

Livelihood implications of *in situ* conservation strategies of wild fruit tree species in Uzbekistan

In collaboration with different national and international partners, Bioversity International led a project that targeted change in the management, use, consumption and marketing of wild fruit diversity for improved farmer livelihoods and continued *in situ* conservation

Bioversity International's series of Impact Assessment Briefs aims to inform readers about the major results of evaluations carried out by the centre.

Almost one and a half billion people depend directly on forest products for some portion of their livelihoods and household consumables – and thousands of tree species are instrumental to global diets, health, shelter, fuel and incomes of the world's poor.

above, the loss of biodiversity and degradation of natural habitats threaten the continued delivery of ecosystem services and decrease the stability of the environment, increasing the risks of floods, droughts, and other natural disasters.



Central Asia is one of the world's five most important centres of origin and diversity of cultivated plants. Over 8,000 plant species exist in the region, and Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan are particularly rich in fruit and nut tree species with global commercial and nutritional importance. These trees represent a 'living genebank', wherein genes that allow certain species or varieties to withstand climate change or that can be used to breed varieties with desirable traits for humankind are maintained.

Yet, the native genetic diversity of fruit tree species has greatly suffered from erosion in Central Asia due to deforestation, industrialization, logging and overgrazing. In addition to representing an irrevocable loss of the valuable genes described



Uzbekistan is still the home for 83 traditional varieties of apricot, 43 of grape, 40 of apple, 30 of walnut, 21 of pomegranate, 15 of pear, all grown within the farmers' production systems

Bioversity International is a member of the CGIAR Consortium. CGIAR is a global research partnership for a food secure future.



Photo: A lonely apple hangs in an orchard bursting with different wild apple species. Credit: Bioversity International/D. Hunter

The project

Throughout 2006 and 2011, Bioversity International has been promoting the conservation and use of plant genetic diversity in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan under the auspices of the United Nations Environment Programme (UNEP) and Global Environment Facility (GEF).

The scope of the project was to ensure that local farmers, research institutes, and national policymakers were provided with, used and contributed to knowledge, methodologies, and policies to conserve *in situ* and on-farm horticultural crops and wild fruit species.

Specifically the project's key objectives were to: provide options for policymakers to strengthen legal and policy frameworks; assess, document, and manage local varieties of horticultural crops and wild fruit species in a sustainable way; promote broad stakeholder participation, representative decision-making, and strong partnerships among them; and finally to strengthen the capacity to implement all aspects of fruit species genetic diversity conservation at local, national and regional levels.

At the local level, which was the focus of this impact assessment, project activities were aimed at changing the way wild fruit diversity is managed, used, consumed and

marketed to increase the benefits farmers and their households derived from it and hence to create the incentives for farmers to continue maintaining this diversity on farm and *in situ*.

The project focused on a number of priority crops and wild tree species including apricot (*Prunus armeniaca*), alycha (*Prunus cerasifera*), grapevine (*Vitis* sp.), pomegranate (*Punica granatum*), pear (*Pyrus* sp.), fig (*Ficus carica*), almond (*Amygdalus communis*), sea buckthorn (*Hippophae* sp.), walnut (*Juglans regia*), peach (*Persica vulgaris*), pistachio (*Pistacia vera*), and apple (*Malus* sp.).

Activities carried out within the context of the project have led to several tangible outputs and outcomes: over 50 fruit tree nurseries have been established to date, producing more than 1.5 million traditional variety seedlings of apple, grape, pomegranate and other fruit and nut trees annually. The project trained 300 farmers each year in soil, water and crop management practices. All of this aimed at improving production systems, market linkages and the establishment of farmer associations that in turn would have improved local incomes and livelihoods.

KEY FIGURES

Over 50 fruit tree nurseries were set up as a result of the project – producing over 1.5 million traditional seedling varieties annually of apple, grape, pomegranate and other fruit and nut treesicipating households consumed vegetables as compared to **32%** of non-participants.



Did you know? Central Asia's wild fruit trees are like a 'living genebank'. If we conserve their precious genetic resources today, we will be able to use them to breed varieties that withstand climate change in the future

Partners

Several participatory workshops were organized with the intention to engage different stakeholders. Key groups involved included government ministries and agencies dealing with the environment, agriculture, finance and education; scientific institutes operating at national levels, universities, government-sponsored farmer associations organised to address agrobiodiversity issues, NGOs promoting conservation and agricultural development, and farmers, forest dwellers and other community groups. To encourage participation in planning and project implementation, stakeholder groups were consulted when developing project survey procedures, criteria for crop, agroecosystem, and project site selection. In addition, in each of the project countries, 35 to 40

stakeholders including representatives from governments, research institutes, NGOs, and farmer associations (or individual farmers), participated in planning meetings. In particular, ministries and local government bodies actively contributed to the project.

KEY FIGURES

- Areas planted with traditional varieties helped to restore degraded lands. This is now being researched further in new projects in the region.
- The participation of at least one household member in project activities led to a 39% increase of species present in the area of the project according to the Simpson Index of Diversity.

Above: In Uzbekistan, it is often up to the women to harvest wild walnut.
Credit: Bioersity International/L. Nikolai



Photo: Collecting apples from fruit orchard, Kyrgyzstan.
Credit: Kuban Turgunbaev

Methodology

After 2013, an impact assessment study was carried out to examine whether the tangible benefits of the Biodiversity International project were transferred at the household level, with specific emphasis on Uzbekistan, selected for the country relevance in terms of household characteristics and area covered by the project. In particular, the assessment focused on the effects of the interventions in the activity

KEY FIGURES

- Farmers consumed and marketed wild fruit tree species by an additional 10 and 8%, respectively.
- Apricot was cultivated by over 40 % of project households in Uzbekistan thus amounting to over 30,000 households.

areas involving the enhancement of use and consumption of target fruits, as well as of their marketing value, to improve household food security and wellbeing.

The assessment aimed at providing the following two outputs:

- 1) Evidence of how the application of project activities leads to an increase in *in situ* diversity;
- 2) Evidence of the extent to which the application of project activities, through the conservation of diversity *in situ*, contributes to livelihood benefits.

A total of 206 gender-disaggregated households (including both project participants and non-participants) were randomly selected and interviewed in eleven regions of Uzbekistan (including Andijan, Bukhara, Fergana, Jizak, Karakalpakstan, Kashkadarya, Khorezm, Namangan, Samarkand, Surkhandarya, Tashkent) in 2007 and 2011. An in-depth qualitative assessment of the project followed to understand the reasons why specific outcomes occurred (or not) at the household level.

KEY PARTNERS IN UZBEKISTAN THAT FACILITATED THE COLLECTION OF DATA USED FOR THE STUDY

Dr Karim Baymetov, Mr Farhod Nazarov – Uzbek Research Institute of Plant Industry

Dr Elena Dorohova-Shreder, Dr Vladislav Arzumanov, Dr Mikhail Dzavakyants, Dr Abduvahob Abdurasulov, Mr A. Ahmadjanov, Mr T. Mahkamov, Mr A. Imomberdiev, Mr O. Islamov, Mr M. Salahov, Mr Kh. Razakov, and Mr Sh. Sobirov – Uzbek Research Institute of Horticulture, Viticulture and Wine-making named after R. Shreder

Dr Galina Chernova, Dr Eugeniy Butkov, Mr Lutsian Nikolyai, Mr Timur Tulyaganov. Ms Lazokat Azimova, Mr B. Yusubbaev, Mr S. Islamov – Uzbek Research and Production Centre of Ornamental Gardening and Forestry

Dr Furkat Hasanov, Dr Komil Tojiboev, Dr Uktam Pratov, Dr A. Yuldashev, Mr A. Khujanov – Uzbek Research and Production Centre of Botany

Dr Abdikhalil Kayimov – Tashkent Agrarian University

Dr Hojmurat Tolipov – Main Office of Forestry of Ministry of Agriculture and Water Management of Uzbekistan

Dr Eugeniya Hegay, Dr F. Mustafine – Uzbek Institute of Genetics and Plant Experimental Biology

KEY FIGURES

- 1,500 farmers were trained in soil, water and crop management practices.
- Wild fruit trees were allocated 5% more land thanks to project activities.

Results

According to the data collected, several wild fruit species are cultivated and maintained *in situ* by farmers. Apricot is the most frequently grown fruit tree species and it is cultivated by more than 40% of the interviewed households. Other widely-cultivated fruit species - grown by over 10% of the households - include grape, pear, pomegranate, fig and alycha.



THROUGH THE GENDER LENS

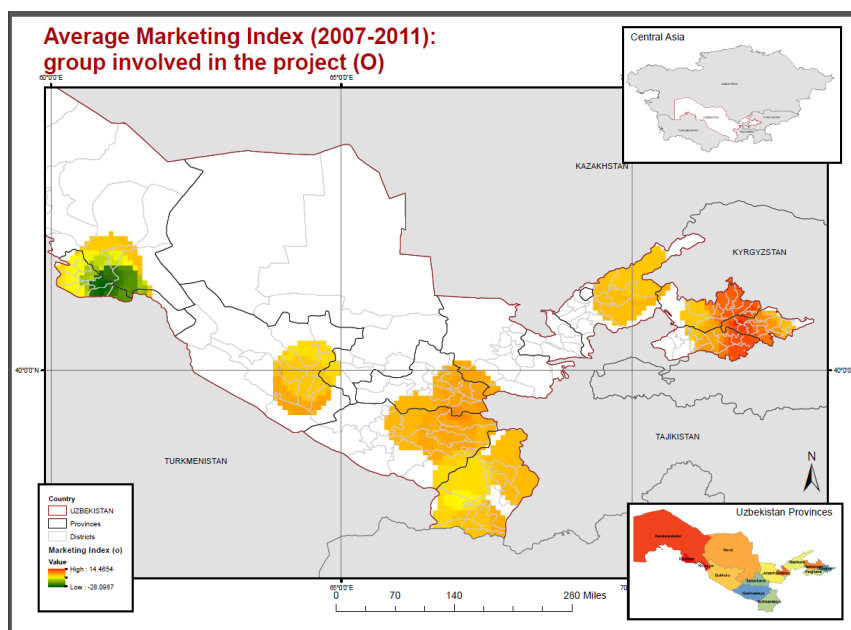
In the context of a global comparative study entitled *Gennovate: Enabling gender equality in agriculture and environmental innovation*, Bioversity International and Kyrgyz partners Pikir Izldoo Laboratoriyasy, Limited Liability Company examined gender norms and agency related to natural resource management.

Women in Kyrgyzstan contribute to sustainable biodiversity management and conservation of walnut forests, but they are often excluded from meetings relating to forest management and have difficulties accessing information. The global comparative study engages men and women of different socio-economic backgrounds and ages in discussions to improve knowledge sharing and co-learning within the community, as well as with researchers.

Surveys of households and commercial orchards collected from 2006 to 2011 demonstrated that Uzbekistan is still the home for 83 traditional varieties of apricot, 43 of grape, 40 of apple, 30 of walnut, 21 of pomegranate, 15 of pear, all grown within the farmers’ production systems. Wild almond, pistachio and walnut and other wild fruit and nut species are still concentrated in the forests and used by local people for their personal consumption and income. Fresh fruit marketing and self-consumption are the most frequent uses for all the cultivated species, with the exclusion of mulberry, where the processing of the fruits exceeds other types of use.



Photos: Older women and men engaged in gender-responsive participatory research activities, Kyrgyzstan. Credit: National Academy of Sciences of the Kyrgyz Republic/K. Musuraliev



Map: Average marketing index (2007-2011) among project participants. The figure shows the observed heterogeneity of the marketing index across the target regions. Higher scores of the index implies that a higher share of the agricultural production is sold on the market. The area of Uzbekistan bordering with the Turkmenistan shows the smallest values, while those areas close to Kyrgyzstan have the highest score.

This brief is based on a report by Elisabetta Gotor and Francesco Caracciolo 'Livelihood implications of *in situ*-on farm conservation strategies of wild fruit species in Uzbekistan, Bioversity International 2015., and on a complementary study to examine the gender impacts of the interventions.

Citation
Gotor E., Caracciolo F., Elias M., Trincia C. (2015) Livelihood implications of *in situ*-on farm conservation strategies of wild fruit species in Uzbekistan. Bioversity International series of Impact Assessment Briefs no. 16. Bioversity International, 6 p.

In 2013, the Convention on Biological Diversity recognized *Guidelines: Access and benefit sharing in research projects* – a publication developed by Bioversity International within the scope of this project – as an important tool to help countries and policymakers implement the Nagoya Protocol.

marketing thereof, had also increased by 5.3% and 10%, respectively.

With respect to livelihood outcomes, the participation in the project and the interventions themselves had a positive impact on the appliance and livestock indices (around 3%), but these were not statistically significant. This may be because an insufficient period of time had elapsed between the end of the project and the evaluation to detect an impact on livelihoods. It may also result from limited knowledge-sharing among local participants and non-participating households, which hinders the uptake of project innovations among non-participant households within and across communities.

Results strongly support the hypothesis that the participation of at least one household member in project activities had a positive and significant effect on the conservation of fruit tree species diversity. This is shown by a 61% increase in the Equitability Index, which measures species evenness and a 39% increase in the Simpson Index of Diversity, which measures the number of species present, as well as the abundance of each species, at the end of the project. The area cultivated of targeted fruits, as well as the consumption and

RECOMMENDATIONS

Project Dissemination:

The ex post assessment revealed that dissemination of good practices across participant and non-participant households could be improved by having a more constant presence in project sites and by examining the way in which information circulates within and across project communities. In particular, future projects should consider:

- selecting highly-motivated participants through various channels rather than local forest authority identification alone;
- involving households from different village quarters as village residents often interact closely with their nearest neighbours;
- ensuring a good balance of male and female focal points who can effectively reach other villagers of their own gender.

Knowledge Sharing:

In order to mitigate against the barriers of knowledge transmission and continued adoption of project innovations raised by high out-migration rates in project areas, it is recommended to involve youth who can disseminate information among their peers and promote continuity of the practices as their parents age, and establishing sharing mechanisms for project technologies, such as grafting equipment, as well as associated knowledge within project villages.

Livelihood Outcomes:

Interventions of this type need a longer time span to generate tangible improvements on the livelihoods of the concerned population and therefore should be measured with greater temporal intervals.