

***In situ* Conservation of Crop Wild Relatives Through Enhanced Information Management and Field Application:**

South-South Cooperation to Develop Global Tools for Crop Wild Relatives Conservation and Sustainable Use

I. Executive Summary:

Carried out between 2004 and 2010, the Project was funded by the Global Environment Facility (GEF) and implemented by the United Nations Environment Programme (UNEP) in collaboration with the Governments of Armenia, Bolivia, Madagascar, Sri Lanka, and Uzbekistan. Under the coordination of Bioversity International, the Project set out to establish a broadly-based partnership to enhance the *in situ* conservation of Crop Wild Relatives (CWR) in these five countries and to use the experience of doing so as a platform to create and test tools that would enable others to use similar methods, adding to the global knowledge about CWR and their conservation and use. Furthermore the project created important synergies and facilitated sharing and learning through South-South and North-South exchanges.

The outcomes of this project included: the safe and effective conservation of CWR and their increased availability for crop improvement in Armenia, Bolivia, Madagascar, Sri Lanka, and Uzbekistan, along with an international information system to support the conservation of CWR throughout the world. Within each partner country, the conservation status of CWR was determined and information management systems were created bringing together information on CWR held by different institutions. The international information management system was created and tested by partner countries and international partners, and allowed dispersed information held by individual countries, international agencies, and other institutions to be brought together and used to support conservation decision-making at the global level. Decision-making procedures allowing countries to identify priority conservation actions were developed and tested, and those of the highest priority were carried out. Benefit-sharing issues relevant to conservation of CWR were investigated, and initiatives were undertaken to increase the involvement of country decision makers and the public in the conservation of CWR.

II. Actors and Their Roles:

Recipient Entity	Basic Information	Role
Governments of Armenia, Bolivia, Madagascar, Sri Lanka and Uzbekistan	<i>Sector:</i> Public, Agriculture and Environment	Members of the International project Steering Committee; Host the National Project Steering Committees (NPSC) and national Project Management Unit (NPMU)
	<i>Center of Operations:</i> Yerevan, Armenia; La Paz, Bolivia; Antananarivo, Madagascar; Colombo, Sri Lanka; Tashkent, Uzbekistan	
	<i>Ownership:</i> National-level government	

Initiating Entity	Basic Information	Role
United Nations Environment Program (UNEP)	<i>Sector:</i> Biodiversity and Environment	GEF Implementing Agency
	<i>Center of Operations:</i> HQ Nairobi, Kenya, with worldwide operations	
	<i>Ownership:</i> International organization with funding from UN member countries	
Global Environment Facility (GEF)	<i>Sector:</i> Biodiversity	Co-financing Agency
	<i>Center of Operations:</i> Secretariat based in Washington, DC, USA, with operations globally in countries with developing and transition economies	
	<i>Ownership:</i> International organization with funding from UN member countries	
Bioversity International	<i>Sector:</i> Agricultural biodiversity conservation and use	Global Project Executing Agency
	<i>Center of Operations:</i> HQ based in Rome, Italy, with operations in countries with developing and transition economies	
	<i>Ownership:</i> International organization with funding from international development organizations, countries, universities, foundations, and private sector	

Supporting Entity	Basic Information	Role
Armenia: Ministry of Nature Protection; Ministry of Agriculture	<i>Sector:</i> Environment; Agriculture	National Project Executing Agency
	<i>Center of Operations:</i> Yerevan, Armenia	
	<i>Ownership:</i> National-level government	
Bolivia: General Directorate on Biodiversity, Vice Ministry of Environment, Natural Resources and Forest Development.	<i>Sector:</i> Environment	National Project Executing Agency
	<i>Center of Operations:</i> La Paz, Bolivia	
	<i>Ownership:</i> National-level government	
Madagascar: Ministry of Scientific Research, National Centre for Agricultural Research for Rural Development.	<i>Sector:</i> Science; Agriculture	National Project Executing Agency
	<i>Center of Operations:</i> Antananarivo, Madagascar	
	<i>Ownership:</i> National-level government	
Sri Lanka: Ministry of Environment; Ministry of Agriculture, Plant Genetic Resources Centre.	<i>Sector:</i> Environment; Agriculture	National Project Executing Agency
	<i>Center of Operations:</i> Colombo. Sri Lanka	
	<i>Ownership:</i> National level government	
Uzbekistan: State Committee of Republic of Uzbekistan on Science and Technology, Institute of Genetics and Plant Experimental Biology.	<i>Sector:</i> Science; Genetics	National Project Executing Agency
	<i>Center of Operations:</i> Tashkent, Uzbekistan	
	<i>Ownership:</i> National level	

III. About the Initiative:

Background

Crop Wild Relatives (CWR) are the ancestors of modern, cultivated crop varieties. Over the ages, they have provided plant breeders with the genetic material to enhance the nutritional quality and productivity of crops, supply useful traits to counteract extreme weather conditions and provide resistance to pests and diseases. These traits are maintained in the populations of wild relatives because where they grow they continue to adapt to environmental changes. To retain these valuable characteristics, populations of CWR need to be conserved *in situ*, in their wild habitats.

Findings demonstrate, however, that climate change will drive many wild relatives of important crops to extinction through habitat reduction and fragmentation, even without considering other continuing drivers of habitat loss, such as deforestation and over-exploitation. Bioclimatic models are already predicting that climate change will be responsible for a 50 percent loss in the distribution range of wild populations of peanut (*Arachis*), potato (*Solanum*), and cowpea (*Vigna*). Additionally, due to the effects of climate change, 16 to 22 percent of these species will go extinct by 2055. Evidence also suggests that many protected areas will suffer moderate to substantial species loss. This calls into question the ability of protected areas, in their present form, to secure species in a climate change scenario.

Many developing countries, located within zones of plant and crop diversity, contain large numbers of important crop relatives. Although most of these countries have listed the conservation of CWR within their national biodiversity and agricultural development strategies, they generally possess such limited resources that they have not yet been able to invest in programmes to support effective conservation and the optimum use of CWR. In the project discussed in this case study, five countries (Armenia, Bolivia, Madagascar, Sri Lanka, and Uzbekistan), all located within centres of crop or plant diversity, worked together and with international agencies to develop and implement rational, cost-effective approaches to conserving their CWR.

The five project countries set out to improve the conservation and sustainable utilization of these important resources by maximizing the use of existing information and conservation resources to protect CWR species occurring within their borders. This was achieved by establishing effective partnerships among relevant national agencies and individuals, and adding to the information base by carrying out original research on the distribution and uses of and threats to those populations. The project also resulted in an international information system that supports work by other countries on crop wild relatives' conservation.

Challenges

Prior to this Project, practical and sustained action on the ground for the *in situ* conservation of CWR had been very limited, with little or no information available for countries to base their efforts on. This was a major challenge for countries, which nonetheless, given the diversity of species, threats, and needs, developed their own, unique approach to *in situ* conservation of CWR. The partnerships established during the course of the Project were essential to overcome many of the national political, administrative, and infrastructural obstacles that had so far limited efforts for CWR conservation. They were particularly effective in bridging the divide that generally

exists among those sectors that must work together in a project of this nature, i.e. the agricultural, forestry, and environmental agencies, which, more often than not, have no linkages or tradition of collaboration. This in itself presented a considerable challenge for partnership and coordination as well as for establishing a suitable policy/legal enabling environment for CWR conservation. The situation was made more difficult by the fact that CWR are not usually considered to be flagship or iconic species; therefore, attracting interest and resources is a further challenge.

Against a background of almost total neglect, the CWR Project succeeded in forging a partnership that enabled great progress to be made in the area of *in situ* conservation. Furthermore, by developing tools that enable informed decision making on CWR and promoting policies that target the effective conservation of CWR, the Project has delivered improved *in situ* conservation of agricultural biodiversity. This diversity is a *sine qua non* for reducing hunger and malnutrition and also underpins efforts to promote opportunities for economic development.

IV. Financial Arrangements:

The project was co-funded by the GEF, the Governments of Armenia, Bolivia, Madagascar, Sri Lanka, and Uzbekistan, Bioversity International, and other international organizations (e.g. Botanic Gardens Conservation International, Bundesministerium Für Wirtschaftliche Zusammenarbeit (the German Federal Ministry for Economic Development Cooperation), Food and Agriculture Organisation, International Union for Conservation of Nature (IUCN), and UNEP-World Conservation Monitoring Centre.

V. South-South Cooperation Components:

Effective Partnerships

The implementation of project activities created important synergies and facilitated sharing and learning through South-South and North-South exchanges. The project was able to engage more than 60 national and international agencies essential to the complex and multidisciplinary nature of CWR *in situ* conservation. Planning, implementation, and monitoring were carried out through a series of local and national committees, coordinated and guided by Bioversity International through an International Steering Committee made up of representatives from all participant countries and international organizations. A three-person Technical Advisory Committee provided overall technical direction. The agencies and organisations essential to this process traditionally had little history of working together; the project enabled them to do so, with great effectiveness, enabling partners to overcome many of the national political, administrative, and infrastructural obstacles that had so far limited efforts. Moreover, it provided an interdisciplinary and apolitical platform for information gathering and sharing and for the development of national and international information resources which are now available for other countries to employ. Furthermore, by including relevant international partners in the fields of legal and policy review and analysis, information management, and conservation actions, national partners were linked to the best and most up-to-date science in these fields.

Global and National Information Systems

The project included a major component on information management since baseline studies indicated that this was a major gap for effective CWR conservation decision-making. One of the major objectives of the project was to create an information access and management capability that integrated the extensive but fragmented and dispersed data on crop wild relatives held by the international partners, by other international sources and by a number of key institutions in other countries (e.g. major botanic gardens, herbaria, natural history museums etc.). The aim was to create a portal that would bring the information together and make it usable at country level, as well as ensuring the reliability of the data to be tested.

During the project, all five countries brought together pre-existing and new data on CWR in one or more national databases, all based on the same set of descriptors. Pre-existing data was gathered in each country from a variety of sources, available in various electronic formats or often non-digitized. New occurrence data on CWR was gathered during numerous field surveys. Given the different national contexts and varying levels of expertise and use of software programs, all five national inventories were designed according to appropriate national needs. Detailed information for hundreds of CWR species is now available. The five comprehensive national information systems are complemented by a global portal that provides access to CWR information at global level at www.cropwildrelatives.org. All national inventories are searchable through the portal. Further resources on CWR provided by the portal include publications, searches for projects and experts, news, and images.

Enhanced Capacity Building

The Partnership was crucial for building leadership capacity at the local, national, regional, and international levels to incorporate responsibility for conservation of CWR into national biodiversity and plant genetic resource (PGR) systems. Despite their very different natures, biodiversity and government structures, the countries formed an effective working partnership and have acquired unique experience in one of the most challenging areas of agrobiodiversity conservation. This is in itself a significant achievement.

The capacity to analyze and use information for conservation decision-making was substantially increased in all project countries. The Project created important synergies and facilitated sharing and learning through South-South and North-South exchanges. Much was achieved in terms of national capacity building, especially through non-formal training activities and workshops. Since the beginning of the project, over 650 project partner staff members have received training to support project implementation.

Countries developed unique approaches to capacity building through partnerships with universities and the development of postgraduate programmes. Some countries collaborated with university partners to establish exciting modules and courses with a strong emphasis on CWR that target undergraduates, postgraduates, policy-makers and scientists. As a result, the five countries are now well placed to act as regional hubs for CWR conservation in their regions.

A manual of *in situ* conservation of CWR based on the experiences gained through this Project was published in 2010 and serves as an important tool in sustaining and scaling-up future conservation activities. It also represents an important tool for disseminating information on CWR

conservation. The manual describes the experiences and lessons learned by countries while implementing project activities and adds substantially to the limited body of knowledge available for the effective conservation of CWR. Its translation into French, followed by Spanish and Russian versions, will ensure that the lessons learned from the Project are widely disseminated and that they can be up-scaled and applied to other regions that harbour important CWR.

Conservation Actions

Project activities have contributed substantially towards the achievement of Millennium Development Goal 7, particularly Target 7.A (integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources) and Target 7.B (reduce biodiversity loss, achieving by 2010 a significant reduction in the rate of loss). By establishing a platform for information sharing and dissemination of CWR, it also plays a major role in the achievement of Millennium Development Goal 8 (develop a global partnership for development), fostering greater South-South cooperation.

Each of the five partner countries established a comprehensive national strategy for *in situ* conservation of CWR, which included the development of national inventories and methods for prioritizing conservation activities for CWR species from 36 genera. An essential element in each national strategy was an action plan dedicated to CWR conservation. To achieve this, management plans for existing protected areas had to be adapted to include CWR and effective species-specific management and monitoring plans for CWR developed for inclusion in the more general protected area management plans. Species management and monitoring plans were developed for wild wheat in Armenia, wild cacao in Bolivia, wild yams in Madagascar, wild cinnamon in Sri Lanka, and wild almond in Uzbekistan. Moreover, the project has identified places outside protected areas for the conservation of wild rice in Sri Lanka, and wild apple, walnut, and pistachio in Uzbekistan. In addition to their value within each country, these outputs together also represent a significant contribution to the practice of *in situ* CWR conservation in protected areas.

The project has expanded substantially the previously limited body of knowledge on *in situ* CWR conservation in developing countries. Ecogeographic assessments allowed more than 310 CWR species to be Red List-assessed according to IUCN guidelines. Bolivia published the first IUCN Red List specifically dedicated to CWR. This is probably the largest set of such assessments undertaken for CWR and represents a major contribution to documenting the diversity of plant genetic resources for food and agriculture. In addition, all national partners continue to carry out work on evaluation and breeding programmes on the following CWR: wheat and wild pear (Armenia); rice (Sri Lanka and Madagascar); potato, quinoa, and peanut (Bolivia); and barley and pistachio (Uzbekistan). This strengthens the global plant-breeding capacity and furthers the quest to develop varieties with traits needed to meet the challenge of climate change.

VI. Lessons Learned:

The effective *in situ* conservation of CWR is not an easy task. It is not simply a matter of developing conservation biology; there are also a wide range of political, institutional, legal,

social, and cultural issues that must be addressed. The amount of time and resources needed to bring together relevant stakeholders for such efforts is often underestimated.

Accommodation of South-to-South, cross-country learning and sharing of experiences is needed to enhance the impact of the capacity development support provided by a project of this nature.

VII. Conclusion:

The Project was successful in developing a set of global tools that will be essential in scaling-up project results to different areas and regions facing the same challenges.

The Project is an innovation in itself and the first of its kind to put in place national strategies for the conservation and sustainable utilization of CWR, with the five partner countries truly pioneering efforts in this field. With very limited guidance from pre-existing literature, countries produced a wealth of information on lessons learned and good practices that can be applied to CWR conservation at national and international levels. Further to this, countries have carried out participatory research initiatives that have contributed to raising the understanding of the importance of wild relatives as a critical component of biodiversity in production landscapes and sectors as well as for sustainable livelihoods and food security.

Countries have also engaged in reviewing the legal and policy framework for CWR as well as raising awareness on benefit sharing related to CWR with all levels of stakeholders. This, together with CWR awareness programmes aimed at policy-makers and other relevant target groups, as well as important outputs such as the Global CWR Portal and the manual on *in situ* conservation of CWR, is contributing to a greater appreciation of the direct importance of wild relatives to local and national productive sectors and economies.

VIII. Project Contacts:

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IX. Acknowledgements:

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