Indian J. Plant Genet. Resour. 29(3): 265-267 (2016)
DOI 10.5958/0976-1926.2016.00042.5

ICARDA Efforts to Promote *In Situ*/*On-farm* Conservation of Dryland Agrobiodiversity

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The Importance of Dryland Agrobiodiversity

Dryland biodiversity has only recently got due attention because of its potential to contribute in overcoming the effects of global challenges caused by land degradation and and climate change (FAO, 1989). More particularly, the non-tropical dryland agrobiodiversity is of special significance since it encompasses the four major Vavilovian centers of diversity (Mediterranean, West Asia, Central Asia and Abyssinian) where most of the world today's major food and feed species have evolved. The Fertile Crescent (including Jordan, Lebanon, the Palestinian Authority, Syria, southeast Turkey and southern Iran) is considered an area of megadiversity where wheat, barley, lentil, pea, vetch, alfalfa and others have their centers of origin, diversity and domestication and where their landraces and wild relatives are still prevailing within traditional farming systems (Harlan, 1975). This agrobiodiversity, in addition to its role in sustaining the livelihoods of poor communities living under harsh conditions, are a rich reservoir for supplying genetic resources to ensure continuous genetic gains in breeding programmes and for use in the rehabilitation/ restoration of degraded farming and eco-systems or their diversification. Despite limited information available, all indications show that this agrobiodiversity is subject to a rapid and alarming loss calling for more concerted efforts at local, national, regional and global levels for its conservation and sustainable use. The *ex situ* conservation in genebanks should be complemented with *in situ*/farm management of agrobiodiversity to ensure dynamic conservation of larger diversity including that of recalcitrant species and their associated local knowledge Jarvis *et al.*, 2001.

ICARDA through its coordination of the Global Environment Facility (GEF)-funded project on "conservation and sustainable use of dryland agrobiodiversity in Jordan, Lebanon, Palestine and Syria" implemented during 1999-2005 has developed a holistic community based *in situ* conservation approach which is adopted in several initiatives promoting on-farm conservation of landraces in many countries (Amri *et al.*, 2005).

Community-based *in situ* Conservation of Agrobiodiversity

In situ conservation requires a holistic approach based on the full involvement farmers and herders who are the main custodians of agrobiodiversity, the use of the integrated management of ecosystems and farming systems, the development of sound scientific basis and the collaboration at the national, regional and international levels. The strategy is based on agreeing with key stakeholders on technological, add-value, alternative sources of income, institutional and policy options which could increase the productivity and profitability of landraces and natural habitats targeted including:

- Assessment of status and threats to agrobiodiversity and undertaking gap analysis to identify biodiversity hotspots for protection;
- Development dissemination of low-cost agricultural packages;
- Increasing the demand for products of local biodiversity through add-value technologies and promoting alternative sources of income;
- Reforms of the existing policies and legislation (property rights of farmers, government incentives, research/extension/education programmes on agrobiodiversity, empowerment of local communities over natural resources use, benefit sharing mechanisms, etc.);
- Increasing public awareness at all levels using all available means (media, school curricula and extra-curricula, etc.).

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Major Achievements and Impacts

1. *Better Understanding of the Status of Agrobiodiversity and of its Major Factors of Degradation*

- The results of the farming surveys showed that 100 % of the farmers in all drylands and mountainous sites surveyed in Jordan, Lebanon, Morocco, Palestine, Syria, Tunisia and Yemen are still predominantly using landraces of barley, lentil, faba bean, figs and olives. In case of wheat, almonds, apricots, plums and prunes, 50 % of the farmers are using improved varieties.
- The eco-geographic and botanic surveys conducted showed that the natural habitats are highly affected by overgrazing, land reclamation and fragmentation, and successive droughts. Remote sensing has allowed to show the negative trend of climate change on vegetation cover. These surveys along with gap analysis using DIVA-GIS programme have allowed to determine biodiversity hotspots for establishment of natural reserves;

2. *Development and Dissemination of Low-cost Technologies*

- **Technological options for landraces:** For cereals, food and feed legumes, seed cleaning and treatment against seed born diseases showed an increase in grain yield of up to 50 % for some farmers. Similarly, participatory improvement of landraces showed also yield gains. The development of seed producers groups and associations helped in establishing an efficient informal seed production and delivery system for promoting the use of landraces. For landraces of fruit trees, water harvesting, pruning, integrated pest management and use of fertilizer and establishment of nurseries were rewarding.
- **Natural habitats management options:** reseeding/ replanting with native species, application of phosphorous, rest grazing, along with the use of water harvesting techniques, plantation of shrubs, introduction of feed block technology, animal culling and of Para-Vet services are among the recommendations for rangeland and livestock management options.
- **Demonstration of add-value technologies:** Most of the products of landraces have a price premium attributes and are more suited for traditional dishes. Training of local communities and mainly women on food processing for the production of jams, compotes, syrups and dried fruits, along with better packaging and libeling allowed better marketing of products.

3. *Investigation of Alternative Sources of Income*

Agriculture is the major activity of the custodians of dryland agrobiodiversity, but its contribution to the income of families if diminishing continuously, which is threatening the remaining agrobiodiversity. Additional alternative sources of income (dairy production, honey production, mushroom production, eco-tourism, etc.) were initiated and showed potential for adoption.

4. *Reforms of National Biodiversity Policies and Legislations*

The project was able to develop a framework which includes all the steps to fallow in the development of national biodiversity policies and legislation. This includes institutional and policy options to be undertaken at international, regional, national, community, farm and plot levels to promote the conservation of biodiversity in general and agrobiodiversity in particular. Among actions initiated in some countries, the shift to use native species in reforestation/afforestation, introduction of biodiversity in education system, establishment of agrobiodiversity units within the Ministries of Agriculture.

Conclusion

The dryland agrobiodiversity in CWANA region is key to sustain the livelihoods of poor communities and food security and is important for the resilience of dryland farming systems and for ensuring other ecosystems benefits. The success of *in situ* conservation will require more research and more concerted efforts at all levels to empower the custodians of the agrobiodiversity and allow economic returns for their efforts. Management plans including technological, socio-economic, institutional and policy options need to be developed for each situation with full involvement of key stakeholders. However, collecting and conserving in genebanks should be continued and enforced mainly for threatened and endangered populations. ICARDA plays a crucial role in promoting the conservation and sustainable use of dryland agrobiodiversity through *ex situ* conservation of more than 154,000 accessions held in-trust in its genebank and through providing training and technical backstopping to national genebank in CWANA region.

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