conduct research for development was strengthened. About 116 research and extension staff were trained, and two graduate students obtained their degrees through collaborative research with ICARDA.
- Environmentally-friendly pest management strategies were introduced and adopted by farmers: Integrated Pest Management options using host-plant resistance, parasitoids and entomopathogenic fungi were introduced to replace the use of insecticides to control Sunn pest, which causes severe damage to wheat and barley in Turkey.
- Options to reduce rangeland degradation and conserve the environment were introduced. ICARDA provided technical backstopping for assessing rangeland biodiversity, supplied 2000 fodder shrub seedlings for rangeland reseeding and seeds of vetch for hay production.
- The use of supplemental irrigation to increase agricultural productivity in water-

scarce environment was demonstrated in the Central Anatolian cool highlands agro ecology.

Current Activities

- Collaborative activities on crop improvement (wheat, barley, chickpea, lentil, and forage legumes), entomology, water management, seed multiplication, small ruminant production and socioeconomics.
- Training courses on crop improvement, natural resource management and seed production for research and extension staff. Support for scientific visits and participation in workshops and conferences, and supervision of graduate students.

Future Plans

The collaboration between Turkey and ICARDA, which has been strong and beneficial to the entire CWANA region, will develop further, especially in areas of germplasm enhancement, natural resource management, and capacity building for scientific agricultural research. Also, collaborative activities within the framework of the joint Turkey/CIMMYT/ICARDA Winter Wheat Improvement Program will constitute a key element of the partnership.