



Syria-Jordan-Lebanon-Palestinian Authority  
GEF/UNDP/CARDA/IPGRI/ACSAD

# Dryland Agrobio

Conservation and Sustainable Use of Dryland Agrobiodiversity  
Funded by GEF/UNDP

حفظ التنوع الحيوي الزراعي واستخدامه المستدام في الأراضي الجافة

No. 7

October - December 2001

## The place that gave agriculture its beginning might also give it its future

By David Abbass

The Near East is a beautiful land of rugged diversity and ancient culture. It's where civilization began and where people first turned to agriculture for their sustenance. It is not surprising then that the Near East is the center of origin of many of the world's most important crop and tree species. Throughout the region, the wild relatives of today's cultivated crops and fruit trees can be found growing alongside fields of ancient crop varieties, and alongside fields of recently improved varieties.

For the 48 million people who rely on agriculture in this hot, dry land, however, life can be difficult. Rainfall is erratic and low. Most farmers must rely on less than 300 mm annually. Where irrigation water is available, farmers contend with salt buildup, and in many cases diminishing water supply. And water is not the only concern. Farmers in the Near East face the twin problems faced by farmers the world over—namely, plant diseases and insect pests.

These harsh conditions would seem to favor the sturdy and well-adapted local varieties, bred by farmers down through the millennia to withstand treacherous extremes and deliver a crop even in bad years. Yet, these ancient varieties, along with their wild relatives, are in grave danger of being lost forever. With them goes a storehouse of genetic material that could be used by plant breeders to lend valuable traits, such as drought and heat tolerance, or pest and disease resistance, to new improved varieties.

Aside from the loss of genetic potential, lack of plant diversity can lead to tragic consequences for farmers and the environment—land planted to one or just a

few species is more vulnerable to pest and disease attack and to the vagaries of the weather. For farmers this can mean severely reduced income, and possibly, reduced long-term potential of farmland; it can also mean a changed microclimate, severe erosion, and even desertification.



*Diversity of fruit trees in an orchard in Ajloun, Jordan.*

No one knows just how much has been lost already, nor is it known which species are most vulnerable and in which locations, but many people and organizations are working hard to find the answers. Among them, the Conservation and Sustainable Use of Dryland Agrobiodiversity Project is working with farmers and national agricultural research systems in Jordan, Lebanon, the Palestinian Authority, and Syria to gain a clear picture of the problem and to come up with solutions. The ultimate goal is sustainable, productive agriculture that ensures the preservation and utilization of landrace varieties and their wild relatives

## Dryland Agrobio



*Improper land use has resulted in failure of olive plantations in parts of Sweida region.*

The project is paid for by the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP), and is coordinated by the Syria-based International Center for Agricultural Research in the Dry Areas (ICARDA), which is providing technical backstopping and training in cooperation with the International Plant Genetic Resources Institute (IPGRI-CWANA), and the Arab Center for Studies of the Arid Zones and Dry Lands (ACSAD), also based in Syria. ICARDA has a global mandate to conduct agricultural research in dry areas, so the lessons learned from this project will be used around the world.

The first step was to enlist cooperators, a task made easier by the ever-increasing appreciation among farmers and policy makers regarding the importance of maintaining biodiversity. The next step was to select sites for analysis, and devise a comprehensive survey that would produce a complete and accurate inventory of the existing biodiversity, and collect diverse environmental and socioeconomic data that might reveal the various pressures on the natural landscape.

Survey data will flow to ICARDA from work sites in Jordan, Lebanon, the Palestinian Authority, and Syria, for the duration of the multi-year project. Once analyzed, a clearer picture will emerge of the status of biodiversity, the pace of degradation, and the species and sites most at risk.

It is the first comprehensive survey of agriculturally important genetic diversity in the region. It will create a baseline from which future initiatives will measure their impact. Most importantly, the survey will help explain precisely why and how biodiversity is being lost. Once this is known, policy and practice can be changed to correct the problem.

The project's main implementers, the various agencies of the respective ministries of agriculture, farmers, and nongovernmental organizations, have already flagged what they consider the main threats. They include overgrazing, urbanization, and the mismanaged spread of unsustainable agriculture practices. Some farmers have been ruined after making an ill-advised switch to a poorly adapted improved variety, or unsustainable cropping system. In the process, old varieties and their wild relatives are abandoned or destroyed.

Information from the project's survey will be crucial in stemming the loss of biodiversity, but ICARDA and its cooperators are going well beyond collecting and analyzing data. Important specimens are being reproduced and their seeds deposited in national, regional, and international genebanks. Others are being planted in protected areas and on farms.

The latter, *in situ* method, allows for the preservation of a greater range of genetic diversity, while at the same time, allows a species to continue to evolve in response to a changing environment. This approach also helps preserve local knowledge about the plants and farming practices.

Farmers are the key stakeholders in the project. Their knowledge is respected and needed. They help the project teams identify and understand the components of diversity. Some farmers are actively protecting traditional crop species on their land. Others are establishing community-managed pasture nurseries that will provide seeds for the future.

The project is also making use of water harvesting, or catchments management, to enhance crop production and food security. It is an ancient practice with a new twist. Geographical information systems and remote sensing are being used to identify places where water can be harvested over a relatively large area and delivered to the crops using simple ground-forming methods, making it possible to grow crops where none would grow before.

Since the project must reach people beyond the selected sites, public awareness is critically important. Field days, media events, and targeted dissemination of information are educating people at all levels of society about the importance of dryland agricultural biodiversity. The project is also collaborating with ministries of education to introduce biodiversity conservation into school curricula.

## Dryland Agrobio

To ensure that biodiversity is given its full importance in national decision-making bodies, policy-makers are afforded special attention when it comes to awareness building. Preservation and enhancement of biodiversity might require modifications to policy, legislation, and all manner of regulations. But it is the farmers and people in local communities who should have the biggest say. The project is working to empower local communities by giving them the means to preserve biodiversity and to be a part of the decisions that affect biodiversity and land use.

The project also recognizes that it is unrealistic to expect farmers and communities to conserve diversity if it is not in their economic interests to do so. That's why the project is investigating sustainable sources of income generation in the project sites. These might include community-managed pastures to produce seeds and rootstocks, or bee-keeping, jam making, and craft production. There might even be opportunities for ecotourism.



*Agrobiodiversity conservation could be promoted through fairs at historical sites like Ajloun castle.*

The Near East dryland agro-biodiversity project represents a groundbreaking approach to the serious problem of genetic erosion. It can already point to successes establishing nurseries and collecting important seed stocks, but its greatest success has been its ability to bring people together to work to address this critical challenge.

Improved agricultural techniques are boosting food security and incomes for participating farmers, while safeguarding the resources on which future development depends.

## Third Regional Technical and Planning Meeting Lattakia, Syria, October

The Dryland Agrobiodiversity Project's third regional technical and planning meeting 11-14 Oct. 2001, was opened by H.E. the Minister of Agriculture and Agrarian Reform Mr Asa'ad Mustapha in the presence of the Governor of Lattakia, Mr Safi Abou-Dan, and the Al Ba'ath Party Branch Secretary, Dr Nabih Ismail, representatives of GEF, UNDP, ICARDA, IPGRI, ACSAD and the delegations of the countries collaborating in the implementation of the project activities. More than 60 other represents of the local agriculture sector, the women, youth and farmers unions took part in the opening ceremony.

In his address at the opening session on behalf of ICARDA Director General, Prof. Dr Adel El-Beltagy, ICARDA's Assistant Director General (Research), Dr William Erskine, said, "I cannot stress enough the importance of the conservation of dryland agro-biodiversity and the management of natural resources for sustaining agricultural development and food security at the



*At the opening session, from left: Mr Costante Muzio, UNDP. Resident Representative in Jordan; Mr Tawfik Ben Amara, UNDP Res. Rep. in Syria; Dr William Erskine, Assistant DG-Research at ICARDA; Dr Nabeeh Ismail, Secretary of the Al Ba'ath Party in Lattakia; Mr Asa'ad Moustafa, Minister of Agriculture and Agrarian Reform; Mr Safi Abou-Dan, Governor of Lattakia, and Dr Hani Daraghma, GEF Representative.*

community, national, regional, and global levels "The project is unique, and should lead to community-based conservation of local, diverse crop and food tree varieties and their wild relatives, with the help of local knowledge. Such on-site conservation efforts complement the ongoing collection, evaluation, and

## Dryland Agrobio

conservation work done by the implementing agencies, which together hold hundreds of thousands of plant accessions in cold storage," Dr Erskine said.

"Agrobiodiversity is being lost, however, mainly due to the mismanaged spread of modern agriculture, with its reliance on a few improved varieties of introduced species. Over-grazing and urbanization also take their toll. Lost with the plant species are traits that plant breeders might need in years to come. Temperatures in the dry areas of the Near East are expected to rise five degrees Celsius in the next 100 years, and rainfall is expected to diminish. The local varieties and wild relatives conserved as a result of this project, for example, might one day lend drought and heat tolerance to improved crop varieties that contribute to the sustainability of agriculture in the region, and in other dry areas of the world.

"Success will depend on the extent of involvement at the local level, the benefits to communities resulting from changes in policy and legislation, development of value-added technologies, and alternative sources of income," Dr Erskine said.

In congratulating the project partners for the success and good progress of the project in its first two years, the GEF representative, Dr Hani Daraghma, said "agrobiodiversity is fundamental to food security and livelihood" and "farmer involvement is critical to the effectiveness of the project."

He also said that the project is the "most challenging" one so far undertaken by GEF, "not only in the dry areas, but globally."



*Some of the participants in the 3rd Regional Technical Planning Meeting (Palestinian delegation in front row).*

UNDP Resident Representative in Syria, Mr Tawfik Ben Amara, pledged continued support to the project. He said the project's goals and Syria's goals of biodiversity conservation and utilization are in line with his agency's efforts toward sustainable development "to alleviate poverty, create jobs, promote good management of natural resources, and strengthen the role of women."

The Project's National Coordinator in Syria, Mr Ali Khnifis, on behalf of the Syrian Component, welcomed all participants and said that conservation and utilization of plant and animal genetic resources are afforded high importance in Syria. He cited the establishment of genebanks, conservation areas, and legislation aimed at preserving biodiversity. The project is making substantial contributions through its biodiversity monitoring surveys, public awareness building, and farmer training. Farmer involvement is a key feature "in implementation of all components," he said.



*Participants in the 3rd Regional Technical Planning Meeting in Lattakia.*

In his opening address, H.E. Mr Asa'ad Mustapha, Minister of Agriculture and Agrarian Reform, Syria, stressed the need for legislation to protect biodiversity.

"Legislation and regulations are a great concern for all countries, because biodiversity is being lost, for a number of reasons. But all countries are convinced that biodiversity is a gold mine for all humanity," H.E. the Minister said.

## Dryland Agrobio

"We're giving high priority to this project. It is doing more than just public awareness, it is doing work on the ground. We would be pleased to offer all of our resources to help ensure success of this project and extend its activities and strategy to other regions of the country," he said.

H.E. the Minister outlined the efforts of Syria in conserving biodiversity through designation of 36 protected nature sites, comprising 500,000 ha, and 16 forest reserves, comprising 160,000 ha. Some 30 million forest tree seedlings and 9 million pasture shrub seedlings have been planted, and tonnes of seed were produced for land rehabilitation last season. In collaboration with the German government and the Food and Agriculture Organization of the United Nations, 22,000 ha were designated a nature reserve in Palmyra, and in cooperation with Japan, an "environmental garden" was set up in Homs to conserve old species, especially fruit trees. Syria has developed strategies for three, five, and ten years, which give good attention to maintenance of biodiversity. He asked the National Project Manager to provide him with a list of achievements, the number of trained staff, and an outline of the support needed to extend the project strategy and activities to other regions of the country.

Project Regional Coordinator, Dr Ahmed Amri, National Project Managers of Jordan, Dr Mohammed Ajlouni; Lebanon, Dr Wafa Khoury; the Palestinian Authority, Mr Younis Sbeih; and Syria, Mr Ali Khnifis, were acknowledged for their hard work and dedication to the project.

During general discussion the following recommendations were stressed:

- The necessity to activate the exchange of germplasm, the sharing of the data and information as stated in the project documents
- The need to comply with the standardized methodologies developed by the Regional Component during the thematic meetings (The National Project Managers will ensure follow up of the recommendations of the thematic group meetings)
- The contracts established with institutions should allow for revision to ensure the delivery on time and the quality of the activities contracted
- The indicators developed within the logical framework matrix and by the thematic meetings should be applied and tested in the evaluation of the project progress
- The Regional Technical and Planning meeting should focus more on impacts, lessons learned, and constraints encountered rather than on results of activities conducted.

At the closing session, all the representatives of national and international institutions expressed their appreciation and extended thanks to the Syrian government for its hospitality and interest in further supporting the project; the Syrian Project Component for an excellent side program showing some of the project activities; and the Regional Component, especially Dr Ahmed Amri, Mr Ali Shehadeh, and Ms Hasna Boustani for all the arrangements to make the meeting a success.

## Public awareness activities during the 3<sup>rd</sup> RTP meeting

### 1. Rural theater contributes to increased public awareness

Increased public awareness is critical for the conservation and sustainable use of biodiversity. Mass media, workshops, and school activities were used by the project to introduce the importance of dryland agrobiodiversity to large public audiences. In Syria, the Ministry of Agriculture and Agrarian Reform has a rural theater group that spreads agricultural messages throughout the country. The project has worked with the rural theater team with the help of IPGRI-CWANA public awareness officer Mr Rami Khalil and Syrian National Project Coordinator Mr Ali Khnifis to present a play emphasizing the impor-

tance of conserving local agrobiodiversity and indigenous knowledge. The play, called "the box of life" highlights the value of the project's target species and the special uses they hold as food, feed, and medicine. This play was presented during the opening of the Regional Technical and Planning Meeting in Lattakia and was presented to farmers and school children in the project sites of Al-Haffeh and Sweida.

This public awareness tool appears to be effective and the Jordan and Lebanon Components have invited the theater group to perform. The Palestinian component plans to establish a similar group within the Ministry of Agriculture.

# Dryland Agrobio



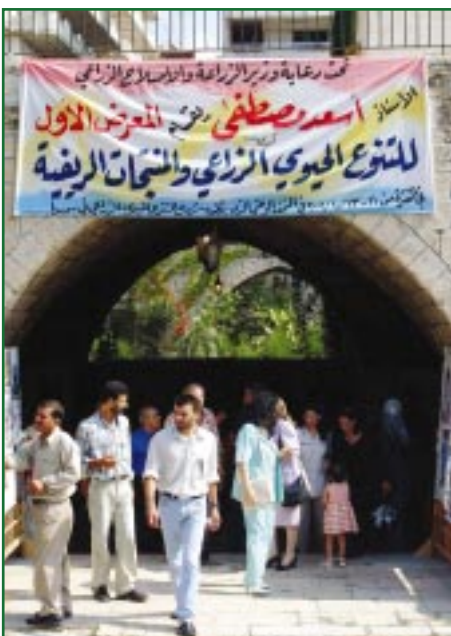
*Rural theater is used in Syria to increase public awareness about the importance of preserving local agrobiodiversity and local knowledge.*

## 2. Agrobiodiversity fair

The Syrian Component organized a four-day agrobiodiversity fair at the historic Museum of Lattakia on 11-15 October 2001. At the fair, inaugurated by H.E. the Minister of Agriculture and Agrarian Reform and visited by participants to the Regional Technical and Planning meeting, farmers and local NGOs presented products, such as jams, compotes, oils, burghul, frika, handicrafts, and other products, including medicines, made from local agrobiodiversity. The National Project Components of Lebanon, Jordan, and Palestine also presented agricultural products made from local crops.

## 3. Paintings by school children

The Regional Component presented paintings produced by school children from Jordan, Syria and



*Entrance to the agrobiodiversity fair in Lattakia promoting agrobiodiversity conservation.*



*Local communities participated in the agrobiodiversity fair in Lattakia with products made from local and native species.*

the Palestinian Authority. These paintings will be considered in the painting contest, which will be organized by the Regional and Syrian Components with the help of Mr Rami Khalil, the IPGRI-CWANA public awareness officer.



*School children were encouraged to express their interest in conserving the environment and biodiversity, through painting contest.*

## 4. Field visit

Participants traveled to Al-Haffeh target area where they visited an agrobiodiversity shop created full of products made from landraces and local agrobiodiversity. They also visited an impressive fruit tree agrobiodiversity nursery created by Mr Fahd Abdel Sattar with the support of the project. The aim is to multiply landraces of target species and their wild relatives. The Syrian Project Component, the Palestinian Component, and the Regional Component have distributed T-shirts, caps, cups, and handicrafts bearing the project logo.

## Dryland Agrobio



*The agrobiodiversity shop in Al-Haffeh full of products made from landraces and local biodiversity.*



*Participants in the coordination meeting visited a private agrobiodiversity nursery created at Al-Haffeh with the help of the project.*

## Summary of project main activities October-December 2001

### *Regional Component*

1. On 15 October 2001, Syrian TV interviewed GEF Representative Dr Hani Daraghma and Regional Coordinator Dr Ahmed Amri for 25 minutes on the importance of conservation of dryland agrobiodiversity and the strategy followed by the project to promote community-based *in situ* conservation.
2. On 18 September 2001, Dr Amri participated in a meeting of the National Biodiversity Committee, Syria, which discussed the add-on activities on a National Biodiversity Strategy conducted by the Ministry of Environment.
3. Jordan National Project Coordinator Dr Mohammed Ajlouni and Dr Amri met with the Director of Forestry at the Ministry of Agriculture in Jordan and discussed collaborative activities to promote the use of target species in forestation and landscape management efforts. The seeds of wild fruit trees will be collected jointly and the project will provide training to the staff of the Directorate on methodologies for sampling and monitoring diversity.
4. The Regional Coordinator participated in the Mashreq/Maghreb Project coordination meeting and the priority-setting workshop for West Asia, organized by ICARDA in Aleppo, 13-19 November 2001. Conservation of agrobiodiversity

was promoted as a priority research and development area.

5. The Dryland Agrobiodiversity Project Regional and National Components participated in the National Agricultural Fair held in Damascus. Mr Rami Khalil, IPGRI-CWANA public awareness officer, organized a stand where posters and local agrobiodiversity products from the participating countries were displayed



*The agrobiodiversity project stand at the National Agricultural Fair in Damascus.*

## Dryland Agrobio

6. Dr Amri delivered a seminar to more than 100 researchers and development agents in Morocco on the *in situ* conservation approach and the project strategy and achievements. The National Agricultural Research Institute has expressed interest in initiating the same approach for preserving dryland agrobiodiversity in Morocco;
7. Dr G. Ayad Regional Director IPGRI-CWANA and Dr Amri were invited by the IPGRI-global *in situ* conservation project to present the lessons learned from the Dryland Agrobiodiversity Project and help in planning a second phase of the *in situ* project component implemented in Morocco. Dr Amri has presented two oral contributions, one on the community-driven approach to conserve *in situ* the dryland agrobiodiversity and the other on participatory breeding and genetic manipulation to improve and maintain the diversity of landraces. The collaboration between our project and the IPGRI global *in situ* conservation project, which is being implemented in eight countries, was discussed with the global project's Coordinator, Dr D. Jarvis, and Dr Ayad. Dr Amri presented to INRA-Morocco ways to reconcile genetic manipulation and conservation of local agrobiodiversity.

### Jordanian Component



*Demonstration of water harvesting techniques for protecting an oak forest in Zarka.*

1. The project supported the demonstration of water harvesting techniques for protecting natural oak forests in Zarka Governorate, and the target wild species it contains.

2. The project, in cooperation with Jordan Environment Society (JES), and Forestry Department launched a clean-up campaign at Shtafaina natural forest in Ajloun target area on 25 October 2001. About 150 male and female students from Ajloun schools, in cooperation with the Ajloun Agriculture Directorate, participated in the event. Before the campaign, the students attended one-hour lectures on protecting biodiversity and forests. Ajloun's Governor announced the



*Lectures at clean-up campaign.*

beginning of the campaign and introduced the participants to the importance of keeping our world clean and healthy. The concept of conserving biodiversity was highly stressed during the campaign. Printed T-shirts and waste bags were distributed to all participants by JES. The project management donated 150 caps in addition to 100 barrels for collecting waste. The event was a good opportunity to encourage more cooperation in future toward conserving nature and promoting a healthy environment.



*Students during the clean-up campaign.*

## Dryland Agrobio

3. The project participated in Muwaqqar agricultural fair organized by the Gender Unit at the Ministry of Agriculture on 28 October 2001.
4. In cooperation with the Ministry of Agriculture, the project started training a female farmer from Ajloun on nursery establishment.
5. Wild species were planted at Abdallah Comprehensive School in Ajloun in co-operation with teachers and students. The new field genebank, planted on field borders, will be an important resource for future utilization. A field genebank for fruit tree targeted species was established in Ballela forest at the Forestry Department in Irbid. The project established a cereal and legume species field genebank on a site carefully selected, and then fenced, at Marw Experimental Station.



*Planting wild species of fruit trees during the creation of a school garden.*

6. Dr M. Ajlouni participated in a local seminar on "Environmental Problems and Solutions," organized by GEF and Royal Society for Conservation of Nature (RSCN) at Ajloun on 3 November 2001, and gave a seminar introducing the concept of agrobiodiversity and its importance. The attendees were from Ajloun Agricultural Directorate, and from 25 local societies and NGOs.
7. In celebration of Arab Environmental Day, the JES office in Ajloun target area organized an environmental week, beginning 12 November 2001, under the patronage of Ajloun Governor at Princess Ayshe Bint Al Hussein Comprehensive School. The week included sessions on the environmental status and problems in Ajloun. Dr M. Ajlouni, presented a paper on the importance of conserving agro-biodiversity. On 15 November 2001, there was a clean-up campaign in which 50 students, along with JES staff and cleaning workers.



*Clean-up campaign organized by the project component in Jordan.*

8. The project participated in the Second National Olive Festival organized by the National Center for Agricultural Research and Transfer of Technology (NCARTT), in cooperation with the Extension Department, on 28-30 November 2001, to mark the beginning of the olive harvest. The Festival included the presentation of different olive varieties, local, improved, and introduced, in addition to samples of oils from different varieties and some traditional food. The project presented posters and gave out leaflets.
9. Project Assistant, Mr Nabih Kayed, presented a paper on "the role of rural women in conserving biodiversity," at the national workshop on "the status of the rural women in agriculture," organized jointly by NCARTT and ICARDA on 7 November 2001. On 1, 22, and 29 November 2001, onwards, the Project Manager attended meetings of the national agrobiodiversity project implemented by NCARTT. The meetings reviewed reports prepared by team leaders on their achievements and implemented activities.
10. As a member of the steering committee of the Biodiversity Strategy and Action Plan Project (BSAP), the Project Manager attended the second national conference on "Establishing the National Biodiversity Strategy and Action Plan" conducted by BSAP on 25-26 November 2001. The conference targeted decision makers in Jordan, and included a review of the draft strategy and action plan.

### *Lebanon Component*

1. A training course on "establishment and management of fruit tree nurseries" was conducted in Aarsal for communities in the project's three target sites on 4-5 October 2001, with technical support from two experts from ACSAD, Mr Rafik Raiss and Mr Usama Sammounh. Fifteen farmers and interested community members, including

## Dryland Agrobio

two women from the Aarsal Rural Development Association, attended the course, which covered theoretical and practical subjects. Work at the newly established wild and local fruit tree nursery in Aarsal was initiated based on the course outputs.



*An oddly shaped almond tree found in the project site.*

- Several meetings were organized to support local communities in establishment of cooperatives. Two cooperatives were established in each of the villages of Ham and Maaraboun. The project worked with these NGOs to define development priorities that can be supported by the National Council for Development and Reconstruction. Besides. The project continued to help organize women's groups to collect wild pears, prunes, and others fruits, which are being turned into juices, compotes, and jams



*The project has helped to create the "Mountain Girls" group in Nabha.*

- Project-supported MSc. student Ms Nivine Hajj Hassan submitted and defended her thesis on the characterization of wild cereal relatives from the drylands of northern Bekaa, Congratulations.

- A calendar depicting local and wild fruit trees in Lebanon was prepared and distributed to local schools, concerned national public and private institutions, regional and international organizations, potential donors, and target communities.
- The National Project Manager, Dr Wafa Khoury, held several meetings with Mr Karaa, the Director of the rural rehabilitation section of the Litani River Authority, to explore possible joint activities, mainly in reforestation and establishment of fruit tree nurseries and genebanks. The meetings were followed by tours of potential sites.
- Project Site Assistant, Mr Mohamed Monzer, with Mr Adel Nassar (ICARDA-Terbol), supplied seeds of local wild fruit trees to Sultan Yaakoub village in western Bekaa, and helped plant them as part of reforestation campaign run jointly with the village municipality, the Litani River Authority, the CoDeL-GTZ funded project, and the Lebanese Army. More activities are being planned with Litani River Authority.
- Water-harvesting specialist, Dr Theib Oweis, was in Lebanon on mission, along with Mr Pierre Hayek and Mr Jihad Abdallah, all of ICARDA headquarters, to evaluate planned project sites. Based on field visits and discussions with farmers, the planned water-harvesting activity with orchards in Aarsal was postponed and a new activity involving contour stone-walls and fruit tree planting was agreed upon in the village of Nabha-Kalile. The walls were designed, but building was discontinued due to heavy rain and the season of feasts.

### *Palestinian Component*

- The Palestinian Component, with Al-Najah University, which was contracted to help promote public awareness, created biodiversity clubs at schools in the four project sites. These clubs are holding weekly meetings to discuss or perform activities related to agrobiodiversity conservation. The students have held various activities, such as picture drawing, and collection of local knowledge about the nutritional value of different types of target plants. The students have also participated with the project team in the collection of seeds of target species. The project team members explain to the students the uses of the species collected and the importance of their conservation. The seeds of wild fruit trees collected by the

## Dryland Agrobio

students and by the project staff are being used to create field genebanks in leading farmers' fields and at Beit Qad Experiment station, and most of the seeds are used to produce seedlings at Ministry of Agriculture nurseries.



*Student environment clubs are active in promoting the conservation of local agrobiodiversity in Palestine.*

- Local NGOs contracted by the project have developed plans for building water harvesting structures at Al-Dahria and Sair project sites in Hebron. The plans have been reviewed by the project team and collaborating farmers, who recommended the holding of training courses and workshops for farmers on different water harvesting techniques.
- The project staff reserved different amounts of landrace seed varieties (wheat, barely, lentils, and vetch) collected from farmers for redistribution to other farmers. The idea is to increase and conserve local seeds. The project reserved 15 dunums in Al-Arroub Agricultural Station for seed increase and identification of landraces. The activity is meant to promote the use of landraces.
- Project manager Mr Younis Sbeih, project seed technologist Ms Buthaina Mizyed, and project crop breeder Mr Haitham Hasasneh attended a three-day workshop on "development of seeds of local varieties," organized by the Palestinian Agricultural Relief Committee in Ramallah. The project manager presented two lectures, the first on agrobiodiversity in Palestine, the second on policy needed for conserving agrobiodiversity in Palestine. Discussion addressed the work necessary to conserve local varieties.
- The project team distributed more than 120 trees of *Pistacia vera* to farmers in the project target area. Project staff and local farmers will assess the performance of these trees (productivity, adaptability to different conditions, scion rootstock compatibility). The project has also distributed 750 seedlings of pistachio, almonds, olives, and *Ceratonia* to collaborating farmers for the purpose of reforestation.

- A project calendar was produced and 1000 copies distributed to all collaborating institutions, farmers, and schools, and to donors and international organizations. The project also produced 500 T-shirts and 300 caps for distribution to farmers at workshops and to students (picture of calendar, T-shirts and caps distributed by the Palestinian project component).
- Mr Sameh Jarrar was selected to work with the project as a field assistant in Jenin District, replacing Mr Abed Fakher. We wish Sameh good luck in his new post.

### *Syrian Component*

- More than 200 farmers in Sweida attended a technical workshop on 26 November 2001 at Al-Moshanaf. The workshop was opened by the Governor of Sweida and Directors of the agriculture, forestry and extension departments. Project Manager Mr Ali Khnifis and Regional Coordinator Dr Ahmed Amri presented the project objectives and preliminary achievements and emphasized the need for government, international organizations and local communities to join in safeguarding the plant treasures still found in parts of the region. The excessive grazing and the increasing land reclamation should be reviewed to avoid further degradation of natural habitats and the subsequent loss of the wild relatives of today's important crop species.
- The project team, helped by some collaborating farmers in Sweida and Al-Haffeh, collected large quantities of seed of wild fruit trees. Seeds were given to forestry department nurseries for increase, and to farmers in Sahwat Balatah, who are developing an agrobiodiversity nursery, with the help of the project.



*High officials, farmers and school children attending a workshop on agrobiodiversity conservation in Sweida.*

## Agrobiodiversity status in Jordan

By Dr Mohammed Ajlouni

*Presented during the IUCN conference held in Amman*

### Introduction

The Near East is an area of megadiversity of important food crop and pasture species. It is one of the few so-called nuclear centers where numerous species (notably wheat, barley, lentil, pea, and vetch) of temperate-zone agriculture originated 10,000 years ago, and where their wild relatives and landraces of enormous genetic diversity are still found. Many fruit trees, such as almond, olive and pistachio, also originated in this region and have dominated its traditional agricultural systems. They are present as a diverse range of wild relatives and local varieties. Cultivated olive, for example, exists as 50 different clones in the region; while almond, one of the most widely cultivated fruit trees in the Mediterranean, includes more than 15 local clones with distinct variations in fruit size, inflorescence, hairiness and flower color.

Jordan comprises a sizable part of the Near East's area. The global importance of Jordan's biodiversity lies in its geographical location, climate, and geological formations. The country's topography includes three major features: the Jordan Rift Valley and the Dead Sea Basin; the highlands, covered mainly with forests; and the Eastern Desert (Badia). These unique geographical formations provide for tremendous diversity of habitats. It is located at the crossroads of three continents; it has been the bridge for extensive exchange of cultural and natural resources. Nestled, so to speak, between Europe, Asia and Africa, Jordan has a biogeography comprised of four distinct biogeographic zones: Mediterranean, Irano-Turanian, Afro-subtropical, and Saharo-Arabian.

As the global conservation community becomes increasingly concerned with dryland biodiversity and the consequence of its conservation and management, Jordan, situated at the center of this unique biota, represents the biodiversity of drylands, which in their terms are transitional areas between many rich areas with biological resources. Jordan is the only country that has maintained and continues to maintain species related to this different biota.

### Agrobiodiversity components

Biodiversity is defined as the variability among living organisms and ecological complexes in which they occur, as well as the number of different items and their relative frequency. The term encompasses different ecosystems, species, genes, and their abundance.

The importance of conservation and sustainable use of biodiversity has been stressed at international, regional, and national levels, in response to rapid degradation of natural resources. Biodiversity can also be defined in an agricultural context, and can be described as the variety and variability amongst living organisms (of animals, plants and, microorganisms) that are important to food and agriculture in the broad sense. This agrobiodiversity is more than a subset of biodiversity, but rather an extension of biodiversity that embraces units (such as cultivars, pure lines, and strains) and habitats that are not normally considered or even accepted as properly part of biological diversity. In other words, agrobiodiversity includes all those species and the crop varieties, animal breeds and races, and microorganism strains derived from them, that are used directly or indirectly for food and agriculture, both as human nutrition and as feed (including grazing) for domesticated and semi-domesticated animals, and the range of environments in which agriculture is practiced. It also includes habitats and species outside of farming systems that benefit agriculture and enhance ecosystem functions.

Agrobiodiversity can be considered at three major levels – ecological diversity, organismal diversity, and genetic diversity, in addition to the human interaction with all of these levels. Deliberate interaction between humans and natural ecosystems and the species they contain often leads to major modifications or transformations. Agroecosystems are the product, therefore, of not just the physical elements of the environment and biological resources, but vary according to the cultural and management systems to which they are subjected. Agrobiodiversity, thus, includes a series of social, cultural, ethical, and

# Dryland Agrobio

spiritual variables that are determined by farmers at the community level. These factors must be taken into account as part of the process of selection and introduction of new or underdeveloped crops, although they are often overlooked.

## Reasons behind biodiversity loss

There is virtually no place on earth where biodiversity is not under siege from the combined pressure of human growth, excessive resource demands, exotic species introduction, and atmospheric pollutants. Jordan is affected with some of these factors, too.

- *Combined pressure of human population growth* Jordan, a small country, 90% desert, is home to approximately 4.5 million people. The population is growing at a rate of 3.4%, which is one of the highest growth rates in the region. Most people in Jordan live in the highland region, which has the greatest agrobiodiversity. Due to population growth, urban areas have crept into forestland and rangeland, which has meant the cutting of trees, the plowing of land, and the introduction of new and highly productive gene types. These practices cause most of the loss and degradation of the agrobiodiversity in the country.

- *Plant cover in Jordan has been subjected to a high degree of pressure due to high demand for food and feed, due to a high rate of population growth:*

1. Illegal cutting of trees for wood, to be used in the manufacture of furniture or as heating fuel in urban areas.
2. Over grazing of sheep and goats has destroyed the plant cover in many areas. Growth of some forest has been disturbed due to the destruction of seedlings.
3. Illegal collection of medicinal and ornamental plants.
4. Introduction of exotic species is considered to be the most important factor contributing to loss of agrobiodiversity. Due to the high productivity of these genotypes, landraces ideally suited to the environment have been displaced.
5. Natural disasters and pollutants have destroyed a significant amount of the plant cover. Fires, for example, destroy an estimated 30,000 trees and 500-1000 dunums of rangeland annually. Climate changes, which result in low rainfall and drought, lead to increased desertification.

How can we stop the loss in biodiversity? To answer this question, we have to take into consid-



*Land reclamation is affecting the forest ecosystems in Ajloun.*

eration the extinction caused by habitat destruction over centuries. We should stop habitat loss immediately, and try to restore a substantial fraction of the habitat that has already been lost, bearing in mind that the population is growing and thus the consumption of resources is increasing. We must also consider the social cost of these practices. Under these circumstances, our plans for conserving biodiversity and sustainably using it should meet our social and economic needs.

Actions taken to conserve and sustain agrobiodiversity in Jordan

- Plant diversity in Jordan has declined dramatically and some species have been lost from the wild since the early part of this century. Many plant species remain at risk. Reasons have been put forward to explain this loss of species, but they do not apply to all ecosystems, and the magnitude of each factor differs from one ecosystem to another. Therefore, we need to study the causes of agrobiodiversity degradation in each ecosystem and determine its effect, in order to find ways to stop the loss and rehabilitate ecological systems. The socioeconomic situation that influences utilization of plant species must also be studied.
- To find alternative uses for land that ensure the conservation and sustainability of the ecosystems, current land uses and the cultural systems that guide farmers should be studied. Correct land-use can be promoted, adopted, and spread to areas that have similar eco-geographical characteristics. Wrong practices should be corrected.
- Information should be directed at policy makers, technical staff, relevant institutions, and local users of agricultural biodiversity, including producers and consumers to raise national awareness about the importance of conservation and sustainable use of agrobiodiversity. Opportunities

## Dryland Agrobio

for profitable use of agrobiodiversity and related work should be emphasized.

- Farmers and farm communities should receive training on *in situ* and on-farm conservation and sustainable use of agrobiodiversity. Jordan presently lacks the expertise needed to deal with these issues, especially considering the new obligations under the international agreements, such as CBD. New programs or projects should be screened to ensure that first priority is given to building local expertise and capacity in areas such as resource management, technology transfer, biological inventory, data management, environmental policy research, legal expertise, conservation biology, participatory methods, and biotechnology.
- National policies, legislation, and land tenure arrangements should be reviewed and reformed to promote the conservation and sustainable use of agrobiodiversity. Profitable and sustainable production should be encouraged and new conservation measures introduced. Policies have to be evaluated and good lessons learned. Sound practices should be adopted by farmers and transferred to other areas. Support should come from the national and international level:

### *At the national level:*

1. Determination of the macro-policies that deal with issues such as land ownership, the creation of conservation areas, access to and control of biological resources.
2. Recognition of intellectual property rights, and the creation of incentives or deterrents to use of resources in the public domain.
3. Proper guidance for conducting and harmonizing assessments of resources and of relevant sectoral and cross-sectoral capacities and priorities.
4. Identification and enhancement of relevant legal instruments and mechanisms.
5. Identification of areas of focus in order to determine priorities for programs and action plans.
6. Encouragement of different sectors to meet and agree on the need to collaborate and establish mechanisms to ensure that agricultural biodiversity is properly incorporated into national instruments.
7. The making of fundamental changes in society to slow the loss of biodiversity.



*Water harvesting techniques are demonstrated extensively as a way to conserve local agrobiodiversity.*

### *At international level:*

1. Regulation of access to and control of biological resources.
2. Protection of intellectual property rights.
3. Environmental protection.
4. Commercial laws that promote development, conservation and fair and equitable sharing of benefits derived from the sustainable use of biological/genetic resources.
5. Coordination among countries in terms of identification, assessment and development of strategies and programs.
6. Development of agreed criteria and indicators to strengthen cooperation on the conservation and sustainable use of agrobiodiversity.
7. Development of a joint work program through consultation and information exchange.
8. Invite international organizations, such as the World Bank, UNEP, etc., to contribute to efforts to promote conservation and sustainable use of agrobiodiversity.
9. Encourage international cooperation and coordination among funding agencies to ensure adequate financial support for the development and implementation of a multi-year program of activities on agrobiodiversity and the mechanisms needed for its development.
10. Integrate the concern for biodiversity conservation with development needs.

Sittenfeld, A., and Artuso A. A framework for biodiversity prospecting: The INBio experience. The Arid Lands Newsletter #37.  
GCEP (General Corporation for the Environmental Protection). 1998. Jordan country study on biological diversity.

Mulvany, P. 1997. ITDG, Technical workshop on farming systems approaches for the sustainable use and conservation of agricultural biodiversity and agro-ecosystems. FAO.

Reid, W.V. Reversing the loss of biodiversity: An overview of international measures. The Arid Lands Newsletter # 37

WRI (World Resources Institute). 1992-1993. World resources: Root causes of biodiversity loss. Oxford University Press.

### Thesis abstract

#### Genetic variability of wild *Triticum* and *Aegilops* species in Baalbeck and Aarsal regions

A paper prepared by Ibrahim Jihad El Saliby, through the Dryland Agrobiodiversity Project, in partial fulfillment of the requirements for a Diploma in Agricultural Engineering, Lebanese University, Faculty of Agricultural Sciences

Genetic diversity is an important tool for long-term survival and preservation of almost all living species. Our wild species are and will always be the genetic reservoir of diversity, thus the importance of their preservation and evaluation. Wheat wild species and their ancestors are endemic to our region, but they are threatened with genetic erosion through human-related activities. This study was conducted with the support and cooperation of the Lebanon component of the Dryland Agrobiodiversity Project, which works to conserve wild species. Accordingly, the objectives of this thesis were to investigate the distribution of wild *Triticum* and *Aegilops* species in the Balabek area, specifically Khreibe and Nabha, and in Aarsal, to determine the major threats to these populations, and to study the intra-specific variability of these species and the factors affecting it. A field survey was done on 16 sites in Nabha and 19 sites in Khreibe. A modified plot sampling methodology consisting of 5 sampling units (quadrates) and a 1-hectare sampling area consisting of a circle of 56-m radius were used to assess the genetic diversity in these locations. Seeds were collected and SDS-PAGE was performed to study the intra-specific diversity. No survey was done in Aarsal because of restrictions on time during which wild species can be identified, described, and their seeds collected.

Results showed that *A. biuncialis* and *A. ovata* were the dominant target species in Nabha (present in 10 out of 16 sites) and Khreibe (present in 5 out of 19 sites), and additionally *A. triuncialis* from Khreibe (present in 5 out of 19 sites). The least abundant were *T. boeoticum* in Nabha (present in 1 out of 16 sites) and *A. umbellulata* and *T. urartu* in Khreibe (present in 1 out of 19 sites). Moreover in Nabha, many species, such as *A. vavilovi*, *A. cylindrica* and *T. dicocoides*, were recorded in the survey as target species in many of the surveyed sites (outside the sampling units but inside the sampling area) and in seed collection sites, indicating their presence and scarcity. In both areas, overgrazing of different species seems to be a serious threat of eradication to the populations, but this was more obvious in Khreibe. In addition, soil erosion was also observed and is believed to play an important role in the extinction of these species. *In situ* conservation of the species in the remaining sites, reseeded, and reestablishment of the seed bank must be priorities to reduce the possibility of erosion of these genetic resources in Khreibe. While in Nabha, good management and control of grazing and reseeded could also be useful for conserving these species. In general, the differences in banding patterns between accessions of the same species generated by SDS-PAGE showed low levels of diversity in many of the studied species (*A. caudata*, *A. ovata*, *A. vavilovii*, *T. boeoticum*, *T. urartu*), while others (*A. biuncialis*, *A. cylindrica*, *A. triuncialis*, *T. dicocoides*) showed moderate diversity levels. These results clearly indicate the ability of protein band analysis, particularly SDS-PAGE, to accurately detect intra-specific diversity within and between populations. This ability was more apparent as the number of collected and tested accessions increased.



## Dryland Agrobio

### Community-based *in situ* conservation of dryland agrobiodiversity in West Asia

Ahmed Amri, Mohammed Ajlouni, Wafa Khoury  
Younis Sbeih and Ali Khnifis

*Abstract of a paper presented to the global  
in situ project in Morocco*

The dryland agrobiodiversity in West Asia has a global significance as it encompasses the diversity of major species important for food and agriculture. GEF-UNDP has financed a five-year regional project (1999-2004) aimed at promoting the *in situ* conservation and sustainable use of 16 plant genera in Jordan, Lebanon, Palestinian Authority, and Syria. The target species include landraces and wild relatives of barley, wheat, lentils, *Allium* species (garlic, onion), figs, olives, almonds, cherries, pistachio, plums, and apricots, and forage species of Lathyrus, Medicago, Trifolium, and Vicia. The strategy adopted is based on community participation, the development of appropriate agricultural packages and technologies to add value to agricultural products, raising public awareness, and reforms of existing policies and legislation. ICARDA is responsible for regional coordination in cooperation with IPGRI and ACSAD.

During the last two years, socioeconomic and ecogeographic surveys have been used to select sites rich in target species and to identify major factors of degradation of dryland agrobiodiversity. Overgrazing, the wide spread of apple, cherry and olive plantations, and the lack of interest of new generations are major factors affecting local biodiversity. Demonstration trials included water harvesting,

rangeland rehabilitation, and low-cost agricultural techniques to improve the performance of landraces.

Regarding public awareness, the project is working towards the introduction of agrobiodiversity conservation in the education system (school curricula, drawing contests, theater performances), the use of local species in forestation efforts, and the organization of, and participation in, agricultural fairs to promote local products. The value of medicinal plants and other neglected species is promoted, as is honey production, and the improvement of food processing, to help diversify the income of farmers. Special nurseries for the multiplication of local species are supported.

On matters of policy and legislation, a developed framework shows steps for the domestication of international agreements and the empowerment of local communities.

The project is also involved in the development of scientific bases for *in situ* conservation and increasing national capabilities to work on *in situ* conservation. The project is working toward the development of indicators for assessing and monitoring agrobiodiversity, including the use of DNA molecular and GIS/RS techniques.



*An old Romani landrace of olive.*



*Diversity of fruits in Al-Haffeh nursery.*

