

Lebanon & ICARDA

A three-decade partnership in research for development for improved livelihoods



Terbol Research Station in the Bekaa agro-ecosystem. One of ICARDA's permanent research stations, active since the 1970s.

Key Facts: Agriculture in Lebanon

Some 30% of the country's area (10,452 square km) is arable, with the most fertile areas are located along the coastal strip and in the Bekaa plane where ICARDA's Terbol and Kfardane research stations are located. While agriculture contributes to only 5 % of the country's GDP however, more than 25 % of the total population (4.6 million) is active in the sector. Services such as commerce, tourism, banking and education contribute to around 73% to the GDP while industry contributes to the remaining 22% (2009 statistics). Lebanon relies to a great extent on imports, estimated at \$16,137M in 2009 as compared to exports (\$3478M). Agricultural imports are 16% of all imports and 12% of total exports. Major crops in Lebanon include: fruit trees (28% of total cultivated area), cereals and grain legumes (28%), olives (21%) and vegetables (15%).

Lebanon is ICARDA's second host country and the country that witnessed the launch of the center in the mid-1970s through the ALAD program of the Ford Foundation. This process culminated in 1977 with a host country agreement signed with the Government of Lebanon in 1977, which established ICARDA here as an International Center.

Lebanon and ICARDA today

ICARDA's temporary headquarters has been located in Lebanon Since 2012, hosting a core of staff and some senior management. To support this new presence, partnerships have been expanded with the Ministry of Agriculture and longstanding partners Lebanese Agricultural Research Institute (LARI) and the American University of Beirut (AUB). This has strengthened ICARDA's research infrastructure in Lebanon to serve the national program and provide important support to the center's global science program.

LARI-ICARDA

The partnership with LARI has expanded to include more use of land at Terbol Station, additional space for laboratories, offices and greenhouses and the use of LARI's animal keeping facilities. Cooperation has also been strengthened for legume and cereal pathology. The use of other LARI stations in North Lebanon has also been expanded with four new facilities:

- Seed health laboratory
- Doubled Haploid Laboratory
- Pathology Laboratory
- Virology laboratory

American University of Beirut-ICARDA

The partnership with American University of Beirut (AUB) and its Faculty of Agricultural and Food Sciences has expanded to include use of facilities at its AREC rural livelihoods center.

- Gene Bank and genetic conservation facility
- Rooms for seed preparation & storage (250-300 m2)
- Land for trials and seed multiplication (33ha)
- Office space, trainee rooms and accommodation

The Lebanon-ICARDA Research partnership

ICARDA's longstanding partnership with the LARI has the dual goal of strengthening agricultural research in Lebanon and providing a platform for ICARDA's research, that feeds into its global science program. Collaborative research has been on-going in three research sites since the 1970s – at Terbol (main and permanent site), Kfardan and Tel Amara. In 2012 a new site at the American University of Beirut's Education and Research Center (AREC) was added.

LARI-ICARDA cooperation has resulted in production of many of the improved crop varieties released in Lebanon, which cover large areas of the country. These include bread wheat, durum wheat, barley, chickpea, faba bean and forage legumes. In addition to its on-going research program at Terbol and Kfardan, ICARDA runs demonstration trials, bilateral and regional projects in other locations in the country. This work links to national institutions and other national research partners across Central and West Asia and North Africa.

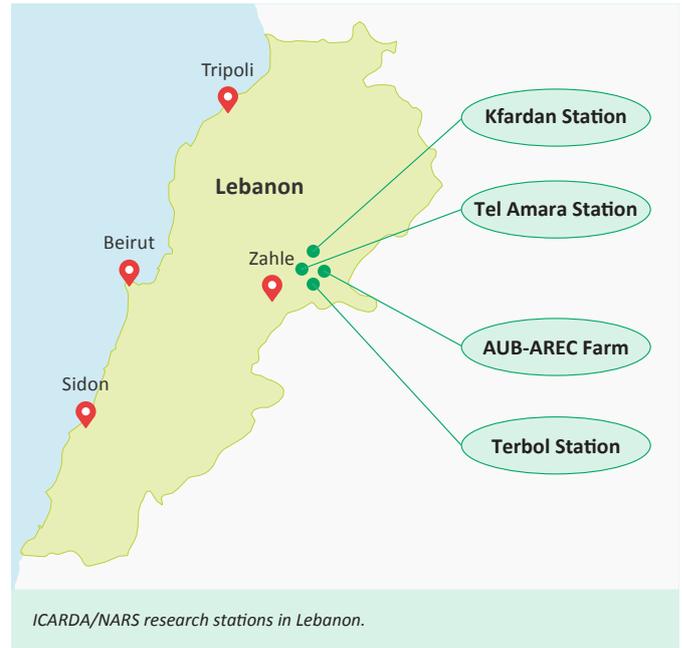
An ideal research setting - in three agro-climatic zones

The centers offer ICARDA researchers three different agro-climatic zones – Mediterranean, coastal and semi-arid – where they can efficiently test and screen germplasm for different physiological and agro-climatic situations, that are similar to many dry areas worldwide. For global drylands research, the country provides an ideal setting for screening crops for tolerance to mild cold, drought and heat stresses and resistance to important crop diseases and insect pests.

ICARDA's Terbol site is 30 hectares supported by recently expanded facilities and laboratories, following the temporarily relocation of ICARDA's headquarters to Beirut in 2012. The site runs trials of winter crops, spring chickpea and summer crops. Researchers at the station do crossing for plant breeding in cereals and legumes as part of the ICARDA global breeding programs. With its relatively mild summers, two generations can be grown per year, considerably speeding the breeding process. This climate is also good for trials for cold nurseries and offseason summer nurseries of cereals and legumes, complementing the work of ICARDA's other research stations. Terbol is also proven to be an excellent site for disease screening, mainly for durum and bread wheat and food legumes.



Strengthening partnerships: ICARDA Director General Dr. Mahmoud Solh signing a new agreement with American University of Beirut Provost Dr. Ahmad Dallal for the use of AUB Farm (AREC), at left, Dr. Houalla, Dean of faculty of Food & Agricultural Sciences.



At Terbol and Kfardan, tests focus on germplasm and improved production technologies of the center's mandate crops, in adaptive testing and dissemination of seeds and new technologies to farmers, on the conservation and sustainable use of natural resources. The technologies developed here are further evaluated in farmer field trials and in other partner countries. The Lebanese stations also provide most seeds of newly released varieties distributed to farmers in Lebanon, used in farmers' verification and demonstration trials.

New crop varieties

In its work with LARI, ICARDA is the main source of experimental and released germplasm of cereals and legumes in Lebanon. Through ICARDA, LARI receives basic genetic material for its breeding programs, and improved varieties for release to Lebanese farmers. The outcome of this cooperative work was the release of some 25 new high yielding varieties of cereals and food and forage legumes over the past two decades.

National seed security and the regional seed network

ICARDA has supported the national seed program over the years. Today LARI has put in place a national seed stock and a dynamic new service for farmers, for multiplying and distributing a range of quality-stamped wheat seeds at a fair price. LARI provides additional advice on planting times, weather updates and other useful information, broadcast to the country's farmers weekly by mobile phone text message. This innovative approach, now well established for wheat food security, will be expanded to include other strategic crops for Lebanon.

ICARDA contribution to food security and livelihoods in Lebanon

- **Variety release and seed increase.** ICARDA is the main source of germplasm of cereals and legumes in Lebanon. Research in Terbol and Kfardan stations since 1978 have helped to identify promising varieties that were released by LARI to farmers. The ICARDA-LARI multi-location on-Farm trials running since 1996 have released more than 25 superior varieties of wheat, barley, lentil, chickpea faba bean and forage legumes suitable for different climates in the country.



New Green Houses established at Terbol to be used for crossings

- **Crop disease surveys.** ICARDA’s Biodiversity and integrated Gene Management program has been very active in surveying major crop diseases. Several important surveys were conducted between 1991-1994 on bread wheat yellow rust, legume nematodes and legume viruses. Another survey was undertaken in 2001-2002 on barley yellow striate mosaic virus affecting cereals. ICARDA, in collaboration with the national program were pivotal in assisting Lebanese farmers to avoid crop losses resulting from occurrence of disease epidemics over the past 12 years. This was possible through an intensive screening program established in Terbol that identifies and discards susceptible advanced material before release to farmers.
- **Crop-Livestock integration and production.** ICARDA’s most significant research impacts in crop-livestock production have been through the Mashreq/Maghreb project. First funded by IFAD, the Arab Fund and IDRC for the first two phases between 1996 and 2003 and later with its third phase funded by IFAD and the Arab Fund which ended in 2008. ICARDA and NARS worked within selected communities on improving of feed resources, improving rangeland management and rehabilitation, increasing the productivity of small ruminants through improved fertility and nutrition and the development of alternative feed sources, monitoring of technology transfer, adoption and impact and on policy and institutional research. Seeds of native forage species were multiplied at Terbol station and adequate amounts were produced to initiate rehabilitation activities in several locations in Bekaa in collaboration with LARI, the American University of Beirut (AUB) and local communities. An IFAD-funded project on Awassi sheep improvement provides farmers with the latest knowledge on sheep management practices.

Ongoing Collaborative projects

- **Land and water management**

Water and Livelihoods project: Lebanon is a partner of the USAID funded Middle East Water and Livelihoods initiative (WLI) with Egypt, Iraq, Jordan, Palestine, Syria and Yemen, 3 CGIAR Centers, 22 universities, including American University of Beirut. The Lebanese component is run by LARI in the Orontes river basin which faces poverty, drought and land degradation. The main activity is a socio-economic survey and biophysical characterization to identify pilot sites for water harvesting technologies and new livelihoods options for these communities.

- **Improved Water Management for Sustainable Mountain Agriculture:**

This IFAD-funded project aims to increase agricultural productivity and profitability in Lebanon, Jordan and Morocco with water harvesting, crop-livestock integration and land and water management practices. The project links to the IFAD-funded “Hilly Areas Sustainable Agricultural Development” of the Green plan in Lebanon.

- **Crop improvement and seed multiplication.**

Grain crop improvement is a top priority for the current minister of agriculture and ICARDA plays a key role in supporting this strategy. Some 15.7 tons of Foundation Seeds of 13 newly released varieties of wheat, barley, lentil and chickpea were provided by ICARDA for the Ministry’s seed multiplication program in 2010. Seed distribution to farmers, at very competitive prices, is expected to positively impact productivity of cereals and grain legumes. On-farm trials continue between ICARDA and LARI to identify more high yielding varieties with resistance to biotic and abiotic stresses that suit the country’s climatic zones. In the IFAD-funded project on smallholder wheat-legume cropping systems and climate change, the Lebanese component focused on new varieties of chickpea and durum wheat, and demonstrating conservation agriculture and supplemental irrigation to farmers in Bekaa.

Key partnerships:

- **Government institutes:** Ministry of Agriculture, Lebanese Agricultural Research Institute, Green Plan and the National Council for Scientific Research.
- **Universities:** Lebanese University, American University of Beirut (AUB), Jesuit University, Saint Esprit University (Kasslik).
- **International organizations:** United Nations Development Programme (UNDP) and the Global Environment Facility (GEF), United Nations Economic and Social Commission for Western Asia (ESCWEA), Food and Agriculture Organization (FAO).
- **Non-governmental organizations:** The Green Line Wedge Foundation, Jihad El-Bina’ Foundation, Aarsal Rural Development Association, and the Collective for Research & Training on Development-Action (CRTD-A), Deir El-Ahmar Cooperative, Ham and Maaraboun cooperatives).

Overview: ICARDA key research and capacity building activities in Lebanon

Biodiversity and Integrated Gene Management program:

- Crossing in open fields and greenhouses - Wheat, Barley, Chickpea, Lentil & Faba Beans.
- Summer Season plant breeding
- Double Haploid breeding
- Screening for resistance to biotic and abiotic stresses.
- Evaluation for yield potential under favorable conditions
- Seed health testing
- Seed multiplication and preparation of International Nurseries
- Genetic resources evaluation & Ex-Situ conservation.
- Capacity building and training of national & regional NARS scientists.
- Enhanced small-holder wheat-legume cropping systems to improve food security under changing climate in the drylands of WANA, EU/IFAD project

Diversification and Intensification of Production Systems Program

- Spineless Cactus nursery in Terbol Station
- Small ruminant management, joint ICARDA-LARI feeding trials.
- Implementation of the IFAD funded project “Scaling-up Best Practices for Managing Awassi Dairy Sheep”

Integrated Water and Land Management Program

- Water and livelihoods initiative project in Al-Qaa
- Mountain Lake IFAD project, Hermel
- The Use of Grey Water in home farming project

Capacity building

Over the past 30 years, more than 600 Lebanese scientists, technicians, students and farmers have received training from ICARDA. From those, 228 participated in in-country courses and 74 in regional courses. Six have received specific long-term training and 145 have received specific short-term training. In addition, 18 were co-supervised by ICARDA in graduate degree training and 65 have undertaken long-term training at ICARDA Headquarters.

Agreements: Lebanon-ICARDA

- **Host Country Agreement between ICARDA & the Republic of Lebanon**, signed in July 1977. An amendment sub agreement was signed in 2008 between ICARDA & LARI regarding the use of Terbol & Kfardan Stations as well as about collaboration between the two institutions. (Expires in October 2016)
- **Agreement between ICARDA & LARI** regarding the implementation of the EU/IFAD funded project “Enhanced small-holder wheat-legume cropping systems to improve food security under changing climate in the drylands of WANA”, signed in June 2013 and valid till project end.
- **Agreement between ICARDA & LARI** regarding the implementation of the project “Durable rust resistance”, signed in March 2013 and valid till project end.
- **Agreement among ICARDA, LARI & Green Plan** regarding the implementation of the IFAD funded project “Improved water management for sustainable mountain agriculture”, signed in October 2012 and valid till project end.
- **Memorandum of Understanding between ICARDA and AUB**, signed in January 2013.
- **Letter of Agreement between AUB and ICARDA** regarding the collaboration in seed increase for the international nurseries, signed in January 2013 and amended in November 2013.
- **Agreement between ICARDA and AUB** regarding the implementation of the Modeling of vegetation in Al Qaa under the WLI project, signed in October 2013.
- **Agreement between ICARDA and AUB** regarding safety duplication, multiplication & storage of genetic resources at AREC, signed in December 2013.