

## OPTIONAL ANNEXES

### *In Situ/On-Farm Conservation and Use of Agricultural Biodiversity (Horticultural Crops and Wild Fruit Species) in Central Asia*

#### ANNEX E – Analysis of Existing Legislation and Policy

The following list provides an overview of relevant legislation and policy identified during the PDF-B phase. Identification of these instruments was intended to guide project planners as to strengths and weaknesses in existing policy and law and to support design of the full project. The list is the result of an initial examination only, and will be the starting point from which a full analysis of policy and legislation will be carried out in the early stages of full project implementation.

#### **Kazakhstan**

##### ***Biodiversity conservation and land use:***

- *Laws On Nature Protection* (15-07-97) and *On Ecological Expertise* (18-03-97) address ecological safety, prevent adverse effects of economic and other activities to the natural ecological systems, conserve biological diversity and organize rational nature management;
- *Forest Code of Kazakhstan* (23-01-93) addresses public attitude toward ownership, use and disposal of forest reserves, and more precisely defines the legal basis of protection and reproduction of forests;
- *Treaty on the Cooperation in the Field of Ecology and Protection of Environment* (08/02/92);
- *Treaty on collaboration in the Field of Conservation and Use of Cultivated Plants Genetic Resources between CIS Member States* (04/06/99);
- *Laws On Specially Protected Natural Territories* (15-07-97) and *Land Code of Kazakhstan* (20-06-03) support ecological security, prevent adverse effects of economic and other activities to the natural ecological systems, conserve biological diversity, and organize rational nature management.

##### ***Agriculture and Farmers' Rights:***

- *Law On Quarantine of Plants*, (11-02-99) defines the legal basis and principles of state activities on plants' quarantine (including fruit trees and vines);
- *Law On Protection of Plants*, (03-06-02) regulates issues related to harvest preservation, its quality and protection from adverse health and environmental effects when undertaking phyto-sanitary activities;
- *Law On Seed Growing*, (08-02-03) regulates organization and functioning of seed growing, and state control over production, purchase, processing, storage, transportation, selling, and use;
- *Draft Law On Obligatory Insurance in Plant Growing* protects plant producers from poor weather conditions;
- *Laws On Peasants (Farm) Households*, (31-03-98) and *On Individual Entrepreneurship*, (19-06-97) regulate the legal status of agricultural commodity producers and related organizational, financial, material, and informational activities;
- *Land Code of Kazakhstan* (20-06-03) assigns the right of private property to the land;
- *Civil Code of Kazakhstan* (chapter 53) and *Law On Protection of Achievements in Breeding* (13-07-99) define legal, economic and organizational foundation for

breeding activities, regulate privacy and non-property rights arising from creation, discovery, and use of achievements in breeding (including fruit species).

## **Kyrgyzstan**

### ***Biodiversity conservation and land use:***

- *Law On Nature Protection* (15-07-97) regulates conservation of the natural environment, addresses prevention of adverse effects of economic activities on human and environmental health, and enhances and improves the quality of natural environment;
- *Forest Code of Kyrgyzstan* (08-07-99) protects and supports reproduction of forests and game-preserves, secures their rational use, conserves biodiversity of forest ecosystems, and increases ecological and economic potential of forests;
- *Treaty on the Cooperation in the Field of Ecology and Protection of Environment* (08/02/92);
- *Treaty on collaboration in the Field of Conservation and Use of Cultivated Plants Genetic Resources between CIS Member States* (04/06/99);
- *Laws On Specially Protected Natural Territories* (1999) and *In Biospheric Territories* (1999) list categories of protected natural areas and regulate their use with the purpose of conserving unique natural complexes, gene pools of flora and fauna;
- *Forest Code of Kyrgyzstan* (08-07-99) allows for open-end leases of woodlots and uses up to 50 years to produce forest resources;

### ***Agriculture and Farmers' Rights:***

- *Law On Protection & Use of Flora* defines the legal basis for protection, rational use and reproduction of flora resources, considers related market issues and includes economically justified system of payment for the use of flora object, financing of activities directed to protect and reproduce flora, and a fines and claims system for breaching the law;
- *Land Code* of 1999 abolishes exclusive state ownership of land and other natural resources, declares private ownership, defines agricultural lands that are the most economically and ecologically valuable;
- *Law On Management of Agricultural Lands* (2001) regulates legal relations and safe and efficient use in management of agricultural lands;
- *Law On Legal Protection of Achievements in Crop Breeding* (13-06-98).

## **Tajikistan**

### ***Biodiversity conservation and land use:***

- *Law On Nature Protection* (01-02-96) promotes ecological law and order, conservation of biodiversity, and biosafety;
- *Law On Protection* regulates management of flora and fauna habitats, protects purity and improvement of air, and controls use of city and other air basins;
- *Law On Ecological Expertise* (2003) regulates ecological expertise and defines the rights and obligations of parties involved in expertise;
- *Treaty on the Cooperation in the Field of Ecology and Protection of Environment* (08/02/92);
- *Treaty on collaboration in the Field of Conservation and Use of Cultivated Plants Genetic Resources between CIS Member States*;

- *Law On Specially Protected Natural Territories* (1996) defines legal, economic, social, technological and special measures to be used in the system of protected areas. Manages those territories with socioeconomic interest to society.

#### ***Agriculture and Farmers' Rights:***

- *Law On Quarantine of Plants* defines the legal basis and principles of state activities on plants' quarantine and control;
- *Law On Breeding Achievements in Agricultural Crops* (04-11-95) regulates issues related to creation, protection and use of breeding achievements in agricultural crops;
- *Laws On Dekhkans'<sup>1</sup> (Farm) Households*, (23-04-02) defines legal foundation for establishment and activity of the dekhkan household.

### **Turkmenistan**

#### ***Biodiversity conservation and land use:***

- *Law On Nature Protection* (12-11-91) supports sustainability of the biosphere & ecological systems;
- *Law On Protection & Rational Use of Flora* (28-12-93) protects plant communities, fruits, seeds & parts, promotes their rational use and conservation, prohibits human-induced deterioration of their environment, and supports scientific research and economic incentives to further Law objectives;
- *Treaty on the Cooperation in the Field of Ecology and Protection of Environment* (08/02/92);
- *Law On Natural Territories Specially Protected by State* (19-05-92) defines a system of protected areas for systems & species under threat or having scientific or aesthetic value;
- *Land Code of Turkmenistan* (12-10-90) ensures rational use and protection of land, reproduction of soil fertility, and equitable development for citizens;
- *Forest Code of Turkmenistan* (12-04-93) conserves forests to meet ecological and economic purposes;
- *Model Regulation on State Nurseries of Rare and Vanishing Species of Animals and Plants* (15-12-95) supports reproduction of rare and valuable species of plants and animals.

#### ***Agriculture and Farmers' Rights:***

- *Law On Protection & Rational Use of Flora* protects rights of owners and users of flora;
- *Law On Daikhan Household* establishes principles and the legal basis for the daikhan household;
- *Law On Peasants' Association* defines legal, economic and social foundations of these associations, a main task of which is to produce, store and sell agricultural products;
- *Law On Protection & Rational Use of Flora* promotes increases in quantity & quality of herbage, seeds & fruit crops;
- *Decree of the President of Turkmenistan On Development of Gardening and Planting of Greenery in Turkmenistan* (09-11-92) declares the importance of horticultural development;

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<sup>1</sup> Dekhkan (or Daikhan) Household is a legal entity that owns the land, plants, agricultural machinery, equipment and any other property required for production, processing and selling of the agricultural products. The Dekhkan Household independently defines the scope of its activity and structure.

- *Law On the Leasing of Land to Foreign States;*
- *Law On the Transfer of Land as citizens' property for commodity agricultural production;*
- Decree of the President of Turkmenistan *On Rights of Ownership and Land Use in Turkmenistan (1993)*, a significant step in the acceleration of reforms, lays the legal norms for the transfer of land and for its long-term use.

## **Uzbekistan**

### ***Biodiversity conservation and land use:***

- *Law On Nature Protection (09-12-92);*
- *Law On Specially Protected Natural Territories (07-0593);*
- *Law On Strengthening of Protection of Valuable and Vanishing Plants and Animal Species and Regulating their Use (03-09-93);*
- *Law On Protection of Flora Use (26-12-97);*
- *Law On Forest (15-04-99);*
- The laws listed above determine the legal, organizational and ecologic principles of establishment and management of protected areas, and regulate use of wild plants and normative use of flora;
- *Treaty on the Cooperation in the Field of Ecology and Protection of Environment (08/02/92);*
- *Treaty on collaboration in the Field of Conservation and Use of Cultivated Plants Genetic Resources between CIS Member States (04/06/99).*

### ***Agriculture and Farmers' Rights:***

- *Law On Farms and Dekhkan Households* determines the legal, economic and social aspects of farms and dekhkan households;
- *Law On Achievements in Crop Breeding (29-08-02);*
- Edict of the President of Uzbekistan *On Most Important Guidelines for Strengthening Reforms in Agriculture (24-03-03);*
- Decree of the President of Uzbekistan *On additional measures to ensure execution of laws aimed at reforms in agricultural sector (16-03-04)*. The document addresses the following: control over timely and full execution of laws, decrees and other normative documents in reforming agriculture and economic relations in rural areas; monitoring rational use of lands and implementation of agreements by farmers; prevention of legal violations. The document also addresses protection of farmers' rights and interests, as well as control over rational use of water and fuel-and-oil products.

## **ANNEX F – PUBLIC INVOLVEMENT PLAN SUMMARY**

During the PDF-B phase, a detailed management structure to oversee project management and coordination was developed at both regional and national levels. These are described here.

### **PROJECT COORDINATION AND IMPLEMENTATION ARRANGEMENTS AT THE REGIONAL LEVEL**

IPGRI will be the executing agency for the project mainly through its IPGRI-CWANA sub-regional office in Tashkent. It will play a role in supporting project implementation on the regional level. It will establish the regional-level Project Implementation Unit (PIU) and appoint staff (Regional Project Coordinator, Assistant Regional Project Coordinator, and Bilingual Program Assistant) with specific project management and coordination responsibilities.

A Regional Project Coordinator will be appointed to coordinate implementation of action plans and strategies in all 5 countries. The Coordinator will:

- Provide technical and administrative leadership to the project team and act as the main project representative at global and regional levels;
- Observe agreed project management procedures in order to facilitate project implementation and ensure delivery of high quality outcomes;
- Prepare regional workplan and annual updates including national budget allocations;
- Facilitate communications and linkages at regional and national levels, as well as with UNEP-GEF;
- Serve as Executive Secretary and provide assistance to the International Steering Committee in coordinating project implementation at the regional level;
- Provide assistance to national partners and institutions to develop and execute the approved national and regional action plans;
- Initiate national steering committee meetings, draft the agenda with the chairman and record decisions of the committee;
- Manage the project budget, in accordance with the agreed work plan and approve disbursement of project funds, taking into account the decisions of the international and national steering committees;
- Draft terms of reference and conduct hiring procedures of international project staff and consultants;
- Review terms of reference of sub-contractors and conduct procedures for initiating sub-contracts;
- Co-ordinate, aggregate, and submit all monitoring and evaluation reports;
- Provide timely quarterly progress and financial reports to UNEP/GEF through the IPGRI Finance & Administration Group and the IPGRI regional CWANA office;
- Maintain good communication with the project donors and secure additional finances, including for private sector co-financing, for the approved work plan as necessary.

The Regional coordinator will be assisted by a regionally recruited Assistant Regional Project Coordinator and Bilingual Program Assistant. The Assistant Regional Project Coordinator will be responsible for:

- Providing support to the Regional Coordinator in the financial and administrative management of the project;

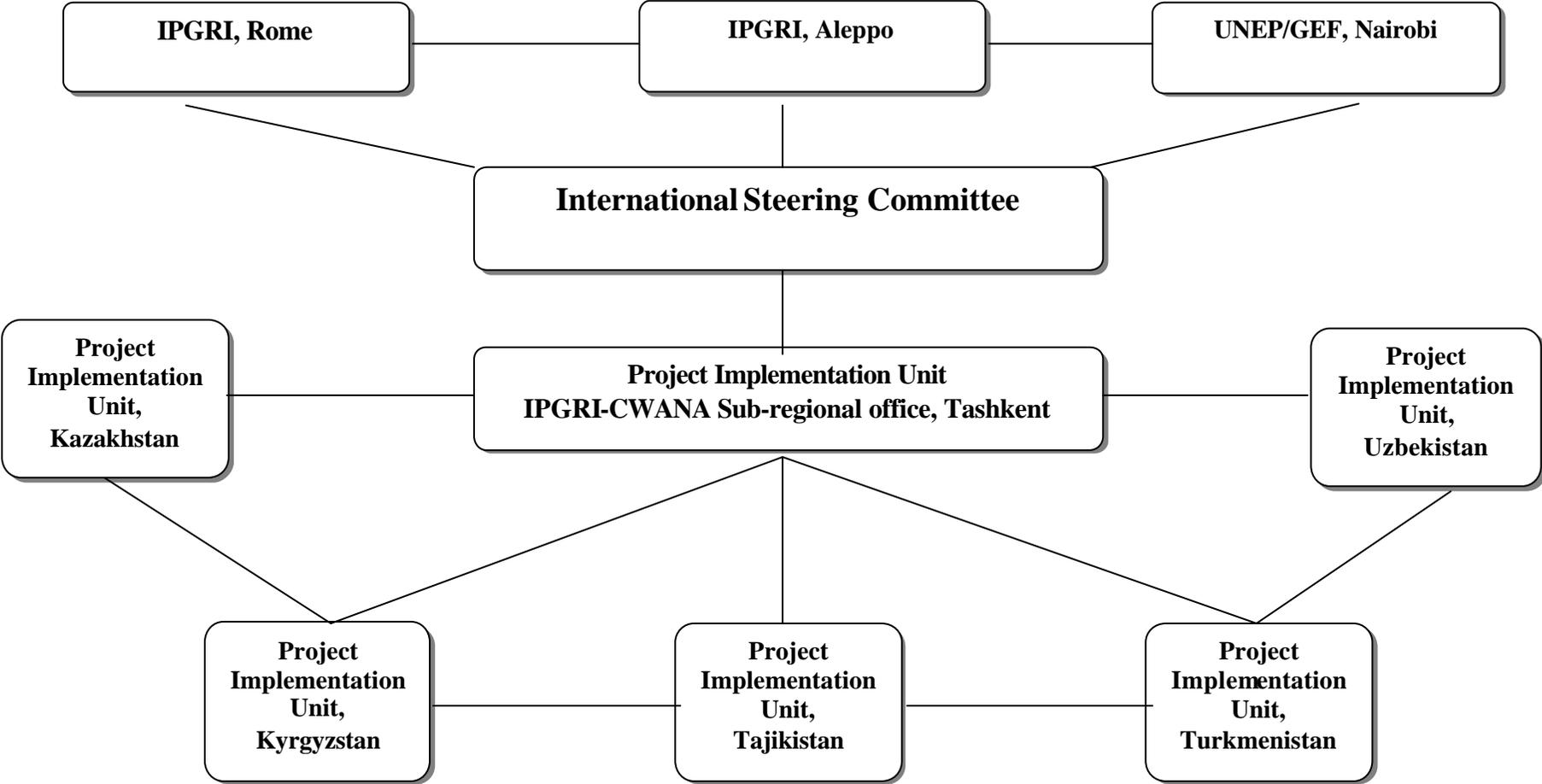
- Recording and monitoring project expenditures and fund availability;
- Reconciling UNEP/GEF and IPGRI financial procedures to ensure accurate and timely financial reporting;
- Preparing quarterly financial reports and reimbursement claims for submission to UNEP/GEF;
- Undertaking office fixed assets inventory and its reporting to UNEP/GEF and IPGRI
- Handling recruiting procedures of consultants and project staff through PFU/IPGRI CWANA procedures;
- Maintaining staff personnel records (attendance, leaves, local staff salary records);
- Maintaining office building, furniture, and vehicles;
- Purchasing office supplies;
- Liaising with the ICARDA/PFU administration and finance Officer regarding financial, administrative and personnel procedures of the project.
- Liaising with the IPGRI Finance and Administration officers both at IPGRI HQ and at the IPGRI regional CWANA office regarding financial, administrative and personnel procedures of the project.

The bilingual Program Assistant will provide the Project Regional Coordinator with the following support:

- Translation and proofreading of project documents, including national reports, quarterly progress/technical reports, meeting reports, technical correspondence, and other related papers from Russian into English and vice versa as requested by the Regional Coordinator;
- Formatting reports, proceedings, and other relevant documents in UNEP-GEF and IPGRI formats;
- Assisting the Regional Coordinator in the management, coordination and implementation of activities;
- Assisting the Regional Coordinator in monitoring the implementation of national work plans;
- Assisting the Regional Coordinator in communication with national partners by phone, fax, and other correspondence;
- Assisting the Regional Coordinator in organizing and conducting International Steering Committee Meetings and National Workshops.

An International Steering Committee (ISC) will be established to oversee project implementation. It will include representatives from all executing agencies at the national level (National Coordinators), the Regional Coordinator, as well as IPGRI and UNEP/GEF. The ISC will hold its meetings two times per year.

**Project Management Structure**



## PROJECT COORDINATION AND IMPLEMENTATION ARRANGEMENTS AT THE NATIONAL LEVEL

The project requires a high level of participation from different stakeholders at the national level: government agencies, research institutes, universities, NGOs, farmers and their associations, and local communities dealing with plant genetic resources research and conservation. During the PDF-B phase, each participating country identified key stakeholders. The countries will each implement a management structure that supports participation of this diverse group of stakeholders. Management structures comprise the following three elements:

A National Steering Committee (NSC) will be established in each participating country to provide general oversight and guidance to the project, facilitate interagency coordination, and monitor national-level activities. The NSC will hold its meetings two times per year. The Committee will include representatives from:

- Ministry of Agriculture;
- Ministry of Nature Protection;
- Academy of Sciences;
- Ministry of Education;
- State Forest Service;
- Site Coordination Committee;
- NGOs;
- Farmer associations;
- Farmers and local communities;
- Project Implementation Unit.

Each country has identified the Institute that will serve as the national-level project executing agency. A National Project Coordinator and necessary support staff will be appointed to assure execution of the project.

A two-tiered Committee structure will be implemented to manage and link activities at project sites. Multidisciplinary Site Committees (MSC) will be established for each project site and will include representation from all key stakeholder groups including farmers, forest dwellers, and local authorities. The Site Coordination Committee (SCC) in each country will link the Multidisciplinary Site Committees within that country, ensuring that lessons learned are shared among the sites and with national and regional level operations. The Site Coordination Committee will include one representative from each Multidisciplinary Site Committee, and one member will sit on the NSC. The Site Coordination Committee will hold two meetings each year at least two weeks prior to NSC meetings to ensure delivery of all recommendations and suggestions of SCC to NSC.

Specific management structures and assignments, and profiles of participating institutions, are provided for each country in the pages that follow.

## KAZAKHSTAN

The Government of Kazakhstan will execute the project through its Ministry of Agriculture and Ministry of Education and Science. The Academy of Agricultural Science will be the project executing agency. The project implementation unit will be based at the Academy of Agricultural Science.

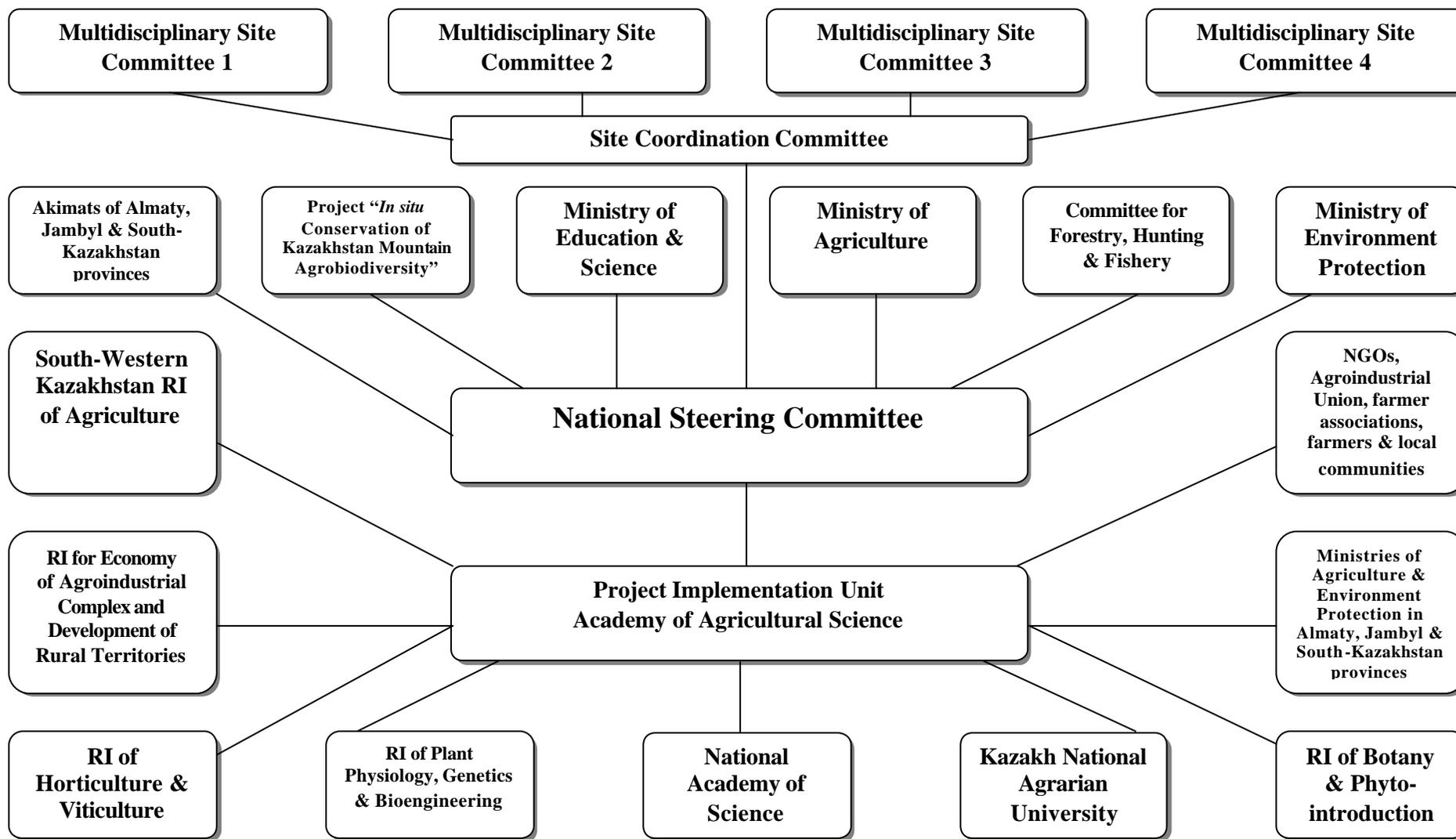
The NSC of Kazakhstan will include representatives from:

- Ministry of Agriculture;
- Ministry of Environment Protection;
- Ministry of Education and Science;
- Committee for Forestry, Hunting & Fisheries of the Ministry of Agriculture;
- Deputy Akims of the Akimats (local authorities) of Almaty, Jambyl & South-Kazakhstan provinces, responsible for the agricultural & forestry issues;
- Site Coordination Committee;
- UNDP/GEF project “*In situ* Conservation of Kazakhstan Mountain Agrobiodiversity”;
- Agroindustrial Union and farmer associations;
- Farmers and local communities;
- NGO “Society of Nature Protection”;
- Project Implementation Unit.

The main project partners in Kazakhstan are:

- The Academy of Agricultural Science;
- Research Institute of Botany and Phytointroduction;
- Research Institute of Plant Physiology, Genetics and Bioengineering;
- South-Western Kazakhstan Research Institute of Agriculture;
- Research Institute of Horticultural and Viticulture of the Kazakh Research and Production Center of Processing and Food Industry;
- Research Institute for Economy of Agroindustrial Complex and Development of Rural Territories;
- Kazakh National Agrarian University;
- National Academy of Sciences;
- Departments of Ministries of Agriculture & Environment Protection in the Almaty, Jambyl & South-Kazakhstan provinces;
- Agroindustrial Union of Kazakhstan;
- Farmer associations;
- Farmers and local communities;
- NGO “Society of Nature Protection”.

## Project Management Structure for Kazakhstan



## Institutional Profile for Kazakhstan

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Ministry of Agriculture</b> The Ministry is responsible for state policy in the field of agriculture, water management, fisheries and forestry. Develops necessary economic and legislative documents on financial and credit systems and pricing for agricultural products; takes measures toward dynamic and sustainable development of agriculture in the country; supervises agrarian research institutes.</p>	<p>Member of the National Steering Committee. General supervision of project implementation; coordinating research institutes subordinate to the Ministry and securing their financing; providing technical consultancies and elaborating recommendations on developing and enhancing farm households, submitting them to the legislative bodies.</p>
<p><b>Committee for Forestry and Hunting of the Ministry of Agriculture</b> The Committee is subordinate to the Ministry of Agriculture. Supervises forestry management in the specially protected territories (natural reserves, including biosphere, national natural parks, forests having scientific importance, forest genetic reserves, forest crop plants).</p>	<p>Member of the National Steering Committee. Strengthening regime of wild trees protection in the specially protected territories and forest farms. A key partner in implementation of project activities on wild fruit species in their natural habitat and in promoting active participation of forest dwellers in project implementation. Through its branches in the Provinces the Committee will play a key role in work of Site Committees.</p>
<p><b>Ministry of Environment Protection</b> The Ministry is responsible for development of state policy to optimize nature management systems and environment protection. Develops policy/legislative recommendations on conservation and expansion of forests including wild fruit species, as well as biological and landscape diversity; undertakes executive functions such as environment and natural resources monitoring, rehabilitation of environment, ecological education, etc.</p>	<p>Member of the National Steering Committee. Developing recommendations on conservation and management of biodiversity and their submission to the legislative bodies; maintaining relations among different stakeholders and coordination among various international, regional and national projects in the area of biodiversity,</p>
<p><b>Ministry of Education and Science</b> The Ministry is responsible for state policy in development of science and preparation of highly qualified specialists for the various fields of economics. Supervises research, education, and training institutes conducting fundamental and applied research on biodiversity.</p>	<p>Member of the National Steering Committee. Coordinating research institutes and Universities subordinate to the Ministry; monitoring and evaluating project activities and Outcome s on study, conservation and use of PGR; implementing training strategy, including development of training programs for various groups of stakeholders; ensuring proper use of government’s contribution for specific activities.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Academy of Agricultural Sciences</b> Public agency uniting the country's scientists in agriculture, water management, and forestry. Facilitates implementation of the State's agrarian policy; provides technical and scientific consultancies in conducting fundamental and applied research directed to increase agriculture production and food security; identifies priority areas of research to provide sustainable agriculture development; elaborates recommendations and suggestions on increasing agriculture production, sustainable management of water resources and forestry, and submits them to Ministry of Agriculture; promotes reforms in agriculture.</p>	<p>Providing technical and scientific consultancy on development of new and modification of existing methodologies on survey and assessment of agrobiodiversity levels and distribution as well as applying new technologies for these purposes; providing assistance in establishment and operation of Training Centers; organizing implementation of national and regional training program; improving skills of project team; holding workshops, conferences and undertaking other project activities in relevant areas of expertise, including acting as executing agency for project implementation at the national level. National Coordinator will be based at Academy of Agricultural Sciences.</p>
<p><b>Research Institute of Horticultural and Viticulture of the Research and Production Centre of Processing and Food Industry of the Ministry of Agriculture</b> Conducts research on conservation and use of horticultural genetic resources; develops new high-yield fruit crop varieties and introduces promising horticultural crops; develops biotechnological techniques of reproduction and new technologies of fruit and grapevine crop cultivation.</p>	<p>Developing, modifying, disseminating, and applying methodologies on assessment of distribution and levels of diversity; conducting field surveys of home gardens in south-east of the country; elaborating recommendations on enhancing farmers/local communities in maintenance of indigenous fruit crop diversity and its use in breeding programs and for non-breeding purposes; assisting in establishment of nurseries at demonstration plots; developing and disseminating public awareness materials, organizing farmers' fairs; organizing travel workshops for farmers maintaining horticultural crops; participating in training of farmers and local communities; establishing and maintaining data bases on traditional fruit crop varieties and farmers maintaining <i>in situ</i>/on farm local varieties of horticultural crops; documenting indigenous knowledge. Hosting National Training Centre on horticultural crops.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Research Institute of Botany and Phytointroduction</b> Subordinate to the Ministry of Education and Science. Carries out research on study, conservation, multiplication of indigenous flora as well as introduction of new plant species, develops scientific foundations for conservation and rational use of vascular plants, mushrooms, and algae; studies inter and intraspecific diversity of wild fruit species and monitors status of plant diversity conservation; develops recommendations for including species in the Red Data Book; elaborates methods of agrobiodiversity conservation and submits proposals to the state agencies.</p>	<p>Studying and assessing diversity levels of wild fruit species, their distribution and conservation status; conducting field surveys; developing methodologies on assessment of intraspecific and interspecific diversity of local fruit species in collaboration with Research Institute of Horticultural and Viticulture, their dissemination and use; elaborating recommendations for strengthening conservation of wild fruit species; establishing new and extending existing protected areas in order to cover wild relatives of horticultural crops; developing and disseminating public awareness materials; implementing training strategy, including participation in development of training modules.</p>
<p><b>South-western branch of the Kazakh Research and Production Centre of Processing and Food Industry of the Ministry of Agriculture</b> Division on Horticultural, Viticulture and Dendrology of the Centre. Undertakes research on assessment of local agrobiodiversity and its use in breeding programs; develops fruit crop varieties adapted to conditions of dry areas of south-western part of Kazakhstan; develops new agronomic practices in horticultural production.</p>	<p>Implementing activities of the Division on Horticultural, Viticulture and Dendrology; studying local and old varieties of horticultural crops and vines in the conditions of the south of the country (Zhambyl and South-Kazakhstan provinces); developing recommendations on outcome expansion of fruit and berry products; assisting in establishing nurseries in demonstration plots; publishing recommendations and booklets; organizing fairs at province and district levels; holding workshops.</p>
<p><b>Research Institute of Plant Physiology, Genetics and Bioengineering</b> Subordinate to the Ministry of Education and Science. A leading research institute in the area of plant biotechnology. Develops new forms of plants using bioengineering technologies, techniques of micro-cloning reproduction and long-term conservation of plant germplasm, studies physiological and genetic characteristics of plants in order to promote development of high yield and stress resistant crop varieties, assesses the level of plant diversity using molecular tools.</p>	<p>Assessing agrobiodiversity levels using molecular characterization: chromosomal analysis, DNA – markers; albuminous and isoenzyme markers; GIS analysis; hosting ICT centre.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Kazakh National Agrarian University</b> Subordinate to the Ministry of Education and Science. Provides training of high level specialists for agriculture and forestry, as well as farmers; develops training manuals and colloquiums on agronomy, horticultural, forestry, and economics for graduate and post graduate students; undertakes research on developing and modifying technology of cultivation of promising fruit crop varieties.</p>	<p>Member of multidisciplinary project team on assessment of level of distribution and diversity of horticultural crops and their wild relatives. Developing and implementing training programs for different target groups of trainees, including farmers; developing recommendations on and including PGR colloquiums in educational programs in Universities and schools; developing public awareness materials, training farmers on applying new technologies for cultivation of promising varieties of fruit crops; elaborating educational materials and programs; assisting in organizing training workshops .</p>
<p><b>Research Institute for Economy of Agroindustrial Complex and Development of Rural Territories</b> Subordinate to the Ministry of Agriculture. Studies socioeconomic issues in rural areas and makes prognosis of agricultural development; prepares recommendations on development of financial and credit relations; measures needed support to the village development; studies the market demands for agriculture products; supports collaboration and integration of rural commodity producers and various types of land tenures and farming systems; applies economic mechanisms to support farmers involved in horticultural production.</p>	<p>Socioeconomic assessment of farm households; developing profit sharing mechanisms among partners; recommending ways to strengthen legislation that promotes transfer of agriculture to market driven economy; developing private sector in agriculture; farm development, including farms maintaining horticultural crops; establishing farmer associations. Hosting Regional Training Centre on Socio-economic studies in agrobiodiversity management. Organizing training courses for different target groups, including farmers and forest dwellers on socio-economic aspects of agrobiodiversity management at regional and national levels, developing training materials for these training courses.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p data-bbox="199 237 810 300"><b>Agroindustrial Union and Association of Farmers</b></p> <p data-bbox="199 304 810 533">Public organizations that unite farmers and other rural commodity producers. Provide consultancies on increasing agricultural production and efficient use of economic and legislative incentives for the further development of various agro-food units. Support horticulturists through provision of public awareness materials.</p>	<p data-bbox="831 271 1431 1211">Member of the National Steering Committee. Participating in establishment of Site committees, demonstration plots, nurseries through their branches and representatives in project sites; participating in field surveys; documenting data; establishing and maintaining strong partnerships and collaboration between farmers, communities and other project partners; organizing farmer fairs and training courses for farmers; developing and disseminating public awareness materials; helping to translate research findings into understandable language for farmers; developing training materials for this group of trainees; assisting farmers in applying new technologies for fruit products production and adding value; assisting project team in documenting indigenous knowledge on characterization of fruit genetic resources, processing and storage of horticultural crops products; establishing database on farmers and forest dwellers maintaining local varieties of horticultural crops and promising forms of wild fruit species; participating in organizing training courses and travel workshops for farmers and forest dwellers; providing consultancies in establishment of associations of farmers and local communities which maintain local varieties of horticultural crops and promising forms of wild fruit species.</p>
<p data-bbox="199 1249 810 1348"><b>Departments of Ministries of Agriculture &amp; Environment Protection in the Almaty, Jambyl &amp; South-Kazakhstan provinces</b></p> <p data-bbox="199 1352 810 1648">Provincial Departments of Ministry of Agriculture and Ministry of Environment Protection. Implements state policy in agriculture, including horticultural, forestry and natural resource protection and sustainable use; promotes state policy on reforms in agriculture, land tenure, establishing farms; develops private sector in rural area; provides service, including consultancies on agricultural development.</p>	<p data-bbox="831 1283 1431 1783">Member of the National Steering Committee. Assisting to establish and participating in Site committees; participating in assessment of status of fruit genetic resources conservation; establishing project sites, helping to establish farmer associations; promoting sustainable development of farms including those maintaining local varieties of horticultural crops and promising forms of wild fruit species; helping to organize training of farmers and local communities; developing public awareness materials; disseminating knowledge and practices on how to improve management of farm households and forestry farms; managing a database on farmers.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>NGO “Society of Nature Protection”</b> Undertakes activities in nature protection, raising the level of ecological education, conservation of biodiversity and ecological balance in nature, provision of information service and consultancy in ecological education</p>	<p>Member of the National Steering Committee. Distributing information via mass media; publishing and distributing public awareness materials on importance of local varieties of horticultural crops and wild fruit species among farmers.</p>
<p><b>Multidisciplinary Site Committees</b> Multidisciplinary Site Committees include representation from all stakeholder groups including farmers, forest dwellers, and local authorities. One representative from each Multidisciplinary Site Committee will be included in the Site Coordination Committee (SCC) in each country.</p>	<p>Multidisciplinary Site Committees established at each site will provide the framework within which different stakeholder groups cooperate at the local level. It is at this level that genetic diversity will be identified, documented, and managed. Project activities will flow from this level: data on varieties and their distribution is consolidated across sites to provide a comprehensive picture, strengths and weaknesses in legislation and policy are identified at the point of application (horticultural operations and forests) and communicated to national and regional levels, the value of a participatory approach is affirmed and promoted at all levels.</p>
<p><b>Site Coordination Committee (SCC)</b> Site Coordination Committee includes one representative from each Multidisciplinary Site Committee, and one member will sit on the National Steering Committee (NSC).</p>	<p>The Site Coordination Committee will link the Multidisciplinary Site Committees within that country, ensuring that lessons learned are shared among the sites and with national and regional level operations.</p>

## KYRGYZSTAN

The Government of Kyrgyzstan will execute the project through its Ministry of Agriculture, Water Resources Management and Processing Industry, in coordination with the relevant government agencies and research institutes of the Academy of Sciences. The project executing agency will be the Research Institute of Farming under the Centre of Agrarian Science and Consultancy Services of the Ministry of Agriculture, Water Resources Management and Processing Industry. The project implementation unit will be established at the Research Institute of Farming.

The NSC of Kyrgyzstan will include representatives from:

- Ministry of Agriculture, Water Resources Management and Processing Industry;
- Ministry of Ecology and Emergency;
- State Forest Service;
- Ministry of Education;
- National Academy of Sciences;
- Site Coordination Committee;
- Associations of Farmers;
- NGO “Ecoforest”;
- Project Implementation Unit.

The main project partners in Kyrgyzstan are:

- Research Institute of Farming under the Centre of Agrarian Science and Consultancy Services of the Ministry of Agriculture, Water Resources Management and Processing Industry;
- Institute of Forest and Nut Production named after P.?.Gan of National Academy of Sciences;
- Botanical Gardens named after E.Gareev of National Academy of Sciences;
- Biological and Soil Institute of National Academy of Sciences;
- Kyrgyz Agrarian University named after K.I. Skryabin;
- Kyrgyz State National University named after Zh. Balasagyn;
- Institute of Biosphere of Southern Department of National Academy of Sciences;
- State Commission on Crop Varieties Testing of the Ministry of Agriculture, Water Resources Management and Processing Industry;
- Research Institute of Economy and Processing Industry under the Centre of Agrarian Science and Consultancy Services of the Ministry of Agriculture, Water Resources Management and Processing Industry;
- Research and Production Centre “Kyrgyzzhangak” under the National Academy of Sciences;
- Institute of Ecology and Nature Management under the Kyrgyz State Pedagogical University named after I. Arabaev;
- Naryn Base Station of Research Institute of Farming;
- Issyk-Kul Experimental- Breeding Station of Research Institute of Farming;
- Associations of Farmers;
- Community trust “Tokay”;
- NGOs “Ecoforest” and “Centre of Ecological Information and Training”;
- Public Foundation “Green World”.

**Project Management Structure for Kyrgyzstan**



## Institutional Profile for Kyrgyzstan

Institution	Role in the Project
<p><b>Ministry of Agriculture, Water Resources Management and Processing Industry</b> The Ministry undertakes executive, managerial and coordinating functions on development and implementation of unified policy in agriculture, water management, and processing industry, small and medium agro-entrepreneurship, territorial agricultural structures.</p>	<p>Member of the National Steering Committee. Assisting in coordinating the project; assisting in establishing the ICT network among project stakeholders; organizing exhibitions of farmers' achievements; assisting in establishing associations of farmers and local communities, multidisciplinary site committees, and demonstration plots of local varieties of horticultural crops.</p>
<p><b>Ministry of Ecology and Emergency</b> The Ministry undertakes the state management of environmental protection, and develops and manages implementation of a unified policy for monitoring the status of environment and rational nature resources management in the country.</p>	<p>Member of the National Steering Committee. Assisting in coordinating the project; assisting in establishing the ICT network among stakeholders; elaborating recommendations for legislation.</p>
<p><b>State Forest Service</b> The Service provides oversight of the unified forest policy in the field of reproduction, protection and rational use of forests, flora, development of specially protected natural territories and biodiversity conservation.</p>	<p>Member of the National Steering Committee. Assisting in coordinating the project; assisting in establishing the ICT network among stakeholders; elaborating recommendations for legislation on specially protected natural territories; organizing demonstration plots; establishing multidisciplinary committees and nurseries; holding national workshops.</p>
<p><b>Ministry of Education</b> The Ministry is responsible for state policy in development of science and preparation of highly qualified specialists. Supervises education and training institutes. The following institutions are in the structure: Kyrgyz Agrarian University named after K.I. Skryabin; Kyrgyz State National University named after Zh. Balasagyn; Institute of Ecology and Nature Management under the Kyrgyz State Pedagogical University named after I. Arabaev.</p>	<p>Member of the National Steering Committee. Coordinating institutes and universities subordinate to the Ministry; monitoring and evaluating project activities and outcomes on study, conservation and use of PGR; implementing training strategy.</p>
<p><b>National Academy of Science</b> Unites research institutes and centers and implements scientific programs. The following institutions are in the structure: Institute of Forest and Nut Production named after P. Gan; Botanical Gardens named after E. Gareev; Biological and Soil Institute; Institute of Biosphere; Research and Production Centre "Kyrgyzzhangak".</p>	<p>Member of the National Steering Committee. Providing general oversight of project implementation and performance; coordinating project partners; assessing results.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Centre of Agrarian Science and Consultancy Services of the Ministry of Agriculture, Water Resources Management and Processing Industry</b> Undertakes activities in the field of scientific and innovative provision, and consultancies for development of agriculture, water management, and processing industry.</p>	<p>Assisting in establishment of communication network among stakeholders, organizing fairs for farmer associations and local communities achievements.</p>
<p><b>Research Institute of Farming under the Centre of Agrarian Science and Consultancy Services of the Ministry of Agriculture, Water Resources Management and Processing Industry</b> The Institute develops scientifically justified systems of farming, new technologies directed to conserve and enhance soil fertility and increase productivity of the main agricultural crops; creates productive varieties and hybrids of fruit and berry crops for the various soil and climatic zones.</p>	<p>The project executing agency and member of the National Steering Committee. Undertaking overall survey; establishing demonstration plots, nurseries in farm households; elaborating methodologies on reproduction and <i>in situ</i>/on-farm conservation and recommending uses of local varieties for breeding and non-breeding; establishing database; hosting National Training Centre on Horticultural Crops; holding national training courses and scientific conference on agrobiodiversity.</p>
<p><b>Institute of Forest and Nut Production named after P.?. Gan of National Academy of Sciences</b> The Institute develops forestry and mountain forests management; monitors forest ecosystems; develops activities on forestry and nuts in forests in the south of Kyrgyzstan; develops forest rehabilitation felling and maintenance over cultivated plants.</p>	<p>Conducting overall survey; elaborating scientific recommendations; establishing demonstration plots; identifying characteristics of wild fruit species; establishing database; hosting Regional Training Center on Walnut.</p>
<p><b>Kyrgyz Agrarian University named after K.I. Skryabin</b> The University educates specialists, scientific and pedagogical staff of high and medium qualification for the agrarian sector, managerial staff for peasant and farm households; provides consultancy services.</p>	<p>Assisting in development and publication of public awareness materials; training for project implementers; elaborating training programs; holding training courses for farmers and researchers at sites, holding scientific conference on agrobiodiversity.</p>
<p><b>Kyrgyz State National University named after Zh. Balasagyn</b> Develops education, science and culture by means of undertaking fundamental and applied research; teaches at all levels of higher education and additional professional education on wide range of humanitarian, natural and other sciences; trains highly qualified specialists, managerial, scientific and pedagogical staff.</p>	<p>Participating in development and publication of public awareness materials; assisting in raising the level of the project implementer skills; elaborating training programs and materials; holding training courses and scientific conference on agrobiodiversity.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Botanical Gardens named after E. Gareev of National Academy of Sciences</b> The Botanical Gardens deals with breeding of horticultural crops and studies physiological processes for selection of sustainable forms and varieties in the conditions of the country.</p>	<p>Elaborating scientific recommendations, methodologies on reproduction and <i>in situ</i>/on-farm conservation; establishing database on local varieties of horticultural crops and wild fruit species; hosting the ICT center.</p>
<p><b>Biological and Soil Institute of the National Academy of Sciences</b> The Institute undertakes research on conservation and diversity maintenance of plant gene pools and natural ecosystems of Tien Shan and Alay mountains.</p>	<p>Undertaking overall survey for assessment of distribution and diversity of local varieties of horticultural crops and wild fruit species; establishing WAN and database.</p>
<p><b>Research Institute of Economy and Processing Industry</b> The leading scientific institution in the field of agrarian economy. Subordinate to the Centre of Agrarian Science and Consultancy Services. Studies socioeconomic issues in rural areas and makes prognoses of agricultural development; prepares recommendations on development of financial and credit relations; studies market demands for agriculture products; applies economic mechanisms to support farmers involved in horticultural production.</p>	<p>Participating in development of mechanism of benefit sharing on genetic material use; studying socioeconomic aspects of horticultural crop PGR conservation; establishing relations with the farmers; identifying constraining factors at all levels of collaboration.</p>
<p><b>Institute of Biosphere of Southern Department of the National Academy of Sciences</b> The leading scientific institution in the field of biodiversity (horticultural, nut crops) research in southern Kyrgyzstan.</p>	<p>Participating in the development of proposals on PGR use for breeding purposes; establishing demonstration plots in southern Kyrgyzstan.</p>
<p><b>Institute of Ecology and Nature Management under the Kyrgyz State Pedagogical University named after I. Arabaev</b> Conducts training of specialists in Ecology and Nature Management.</p>	<p>Developing and publishing materials on public awareness; assisting in raising the level of qualification of the project implementers; developing curricula and training materials for various target groups of trainees; organizing training and joint training for farmers and researchers at sites; holding a scientific and practical conference on agrobiodiversity.</p>
<p><b>“Kyrzyzjankak” Research and Production Centre under the National Academy of Sciences</b> The Centre develops and introduces the technology of walnut processing for producing various food stuff and goods.</p>	<p>Elaborating recommendations on horticultural genetic resource use for non-breeding purposes; studying and distributing farmers’ and local populations’ experience; assessing the status of farm households; organizing exhibitions of farmers’ achievements; compiling and distributing lists of prospective local varieties and forms of horticultural crops.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Association of Farmers</b> The Association enhances efficiency of country's economy in transition to market orientation; provides support to farmers; develops leasing and entrepreneurship movement; provides organizational, scientific, methodological and informative assistance in modernization of production, introduction of the new technologies and preparation of highly qualified specialists.</p>	<p>Member of the National Steering Committee. Promoting organization of exhibitions of farmers' achievements; compiling and distributing lists of prospective local varieties and forms of horticultural crops; studying and distributing farmers' and local communities' skills on maintenance, processing and storing products; assisting in establishment of associations of farmers and local communities involved in conservation of local varieties of horticultural crops.</p>
<p><b>NGO "Centre of Ecological Information and Training"</b> The organization provides information services to other NGOs involved in ecology and people in the country; assists in the growth and development of ecological movement in the country; establishes system of information exchange among the members and public; maintains the database on ecology.</p>	<p>Participating in establishing information exchange among partners; developing mechanism for benefit sharing among the partners on PGR use; developing proposals for strengthening the legislation on <i>in situ</i>/on-farm conservation; organizing fairs on the farmers, farmer associations and local community achievements.</p>
<p><b>NGO "Ecoforest"</b> Public ecological organization dealing with development of recommendations on conservation of forests; assists in development and implementation of national programs and research projects in the fields of ecology and environment protection.</p>	<p>Member of the National Steering Committee. Participating in establishment of relations among partners for exchange of information and experience; developing benefit sharing mechanism among partners using PGR; developing proposals for legislation in support of <i>in situ</i>/on farm agrobiodiversity conservation of horticultural crops and wild fruit species; organizing fairs for farmers and local community achievements.</p>
<p><b>Multidisciplinary Site Committees</b> Multidisciplinary Site Committees include representation from all stakeholder groups including farmers, forest dwellers, and local authorities. One representative from each Multidisciplinary Site Committee will be included in the Site Coordination Committee (SCC) in each country.</p>	<p>Multidisciplinary Site Committees established at each site will provide the framework within which different stakeholder groups cooperate at the local level. It is at this level that genetic diversity will be identified, documented, and managed. Project activities will flow from this level: data on varieties and their distribution is consolidated across sites to provide a comprehensive picture, strengths and weaknesses in legislation and policy are identified at the point of application (horticultural operations and forests) and communicated to national and regional levels, the value of a participatory approach is affirmed and promoted at all levels.</p>
<p><b>Site Coordination Committee (SCC)</b> Site Coordination Committee includes one representative from each Multidisciplinary Site Committee, and one member will sit on the National Steering Committee (NSC).</p>	<p>The Site Coordination Committee will link the Multidisciplinary Site Committees within that country, ensuring that lessons learned are shared among the sites and with national and regional level operations.</p>

## TAJIKISTAN

The Government of Tajikistan will execute the project through the Tajik Academy of Agricultural Sciences, in coordination with the relevant government agencies and research institutes of the Tajik Academy of Agricultural Sciences and the Tajik Academy of Sciences. The Research and Production Association “Bogparvar” will be the project executing agency, where the project implementation unit will be established.

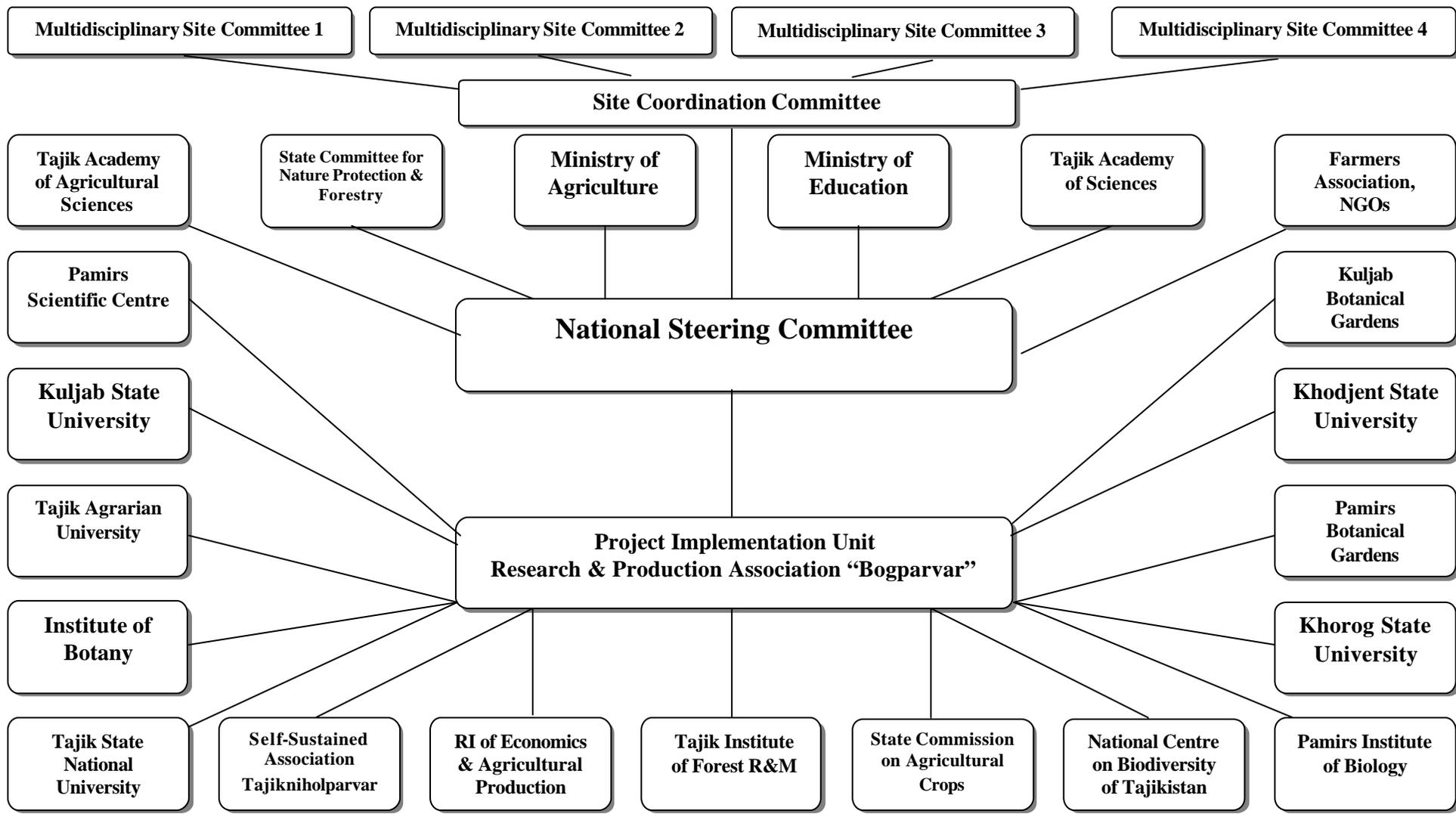
The NSC of Tajikistan will include representatives from:

- Ministry of Agriculture;
- Ministry of Education;
- State Committee for Nature Protection and Forestry;
- Tajik Academy of Agricultural Sciences;
- Tajik Academy of Sciences;
- Site Coordination Committee;
- Republican Society of Nature Protection;
- Republican Society of Horticulturist-Amateurs;
- Association of Dekhkans’ (Farmers’) Households and Agricultural Co-operatives of Tajikistan
- Project Implementation Unit.

The main project partners in Tajikistan are:

- Research and Production Association “Bogparvar”;
- Pamirs Scientific Centre of Tajik Academy of Agricultural Sciences;
- Tajik Institute of Forest Research and Management;
- Pamirs Institute of Biology named after Acad. K. Yusufbekov;
- Institute of Botany of Tajik Academy of Sciences;
- Tajik Research Institute of Economics and Agricultural Production;
- Tajik State National University;
- Tajik Agrarian University;
- Khorog State University named after Acad. M. Nazarshoev;
- Kuljab State University;
- Khodjent State University named after Acad. B. Gafurov;
- Kuljab Botanical Gardens;
- Pamirs Botanical Gardens named after Prof. A.Gurskiy;
- Tajik State Commission on Agricultural Crops’ Varieties Testing and Variety Protection;
- National Centre on Biodiversity of Tajikistan;
- Republican Self-Sustained Association “Tajiknikholparvar”;
- Association of Dekhkans’ (Farmers’) Households and Agricultural Co-operatives of Tajikistan;
- Republican Society of Nature Protection;
- Republican Society of Horticulturist-Amateurs;
- NGO “Zumrad”.

**Project Management Structure for Tajikistan**



## Institutional Profile for Tajikistan

Institution	Role in the Project
<p><b>Ministry of Agriculture</b>            Manages the process of development and implementation of state agricultural policy, dissemination of technologies for agro practice, crop harvesting, processing and marketing agricultural products. The following institutions are in the Ministry's structure: Tajik State Commission on Agricultural Crops' Varieties Testing and Variety Protection; Republican Self-Sustained Association "Tajiknhikholparvar"; Tajik Agrarian University.</p>	<p>Member of the National Steering Committee. General oversight of project implementation and performance; coordinating project partners, assessing results; assisting in elaboration of proposals on legislation.</p>
<p><b>Tajik Academy of Agricultural Sciences</b>            Coordination of agricultural research institutes. Conducts research surveys in the leading directions of agricultural science; explores new ways of technical progress in agriculture; modifies methods of scientific research with the purpose of raising the theoretical level and efficiency of scientific work; studies global scientific advancements and promotes their use in agriculture. The following institutions are in the Academy's structure: Tajik Research Institute of Economics and Agricultural Production; Research and Production Association "Bogparvar"; Pamirs Scientific Centre.</p>	<p>Member of the National Steering Committee. Guiding scientific and practical assistance in project implementation; developing system of allocation and specialization of horticultural and vine farm households as per natural and economic zones; promotes production technologies, breeding of the highly productive varieties with resistance to pests and disease.</p>
<p><b>State Committee for Nature Protection and Forestry</b>            Develops state policy in optimization of nature management systems and environment protection; undertakes executive functions such as environment and natural resources monitoring, rehabilitation of environment, ecological education; organizes forest farms production process on conservation and enhancement of forest resources including wild and cultivated fruit species. The following institutions are in the Committee's structure: Tajik Institute of Forest Research and Management; nature reserves and national parks.</p>	<p>Member of the National Steering Committee. Developing recommendations on conservation and management of biodiversity and their submission to legislative bodies; maintaining relations among different stakeholders and coordinating various international, regional and national projects in the area of biodiversity.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Ministry of Education</b> The Ministry is responsible for state policy in development of science and preparation of highly qualified specialists. Supervises education and training institutes. The structure of the Ministry includes: Tajik State National University; Khorog State University named after Acad. M. Nazarshoev; Kuljab State University; Khodjent State University named after Acad. B. Gafurov.</p>	<p>Member of the National Steering Committee. Coordinating institutes and universities subordinate to the Ministry; monitoring and evaluating project activities and outcomes on study, conservation and use of PGR; implementing training strategy.</p>
<p><b>Tajik Academy of Sciences</b> Unites research institutes and centers and implements scientific programs. The structure includes: Tajik Institute of Botany; Pamirs Institute of Biology named after Acad. K. Yusufbekov; Kuljab Botanical Gardens; Pamirs Botanical Gardens named after Prof. A. Gurskiy</p>	<p>Member of the National Steering Committee. Providing general oversight of project implementation and performance; coordinating project partners; assessing results.</p>
<p><b>Research and Production Association “Bogparvar” of the Tajik Academy of Agricultural Sciences</b> Crop-breeding, study of varieties, technology of cultivation and reproduction of crops in the various regions of the country. Holds collection of fruits, berries, and vine.</p>	<p>Responsible for implementation of the project in the country and Member of the National Steering Committee. Undertaking overall survey; establishing demonstration plots, nurseries in farm households; elaborating methodologies on reproduction and <i>in situ/on-farm</i> conservation; recommending uses of local varieties for breeding and non-breeding; establishing database; hosting National Training Centre on Horticultural Crops; holding national training courses and scientific conference on agrobiodiversity; hosting ICT centre. The Regional Training Centre on Apricot Genetic Resources was established at its Sogdiyskiy branch in Khojent.</p>
<p><b>Pamirs Scientific Centre of the Tajik Academy of Agricultural Sciences</b> Research on harvesting and studying fruit and berries in Gorno-Badakhshan autonomous province.</p>	<p>Surveying natural plants of fruits and berries maintained in farm households; holding training courses.</p>
<p><b>Tajik Research Institute of Economics and Agricultural Production of the Tajik Academy of Agricultural Sciences</b> Socioeconomic studies on state and prospects of development of various organizational structures.</p>	<p>Analyzing economics of farm households; elaborating proposals on modification of legislation.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Tajik Agrarian University of the Ministry of Agriculture</b> Prepares managerial staff for work in agriculture, including agronomists, horticulturists, wine-growers, silviculturists, ethnologists, and phytopathologists.</p>	<p>Holding training courses, workshops for farmers; participating in plant surveys; developing recommendations for farmers on agrobiodiversity conservation.</p>
<p><b>Republican Self-Sustained Association “Tajiknikholparvar” of the Ministry of Agriculture</b> Maintains matricular gardens and planting stock of regionalized varieties of fruit and berry crops and vine.</p>	<p>Assisting farmers in establishing horticultural nurseries and reproduction of planting material of local varieties; participating in workshops.</p>
<p><b>Tajik State Commission on Agricultural Crops’ Varieties Testing and Variety Protection of the Ministry of Agriculture</b> Tests varieties, hybrids, and forms of agricultural crops in zones of the country; issues patents and certificates of authorship for the new varieties.</p>	<p>Assisting farmers in testing selected forms of local fruit and berry crops, their regionalization and issuing patents and certificates of authorship for the new varieties.</p>
<p><b>Tajik Institute of Forest Research and Management of the State Committee for Nature Protection and Forestry</b> Surveys on forest species, state of flora and fauna in reserves; designs of forest husbandry, research on the best forms of wild fruit crops. Holds collections of pistachio, walnut, sea-buckthorn, and hips.</p>	<p>Surveying wild and forest crops of pistachio, walnut, sea-buckthorn; holding training courses, publishing public awareness materials and recommendations.</p>
<p><b>Institute of Botany of the Tajik Academy of Sciences</b> Studies flora of the country. Departments of lower and higher plants deal with development of theoretical fundamentals of geobotany and biogeocenology; describes and studies medicinal plants, including threatened species listed in the Red Book of Tajikistan; studies the morphology and evolution of flora; develops the methods of the rational use of wild fruit species in agriculture of the country.</p>	<p>Studying and assessing diversity levels of wild fruit species, their distribution and conservation status; conducting field surveys; developing methodologies on assessment.</p>
<p><b>Pamirs Institute of Biology named after Acad. K. Yusufbekov of the Tajik Academy of Sciences</b> Studies flora of Gorno-Badakhshan autonomous province. Holds collections of horticultural crops.</p>	<p>Studying biodiversity, conservation and reproduction of the best varieties and forms of apricot, walnut, sea-buckthorn; holding trainings and workshops for farmers.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>The Pamirs Botanical Gardens named after Prof. A. Gurskiy of the Tajik Academy of Sciences</b>  Conserves Gorno-Badakhshan flora; collects natural plants appropriate for maintenance in the dry and mountainous conditions; searches and selects new species, varieties and forms of medicinal plants and cultivates them.</p>	<p>Gathering collections; studying and conserving selected wild fruit and berry crops of Gorno-Badakhshan; participating in surveys, training, and workshops.</p>
<p><b>Kuljab Botanical Gardens of the Tajik Academy of Sciences</b>  Studies and conserves flora of the south-east of Tajikistan; broadens the natural plants of the arboretums, plots of mountainous plants, expositions, medicinal, food, technical decorative and other useful plants.</p>	<p>Participating in surveys on wild fruit crops and vines in Kuljab subarea of Khatlon province; strengthening and reproducing the best forms; holding training sessions and workshops for farmers.</p>
<p><b>Tajik State National University of the Ministry of Education</b>  Prepares biologists for managerial positions in research institutions and teachers of biology including in the fields of botany (zoology, plant physiology, micro-biology, bio-chemistry, genetics).</p>	<p>Studying bio-molecular marketing and biochemical research on horticultural crops; holding training sessions and workshops for farmers.</p>
<p><b>Khorog State University named after Acad. M. Nazarshoev of the Ministry of Education</b>  Trains specialists in the fundamental sciences (physics, biology, chemistry, history, mathematics, law); raises level of teachers in above subjects for the Gorno-Badakhshan autonomous province.</p>	<p>Studying biology of Gorno-Badakhshan horticultural crops; holding training sessions and workshops; preparing publications for farmers.</p>
<p><b>Khodjent State University named after B. Gafurov of the Ministry of Education</b>  Trains biologists for Sogdiyskiy province.</p>	<p>Studying biology of Northern Tajikistan horticultural crops and vines; holding training sessions and workshops; preparing publications for farmers.</p>
<p><b>Faculty of Biology of the Kuljab State University of the Ministry of Education</b>  Trains biologists for Kuljab province.</p>	<p>Studying biology of horticultural crops and vines; holding training sessions and workshops; preparing publications for farmers.</p>
<p><b>National Centre on Biodiversity of Tajikistan</b>  Develops national strategy and action plan on conservation and rational use of biodiversity; implements immediate long-term tasks related to strengthening protection of the vulnerable plants, animals and microorganisms; improves system of management of the protected natural territories that are leaders in agrobiodiversity conservation <i>in situ</i> and rehabilitates the disrupted ecosystems and biological systems.</p>	<p>Participating in the development and modification of legislation on biodiversity; implementing activities on biodiversity conservation at various bio-systemic levels which meet the international requirements.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Republican Society of Nature Protection</b> Public control over the state of flora and fauna in the country.</p>	<p>Member of the National Steering Committee. Distributing information via mass media; publishing and distributing public awareness materials on importance of local varieties of horticultural crops and wild fruit species among farmers.</p>
<p><b>Republican Society of Horticulturist-Amateurs</b> Promotes and establishes orchards and farm households; provides planting material; liaises with horticulturist-scientists.</p>	<p>Member of the National Steering Committee. Participating in training sessions and workshops; promoting scientists' and farmers' achievements in conservation of horticultural biodiversity.</p>
<p><b>Association of Dekhkans' (Farmers') Households and Agricultural Co-operatives of Tajikistan</b> Coordinates farm households and cooperative work; liaises with research institutes.</p>	<p>Member of the National Steering Committee. Responsible for liaison of the Research and Production Association "Bogparvar" with farmers maintaining and protecting local horticultural biodiversity; participating in training and workshops; promoting scientists' and farmers' achievements in conservation of horticultural biodiversity.</p>
<p><b>NGO "Zumrad"</b> Provides education for children on conservation and protection of flora and fauna.</p>	<p>Participating in meetings with farmers on issues of ecology and PGR erosion, workshops and training; developing recommendations.</p>
<p><b>Multidisciplinary Site Committees</b> Multidisciplinary Site Committees include representation from all stakeholder groups including farmers, forest dwellers, and local authorities. One representative from each Multidisciplinary Site Committee will be included in the Site Coordination Committee (SCC) in each country.</p>	<p>Multidisciplinary Site Committees established at each site will provide the framework within which different stakeholder groups cooperate at the local level. It is at this level that genetic diversity will be identified, documented, and managed. Project activities will flow from this level: data on varieties and their distribution is consolidated across sites to provide a comprehensive picture, strengths and weaknesses in legislation and policy are identified at the point of application (horticultural operations and forests) and communicated to national and regional levels, the value of a participatory approach is affirmed and promoted at all levels.</p>
<p><b>Site Coordination Committee (SCC)</b> Site Coordination Committee includes one representative from each Multidisciplinary Site Committee, and one member will sit on the National Steering Committee (NSC).</p>	<p>The Site Coordination Committee will link the Multidisciplinary Site Committees within that country, ensuring that lessons learned are shared among the sites and with national and regional level operations.</p>

## TURKMENISTAN

The Government of Turkmenistan will execute the project through its Ministry of Agriculture in coordination with the relevant government agencies and research institutes. Garrygala Research and Production Center of Plant Genetic Resources will be the project executing agency. The project implementation unit will be established at the Garrygala Research and Production Center of Plant Genetic Resources.

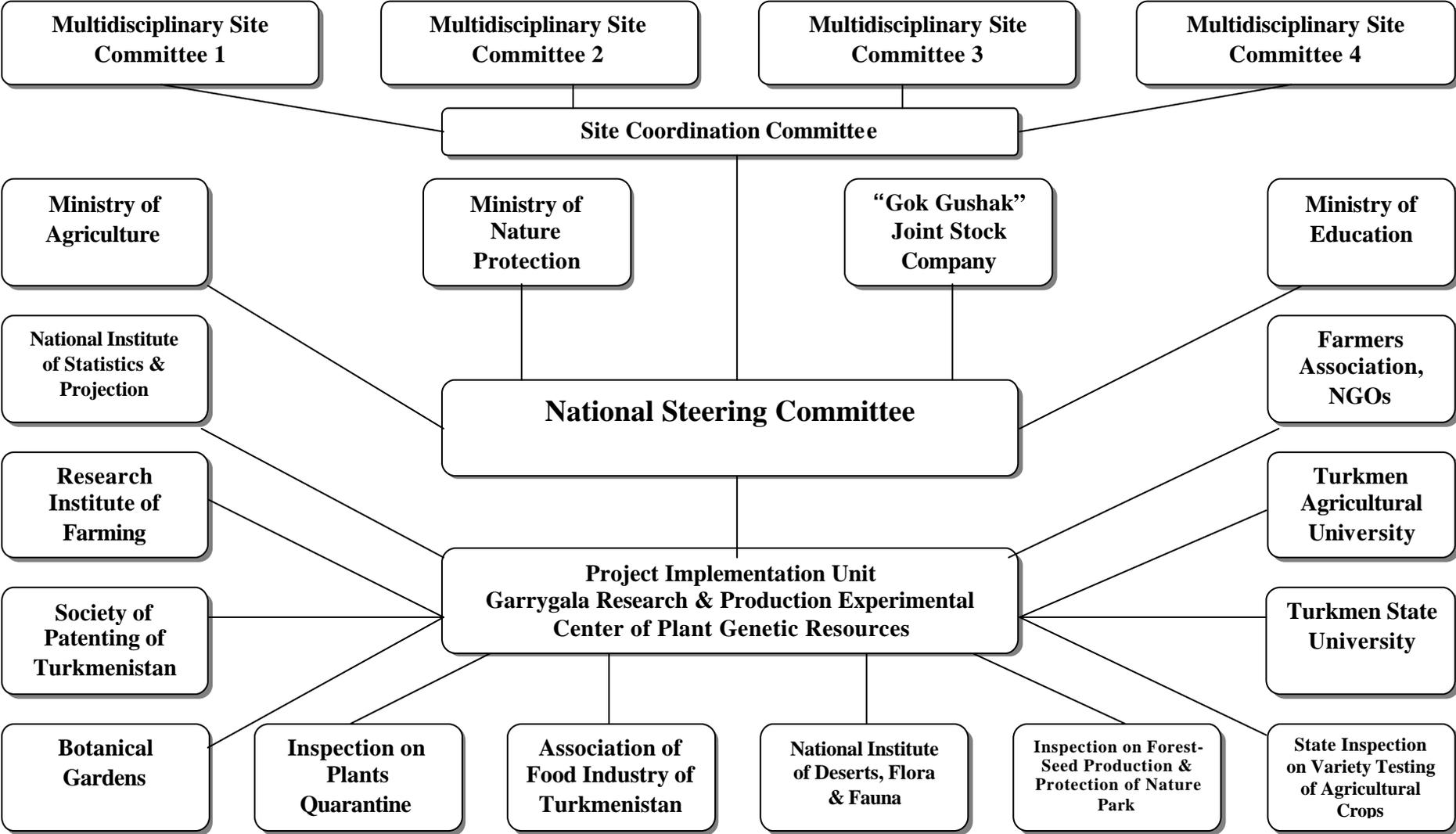
The NSC of Turkmenistan will include representatives from:

- Ministry of Agriculture;
- Ministry of Nature Protection;
- Ministry of Education;
- “Gok Gushak” Joint Stock Company;
- Site Coordination Committee;
- Association of Farmers;
- NGOs (“Ecoforest”, ‘Catena’, Turkmen Society of Nature Protection);
- Project implementation unit.

The main project partners in Turkmenistan are:

- Garrygala Research and Production Center of Plant Genetic Resources;
- National Institute of Deserts, Flora and Fauna;
- Research Institute of Farming;
- Inspection of Forest Seed Production and Nature Parks Protection;
- Botanical Gardens;
- Turkmen State University named after Makhtumguli;
- Turkmen Agricultural University named after S. Niyazov;
- Society of Patenting of Turkmenistan;
- National Institute of Statistics and Projection;
- State Inspection on Variety Testing of Agricultural Crops;
- Inspection on Plants Quarantine;
- Association of Farmers;
- Association of Food Industry of Turkmenistan;
- NGOs “Ecoforest”, Catena”, and “Turkmen Society of Nature Protection”.

**Project Management Structure for Turkmenistan**



## Institutional Profile for Turkmenistan

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Ministry of Agriculture</b>            The Ministry assists executive agencies to develop and implement measures on state regulation in production, processing and selling of agricultural goods; provides production and technical services, materials and machinery supply to the agricultural sector; supplies food to the population; develops and implements unified scientific and technical policy, provides guidelines to the research institutes with agrarian profile. Structure consists of the following entities: Research Institute of Farming, Land Resources Office, Office of Plants Protection, Quarantine Office, Turkmen Agricultural University named after S. Niyazov, Garrygala Research and Production Centre of Plant Genetic Resources.</p>	<p>Member of the National Steering Committee. Coordinating project implementation; assisting in establishing IT network between stakeholders and implementers; organizing exhibitions on farmers' and local communities' achievements; establishing multidisciplinary committees and demonstration plots of local horticultural crops.</p>
<p><b>Ministry of Nature Protection</b>            The main state regulating body in the sphere of environmental protection. Supervises observation of the laws and decisions of the government on environmental protection and rational use of natural resources, forests and hydro-meteorology; protection of environmental systems, soil fertility, use and protection of land, surface and ground water, air, flora and fauna, marine environment and natural resources in the territorial waters of Turkmenistan. The structure of the Ministry includes: five regional branches for nature protection; "Caspecocontrol" Specialized Inspection Office in the Caspian province; National Institute of Deserts, Flora and Fauna; inspection for forest-seed production and Protection of Natural Parks; eight nature reserves.</p>	<p>Member of the National Steering Committee. Together with the Ministry of Agriculture, coordinating project implementation; assisting in establishment of IT network between stakeholders and implementers; organizing exhibitions on farmers' and local communities' achievements; establishing multidisciplinary committees and demonstration plots of local horticultural crops.</p>
<p><b>"Gok Gushak" ("Green Belt") Joint Stock Company</b>            The Company implements the state policy in the field of forest relations, planting of greenery, establishment of ecological zones; improves methods of maintenance and planting forest trees, monitoring their status.</p>	<p>Member of the National Steering Committee. Assisting in establishment of nurseries on growing seedlings of the best local varieties and forms of horticultural crops and wild fruit species in farm households.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Garrygala Research and Production Centre of Plant Genetic Resources</b>  Collects genetic material of agricultural crops; conserves gene pool of local and regional planting crops. National depository for gene pool samples. Holds a unique gene bank (4040 samples) of wild fruit species – relatives of cultivated plant species of the Central Asian genetic center with large number of endemic species. 450 samples of Turkmen origin and 1000 samples of regional origin. Collection of pomegranate consists of 1117 samples, vine - 1010, pistachio - 52, apple - 273, pear - 127, apricot - 517, peach - 101, plum - 28, quince - 78, almond -160, fig- 180, olive - 200, zizyphus - 92, persimmon - 106.</p>	<p>Executing agency of the project. Promoting project implementation and coordinating partner activities; accounting and activity reporting on project; conducting overall survey; establishing demonstration plots and horticultural nurseries in farm households; developing methodologies on reproduction and <i>in situ</i>/on-farm conservation, recommending local varieties use for breeding and non-breeding purposes; establishing database and Regional Training Center on Pomegranate Genetic Resources; holding regional training courses and scientific conference on agrobiodiversity.</p>
<p><b>National Institute of Deserts, Flora and Fauna</b>  Branch of the Ministry of Nature Protection. Coordinates fundamental and applied research in the fields of biological resources, nature protection and rational use of natural resources. Combats desertification; rehabilitates forests and pastures; elaborates proposals and recommendations for conservation of biological diversity; protects flora and fauna from parasitic diseases; protects population parasitic diseases; manages reserves.</p>	<p>Establishing demonstration plots (forest sites with wild fruit species); conducting overall survey of wild fruit species; assisting in establishment of horticultural nurseries in the state forest lands; developing methodologies on reproduction and <i>in situ</i>/on-farm conservation; compiling database; establishing the National Training Center on Pistachio and holding national training courses; establishing WAN on PGR.</p>
<p><b>Research Institute of Farming</b>  Branch of the Ministry of Agriculture. Creates new highly productive, adapted species and hybrids of horticultural, cereals, leguminous, gloats and industrial crops with the use of modern biotechnology and other disciplines of biochemistry as well as provision of seeds of high reproduction.</p>	<p>Establishing demonstration plots; conducting overall survey; studying and distributing farmer and local community experience in maintenance, processing, and storage of local varieties of horticultural crops; establishing horticultural nurseries; developing methodologies and recommendations on local varieties use in breeding and non-breeding purposes; establishing National Training Center on Horticultural Crops; holding national training courses; establishing database on PGR; hosting ICT centre.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Inspection of Forest Seed Production &amp; Nature Parks Protection</b> Branch of the Ministry of Nature Protection. Organizes activities on forest seeds; protects and promotes rational use of forest resources; protects natural parks; rehabilitates forests; assists forest farms in forest seeds maintenance; licenses forest seeds and planting materials; controls certification of seeds and planting materials' quality; elaborates legal and technical documentation on the quality of forest seeds in accordance with international standards.</p>	<p>Establishing demonstration plots (forest sites with wild fruit species); conducting overall survey to assess distribution and diversity of wild fruit species; assisting in establishment of horticultural nurseries in farm households; elaborating recommendations on local variety use in breeding and non-breeding purposes; establishing database.</p>
<p><b>Turkmen State University named after Makhtumguli</b> Develops education, science and culture by means of undertaking fundamental and applied research; teaches at all levels of higher education and additional professional education on wide range of humanitarian, natural and other sciences; trains highly qualified specialists, managerial, scientific and pedagogical staff.</p>	<p>Participating in development and publication of public awareness materials; establishing IT network between stakeholders; assisting in raising the level of the project implementer skills; elaborating training programs and materials; holding training courses and scientific conference on agrobiodiversity.</p>
<p><b>Turkmen Agricultural University named after Niyazov</b> Trains highly qualified specialists for various sectors of agriculture, conducts research on improvement of methodology on agricultural crop maintenance and breeding animals.</p>	<p>Developing and publishing public awareness materials; establishing IT network between stakeholders; assisting in raising the level of the project implementer skills; elaborating training programs and materials; holding training courses and scientific conference on agrobiodiversity</p>
<p><b>National Institute of State Statistics and Projection</b> Collects, analyzes, and publishes socioeconomic data on population, employment, living standard, finance; provides information on the state of industry, agriculture, transportation and other fields of economy.</p>	<p>Participating in socioeconomic survey of the farm households' status; providing appropriate information on agriculture.</p>
<p><b>Association of Farmers of Turkmenistan</b> Enhances efficiency of country's economy in transition to market oriented relations; supports farmers; develops leasing and entrepreneurship movement; provides organizational, scientific, methodological and information assistance in modernization of production, introduction of the new technologies and preparation of highly qualified specialists.</p>	<p>Member of the National Steering Committee. Promoting organization of exhibitions of farmers' achievements; compiling and distributing lists of prospective local varieties and forms of horticultural crops; studying and distributing farmers' and local communities' skills on maintenance, processing, and storing products; assisting in establishment of associations of farmers and local communities involved in conservation of local varieties of horticultural crops.</p>

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Ecological Club ‘Catena’</b> Coordinates activities on biodiversity conservation in Turkmenistan; supports Garrygala Research and Production Centre of Plant Genetic Resources; participates national and regional ecological projects; manages database on rare species of flora and fauna, status of reserve fund; publishes reference books on ecological legislation, farming.</p>	<p>Member of the National Steering Committee. Publishing and distributing public awareness materials on importance of local varieties of horticultural crops and wild fruit species; holding training sessions for local population</p>
<p><b>International Public Charitable Organization “Ecoforest”</b> Assists in implementing projects on afforestation, tree plants, and design of parks.</p>	<p>Member of the National Steering Committee. Publishing and distributing public awareness materials on importance of local varieties of horticultural crops and wild fruit species; holding training sessions for local communities; assisting in identification and consultation on agro-techniques of maintenance and conservation of pistachio and almond.</p>
<p><b>Turkmen Society of Nature Protection</b> Recovery and creation of ecologically favorable conditions for population’s life and work; protection of water resources, air, soil, geological environment, flora and fauna. From 1978 a member of International Union for Conservation of Nature, Central Asian Regional Ecological Centre, entered into an agreement with World Wildlife Fund.</p>	<p>Member of the National Steering Committee. Producing videos; distributing information via mass media; publishing and distributing public awareness materials on importance of local varieties of horticultural crops and wild fruit species among farmers.</p>
<p><b>Multidisciplinary Site Committees</b> Multidisciplinary Site Committees include representation from all stakeholder groups including farmers, forest dwellers, and local authorities. One representative from each Multidisciplinary Site Committee will be included in the Site Coordination Committee (SCC) in each country.</p>	<p>Multidisciplinary Site Committees established at each site will provide the framework within which different stakeholder groups cooperate at the local level. It is at this level that genetic diversity will be identified, documented, and managed. Project activities will flow from this level: data on varieties and their distribution is consolidated across sites to provide a comprehensive picture, strengths and weaknesses in legislation and policy are identified at the point of application (horticultural operations and forests) and communicated to national and regional levels, the value of a participatory approach is affirmed and promoted at all levels.</p>
<p><b>Site Coordination Committee (SCC)</b> Site Coordination Committee includes one representative from each Multidisciplinary Site Committee, and one member will sit on the National Steering Committee (NSC).</p>	<p>The Site Coordination Committee will link the Multidisciplinary Site Committees within that country, ensuring that lessons learned are shared among the sites and with national and regional level operations.</p>

## UZBEKISTAN

The government of Uzbekistan will execute the project through the Center of Science and Technology under the Coordination Council on Scientific and Technical Development at the Cabinet of Ministers of Uzbekistan. It will coordinate with relevant government agencies, research institutes of the Academy of Sciences and Research and Production Centre of Agriculture, NGOs, and Universities. The Institute of Genetics and Plant Experimental Biology will be the project executing agency. The project implementation unit will be established at the Institute of Genetics and Plant Experimental Biology.

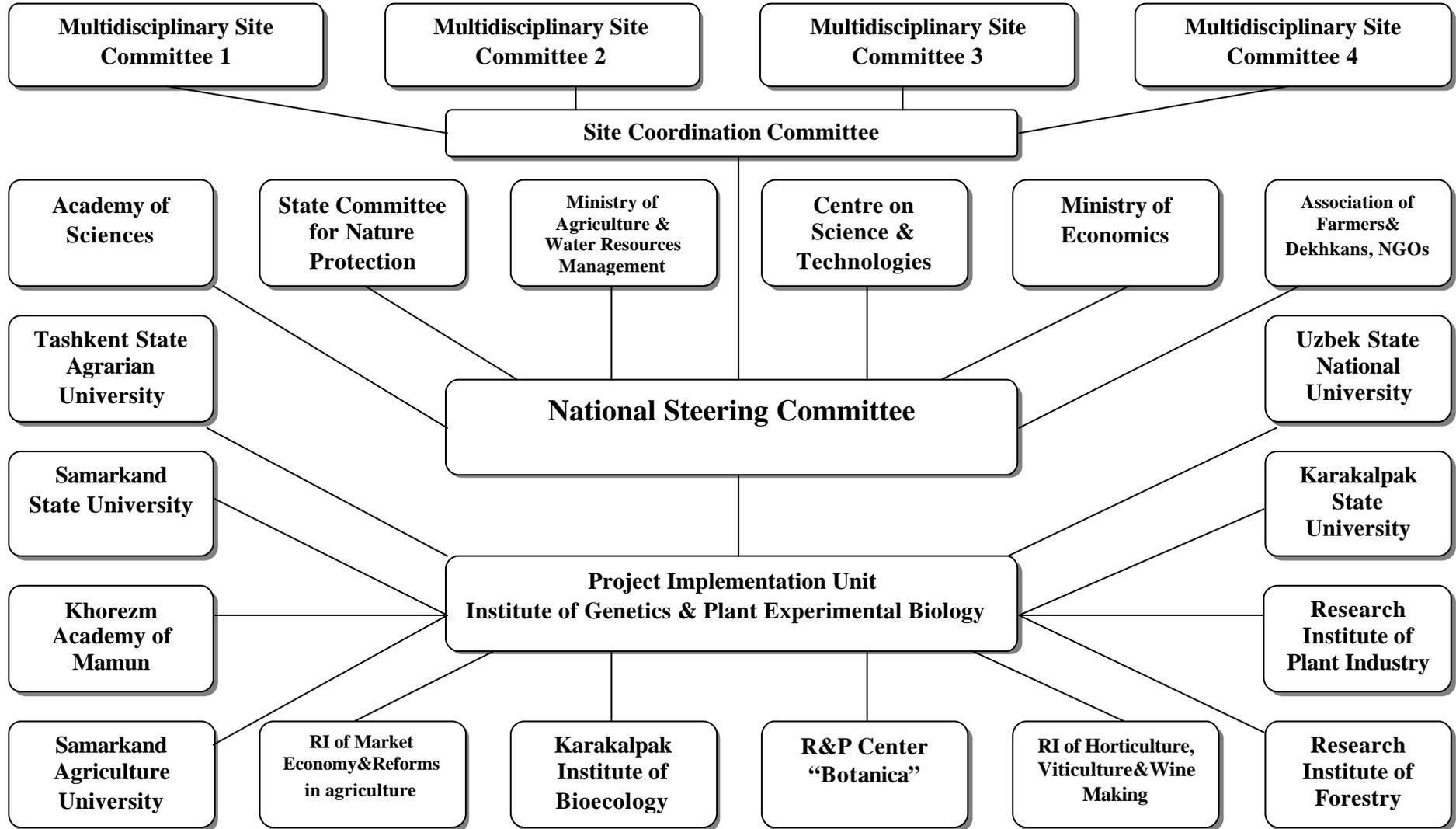
The NSC of Uzbekistan will include representatives from:

- Center of Science and Technologies under the Coordination Council on Scientific and Technical Development at the Cabinet of Ministers of Uzbekistan;
- State Committee for Nature Protection;
- Ministry of Economics;
- Ministry of Agriculture and Water Resources Management;
- Academy of Sciences;
- Site Coordination Committee;
- NGO “Ecoforest”;
- Association of Farmers and Dekhkans of Uzbekistan;
- Project implementation unit.

The main project partners in Uzbekistan are:

- Institute of Genetics and Plant Experimental Biology;
- Research Institute of Market Economy and Reforms in Agriculture;
- Khorezm Academy of Mamun;
- Tashkent State Agrarian University;
- Research and Production Center “Botanica”;
- Research Institute of Plant Industry;
- Research Institute of Horticultural, Viticulture and Wine Making named after R.R. Shreder;
- Research Institute of Forestry;
- Institute of Bioecology of Karakalpak branch of Academy of Sciences;
- Samarkand State University;
- Samarkand Agriculture University;
- Karakalpak State University;
- Uzbek State National University;
- Association of Women-Scientists “Olima”;
- Association of Businesswomen of Uzbekistan;
- NGO ‘Ecoforest’;
- Association of Farmers and Dekhkans of Uzbekistan.

**Project Management Structure for Uzbekistan**



## Institutional Profile for Uzbekistan

Institution	Role in the Project
<p><b>Ministry of Agriculture and Water Resources Management</b> Executes government policies in the agriculture and water resources sector through several divisions: General Division of Forestry, Division of Agricultural Investigations, Division of Cotton Production, Division of Grain and Wheat Production, Division of Seed Production, Division of Veterinary Medicine. The Uzbek Research and Production Center of Agriculture is part of its organizational structure and is responsible for scientific and technical development in agriculture.</p>	<p>Member of the National Steering Committee. Participating in the project through the Research and Production Center of Agriculture and Main Office of Forestry; providing general oversight of the project implementation and performance; coordinating among project partners; assessing results.</p>
<p><b>Ministry of Economics</b> Develops and implements policies in the agricultural economic sector.</p>	<p>Member of the National Steering Committee. Providing general oversight of project implementation and performance; coordinating project partners; assessing results.</p>
<p><b>State Committee for Nature Protection</b> Executes government policies in environment and nature protection. Responsible for protected areas management.</p>	<p>Member of the National Steering Committee. Responsible for inventory and monitoring of project implementation.</p>
<p><b>Centre on Science and Technologies under the Cabinet of Ministers of Uzbekistan</b> Executes government policies on scientific and technological development; provides financial support and assesses scientific and technical results.</p>	<p>Member of the National Steering Committee. The national entity responsible for project implementation through its Scientific Council on Plant Genetic Resources. Revising and assessing results on conservation of crop wild relatives.</p>
<p><b>Academy of Sciences</b> Unites all research institutes in Uzbekistan. Funded by Centre on Science and Technologies of Uzbekistan and implements its scientific programs.</p>	<p>Member of the National Steering Committee. Participating in project implementation through its Institute of Botany, Institute of Genetics and Plant Experimental Biology, Institute of Bioecology of the Karakalpak branch of Academy of Sciences, Khorezm Academy of Mamun.</p>
<p><b>Institute of Genetics and Plant Experimental Biology</b> Subordinate to the Academy of Sciences. Undertakes genetic monitoring of biodiversity; maintains collection of 38 wild cotton species, 5500 hybrids of wild species and cultural varieties of cotton, and 700 isogenic lines.</p>	<p>Executing agency of the project; hosting Project Implementation Unit; promoting project implementation and coordinating project partners; maintaining accounts and producing activity reports; assessing existing databases; developing meta database and methodology for data analysis; hosting Regional Training Centre on Molecular Markers; organizing regional training courses; developing training materials; hosting ICT centre; participating in scientific conference on agrobiodiversity.</p>
<p><b>Research and Production Centre “Botanica”</b> Operates through Institute of Botany and Botanical Garden of Academy of Sciences. Carries out theoretical and applied research on flora; conserves plant biodiversity; develops proposals for establishment of protected areas;</p>	<p>Assessing existing databases; developing methodology for data-analysis and updating; monitoring project implementation; conducting training programs; producing public awareness materials; analyzing and developing proposals for legislation on conservation; developing <i>in situ/on-</i></p>

<b>Institution</b>	<b>Role in the Project</b>
determines species for protection and introduction; maintains herbaria; updates Red Book; develops proposals for nature protection legislation.	farm conservation management plans within and outside of protected areas; participating in scientific conference on agrobiodiversity.
<p><b>Research Institute of Forestry</b> One of the research institutes of the Research and Production Centers of Agriculture under the Ministry of Agriculture and Water Research. Conducts research on forest plant diversity; implements state scientific programs on plant genetic resources conservation in 9 State Reserves and 2 National Parks.</p>	Assessing existing databases; developing methodology for data-analysis and updating; monitoring <i>in situ</i> /on-farm conservation; distributing maps; conducting training programs; producing public awareness materials; hosting National Training Centre on nuciferous crops; organizing national training courses; developing training materials; participating in scientific conference on agrobiodiversity.
<p><b>General Office of Forestry under the Ministry of Agriculture and Water Resources</b> Manages protected areas in Uzbekistan; conducts research and monitoring of plant genetic resources in the protected areas.</p>	Analyzing and developing proposals for legislation on conservation.
<p><b>Uzbek Research Institute of Plant Industry</b> Main plant genetic resources research institute in Uzbekistan and one of the research institutes of the Research and Production Center of Agriculture under the Ministry of Agriculture and Water Research. Undertakes research and training activities; maintains germplasm collection of more than 50000 accessions. Traditional partner of international institutions (IPGRI, ICARDA, CYMMIT) involved in plant genetic resources research.</p>	Conducting training programs; developing project management and actions plan; developing proposals for use of <i>in situ</i> /on-farm conservation in breeding programs; participating in scientific conference on agrobiodiversity.
<p><b>Research Institute of Horticultural, Viticulture and Wine Making named after R.R. Shreder</b> Part of the organizational structure of the Research and Production Center of Agriculture under the Ministry of Agriculture and Water Resources. Conducts scientific research on horticultural plants.</p>	Assessing benefits from use of <i>in situ</i> /on-farm conservation by local communities and business; establishing demonstration plots; maintaining National Training Centre on Horticultural Crops; organizing national training courses; developing training materials; participating in scientific conference on agrobiodiversity.
<p><b>Khorezm Academy of Mamun</b> Subordinate to the Uzbek Academy of Sciences. Conducts research on introduction of new herbs and non-traditional crops.</p>	Holding training sessions and workshops; establishing horticultural nurseries and multidisciplinary committees; participating in scientific conference on agrobiodiversity.
<p><b>Tashkent State Agrarian University</b> Founded in 1991 on the base of Tashkent Agricultural Institute. Trains specialists in the field of horticultural, forestry, gardening, plant protection, and agricultural economics.</p>	Assisting in development and publication of public awareness materials; training for project implementers; elaborating training programs; holding training courses for farmers and researchers at sites; participating in scientific conference on agrobiodiversity.

<b>Institution</b>	<b>Role in the Project</b>
<p><b>Research and Production Centre on Agriculture under the Ministry of Agriculture and Water Resources Management</b> Supervises the research institute dealing with conservation and study of PGR.</p>	<p>Providing general oversight of the project implementation and performance; coordinating project partners' activities; assessing results.</p>
<p><b>Research Institute of Market Economy and Reforms in Agriculture</b> Structural part of the Research and Production Center of Agriculture under the Ministry of Agriculture. Facilitates establishment of market infrastructure in rural areas, efficiency of farmers' work in market economy conditions.</p>	<p>Conducting socioeconomic surveys in farm households; developing recommendations on increasing their profitability.</p>
<p><b>Association of Women-Scientists "Olima"</b> Promotes women's participation in sciences and strengthening international collaboration.</p>	<p>Assisting and supporting women participating in the project.</p>
<p><b>Association of Businesswomen of Uzbekistan</b> Supports women in business.</p>	<p>Consulting on household management and sale of products in the condition of market economy.</p>
<p><b>Institute of Biology of the Karakalpak branch of Academy of Sciences</b> Undertakes ecological surveys on anthropogenic factors that impact the environment of Aral Sea basin; undertakes research on the problems of biodiversity and identification of the conditions of ecosystem sustainability.</p>	<p>Participating in expeditions, reproduction and regionalization of local varieties of horticultural crops; establishing nurseries; holding workshops and scientific conference on agrobiodiversity.</p>
<p><b>Association of Farmers &amp; Dekhkans of Uzbekistan</b> Public organization that unites farmers, dekhkans and other rural commodity producers. Provides consultancies on increasing agricultural production and efficient use of economic and legislative incentives for the further development of various agro-food units.</p>	<p>Member of the National Steering Committee. Promoting organization of exhibitions of farmers' achievements; compiling and distributing lists of prospective local varieties and forms of horticultural crops; studying and distributing farmers' and local communities' skills on maintenance, processing, and storing products; assisting in establishment of associations of farmers and local communities involved in conservation of local varieties of horticultural crops.</p>
<p><b>Multidisciplinary Site Committees</b> Multidisciplinary Site Committees include representation from all stakeholder groups including farmers, forest dwellers, and local authorities. One representative from each Multidisciplinary Site Committee will be included in the Site Coordination Committee (SCC) in each country.</p>	<p>Multidisciplinary Site Committees established at each site will provide the framework within which different stakeholder groups cooperate at the local level. It is at this level that genetic diversity will be identified, documented, and managed. Project activities will flow from this level: data on varieties and their distribution is consolidated across sites to provide a comprehensive picture, strengths and weaknesses in legislation and policy are identified at the point of application (horticultural operations and forests) and communicated to national and regional levels, the</p>

<b>Institution</b>	<b>Role in the Project</b>
	value of a participatory approach is affirmed and promoted at all levels.
<p><b>Site Coordination Committee (SCC)</b>  Site Coordination Committee includes one representative from each Multidisciplinary Site Committee, and one member will sit on the National Steering Committee (NSC).</p>	The Site Coordination Committee will link the Multidisciplinary Site Committees within that country, ensuring that lessons learned are shared among the sites and with national and regional level operations.

**ANNEX G – TIMELINE**

**PLAN OF ACTIVITIES FOR FULL PROJECT: 01/2005 - 12/2009**

Activities	Timeframe				
	01/2005 - 12/2009				
<b>Outcome 1. Policy options for supporting farmers and local communities to conserve <i>in situ</i>/on-farm local varieties of horticultural crops and wild fruit species are available and used.</b>	Year 1	Year 2	Year 3	Year 4	Year 5
1.1 Produce policy recommendations that support <i>in situ</i> /on-farm conservation of horticultural crops and wild fruit species:					
1.1.1 Analyze existing legislation on protected areas.					
1.1.2 Analyze legislative options for farm development and submit proposals for establishing farmer associations.					
1.1.3 Analyze existing legislation and normative deeds on conservation of wild fruit species in protected areas and other forest lands.					
1.1.4 Produce recommendations needed for extension of existing and establishment of new protected areas to cover diversity of wild fruit species.					
1.1.5 Produce recommendations to support farmers and local communities in maintaining local varieties of horticultural crops and wild fruit species.					
1.1.6 Organize workshops with the representatives of governments sectors e.g. finance, planning, agriculture and environment to discuss adoption and implementation plans of policy recommendations					
1.2 Analyze options and produce proposals on protection of Farmers' Rights.					
1.3 Develop mechanisms for benefit sharing among partners in cases where genetic material is conserved by farmers and used for breeding purposes, including practical field testing.					
1.4 Produce and disseminate public awareness materials on the value of local varieties of horticultural crops and wild fruit species:					
1.4.1 Video on farmers maintaining local varieties of horticultural crops and wild fruit species, their experience and knowledge;					

1.4.2 Video on value of local varieties of horticultural crops and wild fruit species as basis of sustainable agriculture production and healthy environment;					
1.4.3 Information about local varieties of horticultural crops and wild fruit species via mass media;					
1.4.4 Brochures, posters and leaflets on value and importance of conservation of genetic resources of horticultural crops for use by farmers and decision;					
1.4.5 Web site on project outcomes for public use.					
1.5 Promote participation of farmers and local communities in project activities.					
1.5.1 Round tables with farmers and local communities on importance of conservation of local varieties of horticultural crops and wild fruit species;					
1.5.2 Establish agro-theaters in rural schools/Universities near project sites					
<b>Outcome 2. Knowledge and methodologies on <i>in situ</i>/on farm conservation and utilization of horticultural crops and wild fruit species are available, disseminated and used.</b>					
2.1 Conduct multidisciplinary survey mission to assess distribution and level of diversity of target wild fruit species and local/traditional varieties of horticultural crops and their adaptation to climatic/edaphic in situ/on-farm condition, using agromorphological, biochemical and molecular characterization, including molecular and isoenzyme markers, GIS and other modern techniques of PGR evaluation:					
2.1.1 Provide appropriate facilities for field survey and data analysis and exchange: field equipment and tools, laboratory facilities and materials, office equipment, hardware, software, GIS, vehicles.					
2.1.2 Establish digital database on assessment of diversity distribution and level of genetic resources of target fruit species;					
2.1.3 Produce brochure on description of local varieties of priority horticultural crops and wild fruit species.					
2.1.4 Produce database on adaptive characters that can improve farmers' resilience to variable in situ/on-farm environments accessible to farmers					
2.2 Study and disseminate experience of farmers and local communities on maintenance, processing (drying, etc.) and storage of products of local varieties of horticultural crops and wild fruit species:					

2.2.1 Document traditional skills and knowledge;					
2.2.2 Publish brochure on traditional knowledge of maintaining local varieties of horticultural crops and wild fruit species, processing and storage of horticultural products;					
2.2.3 Organize travel workshops for experience exchange among farmers/local communities ;					
2.2.4 Produce video about traditional knowledge on maintaining local varieties of horticultural crops and wild fruit species.					
2.3 Establish demonstration plots with local varieties of horticultural crops in selected agroecological zones and promising populations of wild fruit species in their natural habitats.					
2.4 Promote establishment of nurseries to reproduce best local varieties of horticultural crops and promising forms of wild fruit species in farms and forest farms respectively:					
2.4.1 Identify existing nurseries that manage both local varieties of horticultural crops and promising forms of wild fruit species;					
2.4.2 Determine the requirements of farmers in planting stock of horticultural crops;					
2.4.3 Identify sources of provision of farmers with planting stock of horticultural crops;					
2.4.4 Identify key farmers who have nurseries for planting stock;					
2.4.5 Assist in strengthening of the existing nurseries, enlarging their assortment, and establishing new ones where needed;					
2.4.6 Promote the strengthening of collaboration among farmers maintaining nurseries (nursery network);					
2.4.7 Provide equipment and tools for growing local varieties of horticultural crops and wild fruit species in nurseries: mini-tractors, farming implements, tools for grafting, etc.					
2.4.8 Develop methodologies on reproduction of local varieties of project fruit species which combine official research findings and traditional knowledge on maintenance of these crops.					
2.5 Establish network of databases on local varieties of horticultural crops and wild fruit species maintained on farms and in forest sites:					

2.5.1	Develop protocols of agreements on access to the database and uses of data;				
2.5.2	Provide conditions for farmers and local communities to access the database.				
2.6	Identify the best varieties of horticultural crops and their wild relatives with economically valuable features and develop recommendations to use them for breeding purposes to improve assortment of fruit crops adapted to local environments.				
2.7	Develop recommendations for using fruit genetic resources in non-breeding programs (marketing horticultural and forestry fruit and other products such as bark, flowers, roots, seeds, etc.), direct use of fruit products, in marginal lands, for environmental improvement and rehabilitation (soil and water preservation, improvement of hydrological regime and microclimate, etc.), in reforestation projects.				
2.8	Undertake a socioeconomic assessment of the status of farms where local varieties of horticultural crops are maintained, and develop relevant proposals on modifications of running farm households.				
2.9	Promote the application of new technologies for producing fruit crops products and adding value.				
2.10	Increase knowledge of farmers and local communities on marketing of fruit crop products.				
2.11	Develop and apply scientific guidelines on technology of growing the best local varieties of horticultural crops and promising forms of wild fruit species.				
<b>Outcome 3. Broad participation and strong partnership/links among farmers, among farmers and institutions, between farmers and institutions, and private sector, and among countries are established.</b>					
3.1	Establish Multidisciplinary Site Committees in each pilot site.				
3.2	In each country, establish a Site Coordination Committee comprising representation from each Multidisciplinary Site Committee.				
3.3	Undertake analysis of status of linkages among farmers, among institutions, between institutions and farmers/local communities using the tools and methods of Participatory Rural Appraisal (PRA).				
3.4	Undertake analysis of existing links between/among countries in the region using the tools and methods of Participatory Rural Appraisal (PRA).				

3.5 Identify constraints and solutions to them at all levels of partnership using the tools and methods of Participatory Rural Appraisal (PRA).					
3.6 Develop agreements on collaboration on access and exchange of information on database between/among institutions involved in work on genetic resources of fruit crops at national and regional levels.					
3.7 Establish database on farmers' achievement on <i>in situ</i> /on-farm conservation of local varieties of horticultural crops and wild fruit species.					
3.8 Compile and publish information on farmers, maintaining local varieties of horticultural crops and wild fruit species in information bulletin.					
3.9 Establish electronic communication for broader information exchange among farmers, researchers, donors and other stakeholders:					
3.9.1 Provide partners with communications equipment (for e-mail communication, fax, phone);					
3.9.2 Establish database on project partners.					
3.10 Organize farmers' achievement fairs to promote use and exchange of local varieties and compile and disseminate list of promising local varieties and forms of horticultural crops and wild fruit species to be conserved and used.					
3.11 Promote establishment of farmers' associations to maintain local varieties of horticultural crops and wild fruit species.					
3.12 Hold scientific and practical conferences on agrobiodiversity conservation at national and regional levels.					
<b>Outcome 4. Capacity for training and support activities on <i>in situ</i>/on-farm conservation and use of fruit species genetic resources is established.</b>					
4.1 Establish Regional Training Centers on pomegranate, walnut, and molecular markers.					
4.2 Establish National Training Centers on priority fruit species.					
4.3 Provide appropriate facilities for training, field surveys and data analysis, tools for cultivating in nurseries.					
4.4 Develop training programs and manuals for different categories of trainees.					
4.5 Training of identified target groups.					

4.6 Organize participatory workshops of farmers and researchers with on site visits on <i>in situ</i> /on-farm conservation of local varieties of priority horticultural crops and wild fruit species.					
4.7 Establish national and regional ICT networks for information management and exchange on agrobiodiversity.					
<b>Outcome 5. Project Management</b>					
5.1 Make arrangements for overall project administration and implementation infrastructure:					
5.1.1 Hire regional project coordinator and other staff of the regional implementation unit;					
5.1.2 Hire project personnel in partner countries;					
5.1.3 Establish and equip national project offices.					
5.2 Establish and operate accounting and activity reporting system.					
5.3 Prepare work plans for partner country units.					
5.4 Conduct training workshops for project personnel in partner countries.					
5.5 National Steering Committee Meetings.					
5.6 International Steering Committee Meetings.					
5.7 Organize annual project implementation review meetings					
5.8 Organize annual work planning workshops					
5.9 Perform midterm evaluation of the project and take necessary action to improve project delivery.					
5.10 Perform terminal evaluation of the project.					

## ANNEX H – SURVEY PROCEDURE AND DIVERSITY LEVEL ASSESSMENT OF PRIORITY CROPS

Survey procedures and diversity level assessment of priority crops will be carried out to provide the scientific basis to meet project objectives in each of the project sites and selected demonstration plots. The studies will help to identify priority areas for *in situ*/on-farm conservation and use of horticultural crops and wild relative genetic diversity.

### ANALYSES

For the first time in the region, assessment of horticultural crop and wild fruit species genetic diversity will be carried out using molecular markers, GIS, and socioeconomic studies in an integrated approach in all five Central Asian countries. Identification and assessment of biodiversity will be carried out at three levels: ecosystem, interspecific, and intraspecific diversity. In the process, the criteria for selection of the priority crops, and agroecological zones and systems, will be tested.

The role of farmers is central, and their participation is the key factor in achieving effective *in situ*/on-farm conservation. Therefore the socio-economic circumstances of farms and farm households, and their motivations for conservation and use of horticultural crops and their wild relatives, will be explored. These include:

- How levels of distribution of genetic diversity are affected by household characteristics;
- The factors that affect the level and conservation of that diversity;
- Value of local varieties to farmers and local people;
- The roles farmers play in the public and economic systems.

Descriptions of agroecosystems (non-biotic and biotic factors, agroecosystems management) are key elements in assessment of biodiversity and its level of distribution. Assessment of diversity levels requires attention to the agromorphological features of accession, which farmers use to make selection decisions. Initially, evaluative descriptors will be used to describe those morphological, biological, and value features that are easily distinguished with the naked eye. Later in the process, morphological data will allow comprehensive biodiversity assessment.

Special attention will also be given to the impacts of economic factors, agroecology, market development, and the processing industry. The value of varieties is directly related to how they comply with farmers' needs. It is therefore important to consider factors such as economic change, market development, and government policy when developing strategies to conserve genetic diversity.

### RESULTS

Once selection data has been collected and analyzed, farm households will be selected for the future cooperation. Accessions for *in situ*/on-farm conservation will be selected and descriptions of their agronomic, morphological, and pomological characteristics will be provided. Farm households, local varieties, and forms of horticultural crops will be mapped through use of GIS. The extent and distribution of genetic diversity, the social, economic, cultural, and ecological factors, and other processes having an impact on the support of *in situ*/on-farm biodiversity by farmers will be identified. Impact of gender, age, social, and economic status of farmers on their support of *in situ*/on-farm biodiversity will also be

identified. Ultimately, a policy that supports farmers and local communities in their role to conserve PGR will be elaborated, and farmers will be integrated into the national systems of PGR conservation and joint research work.

## SURVEY PROCEDURES

Based on analysis and data obtained in various countries, IPGRI has published a Training Guide for *In Situ* Conservation On-farm. It contains recommendations on development of survey procedures and biodiversity assessment which can be used for the national PGR systems. Development of this procedure has relied to great extent on this Training Guide.

It should be noted, however, that *in situ*/on-farm research has historically focused on annual crops (cereals, vegetables). The biological characteristics of these crops differ sharply from perennial (horticultural) crops, as do methods of horticultural crop reproduction. Horticultural crops differ in phenophase periods, dates of ripening, selection of pollinators, and peculiarity of fruitage. The variability of morphological characters is high, and some of them might be phenotypical. This project is the first to undertake the proposed level and extent of research about *in situ*/on-farm conservation of horticultural crops and their wild relatives.

Factors and conditions will vary from country to country, therefore it is important to be adaptable in applying the survey procedures and biodiversity assessment, and to be prepared to refine the process as it proceeds. Following are survey procedures established to:

- Determine characteristics of farm households or sites of accession collecting;
- Analyze biodiversity in ecosystems, and components of ecosystems;
- Undertake biodiversity assessment.

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## CHARACTERISTICS OF FARM HOUSEHOLDS AND LOCATIONS OF ACCESSION COLLECTING

A farm household represents an agroecosystem where biodiversity is maintained by a farmer. Knowledge of management and maintenance of this system is essential to understand the processes of its conservation. Location of the farm household has a considerable effect on the types and uses of products. Distance to the place of selling and transportation costs are indicators of economic feasibility. Depending on these factors, products might be used on the farm itself or be sold. Therefore, the market and processing industry are key criteria for crop and variety selection.

Characteristics of farm households will help determine the motivations for conservation, and will assist the researchers in working effectively together with farmers.

### 1. Farm household location

- Farmer's name \_\_\_\_\_
- Region \_\_\_\_\_
- District \_\_\_\_\_
- Village \_\_\_\_\_
- Locality \_\_\_\_\_

Plain	Cross-country	Hilly	Mountainous
0-0,5 <sup>0</sup>	11-16 <sup>0</sup>	16-30 <sup>0</sup>	More than 30 <sup>0</sup>

Location of sample exposure site (km from village, town)

Latitude	Longitude	Altitude
Slope: steepness and its exposition		
Inclination in <sup>0</sup>	Inclination direction: N, S. E. W, NW, etc. N, S. E. W ...	

### 2. Human resources

Genus composition	Age	Education	Specialization	Status

### 3. Responsibilities of the family members for agrobiodiversity conservation

##	Agro-activities held in farm	Father	Son	Son	Mother	Daughter	Daughter
	Variety selection						
	Variety reproduction						
	Variety distribution (selling)						
	Trees pruning and shaping						
	Watering						
	Soil cultivation						
	Pest and disease control						
	Harvest						
	Harvest selling						
	Crop processing:						
	- drying						
	- production of jam, stewed fruit, etc.						
	Storage of fruits						
	Keeping of cattle and oxen:						
	- provision of forage						
	- caring for cattle						

### 4. Land resources and logistical support of the farmer

Area, h

Site fragments: h, h, h

Soil fertility: high, medium, low

Bedding of subsoil waters: deep (more than 2 m), medium (1.5-2.0 m), close (1-1.5 m)

Irrigated, not irrigated, conventional irrigation

Irrigated water supply

- Weak – 1-2 watering
- Medium – 3-4 watering
- Full – more than 4 watering

Availability of agricultural machinery:

- caterpillar – \_\_\_\_\_ pcs., not available
- intertillage - \_\_\_\_\_ pcs., not available
- tractors with hinged tools - \_\_\_\_\_ pcs., not available

Provision of (in percent out requirement):

Fertilizers – weak (up to 30%), medium (up to 75%), full (up to 100%)

Chemical weed-killers – weak (up to 30%), medium (up to 75%), full (up to 100%)

## 5. Market infrastructure

Distance to road (with hard surface): close (up to 5 km), average (up to 10 km), remote (more than 10 km)

Distance to market: close (up to 20 km), average (up to 30 km), remote (more than 30 km)

Distance to processing plant: close (up to 25 km), average (up to 35 km), remote (more than 35 km)

Transport: rental, personal vehicle

Transportation expenses in percentage of income

Economic expediency of the agricultural products (horticultural, viticulture): expediently, not-expediently, used in the farm

## 6. Economic status of the farmer

Family welfare: poor (up to two minimum wages per every member of the family), average (up to four), good (more than four)

Keeps:

- Cattle – quantity - \_\_\_\_\_ pcs
- Oxen – quantity - \_\_\_\_\_ pcs
- Poultry – quantity - \_\_\_\_\_ pcs

Provision of the family with its own production, %:

Vegetable origin –

Animal origin –

Income source, %:

- Portion of the agricultural crops' (horticultural) harvest in the household's income
- Income outside the household (employment elsewhere)

Portion of the agricultural products (horticultural, viticulture), %:

- In the fresh form
- Processed in the household itself
- For sale

## 7. Farmer's capability to participate in the project

Farmer's interest in collaboration: interested in, not interested in, may participate in some project activities

Farmer's potential in the project framework:

Participation in: research, survey at pilot sites, breeding programs, nurseries, distribution of local knowledge (storage and processing of crops, pruning and shaping of trees, combating pests and diseases)

Access to the GR of horticultural:

- collection of research institutions: - yes - no
- State varieties testing sites on horticultural testing: - yes - no
- Markets: - yes - no

Contacts with other farmers:

- Exchange or receipt of the planting material: - yes - no
- Getting information about varieties, combating pests and diseases: - yes - no

Contacts with research institutions: - local - national

- Provision of scientific and popular literature on horticultural: yes, no, limited availability

## ANALYSIS OF AGROBIODIVERSITY IN AGROECOSYSTEMS, AND COMPONENTS OF AGROECOSYSTEM

Levels of genetic diversity among farm households differ. They depend on material and technical factors, and on the land resources. Characteristics of farm soil (fertility, moisture provision) and climatic conditions of the location (e.g., intensely cold weather, frost, drought) are also significant factors that influence farmers' selection of varieties.

Variety selection criteria by farmers:

- intense (high-yield) type
- resistance to stressful factors in the environment
- market value
- level of utility for the family

Criteria for naming by farmers:

- place of origin
- morphological evidence
- agronomical data
- adaptation (resistance, fitness) to the factors of environment (physiological evidence)
- use of product

Crop value to farmers:

- food
- decorative
- medicinal
- superstition

Economic value of the variety:

- level of practicality for the family
- market value
- aptitude to various types of processing

### Features used by the farmers and scientists to distinguish varieties

##	Features distinguishing varieties	Farmers	Scientists
1	Morphological features of the tree:		
	Form of crown		
	Character and bloom of sprout		
	Coloration of trunk and frond's crown		
	Leaf form and size		
	Leaf blades edges		
	Grandules availability and their location		
2	Morphological features of the fruit:		
	Form		
	Size		
	Relief		
	Coloration		
	Coloration of pulp		
	Form of calyx		
	Form under calyx pipes		
	Form of heart and its location		
	Aroma		
	Period of ripening		

3	Distinguishing varieties at molecular level		

Agrobiodiversity distribution among farmers:

- exchange of grafts or planting stock
- via local communities
- via associations of farmers
- via forest farms (nurseries)
- purchase at markets, and
- from specialized nurseries

It is recommended that the basic climatic indices be obtained from the nearby weather station: the sum of active and effective temperatures, amount of precipitation and breakdown by months, minimum, maximum, and average temperatures, first and last frosts, etc. These are needed to determine abiotic factors that influence biodiversity on farms.

Agrobiodiversity size and distribution within:

- Farm
- Village
- District
- Region

To identify:

1. Crop capacity: kg from a tree
2. Variety's merits
3. Variety's demerits
4. Distinctive features
5. Preferable features
6. Assessment of and reason for variety selection by the farmer
7. Inclination to formation of root shoots
8. Method of reproduction
9. Value of accession to genetic diversity

Value for the farmer - probability for *in situ* conservation

Breeding value – for *ex situ* conservation (most important economic indications: winter-resistance, self-production, resistance to the stressful factors of environment, quality of fruits, and appropriateness of the various types of processing).

**Total size of horticultural crops' agrobiodiversity at experimental sites (at village, district level)**

Agrobiodiversity in farm households	Number of farm households						
Quantity of breeds/types							
Quantity of species							
Quantity of varieties, forms							

**Size and distribution of horticultural crops' agrobiodiversity at experimental sites**

Horticultural Crops	Number of farm households							Total
Apricot								
Species:								

Varieties or forms:								
Apple								
Species:								
Varieties or forms:								
So on as per a crop								

## Characteristics of biocenose

### Wild (growing wild) horticultural species in agroecosystem or growing nearby

##	Crop	Genus	Species
1	Apple	Malus M.	M. sieversii (Idb)M.Roem M. niedzwetzrayana Dieck M. turkmenorum Juss M. kirghizorum Al.etAn.Fed
2	Pear	Pyrus L.	P. korshynskyi Litw P. bucharica Litw P. regelii Rehd P. cajon Zapr P. turcomanica Maleev
3	Hawthorn	Crataegus L.	C. pontica C.Koch C. turkestanica Pojark
4	Plum	Prunus M.	Pr. cerasifera Ehrh.
5	Almond	Amygdalus L.	A. communis L. A. bucharica Korsh A. spinosissima Bge A. petunnikovii Litw A. vavilovii M. Pop
6	Pomegranate	Punica L.	P. granatum L.
7	Pistachio	Pistacia L.	P. vera L.
8	Zizyphus	Ziziphus M.	Z. jujuba M.
9	Oleaster	Elaeagnus L.	E. angustifolia
10	Currant	Ribes L.	R. meyeri Maxim R. janczevskii Pojark R. nigrum L
11	Raspberry	Rubus L.	R. caesius L.
12	Fig	Ficus L.	F. carica L.
13	Sea-buckthorn	Hippophae L.	H. rhamnoides L
14	Cherry	Cerasus Juss	C. mahaleb M., C. verrucjsa Nevskii
15	Aflatunia	Aflatunia Vass.	A. ulmifolia Vass.
16	Barberry	Berberis L.	B. heterobotrys Wolf B. integerrima Bge B. multispinosa Zapr
17	Walnut	Juglans L.	Juglans regia L.

Species diversity to be identified:

- species composition
- prepotent species
- concomitant species
- age of biocenose
- age composition
- level of distribution (share of participation in biocenose)
- characteristics of phytocenosis – share of some species (phytocenosis composition)
- forest generating genus
- forest composing genus
- above-zero plants and trees
- normal plants
- below-zero plants, trees and their share

SYSTEM OF CONSERVATION AND MANAGEMENT OF AGROECOSYSTEMS

1. Tree spacing \_\_\_\_\_, unsystematic (free)
2. System of soil management in the garden: fallow land, siderites, use for forage and vegetable crops

3. Irrigation:

Number of waterings	In winter
	During vegetation

4. Fertilizing, dosage: per 1 h

mineral	organic	Dates of entry
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5. Pruning and training: undertaken thoroughly, slightly, absent
6. Pruning for shape: layered, calyx, local system, etc.
7. Combating pests and diseases: not undertaken, undertaken based on scientific recommendations, local methods are used: herbaceous extracts, ashes, sowing of grasses which frighten off pests
8. Protection of trees from frost. Local methods: burying with soil (subtropical crops and vine), smoke generation, winter watering
9. Reproduction of biodiversity (horticultural) in conditions of household:
  - Methods: inoculation, graftage, with seeds or stone, with cuttings.
  - Potential for reproduction: exists, no
10. Fruit storage: In special rooms, in usual conditions, in storages
11. Types of horticultural and berry processing in the farm household: drying, jam production, stewed fruits, etc.
12. Main agrotechnical factors limiting agroecosystem's development: unsystematic training, high density system, lack of pollinators, lack of measures to combat pests and diseases, lack of irrigation
13. Main biotic factors limiting development of agroecosystem:
 

The most widespread pests: violet armed scales, pear leaf blister mite, apple maggot, aphids, spider tick, coccid comstoc maggot, red plum maggot, red spider mite, etc.

The most widespread diseases: head scald, brown rot of stone fruits, apple scab, monilia, farinaceous dew, leaves kink, mildew, leaf curl of fruits, etc.
14. Basic non-biotic factors which limit which limit development of agroecosystem:
  - Low air temperature in winter (frost)
  - Late spring frosts
  - Insufficient soil moisture
  - Soil saltiness

## BIODIVERSITY ASSESSMENT

Each of the priority crops is characterized by a wide diversity of morphological and biological features. As a result of the surveys and analysis of farm households, biodiversity assessment will be done at interspecific and intraspecific levels. At the same time, analysis of components of the agroecosystem will reveal its species diversity.

It is essential to identify intraspecific diversity based on agromorphological and biological traits. The project implementers will study and describe the most important traits of vegetative and generating organs and biological features of the selected priority crops and their wild relatives. These features are the most important criteria for biodiversity assessment in situ/on-farm.

### **Most important biological peculiarities of horticultural crops for assessment of their intraspecific diversity**

1. Year of entry to the fruitage on \_\_\_\_\_ (year) after planting.
2. Year of entry to the full fruitage.
3. Early bearing: early, average, late.
4. Dates of blossoming: early, average, late.
5. Blossoming: rich, average, weak.
6. Resistance to late frosts (0-5 number).
7. Self fertility: self-fertile, self-sterile.
8. Variety's spur: lacking, weak, medium, strong.
9. Pollinator:
10. Bearing habit: on one year old grafts, on spurs, mixed
11. Fall of fruits: strong, average, weak.
12. Dates of the greatest fall of fruits.
13. Fall of fruits after their ripening: strong, average, weak.
14. Dates of ripening: early, average, late.
15. Uniformity of ripening of fruit: not uniform, uniform
16. Variety: summer, autumn, winter.
17. Duration of maturing: \_\_\_\_\_ days.
18. Dates of harvesting.
19. One-dimensionality of fruits, relation of fruit's average weight to the maximal weight of fruit, in %: one-dimensional (80%), average dimensional (60-80%), non-dimensional (up to 60%)
20. Dates of consuming maturity.
21. Periodicity of fruitage: strong, average, weak, none.
22. Transportability: strong, average, weak.
23. Storage of fruits: high, average, weak, stored until \_\_\_\_\_.
24. Fruit use: consuming in fresh form, exporting, processing (including drying).
25. Frost-resistance: 0-5 number.
26. Winter hardiness: 0-5 number.
27. Resistance to the main: pests: 0-5 number; diseases: 0-5 number.

## **Most important morphological characteristics of horticultural crops for assessment of their intraspecific diversity**

Tree vigour:	strong, medium, weak
Origin:	seminal, vegetative
Crown:	form, foliated
Stock:	character of surface, color
Fronds:	angle of origin, character of surface, color
Grafts:	width, convolution, coloring of the summer and winter grafts, bloom
Buds:	size, form, color, bloom
Leaves:	size, form, color of the upper and lower blades, bloom, contour of edges, convolution, character of edges, availability of stipules
Petiole:	size, bloom
Glands on leaves:	number, form, color
Petiole glands:	number, form, color
Blossoms:	number from one fruit bud, number, form, color
Calex:	form, color, bloom
Sepal:	form, color, bloom
Petal:	form, color, bloom
Stamen:	size, color of filaments, color of anthers
Style:	length of stub, bloom of stub, quantity
Position of style in relation to the level of stamen:	upper, lower, at the same level

### **Stone fruits**

Fruit:	size (identified by weighing of a hundred fruits taken randomly)
Shape:	flat, rounded, egg-shaped.
Form:	oval, spherical, egg-shaped, etc.
Top:	rounded, pressed in, sharp
Base:	cavity, elongated
Suture:	
Seam:	deep, medium, weak, absent
Pedicle:	naked, down
Peel:	naked, down, with waxy film, easily taken off from the fruit, with difficulties, do not taken off
Color:	basic, covering
Pulp:	color, cavity color
Pulp consistence:	delicate, joint, gristly, mealy, fibrous
Aroma:	weak, medium, strong, without aroma
Character of taste:	sweet, sour-sweet, sour, tart, tasteless
Stone:	size, form
Surface:	smooth, with holes, striated, wrinkled
Separation of stone:	comes off, do not come off
Color of the fresh stone:	
Taste of kernel:	sweet, bitter

### **Pome fruits**

Fruits:	size (identified by weighing of a hundred fruits taken randomly)
Form:	oblong, conic, rounded, cylindrical, pear-shaped, turnip shape, etc.
Surface:	smooth, ribbed, bumpy
Pedicle:	size, width

Crater:	breadth, depth, form, rustiness
Calyx:	falling, non-falling, openness
Saucer:	breadth, depth, surface character
Under-cup surface:	form, breadth, depth
Coloring of fruit:	basic, covering
Subcutaneous points:	quantity, size, color
Heart:	position, size, form
Seed cells:	size, form, openness
Peel:	width, compactness
Pulp:	color, consistency, grain, stony cells
Seeds:	size, form, color
Aroma:	weak, medium, strong, without aroma
Character of taste:	sweet, sour-sweet, sour, tart, tasteless

### **Vine**

Bush:	growing force, size
Grafts:	width, color
Leaf:	color, form, size
Leaf's blade:	flat, folded, funnel-shaped
Surface of the upper blade:	flat, cellular, wrinkled
Surface of the lower blade:	naked, down, dim
Bloom:	cobwebbed, felt, absent
Division:	weak, medium, strong
Number of blades:	unbroken, three-bladed, five-bladed
Rod cavity:	open, vaulted, rounded, closed, slit-like
Petiole:	short, long
Blossom:	bisexual, functionally female
Cluster:	size, form, compactness
Berry:	size, form, color, color of sap
Peel:	compactness, width
Waxy film:	weak, medium, strong, absent
Pulp consistency:	crunch; melting, pulpy
Aroma:	muscatel, strawberry, absent
Seeds:	quantity, size, form, absent
Taste:	sweet, sour-sweet, harmonious

### **Pomegranate**

Living form:	bush, decumbent bush, diminutive form (height not more than 1 m)
Bush:	number of trunks
Crown's shape:	branchy, rounded, friable, compact
Grafts: width,	convolution, color
Prickliness:	weak, medium, strong, absent
Leaves:	size, form, color, bloom
Blossoms:	size, color
Type of flower:	long-style, jug-shaped (female), % short-style, bell-shaped (male), %
Fruits:	small (200-240 gram), medium (250-300 gram), large (300-800 gram)
Form of fruit:	rounded, round-flat, pear-shaped, turnip shaped
Form of the top and base of the fruit:	flat, rounded
Surface:	ribbed, shiny

Neck of calyx:	short, medium, long
Calyx:	size, quantity sepal
Toothing of calyx:	size, quantity, form, position
Coloring of fruit:	basic, covering
Peel:	very thin (0,1 cm), thin (0,2-0,3 cm), medium (0,3-0,4 cm), thick (0,4-0,5 cm)
Width of membrane:	thin, medium, thick
Grain:	color, form, size
Level of peels separation from grains and membranes:	
Seeds:	size, solidity
Taste:	sour, sweet, sour-sweet, pleasant

## **Pistachio**

### Description of trees

#### Morphology of vegetative organs:

- origin (seminal, stem wood)
- biomorphological type (bush or tree)
- height
- number of trunks
- crown's form (delicate, branchy, spherical, etc.)
- bifurcation type (sympodial, etc.)
- crown's diameter
- rind of the main trunks (light, grey, cracked)
- state of development (good, satisfactory, not satisfactory)
- average growth of the main crown generating grafts
- vegetative buds (large, medium, small)
- distance between buds
- leaf (complex, simple)
- quantity of leaflets in the leaf
- length of leaf (from the base of the petiole)
- breadth of leaf
- terminal leaflet (length, breadth, form)
- color and bloom of leaf

#### Morphology of the generating organs:

- generating buds (large, medium, small)
- quantity of generating buds on one fruit frond
- Inflorescences at the moment of mass blossoming of style blossoms (long – more than 8 cm, medium - 6-8 cm, short - less than 6 cm)
- inflorescence at the moment of mass blossoming of staminal blossoms (long – more than 6 cm, medium - 4-6 cm, short - less than 4 cm)
- quantity of inflorescence on one fruit frond
- average number of ovaries in one cluster
- average number of fruits in one cluster
- biological productivity (on 5 number scale)
- phenological peculiarities

#### Fruits (nuts of pistachio):

- size – length, breadth, height (average indicators per a hundred nuts)
- form of stone-fruit (rounded, oval, elongated-oval, falcated, etc.)
- weight of nut – average indicators per a hundred nuts (dried, cleaned from pericarp)

- output of open nuts (% from a hundred nuts)
- nut's bursting character – one or two-sided, for the 1/3 length, etc.
- kernel's output, % from not less than 25 nuts
- pericarp's color of mature fruits (white, rosy, raspberry, etc.)

## Walnut

Origin

Use of free (female, marketable)

Object popularity (frequency, repetition)

Tree:

form

phenology: swelling of buds,

- period of leaves appearance (early, medium, late)
- appearance female blossoms (early, medium, late)
- abscission of leaves

habitus (height of trunk, crown's form)

diameter at the height of 1.5 m

dichogamy (protandry, protogyny, homogamy)

early development (early bearing, beginning of fruitage)

flank fruitage ??????? (% buds)

period of fruitage (early, medium, late)

bursting of pericarp

nut's form

nut's (diameter)

nut's length

texture of shell

color of shell

membrane

solidity of shell

thickness of shell

kernel color

kernel output

oil content

proteins content

carbohydrate content

sealed end existence (on trunk, near the root collar)

## **ANNEX I –PROJECT CROPS, AGROECOSYSTEMS, SITES AND CRITERIA FOR THEIR SELECTION**

### **CRITERIA TO SET PRIORITY SPECIES AT REGIONAL LEVEL**

1. Importance for consumption and marketing
2. Importance for local livelihoods
3. Presence of local varieties/wild relatives of target species under the threat of genetic erosion
4. Importance for additional cost
5. Presence of wild species and/or wild relatives
6. Presence of high level of intraspecific diversity or special types
7. Availability of capacity of national research institutes
8. Tradition of cultivation/use of target crop/species
9. Global significance

### **CRITERIA FOR SELECTION OF AGROECOSYSTEMS AT REGIONAL LEVEL**

1. Presence of high intraspecific/form and variety diversity of fruit genetic resources in the agroecosystem
2. Presence of wild relatives of target crops in agroecosystem
3. Average of particular types of soil and climate conditions
4. Social and cultural aspects and traditions in cultivation and use of target crop
5. Diversity of farming systems and wild habitats
6. Presence of wild relatives/landraces under threat of genetic erosion

### **CRITERIA FOR SITE SELECTION AT REGIONAL LEVEL**

1. Farmers/local community knowledge and skills in maintaining of fruit crops
2. Nearness to diversity center
3. Farmers/local community interest in collaboration
4. Availability of local institutes, NGOs, experimental stations and others dealing with studying and conserving PGR
5. Presence of wild relatives
6. Availability of markets
7. Socioeconomic and ethnic diversity
8. Diversity of husbandry forms

## Selected agroecosystems and project sites in the region

#	Crop/species	Region	Agroecosystem	Project sites
<b>Kazakhstan</b>				
1	<b>Apple</b> ( <i>Malus sp</i> )	Jungar Alatau	Medium hills Rainfed	Sarkhan district: Sarkand, Topolevka, Koily villages. Alakhul district: Lepsinsk, Kabanbai villages.
		Ketmen	Low hills Rainfed/irrigated	Uygur district: Shonji, Ketmen villages.
			Medium hills Rainfed	Uygur district: Koldjat vil.
		Zailiyskiy Alatau	Medium hills Rainfed/irrigated	Enbekshi-Kazakh district: Turgen, Issyk villages. Talgar district: Kotu-bulak gorge. Karasay district: Kamenka vil.
		Chuiliy Mountain	Low hills Rainfed/irrigated	Ryskulov district: Kulan vil.
		Kyrgyz Alatau	Low hills Rainfed/irrigated	Merken district: Merke vil. Ryskulov district: Kulan vil.
		Karatau	Low hills Rainfed/irrigated	Juvalinskiy district: Mashat vil. Tulkubasskiy district: Tulkubas vil., Boroltai vil. Saryagash district: vil. named after K.Konusbaev Makhtaaral district: Zhemis-Zhidek vil.
			Medium hills Rainfed/irrigated	Tulkubasskiy district: Koktal, Zhualy villages
2	<b>Pear</b> ( <i>Pyrus sp</i> )	Chuiliy Mountain	Low hills Rainfed/irrigated	Ryskulov district: Kulan vil
		Kyrgyz Alatau	Low hills Rainfed/irrigated	Merken district: Krasniy Oktyabr vil. Baizakov district: Akir Tube vil.
			Medium hills Rainfed/irrigated	Merken district: Plodovojagodniy vil.
		Karatau	Low hills Rainfed/irrigated	Tulkubasskiy district: Amangeldi vil.
			Medium hills Rainfed/irrigated	Tulkubasskiy district: Michurin vil.
		Jungar Alatau	Low hills Rainfed/irrigated	Sarkandskiy district: Topolevka vil. Uygur district: Koksuv vil.
		Zailiyskiy Alatau	Low hills Rainfed	Talgar district: Baibulak vil.
			Medium hills Rainfed	Talgar district: Almalyk vil.
3	<b>Apricot</b> ( <i>Prunus armeniaca</i> )	Karjantau	Low hills Irrigated	Saryagach district: Derbisek vil. Makhtaaral district: Zhemis-Zhidek vil.
		Ketmen	Low hills Rainfed/irrigated	Uygur district: Shonji, Dardamty, Ketmen vil.

# #	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
			Medium hills Rainfed	Uygur district: Koldjat vil.
		Zailiyskiy Alatau	Low hills Rainfed	Enbekshi-Kazakh district: Baisent, Bijanov, Dihan villages.
			Medium hills Rainfed	Talgar district: Belbulak, Koturbulak, Prjamoe; Talgar gorges. Enbekshi-Kazakh district: Issyk gorge. Kurdai district: Karakunuz forestry.
4	<b>Grapevine</b> ( <i>Vitis</i> sp)	Southern Kazakhstan	Low hills Rainfed/irrigated	Saryagach district: Kaplanbek vil. Makhtaaral district: Zhemis-Zhidek vil.
			Medium hills Rainfed/irrigated	Tulkubas district: Zhualy vil., vil. named after T.Ryskulov Sayram district: Sayram, Karamurt villages
		South-Eastern Kazakhstan	Low hills Irrigated	Panfilov district: Bedjin, Koktal villages. Uygur district: Shonji vil.
<b>Kyrgyzstan</b>				
1	<b>Alycha</b> ( <i>Prunus cerasifera</i> )	Jalalabad Province	Mountain Rainfed	Karaalma forestry: Urunbash, Karaalma vil. Arslanbob forestry: Gumkhana, Djaiterek, Dashman. Kaba forestry: Akterek.
2	<b>Apple</b> ( <i>Malus</i> sp)	Jalalabad Province	Mountain and foothills Rainfed	Karaalma forestry: Urunbash, Karaalma, Jalgyz-Janak villages. Arslanbob forestry: Gumkhana, Jaiterek, Dashman. Gavinskiy forestry: Kaba, Ak Terek vil.
3	<b>Sea buckthorn</b> ( <i>Hippophae rhamnoides</i> ) <b>Currant</b> ( <i>Ribes</i> spp)	Issyk Kul Province	Mountain Rainfed	Issyk Kul forestry, Djatioguz forestry: Aksui Issyk Kul forestry
		Naryn Province	Mountain Rainfed	Salkyn Tor Nature park, Flood lands of Naryn river Salkyn Tor Nature park
4	<b>Grapevine</b> ( <i>Vitis</i> sp)	Chui Valley	Mountain & foothills Rainfed	Sokuluk district: Kashka Bash village. Moscovskiy district: Asyl Bash village. Chui district: Saylyk village.
		Osh Province	Mountain & foothills Rainfed	Aravan district: Aravan vil. Karasu district: Karasu vi.
		Jalalabad Province	Mountain & foothills Rainfed	Aksyiskiy forestry: Krupsay, Aflatunsk. Suzak district: Oktybrskoe village.
5	<b>Pistachio</b> ( <i>Pistacia vera</i> )	Jalalabad Province	Foothills Rainfed	Toskool-Ata forestry: Khara Miste, Alash. Kochkor Ata forestry: Kuduk, Kok Tash, Mailusuu.

# #	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>		
				Karaalma forestry: Suzak.		
6	<b>Walnut</b> ( <i>Juglans regia</i> )	Osh Province	Mountain Rainfed	Mirzaakin forestry: Uzgen.		
		Jalalabad Province	Mountain Rainfed	Kaba forestry: Akterek. Arslanbob forestry: Gumkhan, Djaiterek, Dashman. Arkyt forestry: Kyzyl Ungur. Ortok forestry: Kadu; Karaalma forestry: Karaalma vil.		
<b>Tajikistan</b>						
	<b>Apple</b> ( <i>Malus sp</i> )	Northern Tajikistan, Sugd province	Valley Rainfed	Asht district: Shaidon and Pongoz vil.		
			Mountain Semi Rainfed	Gorno-Matchinsk district: Paldorak, Obburdan vil. Penjikent district : Jeri, Dashti Kozi vil.		
			Foothills Irrigated	Isfara district: Vorukh, Chorkukh, Kulkand vil. Shakhristan district: Oktangi vil., Shakhristan settlement.		
		Western Pamir, Gorno-Badakhshan autonomous province	Mountain Semi Rainfed	Darvaz district: Kalaikhumb, Kurgovad vil. Vanch district: Vanch settlement, Jazgulom vil. Shugnan district: Porshnev, Sokhcharv vil.		
		Central Tajikistan	Valley Irrigated	Gissar district: Gornaja Khanaka, Almosi vil.		
			Foothills Relatively Irrigated	Faizabad district: Dubeda, Miskinobod vil.		
			Mountain Irrigated	Djirgital district: Ljakhsh, Pildon vil.		
		Southern Tajikistan, Khotlon province	Mountain Rainfed	Muminobod district: Gofilobod and Shakhrak vil. Shurabad district: Shurabad and Dargistan vil. Khovaling district: Paranak and Novobod vil		
		2	<b>Pear</b> ( <i>Pyrus sp</i> )	Southeastern Tajikistan	Foothills Irrigated	Muminobod district: Gofilobod and Mamandien vil. Khovalin district: Dari, Mukhtar, Mozori Sul-ton vil. Shurabad district: Chagam and Gulomobod vil.
					Mountain Rainfed	Muminobod district: Childukhtaron, Chavzadara vil. Khovalin district: Daraimullo, Sangdara vil. Shurabad district: Devdor, Sulmabad vil.

#	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
		Central Tajikistan	Valley Irrigated	Gissar district: Zardolu vil. Faizabad district: Takakhona vil.
			Foothills Irrigated	Rasht district: Khait, Navdi, Dzhavr vil. Nurabad district: Nurabad settl. Djirgital district: Pildon, Gubai vil.
			Mountain Rainfed	Rasht district: Khait, Khazorchashma vil. Nurabad district: Nurabad, Daraji khakimi vil. Djirgital district: Novabad. Pildon; Sajron vil.
			Western Pamir and Darvaz	Foothills Irrigated
		Mountain Rainfed		Vanch district: Dashtak, Shurgovat vil. Shugnan district: Buni, Dasht vil. Darvaz district: Ruzvaj, Togmaj vil.
3	<b>Apricot</b> ( <i>Prunus armeniaca</i> L.)	Central Tajikistan	Valley Irrigated	Tursunzade district: Pakhtabad, Chirkent, Batosh vil. Gissar district: Mortepea, Kalai, Khisor vil. Vakhdad district: Zargar, Dashtibed, Lakajbegi vil.
			Foothills Irrigated	Faizabad district: Faizabad settl., Zardolukho vil. Rasht district: Khait, Gubaj, Novabad, Kalai Surkh, Nimich vil. Djirgital district, Pildon, Ljakhsh, Karamyk, Sajron vil. Tavildar district: Khazrati, Sulton, Sagirdasht vil., Tavildora settl.
			Mountain Rainfed	Faizabad district: Navgrez, Dola vil. Rasht district: Kamarob, Kaznok, Shul vil. Djirgital district, Ljakhsh, Sajron vil., Chirgital settl. Tavildar district: Mienadu vil., Jezgand valley.
			Northern Tajikistan, Sugd province	Valley Irrigated,
			Foothills Irrigated	Isfara district: Chorkukh, Chilgazi, Oftobru, Vorukh vil. Asht district: Oshoba, Kamish-Kurgan, Pongoz, Boboiob vil.

# #	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
			Mountain Irrigated	Ayni district: Kazdan, Darg, Shamtuch, Varz, Rarz vil. Gorno- Matchinsk district: Sabakh, Obburdan, Pastigal, Ustoshon vil. Penjikent district: Margidar, Dashti, Malla vil.
		Western Pamir, Gorno-Badakhshan autonomous province	Foothills Irrigated	Vanch district: Jazgulem, Panchambeobod vil. Rushan district: Vomar, Bardushon vil. (basin of Jazgulem and Bartang rivers).
			Mountain Irrigated	Shugnan district: Sokhchavr, Porshnev vil. Ishkoshim district: Shakh dara and Gund valley, Garmchashma vil.
4	<b>Peach</b> ( <i>Persica vulgaris</i> )	Central Tajikistan	Valley Irrigated	Vakhdad district: Kupruk-Boshi, Turkobod, Simiganch, Zargar vil. Rudaki district: Ljaur, Darjeobod, Esanboi vil.
			Foothills Irrigated	Varzob district: Kandara, Takob vil. Shakhrinav district: Chuza, Khodzha Childier, Sangvor, Chiptura vil.
			Mountain Rainfed	Gissar district: Durbat, Almasi, Gornaja Khanaka, Sunbula vil. Tursunzade district: Jangibog, Karatag, Pakhtabad vil.
5	<b>Sea buckthorn</b> ( <i>Hippophae rhamnoides</i> )	Western Pamir & Darvaz, Gorno-Badakhshan autonomous province	Foothills Rainfed	Darvaz district: Vishkharv valley.
			Mountain Rainfed	Rasht district: Obi Khingou valley. Ishkoshim district: Andorob valley. Shugnan district: Pjandzh valley. Vanch district: Vanch valley.
6	<b>Grapevine</b> ( <i>Vitis sp</i> )	Southwestern Tajikistan, Khotlon province	Valley Irrigated	Kulyab district: Jakhsu valley.
			Foothills Rainfed	Muminobod district: Tutkaul, Parazor vil. Khovalinsk district: Kadakhi, Degrezen vil. Kulyab district: Siraki, Dakhana vil. Moscow district: Kurbon Shaid vil. Chubek Vosey district: Ibrat vil.
		Central Tajikistan	Foothills Irrigated	Tursunzade district: Sharkent valley. Shakhrinauz district: Karatag valley. Gissar district: Khanaka valley. Rudaki district: Dariobod, Ozodi Zanon, Chortut, Chorjakkoron vil. Varzob district: Varzob valley.
		Northern Tajikistan, Sugd province	Valley Irrigated	Bobodzhon-Gafurov district: Auchi-Kalachi, Ispisar, Kistakoz, Samgar, Undzhi vil.

#	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
			Foothills Irrigated	Asht district: Pongoz, Kamish-Kurgan, Asht, Oshoba, Muborak vil. Uratyube district: Suphoriph, Khavotag, Lakat, Rugunt vil. Ganchi district: Eshankurgan, Gazanterak, Dalien vil. Pendjikent district: Margidar, Dashti-Malla vil., Pendjikent town.
7	<b>Pistachio</b> ( <i>Pistacia vera</i> )	Southern Tajikistan, Khotlon province	Foothills Not Rainfed	Pyandj district: Pyandj forestry, Burbulag, Kirovobad, Karatag plots. Bokhtar district: Kurgan-Tube forestry, Toshabad plot. Gazimalik district: forestry named after A.Kholov, Daganakiikskiy plot.
8	<b>Walnut</b> ( <i>Juglans regia</i> )	Central Tajikistan	Valley Irrigated	Gissar district: Kipchak, Kalayi Khisor vil.
			Foothills Rainfed	Rasht district: Khait and Kamarobu valleys. Varzob district: Varzob gorge. Tavildar district: Rabat, Jezgand vil.
		Northern Tajikistan, Sugd province	Mountain Rainfed	Ayni district: Sangiston, Zoosun vil. Asht district: Shaidon, Pongoz, Puntuk vil. Gonno-Matchinskiy district: Podrokh, Postegav, Paldorak vil.
			Foothills Rainfed	Asht district: Kamish-Kurgan, Muborak, Oshoba, Shajdon vil.
		Western Pamir, Gorno-Badakhshan autonomous province	Foothills Irrigated	Darvaz district: Viskharvi gorge, Viskharv vil., Kalaj-Khumb settl.
			Mountain Rainfed	Vanch district: Shargovoi, Rovani, Andarbog, Vanch vil. Rushan district: Bartang valley, Bartang, Dekh, Chadut, Basit, Barchadiv, Pastkhuph vil.
<b>Turkmenistan</b>				
1	<b>Apple</b> ( <i>Malus sp</i> )	South–Western Kopetdag, Balkan province	Mountain Rainfed	Garrygala district: Garrygala forestry, Syunt-Khasardag, forest reserve, Khasar, Sjung (Central site), Verhniy Sumbar.
			Mountain Rainfed	Almalyk Gorge, Mesinev ridge, Gekdepe settlement.
		Central Kopetdag, Akhal province	Foothills Irrigated	Geokdepe settlement, Annau settlement, Babarab settlement.
2	<b>Pear</b> ( <i>Pyrus sp</i> )	South–Western Kopetdag, Balkan province	Mountain Rainfed	Garrygala district: Garrygala forestry. Syunt-Khasardag forest reserve: Khasar, Sjung (Central site), Verhniy Sumbar.
		Central Kopetdag,	Mountain Rainfed	Gorge Almalyk, Mesinev ridge, Gekdepe settlement.

# #	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
		Akhali province	Foothills Irrigated	Geokdepe settlement, Annau settlement, Babarab settlement.
		Northern Turkmenistan, Dashoguz province	Oasis Irrigated	Gorogly district: d/h <sup>2</sup> Zaman, d/h named after Magtymkuli, d/hBereket, d/h named after Kh. Myradov.
		Eastern Turkmenistan, Lebap province	Oasis Irrigated	Atamurad district: d/h named after O. Sokhbetova, d/h Azatlyk, d/h Gyzyliak, d/h Khalach.
		South-Eastern Turkmenistan, Mary province	Oasis Irrigated	Elatan district: d/h English, d/h Dostluk, d/h Rakhat, d/h Vatan.
3	<b>Grapevine</b> ( <i>Vitis</i> sp)	South–Western Kopetdag, Balkan province	Mountain Rainfed	Sumbar river valley, Garrygala settlement, Chendyr valley.
		Central Kopetdag, Akhali province	Valley Irrigated	Bakharden settlement, Geokcha settlement, Akdashpayak settlement, Geokdepe settlement, Abadan settlement.
		South-Eastern Turkmenistan, Mary province	Oasis Irrigated	Elatan district: d/h Sandykachi.
4	<b>Pomegranate</b> ( <i>Punica granatum</i> )	Central Kopetdag, Balkan province	Mountain Rainfed, Irrigated	Chendir river valley, Gorge Shikhbeder, d/h named after Magtymkuli, d/h named after Nijazov, Cumbar river valley, Zerzau gorge, Etrek district, d/h named after Magtymkuli.
5	<b>Fig</b> ( <i>Ficus carica</i> )	South–Western Kopetdag, Balkan province	Mountain Rainfed	Garrygala: Garrygala forestry, Syunt-Khasardag forest reserve, d/h Gergez, Chendir river valley, d/h named after Nijazov.
		Bolshiyi Balkhany, Balkan province	Mountain Rainfed	Gorge Byash Chashme.
6	<b>Almond</b> ( <i>Amygdalus communis</i> )	Central Kopetdag, Akhali province	Mountain Rainfed	Bakharly district: d/h Garovul.
		South–Western Kopetdag, Balkan province	Mountain Rainfed	Sumbar river valley, Palvansov, Aydere, Parkhai gorges.
7	<b>Pistachio</b> ( <i>Pistacia vera</i> )	South–Western Kopetdag, Balkan province	Mountain Rainfed	Palvansov, Shikhbeder, Gobasevut Gorges, Khaneg vil., Garabag vil., Temil vil.

<sup>2</sup> d/h –Daikhan (or Dekhkan) Household is a legal entity that owns the land, plants, agricultural machinery, equipment and any other property required for production, processing and selling of the agricultural products. The Daikhan Household independently defines the scope of its activity and structure.

#	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
		South-Eastern Turkmenistan, Mary province	Foothills Rainfed	Kushka forest farm, Badkhiz forest reserve.
		Eastern Turkmenistan, Lebap province	Mountain Rainfed	Goitendag district: d/h named after S.Nijazov, d/h Dostluk, d/h Azatlyk, d/h Goitendag.
8	<b>Apricot</b> ( <i>Prunus armeniaca</i> )	Central Kopetdag, Akhal province	Foothills Irrigated	Akhal district: Bagir, Bakharden settlements.
		South-Western Kopetdag, Balkan province	Foothills Irrigated	Garrygala district: d/h Daina, d/h Koine-Kasir.
		Northern Turkmenistan, Dashoguz province	Oasis Irrigated	Gorogly district: d/h Abadanlyk, d/h Turkmenistan, d/h Jagtylyk, d/h named after Durdygylych.
		Eastern Turkmenistan, Lebap province	Oasis Irrigated	Sakar district: d/h Gulistan, d/h Lebap, d/h named after Seidi, d/h Vatan.
		South-Eastern Turkmenistan, Mary province	Oasis Irrigated	Mary district: d/h English, d/h Babadajkhan, d/h named after Azalov, d/h Ashgabat, d/h Khakykat.
9	<b>Alycha</b> ( <i>Prunus cerasifera</i> )	South-Western Kopetdag, Balkan province	Foothills Rainfed	Sumbar valley, Eldere, Aidere, Yuvandere gorges.
		Northern Turkmenistan, Dashoguz province	Oasis Irrigated	Boldymzan district: d/h 10 jyl Abadanlyk, d/h Zakhmetkesh, d/h 27 Oktjabra.
		Eastern Turkmenistan, Lebap province	Oasis Irrigated	Atamurat district: d/h Murzebeggala, d/h Azatlyk, d/h Gyzylajak.
<b>Uzbekistan</b>				
1	<b>Apple</b> ( <i>Malus sp</i> )	Tashkent province	Mountain and foothills Rainfed	Karankulsay gorge, Parkentsay gorge Bostanlyk district: Chimgan, Sidjak, Khumsan, Nanai, Bogustan villages Parkent district: Parkent vil., Sukok vil. Zarkent district: Zarkent vil.
		Fergana valley	Foothills of Kuramin ridge in south-western Tian Shan Irrigated	Abu-ali-ibn-sino forestry: Chadak village. Kasan forestry: Kaspisai plot.
			Foothills of Chatkal ridge in south-western Tian Shan Irrigated	Namangan province: Nanai district: Nanai village.
			Alai ridge Rainfed	Fergana province: Cokh village.

# #	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
		Khorezm oasis	Oasis Irrigated	Khazarasp district: Karvak vil., Ulugbek shirkat. Khiva district: Irdinzan vil. Khonka district: Karamazy vil. Turtkul district: Shorakhon vil.
		Gissar ridge Surkhandarya province	Mountain Rainfed	Sargirdag tract; Denau district: Uzun forestry
2	<b>Apricot</b> ( <i>Prunus armeniaca</i> )	Gissar, Zeravshan, Nurata ridges	Foothills Irrigated	Samarkand district: Nekhrobod, Gulobod shirkat <sup>3</sup> . Akdarya district: Amir Temur shirkat.
		Syrkhandarya province	Foothills Irrigated	Baysun district: Baysun vil Derbent district: Derbent vil. Termez district: Manguzar vil., Angor district: Karasu settl.
		Fergana valley, Fergana province	Valley Irrigated	Kuvasay district: Kuvasay vil. Vuadil district: Shakhimardan vil., Vuadil vil.
		Khorezm oasis	Oasis Irrigated	Khazarasp district: Karvak vil. Khonka district: Karamazy vil. Turtkul district: Shorakhon vil. Ellikkala district: Bogeb vil.
		Bukhara province	Oasis Irrigated	Vabkent district: Vabkent vil. Romitan district: Romitan vil. Bukhara district: Bukhara vil.
3	<b>Pear</b> ( <i>Pyrus sp</i> )	Tashkent province	Mountain/ Foothills Rainfed	Karankulsay gorge, Parkentsay gorge Bostanlyk district: Chimgan, Sidjak, Khumsan, Nanai, Bogustan villages Parkent district: Parkent vil., Sukok vil. Zarkent district: Zarkent vil.
		Khorezm oasis	Oasis Irrigated	Khazarasp district: Karvak village, Ulugbek shirkat. Khiva district: Irdinzan vil. Khonka district: Karamazy vil.
		Gissar ridge, Surkhandarya province	Mountain Rainfed	Uzun forestry, Sangardak tract, Tupolon river valley Altyn district: Vakhshovar vil. Saryasia district: Sangardak shirkat. Uzun district: Khonariza shirkat.
		Fergana valley, Namangan province	Foothills of Chatkal ridge in south-western Tian Shan Irrigated	Nanai district: Nanai vil.

<sup>3</sup> Shirkat is a legal entity consisting of citizens voluntarily united on the share holding basis to produce agricultural products.

# #	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
4	<b>Almond</b> ( <i>Amygdalus communis</i> )	Chatkal ridge	Mountain Rainfed	Burchmulla forestry: Khodjekent plot
		Nurata ridge, Samarkand province	Foothills Rainfed	Saraikurgan forestry: Plots # 1 and 2.
		Gissar ridge	Mountain Rainfed	Kitap forestry: Kovzikhona plot.
		Kuram ridge	Foothills	Akhangaran forestry: plots # 2 and 3.
5	<b>Walnut</b> ( <i>Juglans regia</i> )	Chatkal, Ugam, Pskem ridges in south-western Tien-Shan mountain chain	Mountain and foothills Rainfed	Burchmulla Forestry: Sidjak vil., Khojent vil., Chigan vil.
		Nuratau ridge in Pamir–Alay mountain chain	Foothills Rainfed	Nurata Nut species reserve, Farish forestry, Osmonsai settl., Madjarum, Khaist, Ukhum plots.
		Turkestan ridge in Pamir–Alay mountain chain	Mountain and foothills Rainfed	Bakhmal forestry: Bakhmal vil.
		Gissar ridge in, Pamir–Alay mountain chain	Mountain and foothills Rainfed/irrigated	Uzun forestry: Sangardar, Uzun, Denau tracts.
6	<b>Pistachio</b> ( <i>Pistacia vera</i> )	Babatag ridge in Pamir–Alay mountain chain, Surkhandarya province	Mountain and foothills Rainfed	Babatag forestry: Dukhona vil., Chagam vil.
		Nuratau ridge, Samarkand province	Foothills Rainfed	Saraykurgan forestry: plots # 1-4, Saraykurgan vil.
		Tashkent province	Mountain Rainfed	Bostanlyk district: Karankulsai gorge
7	<b>Grapevine</b> ( <i>Vitis sp</i> )	Fergana valley	Valley Irrigated	Andijon province: Markhamat vil., Balykchi vil. Fergana province: Kuva district, Kuva vil. Margilan district: Margilan town.
		Tashkent province	Foothills Rainfed/irrigated	Parkent district: Parkent vil., Sukok vil., Zarkent vil.
		Samarkand province	Foothills Irrigated	Bulungur district: Bulungur vil., Urgut district: Urgut vil. Tailyak district. Tailyak vil.
		Babatag ridge in Pamir -Alay mountain chain.	Valley Irrigated	Altyn district: Khondiza vil.

# #	<i>Crop/species</i>	<i>Region</i>	<i>Agroecosystem</i>	<i>Project sites</i>
		mountain chain, Surkhandarya province	Foothills (Valley of Tupolang river) Rainfed	Uzun forestry: Uzun vil.
8	<b>Pomegranate</b> ( <i>Punica granatum</i> )	Babatag ridge of Pamir -Alay mountain chain, spur of Gissar ridge, Surkhandarya province	Valley Irrigated	Saraosie district: Dashnabad vil. Sherabad district: Sherabad vil. Termez district: Dostlik shirkat, Altyn district: Novabod shirkat, Aksu vil.
			Mountain Rainfed	Uzun forestry: Sangardar tract.
		Fergana valley, Fergana province	Valley Irrigated	Kuva district: Kuva vil., Margilan district: Margilan town.

**Priority fruit species set at national level**

# #	Species	Country				
		Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
1.	Apricot ( <i>Prunus armeniaca</i> )					
2.	Alycha ( <i>Prunus cerasifera</i> )					
3.	Grapevine ( <i>Vitis</i> sp)					
4.	Pomegranate ( <i>Punica granatum</i> )					
5.	Pear ( <i>Pyrus</i> sp)					
6.	Fig ( <i>Ficus carica</i> )					
7.	Almond ( <i>Amygdalus communis</i> )					
8.	Sea buckthorn ( <i>Hippophae rhamnoides</i> )					
9.	Walnut ( <i>Juglans regia</i> )					
10.	Peach ( <i>Persica vulgaris</i> )					
11.	Pistachio ( <i>Pistacia vera</i> )					
12.	Apple ( <i>Malus</i> sp)					
	<b>Number of species</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>9</b>	<b>8</b>

## ANNEX J – INFORMATION AND COMMUNICATION TECHNOLOGY STRATEGY

The Information and Communication Technology (ICT) strategy supports capacity building for efficient and sustainable management of agrobiodiversity information in the Central Asia sub-region. The goal is to establish an electronic knowledge network with protocols and methods developed by the UNEP/GEF “*In situ* Conservation of Crop Wild Relatives through Enhanced Information Management and Field Application” IPGRI project (the Crop Wild Relatives project) for management of agrobiodiversity information, effective dissemination of information between participating partners, and collaborative research and training activities.

### RATIONALE

Farmers generate thousands of ideas and experiences and administer this knowledge. Finding the relevant information when required is time consuming and often ineffective. Existing informal processes of knowledge management are not sustainable; knowledge is often lost when individuals pass away. It has been said that “when a farmer dies a library is burned”.

National programs must conserve, manage, and utilize their own genetic resources knowledge, and assemble and exchange that information with each other. National programs need sustainable documentation and information systems, based on appropriate systems, tools, standards, and procedures with appropriate low-cost methodologies and technologies. The global PGR community needs access to information on the location of germplasm, its conditions of use, and its characteristics. Wide coverage (species, collections) that provides access mechanisms, and addresses different capacities of users, is essential.

A sustainable knowledge management tool is the key solution to address the challenges of capturing indigenous knowledge, analyzing it, and disseminating it in a collaborative manner. Information and Communication Technology (ICT) is the basis of such a system. It supports assembly, exchange, and provision of useful information via data exchange networks and through the development of Plant Genetic Resources (PGR) information systems at the national and facility level. ICT works towards strengthening national programs and institutions through better PGR information systems, and by contributing to global PGR information systems (Knowledge Centres) through data/information and Indigenous knowledge exchange networks.

Toward that end, IPGRI is engaged in developing and promoting standards (e.g. descriptor lists, taxonomic nomenclature checker), developing and maintaining databases on conservation and use (e.g. seed storage behaviour, directory of PGR collections), and supporting efforts to bridge the digital divide. The aim is to allow national programs to have access to and participate in PGR data exchange networks. Protocols and methodologies developed by the Crop Wild Relative project will be incorporated into the Knowledge Network, hence maximizing the potential use and benefits of this project.

### GENETIC RESOURCES INFORMATION SYSTEM (GRIS) – BUILDING ON EXISTING RESOURCES

In 1999, IPGRI-CWANA, together with National Programs in the CWANA Region, developed a modeling tool for this purpose. The Genetic Resources Information system (GRIS) provides National Programs with the capacity to capture and disseminate information and knowledge. It will provide the basis for establishing ICT capacities to support this project.

GRIS is a set of relational databases that document and analyze different types of PGR information including taxonomy, conserved accessions, and germplasm information. New databases can be added to characterize and evaluate what relates to the accessions. GRIS provides instant mapping for data visualization and gives users a complete picture of the current status of PGR data. It is a tool for planning PGR-related activities, supports development of expertise, and makes use of local knowledge.

GRIS was developed and distributed with the GPL open source code to allow sustainable development and customization by national programs. It was tested and adopted in various countries including Egypt, Tunisia, Algeria, Morocco, Oman, Yemen, and Vietnam.

Through this proposal, national programs in the sub-region will be able to develop a joint modeling tool that enables them to better manage PGR information, and eventually biodiversity information, in the sub-region.

A detailed description of GRIS is found in the attachment at the end of this Annex.

#### PROPOSED KNOWLEDGE NETWORK MODEL

The proposed model aims to establish a wide area network (WAN) for the Central Asia Sub-Region by creating a Local Area Network (LAN) within each country member of the network. LANs will be joined together to form the PGR Knowledge Network. Figures 1, 2, and 3 graphically depict the LAN, and the proposed national and regional networks.

Uzbekistan will host the PGR Knowledge Network. Uzbekistan is participating in the project Crop Wild Relatives project, and from that project they will build their LAN system. Therefore no LAN equipment will be needed for Uzbekistan stakeholders but identical technologies shall be used for the Crop Wild Relatives project in order to allow synergy of information in both projects. Such integration between the two projects will maximize its potential adoption by all participating countries and will form a model for other regions in the world to follow.

The GRIS modeling tool will be installed and implemented in every research institute participating in the PGR Knowledge Network. It will accommodate, integrate, and share information with the CWR project.

<b>Country</b>	<b>Number of Institutes</b>	<b>Name of Information Hosting Institute (can be changed later as agreed with national program)</b>
Kazakhstan	5	Research Institute of Plants Physiology, Genetics and Bioengineering
Kyrgyzstan	5	Botanical Gardens
Tajikistan	5	“Bogparvar” Research & Production Association
Turkmenistan	5	Research Institute of Farming
Uzbekistan	5	Institute of Genetics and Plant Experimental Biology

## ACTIVITIES

The ICT strategy aims to develop capacity for efficient management of agrobiodiversity information in the following PGR areas, with the addition of protocols and methodologies used in Crop Wild Relative Project:

- Data capture;
- Data management and analysis;
- Conceptual modeling;
- System development for managing agrobiodiversity through the modeling process;
- PGR monitoring;
- Development and implementation of a timely and cost effective action plan on conservation of PGR.

Using Internet technology, each center will be able to upload its PGR database to a central Web enabled database hosted by a center of excellence mutually agreed upon between the network members. The central GRIS database will be part of other sub-regional web enabled GRIS databases in the CWANA region. Thus, the GRIS model will ensure international exposure of PGR in Central Asia and provide a powerful means to build a collaborative PGR knowledge network.

## OUTPUTS

- A GRIS modeling tool implemented and tailored to the needs of Central Asia;
- Agrobiodiversity programs covering the Crop Wild Relatives and Horticultural Crops and Wild Fruit Species projects;
- A regional agrobiodiversity knowledge network established and operating in the Sub-region;
- Sustainable links and information exchange among network users in the region established and operating in coordination with the CWR project;
- Capacities of the national programs on PGR strengthened.

## ASSUMPTIONS AND RISKS

- Technical specialists in PGR information system management are available in the five project countries;
- Tool modeling is initiated at the national program level;
- Participating countries agree on a 'common profile' of the GRIS outputs and knowledge network;
- The knowledge network is sustainable beyond the life of the project.

**Knowledge Center Model at Central Asia Sub-Region  
For the UNEP-GEF Full Project Proposal**

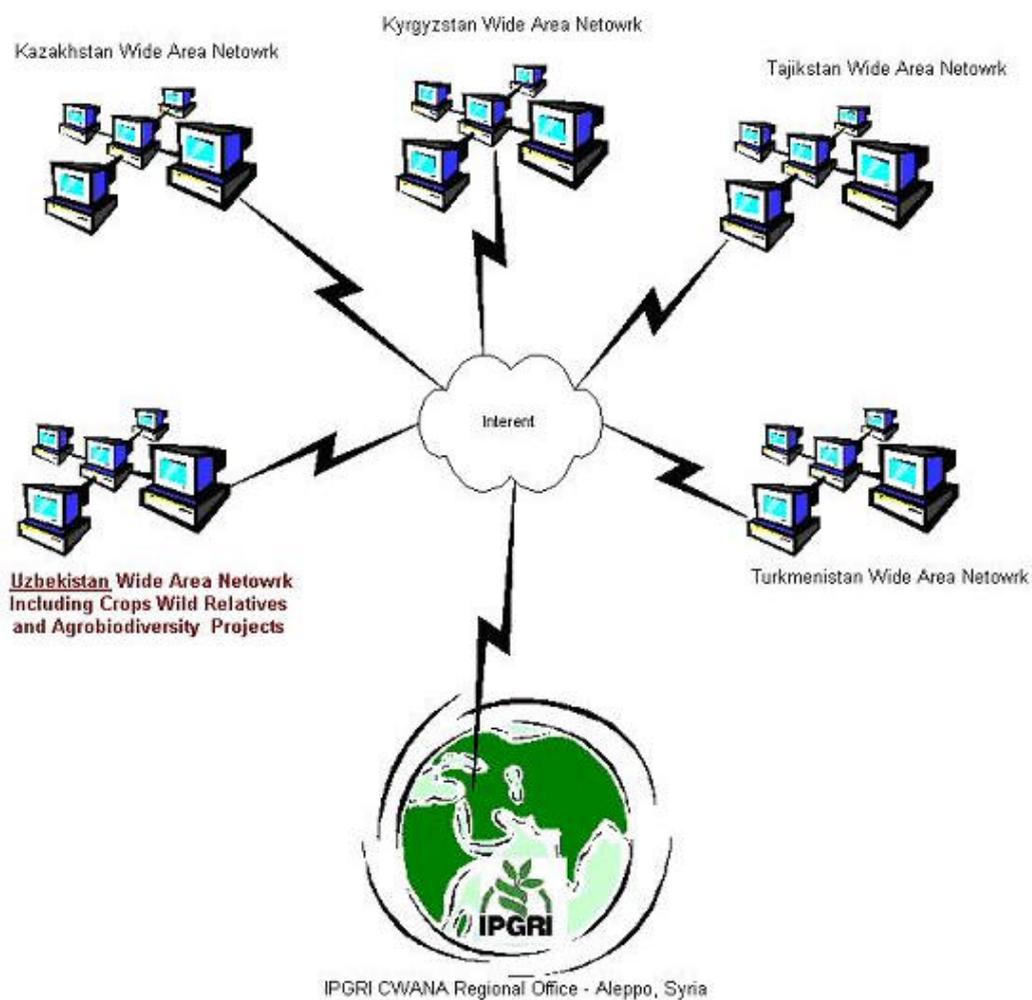


Figure 1. Central Asia PGR Knowledge Network Model

## Knowledge Center Model at Central Asia Sub-Region For the UNEP-GEF Full Project Proposal

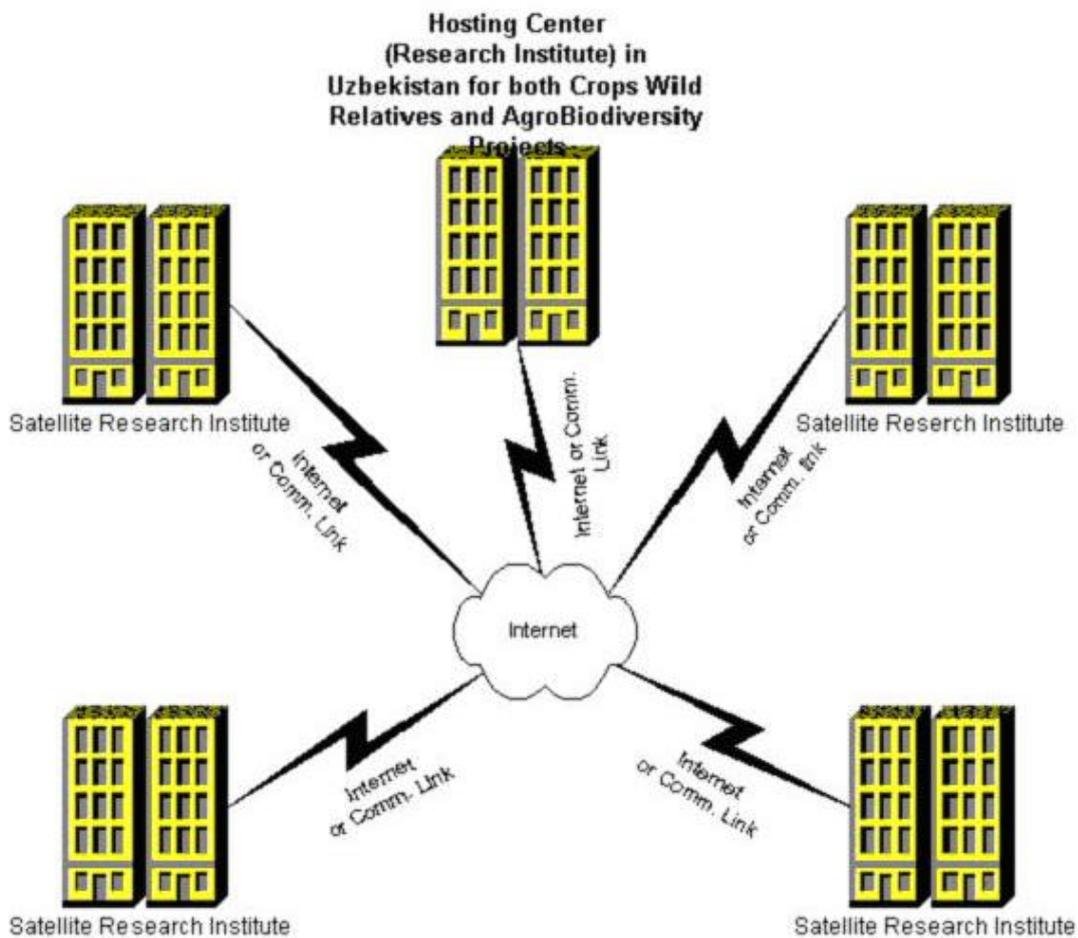


Figure 2. Typical National Wide Area Network Model at Uzbekistan

## **Knowledge Center Model at Central Asia Sub-Region For the UNEP-GEF Full Project Proposal**

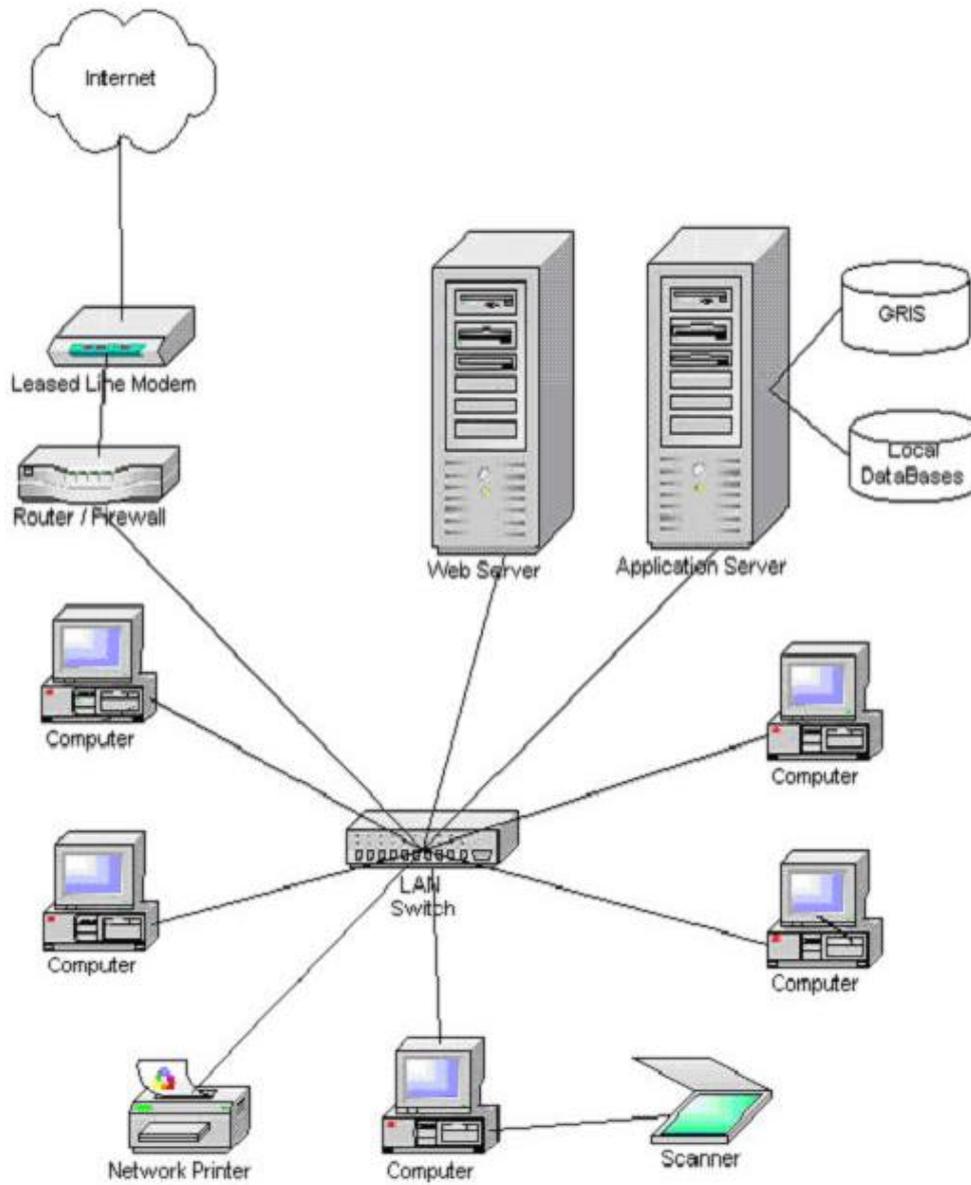


Figure 3. Typical Local Area Network Model at Satellite Research Institute

## ICT REQUIREMENTS

Implementation of GRIS in each regional research institute and a sustainable PGR knowledge network requires hardware, software, Internet service, and technical support and consultation.

**Table-1: Equipment and Quantities\***

##	Item Description	Qty in each institute	Qty in each country	Total
<b>1</b>	<b>Hardware</b>			
1.1	Server Class Computer	2	10	40
1.2	Workstation Computer	5	25	100
1.3	LAN Cabling, Switch, Router and Network Cabinet	1	5	20
1.4	Firewall with Antivirus, VPN and Filter Security	1	5	20
1.5	Symbol PDA unit w/cradle (2 units per center)	1	5	20
1.6	Symbol Hand Held Barcode Reader (2 units per center)	1	5	20
1.7	ZEBRA Thermal Transfer Barcode Printer (2 units per center)	1	5	20
1.8	Barcode Label Rolls (500 labels per roll) 10 rolls per center	1	5	20
1.9	Laser Color Printer A4 with 1200dpi resolution w/ network module	1	5	20
1.10	Scanner Color A4 with 2400dpi min.	1	5	20
1.11	Garmin GPS unit model Trex Venture 12 Channels (2 units per center)	1	5	20
1.12	UPS 650VA with active line and power chute software	1	5	20
1.13	UPS 1KVA with Active line and power chute software	1	5	20
1.14	SONY Digital Camera 4.0Mpeg min. (one camera per center)	1	5	20
1.15	IPGRI Expert Staff Time (LAN & Equipment Commissioning)	1	5	20
<b>2</b>	<b>Software</b>			
2.1	Generic Resources Information system (GRIS) 5 users license	1	5	20
2.2	Linux Operating System Enterprise Full Version	1	5	20
2.3	Antivirus System (5 users license Pack)	1	5	20
2.4	Geographic Information System, (GIS) ArcGIS 8.0	1	5	20
<b>3</b>	<b>Technical Support</b>			
3.1	Annual Hardware and Software Maintenance Contract (15% of Hardware Cost)	1	5	20
3.2	Annual GRIS Helpdesk support contract (8 hours/5 days a week)	1	5	20
3.3	Annual Wide Area Network Administration	1	5	20
3.4	IPGRI Expert for Project Management and Supervision	1	5	20

\*All countries of the region excluding Uzbekistan. ITC component for Uzbekistan is financed by the UNEP/GEF project "In situ Conservation of Crop Wild Relatives through Enhanced Information Management and Field Application", and integrated into the project proposed here.

**Table 2: Information and Communication Technology Financing Plan in USD**

**I. Quantech SAL**

<b>Cash Contribution</b>				
<b>1. Hardware for Research Centers</b>		<b>QTY</b>	<b>Unit</b>	<b>Total</b>
1.1	Server Class Computer	40	5 000	200 000
1.2	Workstation Computer	100	1 500	150 000
1.3	LAN Cabling, Switch, Router and Network Cabinet	20	3 000	60 000
1.4	FireWall with AntiVirus, VPN and Filter Security	20	1 000	20 000
1.5	Sympol PDA unit w/ceadle (2 units per center)	40	1 450	58 000
1.6	Symbol Hand Held Barcode Reader (2 units per center)	40	350	14 000
1.7	ZEBRA Thermal Transfer Barcode Printer (2 units per center)	40	750	30 000
1.8	Barcode Label Rolls (500 labels per roll) 10 rolls per center	400	4	1 600
1.9	Laser Color Printer A4 with 1200dpi resolution w/ network module	20	2 500	50 000
1.10	Scanner Color A4 with 2400dpi min.	20	300	6 000
1.11	Garmin GPS unit model Trex Venture 12 Channels (2 units/center)	40	300	12 000
1.12	UPS 650VA with active line and power chute software	100	300	30 000
1.13	UPS 1KVA with Active line and power chute software	40	500	20 000
1.14	SONY Digital Camera 4.0Mpeg min. (one camera per center)	20	500	10 000
			<b>Subtotal</b>	<b>661 600</b>
<b>2. Software for Research Centers</b>				
2.1	Linux Operating System Enterprise Full Version	20	200	4 000
2.2	AntiVirus System (5 users licesnse Pack)	20	300	6 000
2.3	Geographic Information System, (GIS) ArcGIS 8.0	20	5 500	110 000
			<b>Subtotal</b>	<b>120 000</b>
<b>3. Technical Support for Research Centers</b>				
3.1	IPGRI Expert Staff Time (Hardware & Software Installation & Training)	20	1 500	20240
3.2	IPGRI Expert for WAN Administration * 5 years	20	200	20 000
3.2	IPGRI Expert for Project Management and Supervision * 5 years	20	1 000	100 000
3.3	IPGRI's Administration & Management Cost (10% overhead on Capital Items)			78 160
			<b>Subtotal</b>	<b>218 400</b>
<b>Total Quantech SAL Cash Contribution</b>				<b>1 000 000</b>

## IMPLEMENTATION SCHEDULE

The information capacity will be implemented over a two year period. In the first year, Uzbekistan and Kazakhstan will implement GRIS. In the second year implementation will take place in Kyrgyzstan, Tajikistan, and Turkmenistan.

## INTERNATIONAL ORGANIZATIONS INVOLVED

- UNEP-GEF
- Private Donors
- International Donors
- IPGRI Headquarters
- IPGRI CWANA Regional office

## TRAINING CENTERS

Based on the above research centers, national and regional training centers will be established to fulfill the information technology training needs of member countries. Infrastructure and budget needs are elaborated in the Training Strategy (Annex L).

## MODELING GENETIC RESOURCES INFORMATION (GRIS) COMMUNICATION, FLEXIBILITY AND AUTOMATION<sup>4</sup>

IPGRI-CWANA developed an open source Genetic Resources Information System (GRIS) to provide an affordable and sustainable system that can be locally adapted and improved to suit the needs of the country and the institution. GRIS was conceived as a modeling tool to document and manage the genetic resources both in *ex-situ* and *in-situ*. It consists of a static set of relational databases to document passport data and a user defined databases. The system was conceived to visualize data by creating dot maps to show where a particular species is found and whether it has been sampled.

GRIS addresses the problem of how best to design genetic resources information systems in a way that leads to efficiency and enables better conservation and use of genetic resources. The work is carried out through automation. At the same time it ensures responsiveness to changing requirements and environments (flexibility) and full participation in its conceptualization and further development (communication).

Conservation and use of genetic resources are of paramount importance to national programs in the region. GRIS (ITC) can help tremendously in this endeavor by providing frameworks for setting priorities for actions that need to be taken. GRIS (ITC) enables better documentation, communication and information processing. It will improve the efficiency of surveying, *ex situ* and *in situ* conservation through the automation of tasks, data processing, and information generation.

GRIS was developed as a conceptual modeling process to allow all concerned parties to be involved in the design and implementation of the system. This process allows both user and developer views and requirements to be incorporated in the system. The system will be developed further in other subsequent versions in the future to be less data or structure

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<sup>4</sup> Elaborated by Dr. Kheder Durah, Dr. Abdullah Bari, IPGRI-CWANA 2003.

dependent with extensibility and other functions such as more exploratory data analysis (EDA) features. Subsequent versions of the system will also be developed following the conceptual modeling process approach.

Two case studies show the relevance of this approach: the Oman Biodiversity National Information System (OBNIS) and the SYStème d'Information des PALmiers-dattiers du Maghreb (SYSPALM). These systems were developed by modeling GRIS using conceptual modeling approach. OBNIS was developed to incorporate a wider scope of flora and fauna and includes fossils and specific functionalities. SYSPALM manages survey data on the date palm project using remote and mobile computing technology for conducting surveys and collections and capturing Indigenous knowledge (Palm unit, Palm Camera, Palm GPS, Palm Modem). Graphic depictions of the two cases are found on pages J-13 and J-14.

A team approach to using GRIS can be guided by the following ToR:

- Develop and conceptualize GRIS as a modeling tool;
- Gather requirements and needs;
- Develop extensions for GRIS;
- Disseminate and deploy GRIS;
- Maintain GRIS and its web site;
- Write manuals;
- Provide training.

GRIS was conceived at its inception to be less data dependent and more an integrated system for managing genetic resources in a complementary conservation context. It can:

- Visualize surveyed sites and populations;
- Monitor accessions in gene bank;
- Monitor populations;
- Detect what are and where are the endemic/endangered species.

The development tools used to develop GRIS are BORLAND DELPHI in combination with OBJECT MAP. The system was conceived to visualize data by creating dot maps to show where a particular species is found and whether it has been sampled. In addition, GRIS can support monitoring of seed viability in the genebanks, for example by signaling when germination is below 85%.

From its main menu GRIS provides the following information:

- Site Information including interactive GIS maps;
- Taxonomy;
- Echo-Geographic Surveys;
- Collected Samples;
- Germplasm Management;
- Import/Export Germplasm Data;
- Capture and view information and knowledge thru multimedia features incorporated into GRIS (Video, Audio Clips, images, etc).

In order to maximize both operation and data management efficiency, each accession has been tagged with a barcode that allows optical identification, collection site mapping, and

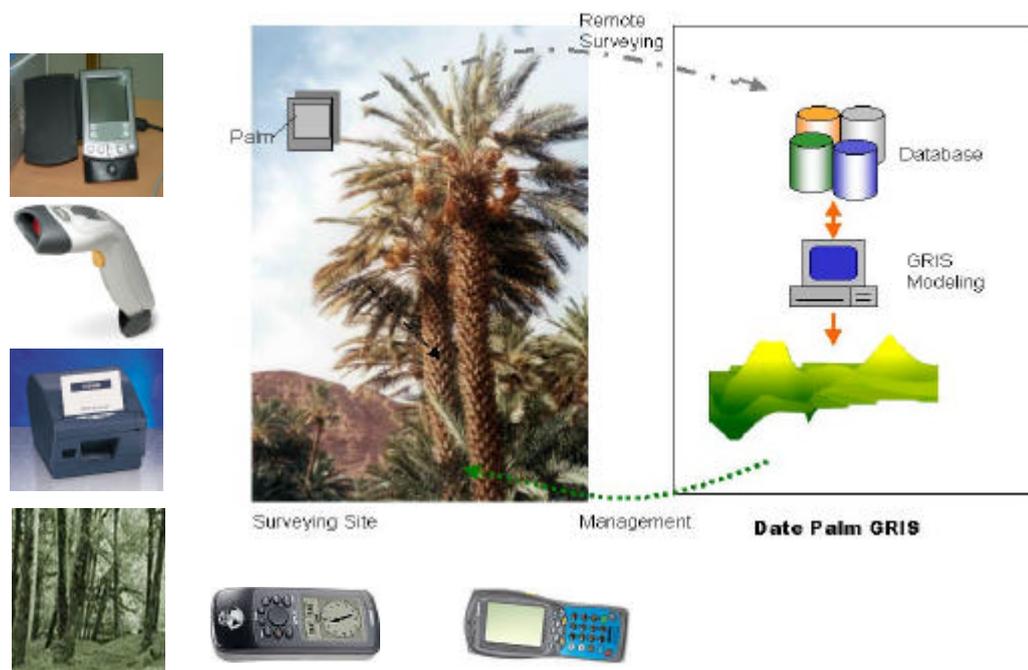
automatic data entry/retrieval. To manage the storage location and status of each sample in the cold rooms, a 3D window has been implemented in GRIS to visually identify the storage location of any sample sought for monitoring the number of seeds /accessions, monitoring seed viability, or estimating a regeneration date.

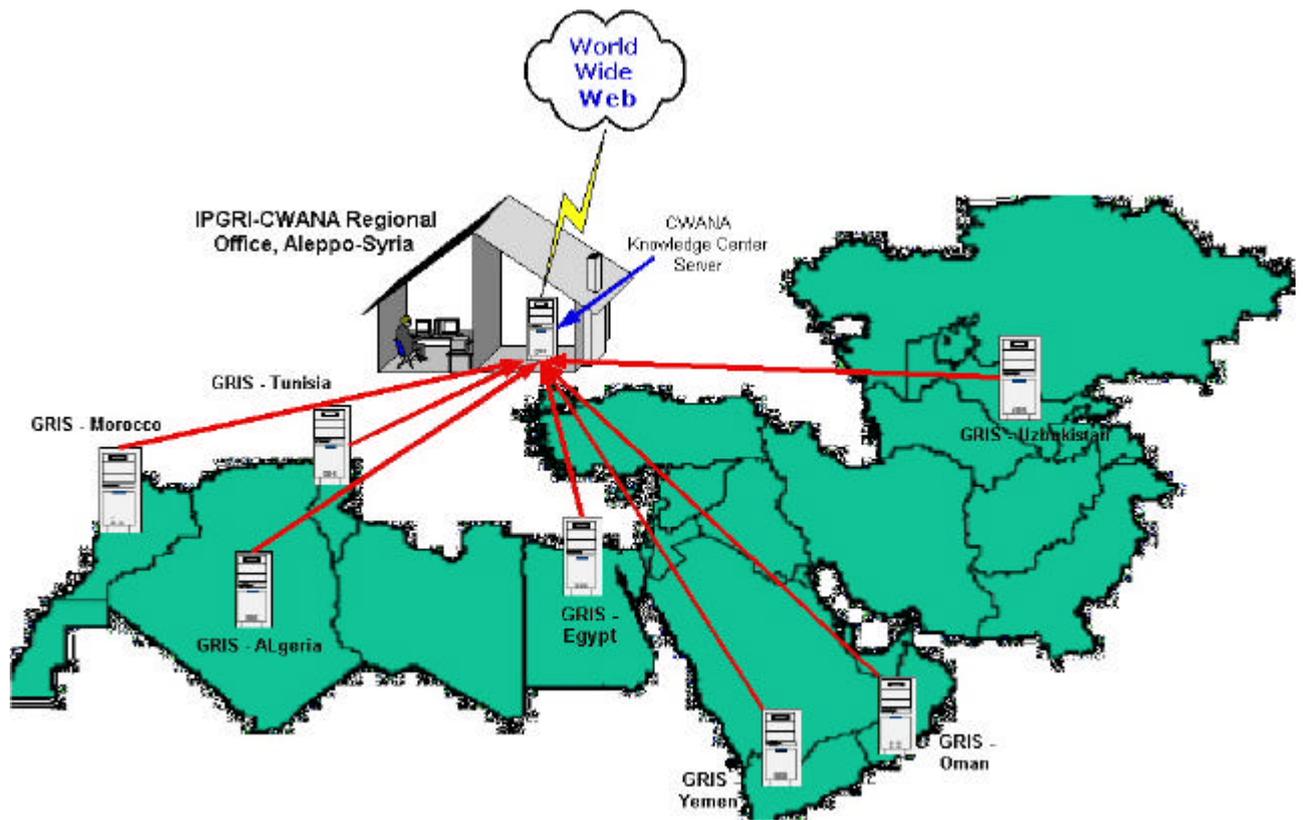
To enhance the reliability of collected information in a survey mission, remote and mobile technology was incorporated into GRIS to make use of:

- Personal Digital Assistant (PDA) Palm unit for digital survey forms;
- PDA Palm Camera to capture high resolution digital images;
- PDA Palm GPS for automatic detection of locations coordinates;
- PDA Palm Modem to remotely transfer survey information to GRIS host computer.

A centralized GRIS database is hosted at the CWANA office to allow distribution of passport data to accessions from various National programs currently using GRIS. This collective database is part of the CWANA Knowledge Center and is based on MS Share Point portal, thus making it available for public use.

## GRIS Network Model and Peripherals





GRIS Network Layout in CWANA Region, by Dr. Kheder Durah, IPGRI-CWANA Nov. 2003

## ANNEX K – STRATEGY FOR THE APPLICATION OF A PARTICIPATORY APPROACH

### INTRODUCTION

A strategy to implement a participatory approach supports a key ingredient to project success: diverse and active participation on the part of multiple stakeholder groups. A participatory approach recognizes the dynamic nature of biodiversity conservation and the necessary involvement of those people who interact most closely with the natural resource.

Conservation of agrobiodiversity brings with it a unique set of stakeholders, including the farmers and forest dwellers whose use of horticultural crops and their wild relatives directly impact their long-term survival. As partners in a dialogue about biodiversity conservation and sustainable use, farmers and local communities represent a fundamental change in the approach to agrobiodiversity conservation. Historically, agrobiodiversity conservation focused on *ex situ* actions, including cryo-preservation, field genebanks, *in vitro* conservation, and management of collections in botanic gardens. *In situ* conservation was used primarily to conserve forests, wild species, and areas or ecosystems valued for their wildlife. In recent years, integration of the approaches has been increasingly recognized as the most effective way to conserve agrobiodiversity.

For agricultural crops, *in situ* conservation on farm, or "on-farm conservation", refers to the habitats where cultivated crops developed their present-day properties, predominantly in farmers' fields. *In situ*/on farm conservation has been defined as "the continuous cultivation and management of a diverse set of populations by farmers in the agro-ecosystems where a crop has evolved" (Bellon *et al.*, 1997). It addresses:

1. Conservation of the processes of evolution and adaptation of crops to their environments;
2. Conservation of biodiversity at different levels (ecosystem, species, intra-species);
3. Integration of farmers in the national plant genetic resources system;
4. Conservation of the ecosystem services that are critical to the functioning of the earth's life-support system;
5. Improving the livelihoods of resource-poor farmers through economic and social development;
6. Maintenance and/or increase of farmers' control over and access to crop genetic resources;
7. Maintenance of public and private socio-economic, ecological and genetic benefits due to the conservation of the processes of evolution and adaptation ensuring that new germplasm is continuously generated.

*In situ*/on-farm conservation provides for continued production based on cultivars adapted to such environments and for their continued improvement in ways that directly meet farmers' needs. In this way, it provides a sound basis for sustainable development.

This strategy has been developed to support full involvement of all stakeholder groups, with emphasis on engaging and integrating farmers and local communities into the process. During the PDF-B phase, several steps were taken to assess the circumstances in the five participating countries.<sup>5</sup> The steps included:

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<sup>5</sup> The strategy presented here was prepared by Dr. Mustapha Malki during the PDF-B planning process.

1. A regional introductory training course on Biodiversity Participatory Management (BPM) and approaches, methods, and techniques, was held in Almaty (Kazakhstan) at the Institute of Economic Studies on the Agro-Industrial Complex and Rural Territories Development from 16 to 18 July 2003. The course was attended by 12 participants from the five countries involved in the project.
2. A series of discussions on existing activities with farmers and rural communities was held in the five countries. A brief description of the pilot sites and priority species for each country was given during these discussions, which were held in parallel sessions with the training course.
3. Field visits to Kazakhstan and Uzbekistan (July 2003), Kyrgyzstan and Tajikistan (August 2003), and Turkmenistan (October 2003) were made to meet with members of the project National Teams.

On the basis of information gathered during the above activities, the growing body of experience in participatory management, and existing experience in the region, a strategy was developed to apply a participatory approach in the five participating countries. The strategy does not provide a comprehensive analysis of participatory methods, tools, and techniques for the following reasons:

1. IPGRI has already produced several publications on these issues which are available for use by project implementers. These include:
  - *Friis-Hansen, E. & Sthapit, B., editors, 2000. Participatory approaches to the conservation and use of plant genetic resources.*
  - *Jarvis, D.I. et al., 2000. A training guide for in situ conservation on-farm. Version 1.*
2. Participatory approaches are almost unknown among scientists, researchers, and other staff involved in the project. Therefore capacity-building in application of a participatory approach is required. Training will be provided in the five countries, at which time there will be a thorough treatment of methodologies and tools (see detailed recommendation later in this report).

## CURRENT SITUATION OF THE NATIONAL COMPONENTS

### Participants

The study leading to the participatory strategy examined current circumstances in the five countries. Assessment of groups involved show the need to better balance inputs and activities among key stakeholder groups:

- National teams are currently weighted heavily toward expertise in the natural sciences (agronomists, biologists, botanists, geneticists, ecologists, forestry specialists). There is inadequate representation from the fields of economics, socio-economic, sociology, anthropology, and extension work. Anthropogenic influences on biodiversity and subsequent relations between social actors and biodiversity, and vested conflicting interests of diverse stakeholders over biodiversity use have been overlooked.
- Heavy – and sometimes exclusive – emphasis has been placed on individual farmers. This approach is appropriate in some cases (for example, pomegranate farmers in Turkmenistan), but in most cases obscures the important social and cultural dynamics that take place between household or community members.

- Governments and public agencies (such as ministries, universities, scientific and technical institutes) are over-represented, while NGOs are underrepresented. Biodiversity conservation is still perceived as a public task that lies almost exclusively on the "shoulders" of the government. However, governments in the region have limitations in the areas of biodiversity conservation and sustainable use, primarily due to lack of resources. More involvement of "non-public" actors is essential.
- The composition of national teams shows full representation of academicians and scientists, without the needed balance of development agents. The project bases action on science, therefore a balanced composition between academicians/scientists (with a good scientific experience) and development agents (with field experience and sufficient contact with farmers and communities) is needed.

Finally, participatory approaches, in general, and in biodiversity conservation in particular, are not widely known or used by the scientists involved in the project. Skilled facilitators are required to ensure full and effective participation of farmers and communities.

## Structures

During the PDF-B phase, two pilot sites, each focused on a priority crop, were initiated in each of the five countries. Those sites were a basis for study of structural settings within which the project will work. The following structures were identified:

1. Individual farms (apple in Kazakhstan and Uzbekistan, and apricot in Tajikistan);
2. Individual farms organized around a farmer association (pomegranate in Turkmenistan);
3. Restricted access forest reserves (walnut and wild apple in Kyrgyzstan, and pistachio in Uzbekistan and Turkmenistan);
4. Open access forest (wild apricot in Kazakhstan);

The first two structures suggest a conventional approach based on a top-down system. Farmers have a limited area of land they own or rent; most are converted from *kolkhoz* (collective farms) or *sovkhos* (State farms) that existed during the Soviet era. However, in the second structure farmers are members of an association that provides some services (irrigation water supply, inputs supply, mechanization, etc.) in return for a cash or in-kind payment equalling 8% of harvest value.

The third structure represents a different type of State-owned common resource managed by the Forestry regime or Ministry of Nature Conservation with restricted access rights (for example, the Kara-Alma site in Kyrgyzstan and the Badkhys pistachio site in Turkmenistan). In the major part of these reserves, specified areas are rented to households (size of the area depends on size of the household). Rent is set at an agreed share of the harvest. In the case of Kyrgyzstan Kara-Alma site, farmers are using the existing resources with an obligation to double the plantation density by planting high-quality selected seedlings grown in their own nursery. This aims to improve the quality of the walnut forest which has declined significantly due to devastating collection of the best-quality fruits in recent decades. In the case of the Turkmenistan Badkhys site, registered users live inside the reserve and are paid a two-share salary: one is cash, the other in-kind represented by the allotted area to be harvested by the household. Access is restricted to registered households or regulated for new-comers during the harvest period (August-September). In some reserves, users are helping to replace cut

trees in return for use of the benefits of the reserve (harvesting and selling fruits), as in the case of the pistachio pilot site in Uzbekistan.

The fourth structure is a State-owned common open-access resource. Any user can collect resources without payment of access and other fees.

Application of the participatory approach will be adapted to each structure. However, the tools, methods and techniques will remain the same. Incentive measures will be used to engage the social actors in conservation activities, especially when there is a strong market influence on the cultivar choice.

#### THE NEED FOR A PARTICIPATORY APPROACH

There is growing recognition of the benefits that can be derived from transferring management of natural resources from central governments and State organizations to local entities. In many countries, principles of decentralisation, subsidiarity, and local participation have been adopted, and are devolving rights and management responsibilities of forests to local government authorities and resource users. This trend recognizes limitations of State government to manage natural resources. Few countries possess the required financial capacity to adequately monitor the use of large areas of forests. As a result, natural resources have not been managed properly and deforestation, over-use, and loss of biodiversity have become major problems.

The trend also recognizes the motivations (e.g., livelihoods) and expertise (e.g., knowledge) local entities have to take on these responsibilities. Participation of farmers and communities in a real dialogue about biodiversity conservation and sustainable use complements existing conventional approaches, such as *ex situ* conservation. When involved from the outset, farmers and communities are more committed, thus increasing the chances of success. Participatory approaches for biodiversity conservation and sustainable use aim to establish equilibrium among social actors and the environment by supporting local stakeholders in their effort to use their knowledge and skills in a positive manner.

Transfer of responsibilities will help democratic processes to emerge, shifting greater authority and decision-making to rural people. An important consequence is control of livelihood assets in the hands of the poor, in itself a tool for poverty alleviation and self-promotion.

#### **The philosophical context of participatory management**

BPM is a situation in which two or more social actors negotiate among themselves a fair system for sharing management functions, entitlements, and responsibilities for a given territory, area or set of natural resources. It is a pluralist approach that incorporates diverse partners (or social actors) in a variety of roles, generally to achieve the end goals of diversity conservation, sustainable use of PGR and the equitable sharing of resource-related benefits and responsibilities. Involving different stakeholders, BPM is a political and cultural process *par excellence* where democracy and social justice is sought.

As in all social processes, BPM needs specific conditions to develop, for example:

- Full access to information on relevant issues and options;
- Freedom and capacity to organize, and to express needs and concerns;
- A non-discriminatory, "inclusive" social environment;
- Willingness of the different stakeholders to negotiate;
- Confidence of the different partners in the agreed-upon conventions.

BPM is a complex and lengthy process which is flexible and adaptable to changing circumstances. It can be seen as a response to the fact that biodiversity management requires multiple options that are compatible with both indigenous knowledge and scientific evidence. In this respect, BPM relies on the following values and principles:

- Recognizing different values, interests, and concerns involved in the management of agrobiodiversity;
- Being open to various types of entitlements beyond the ones legally recognized, notably to private and collective property as well as public or State ownership;
- Seeking transparency and equity in agrobiodiversity management;
- Allowing non-governmental organizations (NGOs) to assume more important roles and responsibilities;
- Relying on the complementarity of the capacities and comparative advantages of different institutional actors, emphasizing active partnerships;
- Appreciating that the process, which requires a long-term investment, is more important than the short-term products;
- Recognizing that it is a learning process (learning-by-doing) which involves on-going revisions and improvements to agrobiodiversity management.

### **Concepts and approaches needed to understand and practice BPM**

BPM is a biodiversity management learning process (*adaptive management*), which involves different social actors or stakeholders (*pluralism*). It also requires appropriate institutional settings for management and use (*governance*), and clearly defined duties and liabilities of users (*patrimony*) for a better arbitrage of access and exploitation rights (*conflict management*). Again, as a multi-stakeholder process, it relies on negotiation and communication between the different stakeholders (*social communication*).

#### *Adaptive management*

Adaptive management is a strategy derived from scientific knowledge of ecosystems and field-based experience. It acknowledges the lack of definitive knowledge about the ways to obtain optimal results in biodiversity conservation. In this respect, an experimental (learning) process assumes that learning occurs during implementation, and that biodiversity conservation can be improved on the basis of what is learned.

The basic elements of adaptive management are: (1) explicit biodiversity conservation objectives and explicit hypotheses on how these objectives can be achieved; (2) prompt collection of data and information on monitoring indicators; (3) continuous evaluation of monitoring indicators and biodiversity conservation outcomes; (4) coherent changes in practices in line with obtained results and lessons learned.

The stages of adaptive management are:

1. Appraisal of the biodiversity situation and problems, preferably in multi-stakeholder workshops and including various institutional actors;
2. Design of biodiversity conservation activities, also preferably in multi-stakeholder workshops, on the basis of a comparison of various different options and explicit hypotheses;
3. Implementation of the agreed-upon biodiversity conservation activities;
4. Monitoring of the achievement of the expected results on the basis of earlier-defined indicators for the expected changes;
5. Evaluation of the achievements to test the effectiveness of the biodiversity conservation activities implemented;
6. Adjustment of the activities according to the lessons learned. This may require reformulation of the biodiversity situation and problems, or the biodiversity conservation objectives, or the activities and indicators.

### *Pluralism*

Pluralism focuses on the recognition that various actors, interests, concerns and values exist in societies. It highlights autonomous and independent, or inter-dependent, social actors, or groups that freely interact and collaborate on biodiversity management issues on the basis of different views, interests, and entitlements. It suggests the existence of different categories of social actors (for example, governmental and non-governmental, groups and private individuals, local communities, and outsiders with entitlements to local resources) bearing important complementary capacities for biodiversity management.

Pluralism suggests also that communities are social actors in themselves which represent the interests and concerns of under-privileged groups and individuals. However, communities are not homogenous entities, and their internal divisions should be recognized.

The recognition of the multiplicity of views and voices in the negotiation process for biodiversity conservation is a fundamental pre-condition for equity and justice, although all views and voices are not equal, and do not carry the same weight.

### *Governance*

Governance represents the complex ways by which individuals and institutions, public and private, manage their common concerns. An adequate form of governance depends on the legitimacy of the political system, the respect shown by the people to its institutions, and the capacity of such institutions to respond to problems and achieve social consensus through agreements and compromise.

Governance is neither a system of rules nor an activity; it is a process. It is based on compromise, not domination. Governance is not always formalized and is based on continuing interaction.

### *Patrimony*

Patrimony refers to the compendium of all material and immaterial elements that help maintain and develop the identity and autonomy of its owner, through time and space, by adaptation of it evolutionary context. A patrimonial representation of a territory, an area, or a set of resources highlights the following characteristics:

- Linking past, present and future generations of managers;
- Focusing more on the owner's obligations than on the owner's rights;
- Promoting a common vision of sustainability that reconciles the needs and opinions of various actors.

### *Conflict management*

Conflict management is a non-violent process that promotes dialogue and negotiation among the different stakeholders in order to guide conflicts towards constructive rather than destructive results. It implies:

- Taking care of disagreements before they generate hostility;
- Helping the institutional actors to explore a multiplicity of options for agreement and subsequently select an opinion everyone can live with;
- Recognizing and intervening in the underlying causes of conflicts, with a view to preventing them in the future.

Sharing values with the process of negotiating a co-management agreement, a modern process of conflict management is characterized by the following:

- Some concerned social actors;
- A common area of interest and some points of conflict (different values, interests, and needs of the different actors involved);
- A forum for negotiation and basic rules for the concerned actors to meet and discuss issues together;
- Some reliable data on the points of conflict;
- Various options for action generated by the concerned actors and discussed among them;
- A written agreement on one of these options;
- The legitimization of the agreement;
- The implementation of the agreement.

However, the process of conflict management is not an easy one, and some difficult circumstances may hamper it. These are as follows:

- One social actor controls one or more other stakeholders;
- One actor gains from prolonging the conflict;
- One or several actors have no confidence in the conflict management process;
- Prejudices and stereotypes prevail;
- Some authorities and chiefs are stubborn and unwilling to negotiate an agreement;
- The country's laws apply to the conflict's matter but they are not enforced.

### *Social communication*

Social communication is about bridging understanding within a human community, involving the exchange of messages (communicating) to create meaning and enrich common knowledge, often in order to face change. It is vital for any activity in which participation of local people is sought.

It is people who bring about development and manage biodiversity. It is illusory to expect any change for the better without their involvement and the mobilization of their capacities and energies, and the enhancement of their knowledge and skills.

Social communication fosters the discussion of problems, opportunities, and alternatives for action. Interpersonal communication – including one-to-one dialogue and group meetings – is the main component of social communication. Interpersonal communication can raise morale, enhance the sense of one's own value and dignity, and promote social solidarity and collaboration.

Biodiversity conservation and sustainable use places significant strains on communities. Their local media, closely linked to the local culture, are often employed to channel ideas and feelings in their struggle for change. In this respect, the challenge for expert professionals engaged in participatory activities of biodiversity conservation focuses on learning to listen, aptitude to learn from farmers and/or community members, and readiness to work with them as partners.

### IMPLEMENTING A PARTICIPATORY APPROACH IN THE CONTEXT OF AGROBIODIVERSITY CONSERVATION

Implementing a biodiversity conservation strategy based on a participatory approach requires a continuous, structured process. Three different phases can be distinguished: (1) the diagnosis and planning phase; (2) the implementation phase; and (3) the monitoring and evaluation phase.

Agrobiodiversity counts among the most important resources upon which livelihoods of the rural populations rely. Its economic value should therefore be considered in the application of a participatory approach. Given that agrobiodiversity users are influenced by the markets, a sound strategy for participatory agrobiodiversity conservation should integrate the economic dimension. Sometimes it is necessary to establish small enterprises that add value to biodiversity, change destructive practices, and allow communities to earn a sufficient and sustainable livelihood. Thus the concept of market-based incentives is increasingly recognized as a necessary component of conservation and sustainable development.

The majority of structures found in the pilot sites of the project represent a collective resource scheme, although the exploitation is individualized. Development of a participatory approach should therefore be based on collective action. There is evidence that collective action is more likely to be sustained when costs are low and benefits are tangible. Joint efforts reduce costs and, in the case of the individual farmer, can serve as a buffer against market forces that temporarily mask the benefits of promoting traditional varieties.

Project design builds on the fact that many countries are applying, wittingly or unwittingly, these approaches in the field of biodiversity conservation and sustainable use. In many forest

reserves, users and government agencies have agreed to cooperate on activities related to biodiversity conservation and sustainable use. Previous training experiences on participatory approaches, such as the one organized by the German cooperation in Kazakhstan, Turkmenistan and Uzbekistan, will be considered and integrated, where appropriate. Therefore, rather than fully relying on the "import" of models from outside the region, experiences within the region will be integrated into the project design.

## **Steps in implementation**

The following sections outline the steps of a participatory approach in conservation of a given species, after having selected a site and the subsequent group of social actors (a community, a group of farmers, etc.), and other concerned stakeholders. The steps are not a "blueprint", but rather follow a process that is a starting point from which site-specific actions can be defined.

### *Diagnosis and planning phase*

The most important participatory tool to be used in this phase is the Participatory Rural Appraisal (PRA). PRA identifies the main elements of agrobiodiversity in the eyes of the selected group of social actors. It is an intensive, iterative and rapid form of investigation, carried out by a small multidisciplinary team. Others include participatory brainstorming, focus groups, and stakeholder analysis.

(a) Participatory Rural Appraisal: PRA assists the members of a social group to identify, analyze and evaluate constraints and opportunities of development, and take sound decisions on development projects to undertake. It focuses on the active role of the community members in problem analysis and development action planning. In contrast to scientists in conventional methods of investigation and Rapid Rural Appraisal (RRA), it is the local populations who "own" the results and outcomes of the PRA.

The evolution of RRA towards greater participation – not just consultation – led to the PRA approach. In PRA, rural people create and manipulate their own information in a visualized format, using familiar materials. There has been an explosion of interest, and experimentation with different methods, techniques, and tools. These include maps, transects, models, calendars, Venn ("chapatti") diagrams, preference matrices, and many others. However, it is not the use of the tools themselves that make the appraisal "participatory", but the way they are used.

PRA uses simple, flexible, and informal tools which require both participation and empathy from the community, along with attitude change from the researchers. It supposes:

- A spirit of participation (learn from/with community members);
- A sense of respect of the community members;
- An interest in their knowledge, their words, their demonstrations;
- A personal interpretation of the results (no answer is an answer);
- Improved listening skills and patience;
- Modesty in terms of showing one's knowledge;
- The instruments and means which encourage community members to communicate and improve their knowledge and skills.

PRA can be used in all phases of rural appraisal and research planning. For reasons of efficiency and project sustainability, and political imperatives for participation, many donors are increasingly insisting that participatory methods be used in project planning. The strength of PRA is that it can empower local people and rural communities to take decisions and responsibility for planning development and research activities, which should lead to greater community involvement and sustainability of research/development activities.

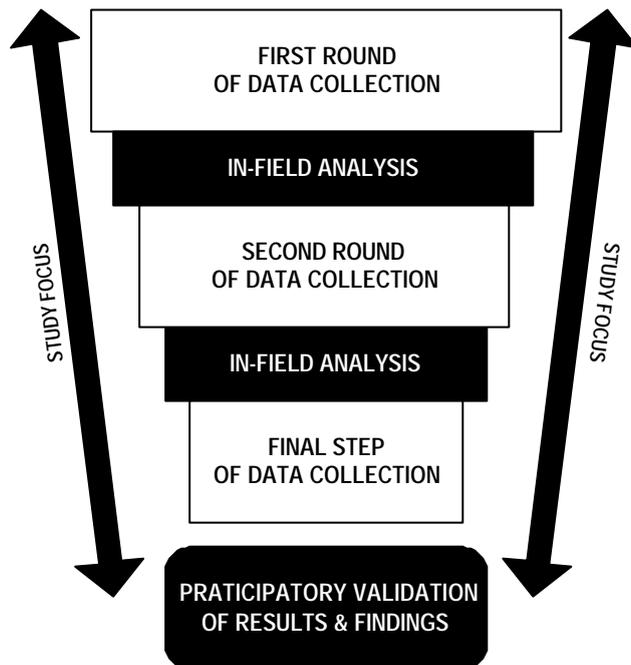
Although it is strongly advocated by many donors and development organizations, the value of PRA may be diminished by a number of circumstances:

- Many PRA practitioners assume that communities are homogeneous, and overlook the social differences and vested interests which can lead to interventions that benefit a few;
- Not all researchers have the skills to facilitate PRA and empowerment. PRA requires a new profession;
- PRA is intensive, and is focused at the community level. When trying to cover a region, there can be problems related to "scaling up" (assuming a community is representative of a wider region);
- Particularly with research institutions, there is still resistance to allowing farmers to determine the research agenda, and giving professional recognition to research activities and results that do not follow a formal "scientific" protocol.

<b>Box 1 – Practical processes of a PRA</b>	
<b>1. Topic choice</b>	
<b>2. Site selection and pre-preparation</b>	<ul style="list-style-type: none"> <li>• <i>Establish contact with the community</i></li> <li>• <i>Establish contact with concerned organizations</i></li> <li>• <i>Review secondary data</i></li> </ul>
<b>3. Team composition</b>	<ul style="list-style-type: none"> <li>• <i>Study objective must be understood by everyone in the team</i></li> <li>• <i>Strengthen communication among team members</i></li> <li>• <i>Choose a facilitator (team leader)</i></li> <li>• <i>Respect the consensus rule in the team</i></li> <li>• <i>Make a consensual choice of appropriate processing and analysis of data collected during the exercise</i></li> </ul>
<b>4. Review of the research work</b>	<ul style="list-style-type: none"> <li>• <i>Review the retained topic</i></li> <li>• <i>Elaborate the research objectives</i></li> <li>• <i>Formulate research questions</i></li> <li>• <i>Identify appropriate tools for each question</i></li> </ul>
<b>5. Preparation of field work</b>	<ul style="list-style-type: none"> <li>• <i>Plan the activities by day (with task distribution)</i></li> <li>• <i>Mobilize the logistical means for the study</i></li> <li>• <i>Establish the "grounded rules" of the team</i></li> </ul>
<b>6. Field management of the study team</b>	<ul style="list-style-type: none"> <li>• <i>Clarify the protocol (well-defined study contract)</i></li> <li>• <i>Facilitation and activities management</i></li> <li>• <i>Daily interaction (evaluation, analysis, planning, task distribution)</i></li> </ul>
<b>7. After the field work</b>	

- *Finalize the analysis*
- *Write the report (who? how? where? etc.)*
- *Suggest conclusions and recommendations*
- *Use the results and findings*

PRA is an intensive, iterative learning process. It stresses the multi-disciplinary dimension of investigation in rural areas, and use of visualization techniques. In order to gain rigour and robustness in the analysis, PRA makes use of a concept of triangulation that ensures the verification and validation of the collected data.



(b) Participatory brainstorming: The purpose of participatory brainstorming is to encourage ideas quickly from a group of farmers or community members without becoming caught up in a detailed discussion. It encourages people to think critically and creatively rather than simply generating a list of options, answers, or interests. Frequently, this tool is the first step toward application of other participatory methods and tools.

(c) Focus groups: Focus groups comprise a small group of selected people who represent different viewpoints. The aim is to collect general information, clarify details, or gather opinions about a given issue.

(d) Stakeholder analysis: In the context of BPM, stakeholders with different "worldviews" and interests continually interact. This may create points of conflicts, and is concurrently the reason that stakeholder analysis is so important to the "pluralist" context of BPM.

Stakeholder analysis can be defined as "*an approach and procedure for gaining an understanding of a system by means of identifying key actors or stakeholders within the system, and assessing their respective interests in that system*" (Grimble & Chan, 1995).

Stakeholders include all those who affect, and/or are affected by, policies, decisions, and actions of a system (individuals, groups, organizations, etc.). In conflicts over natural resources, stakeholder analysis provides a framework for examining who is involved, where their interests lie, and how they relate to each other in terms of power.

In the case of natural resource management, stakeholder analysis can lead to a better understanding of who is affected by and who can influence the way natural resources are managed, with the ultimate goal being to turn situations of conflict into opportunities for collaboration. It helps:

- Analyze the social characteristics of the various stakeholders;
- Understand the situation, the perception of the situation, objectives, potentialities, and weaknesses of the involved or "affected" groups;
- Identify group perceptions and attitudes vis-à-vis others actors and institutions;
- Develop a realistic participatory strategy identifying the various forms of involvement, roles, and responsibilities;
- Verify that the adopted strategy of intervention is appropriate to the needs and potentialities of the concerned groups;
- Evaluate the chances and risks of the planned intervention.

Why is stakeholder analysis so important? Early consultations can have several advantages. They can:

- Help understand the concerns and priorities of the various stakeholders;
- Help ensure the co-operation of stakeholders in implementing the planned activities;
- Increase the stakeholders' sense of ownership in the planned activities;
- Increase the stakeholders' understanding of, and commitment to, the planned activities;
- Provide access to local (indigenous) knowledge, resources and assistance for the planned activities;
- Increase public and political support for the planned activities and management measures.

After identifying the stakeholder groups, it is necessary to determine how each group will be involved in the planned activities. This determination is based on the following criteria:

- **Information:** some groups may have an interest in the planned actions but are not directly affected by them;
- **Consultation:** some groups may experience some impact from the planned actions and need to be fully aware of that;
- **Partnership:** some people are working closely with the intervention team such as staff of organizations assisting in the planned actions;
- **Ownership:** in the case of community-based management, the stakeholders may gain ownership of the planned actions.

(e) Other participatory tools for the diagnosis phase: Many participatory tools can be used during the implementation of a PRA exercise. The most important are:

- **Timelines:** Historical profiles of longer term events and trends;
- **Historical maps:** Portraits of demographic, social, and natural resources;

- **Resource maps:** Geographic distribution of environmental, demographic, social, and economic features;
- **Social maps:** Maps locating key social features;
- **Preference ranking:** Ordinal ranking based on pair-wise comparisons;
- **Matrix ranking:** Preference ranking based on defined criteria with scoring;
- **Wealth ranking:** Assigning households to well-being categories;
- **Venn diagrams:** Diagrammatic representation of key institutional interactions;
- **Seasonal calendars:** Graphic depiction of seasonal events or trends;
- **Transect walks:** Land-use maps based on walking through an area.

At the end of this stage, there should be a clear description of the current situation and how to move forward. The description should be developed by farmers, households, and community members by means of participatory methods, tools, and techniques, with members of the national teams playing only a facilitating role. This process can also give birth to a negotiated plan of action between the project and the farmers and communities.

### *Implementation phase*

During this phase negotiated plans of action will be implemented. It is essential that farmers and communities see that the agreed actions are those that are implemented.

A number of participatory methods, tools, and techniques exist and can be used as appropriate for the context and the available resources. They can be implemented at the local, national, or regional level. These participatory tools have been described in IPGRI publications. Some of the most important are introduced here.

(a) Participatory extent and diversity analysis: The foursquare table can help categorize crop or varietal diversity according to area coverage and frequency of use by households. It helps to understand why some landraces are grown on small areas by many farmers whereas others are grown on large areas by many farmers. Similarly, it helps to understand why few farmers grow certain landraces on large areas whereas few farmers grow specific varieties on small areas.

<i>Large areas/plots</i>	<i>Large areas/plots</i>
<i>Many farmers/households</i>	<i>Few farmers/households</i>
<i>Small areas/plots</i>	<i>Small areas/plots</i>
<i>Many farmers/households</i>	<i>Few farmers/households</i>

(b) Social seed and planting material networks: Informal seed systems are usually the pillars of on-farm conservation of local crop diversity, and such systems are integrated into a social network of rural communication. This tool helps to understand who maintains diversity in a given community and how this diversity is maintained and exchanged among community members.

(c) Rural diversity poetry journey: A combined team of poets and poetesses travels together in the rural areas interacting with the farmers, observing on-farm biodiversity of landraces and translating their feelings and experiences into beautiful poems and songs.

(d) Diversity folk song competition: Local people develop and sing songs that deliver messages about conservation of biodiversity. It is a competitive tool to raise public awareness on the value of biodiversity at the grassroots level and helps strengthen local institutions.

(e) Diversity street drama: local farmers or community members and professional actors take part in a street play or drama in order to sensitize fellow farmers or community members on the value of biodiversity using poetry, dance, and songs in a local social-cultural setting. It has proven to be an effective tool for public awareness, especially when recorded and broadcast through TV channels.

(f) Diversity fair: This tool sensitizes farmers and communities to the value of biodiversity conservation and sustainable use. It is a good forum and opportunity to individual farmers and farming communities to display their crop genetic wealth and indigenous knowledge held through generations, and to get recognition for these valuable resources through diversity awards.

(g) Diversity block: This participatory research technique aims to characterize local landraces under typical conditions of farm management. It has been used successfully for both research and development purposes.

(h) Diversity kit: The kits provide a small quantity of seed to farmers for experimenting with new material and making choices under the farmer's own management conditions. Seed harvested from diversity blocks can be used to assemble diversity kits to be distributed as gifts to experimenting farmers.

(i) Community Biodiversity Register (CBR): CBR is a register maintained by a local community or institution to record the existence of biodiversity and associated knowledge of communities at the local level. It can be kept in a register book or electronic format. Data may include information on the diversity custodians, passport data, and cultural use and significance.

(j) Participatory Plant Breeding (PPB): This is a method that consolidates the role of farmers in plant breeding. It allows them to understand existing local crop diversity, underlying strengths and weaknesses of the available genetic resources, and to search for preferred traits.

### *Monitoring and evaluation phase*

The monitoring and evaluation and implementation phases will run in parallel. It is important to involve multiple stakeholders in the monitoring and evaluation of project activities. It is the people involved in the project who will make it succeed or fail. This means listening carefully and regularly to the views of different stakeholders about what is working and what is not, and hearing reasons for why problems exist and what needs to be improved. This participatory learning method can be based on the use of different participatory tools such as those presented in the section on the diagnosis and planning phase.

CBRs, described above in the implementation phase section, can be used as a participatory monitoring tool for local crop diversity. They provide feedback to formal and informal sectors about the status of local biodiversity.

## Preparation

The study undertaken during the PDF-B phase pointed to those areas that need attention and enhancement to ensure that national teams are positioned to implement the project. The most important measures identified were capacity-building, development of the national teams, and building the stakeholder lists. Since completion of the study, each of the five countries have reviewed and expanded their stakeholder lists. These can be found in Annex F.

## Training

Training will be provided within the full project training structure (see Training Strategy, Annex L):

1. At the Regional Training Center on Socio-Economic Studies two or three scientists will be identified for intensive training on participatory approaches in Europe. The scientists will participate in four-week to three-month training sessions in one of the European countries with advanced experience in these approaches (probably the United Kingdom or the Netherlands). This training will be initiated at the start of the project, as these scientists will themselves serve as trainers when they return to their respective countries.
2. At the national level, two facilitators for each national component will be trained at Almaty Regional Training Center during the first year. For the case of Kazakhstan, two of the scientists trained for the Regional Training Center can play this role. The choice of these two facilitators should follow some criteria (to be defined). Two other facilitators may also be selected and trained during the third or fourth project year.
3. At the national level, all scientists involved in a pilot site will participate in a short training course provided by the two trained facilitators, and with support from the scientists trained at the Almaty Regional Training Centre. Organization of at least two regional training courses at the Almaty Regional Training Centre are envisaged for another two to three scientists from each country (one during the first year, the second in the middle of the project).

Table 1 – Compulsory training for capacity-building on participatory approaches

Type of training	KAZ	KYR	TAJ	TUR	UZB	Remarks
Training of trainers (set-up of a Trainers' Core at Almaty RTC)	2-3					Trainers will be situated at the Regional Training Course in Almaty but will be in charge of the whole region for training and assistance.
Training of facilitators (Year 1)	2	2	2	2	2	Training will be organized at Almaty RTC and given by the Trainers' Core
Training of members of National Teams on the application of participatory methods, tools and techniques	10	10	10	10	10	Training at the national level organized by the trained facilitators, with the assistance of the Trainers' Core.

Table 2 – Non-compulsory training to enhance capacity-building on participatory approaches

Type of training	KAZ	KYR	TAJ	TUR	UZB	Remarks
Training of facilitators (Year 3)	2	2	2	2	2	Training will be organized at Almaty RTC and given by the Trainers' Core
Training of members of National Teams on the application of participatory methods, tools, and techniques (Year 1)	2-3	2-3	2-3	2-3	2-3	Training will be organized at Almaty RTC and given by the Trainers' Core
Training of members of National Teams on the application of participatory methods, tools, and techniques (Year 3)	2-3	2-3	2-3	2-3	2-3	Training will be organized at Almaty RTC and given by the Trainers' Core

The training program will be most effective with availability of a Russian training manual on participatory approaches, and strategic integration with similar previous experiences in the region. Several years ago, German cooperation provided training on participatory approaches for GTZ projects in Kazakhstan, Uzbekistan and Turkmenistan. Beneficiaries of this training could be of great support to the project. A contact person has been identified in Turkmenistan to prepare the Russian-language manual.

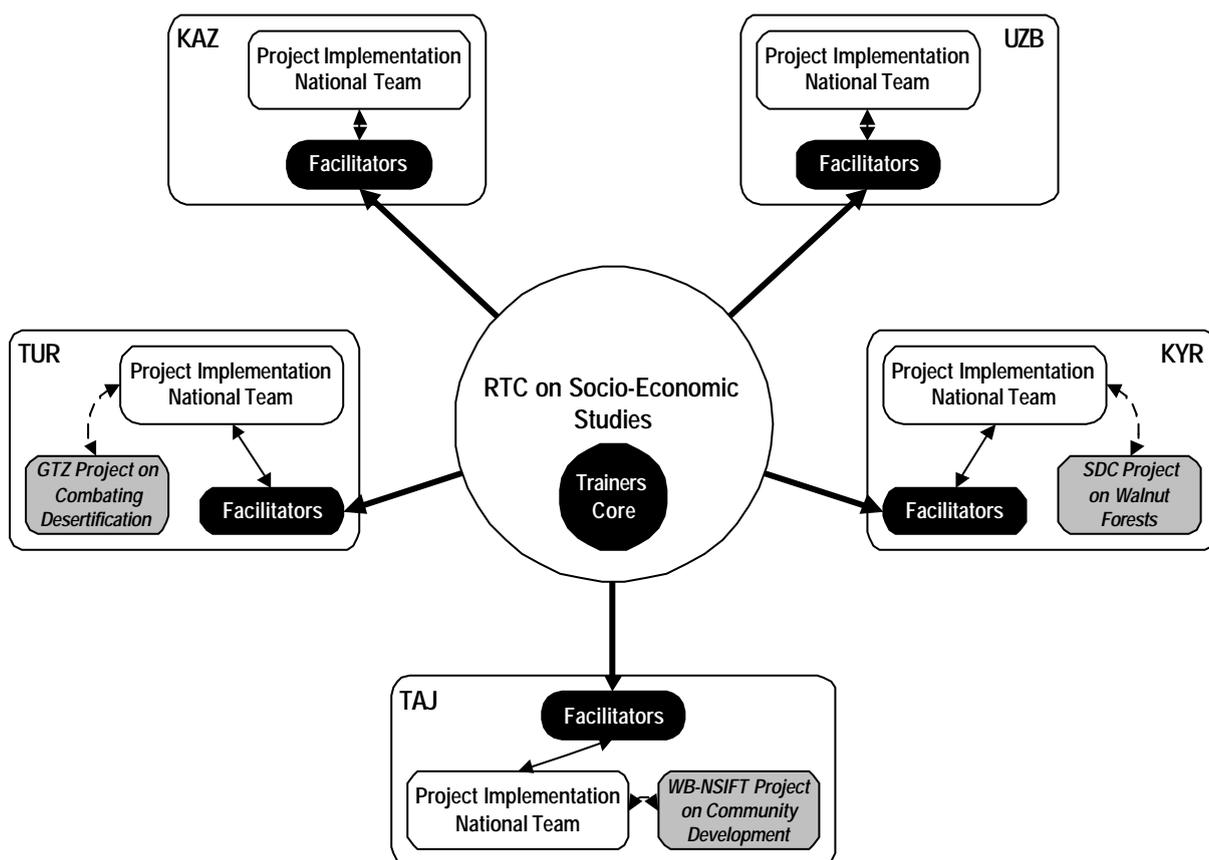


Figure 1 – Training strategy on participatory approaches for the full project supported by the integration of previous similar experiences

The following criteria will be applied to choose the two facilitators for each national component:

- Good experience in agriculture, preferably in the priority species of the national component;
- Good communication skills and good contact with rural populations and farmers;
- Knowledge about socio-cultural aspects of the selected pilot sites;
- Appropriate attitude towards rural living conditions (e.g., respectfulness, modesty, humility);
- Readiness to be "immersed" in a rural area;
- Willingness to frequently visit the pilot sites and build contacts with rural populations.

### *National team development*

BPM is not concerned exclusively with plants; it includes many other dimensions such as marketing, organizing joint efforts, and others. Implementation of participatory approaches therefore requires the adoption of a holistic vision by the national teams in order to cover all aspects related to biodiversity conservation and sustainable use.

One of the consequences of this vision is the development of an integrated team composed of both natural scientists (biologists, geneticists, botanists) and social scientists (sociologists, economists, anthropologists, extensionists) with local experience-based knowledge. The aim is to create a balanced team with the required collective competence to treat a given situation, and whose members master the application of participatory methods, tools, and techniques.

The role of the National Coordinator is to initiate and manage this process of team-building by consulting a variety of scientist whose speciality might support the project activities. There is a need to take the initiative in order to bring all missing disciplines to the national component. This is one guarantee for success of the project.

### *Developing the list of concerned stakeholders*

The BPM project component will play a catalytic role in preparing local populations to take on their responsibilities in conserving agrobiodiversity. More involvement of NGOs in the project activities is one way to play this "social engineering" role and ensure that local populations are prepared to play their role beyond the life of the project. These organizations will undertake a variety of tasks in fulfilling this role, for example publishing and distributing public awareness materials on importance of local varieties of horticultural crops and wild fruit species, assisting in training sessions for local populations, and helping to implement activities in project sites. In cases where such organizations are not available to project sites, the project, with the help of the trained facilitators, should help to create an appropriate social setting (users' or farmers' association, common interest association) in their stead.

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## ANNEX L – TRAINING STRATEGY

### INTRODUCTION

A key element of genetic resources conservation is the extent to which farmers and communities participate in the process of *in situ*/on-farm conservation. Training on *in situ*/on-farm conservation of Plant Genetic Resources (PGR) is therefore a critical aspect for establishing national structures that support effective conservation of agrobiodiversity. Enrichment of knowledge in the fields of biology, conservation, ecology, economics, and sociology will establish a foundation for sustainable agrobiodiversity research and conservation programs. Training will strengthen the collaboration between farmers and research institutions involved in project implementation and help ensure that participatory approaches are successful.

The Training Strategy was developed<sup>6</sup> during the PDF-A and PDF-B phases. Development of the strategy included review of the current state of existing education systems and training of personnel working in the area of conservation and use of PGR in the five project countries. Assessment of the training needs, including identification of target training groups, subject, and type of training was made to achieve project objectives at both regional and national levels. These needs were finalized at national workshops and International Steering Committee (ISC) meetings.

The development process included consultations with project stakeholders including representatives of research institutes, universities and government agencies, farmer associations, and NGOs. The availability of educational institutions, qualified instructors and lecturers with experience in agrobiodiversity, and training programs on the study and conservation of agrobiodiversity were explored. In addition, availability and accessibility of different types of undergraduate and post graduate training in the region, including secondary, trade and professional schools, post-graduate, post-doctorate, on-the-job training were assessed.

The strategy is based on the region's common language of communication (Russian), identity in culture and customs, ecological and economic problems, centers of agrobiodiversity, and conservation challenges.

### CURRENT EDUCATION AND TRAINING CAPACITY

During the Soviet era, the All-Russian Institute of Plant Industry, named after N.I. Vavilov, was the only institution providing post-graduate and post-doctorate training in the Soviet Union. In addition, a number of universities provided undergraduate training in various areas of agriculture. At present, there are 37 universities and research institutes and 16 colleges and technical schools in the region that provide training in the fields of agronomy, horticultural, forestry, ecology, biology, plants protection, and other related specialties. These are listed in Tables 1 and 2, beginning on page L-9.

All countries of the region have training capacity suitable to serve as a baseline for this project. However, current training in the field of agrobiodiversity conservation covers only general issues on agronomy, horticultural, forestry, ecology, and plant biology. It is focused

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<sup>6</sup> The Training Strategy was elaborated by Dr. K. Turgunbaev

on agro-techniques, crop breeding, plant morphology, and taxonomy. Assessment of distribution and diversity levels, methods of conservation and collecting, and biotechnology are not included in the curricula. Appropriate training programs for farmers are not developed at all. Moreover, computer and English language skills of agriculture and forestry officers are not sufficient to allow them to update their knowledge on agrobiodiversity conservation, and to use and have access to related information available at the international level.

Laboratories that provide practical training are poorly equipped, and available references and training manuals are inadequate for training personnel to meet international standards. Communication among the training institutions, both within and between the countries, are poor or completely absent.

#### TRAINING STRATEGY AND CAPACITY BUILDING FOR ITS IMPLEMENTATION

The task of this strategy is to support achievement of project Outcome 4: “Capacity for training and support activities on *in situ*/on-farm conservation and use of fruit genetic resources is established.” The objective of the activity is to improve skill levels and qualifications of all stakeholder groups and ensure adequate training capacity for sustainable agrobiodiversity conservation work beyond the life of the project.

During the PDF-B phase, the Regional Training Center on Apricot Genetic Resources in Tajikistan and the Regional Training Center on Socioeconomic Studies in Kazakhstan were established within existing institutions. Training courses on assessment of diversity levels of wild and cultivated apricot and participatory management of horticultural genetic resources were piloted in these Centers to help assess the training needs for the full project and test preliminary data on training needs identified during the PDF-A phase. Two representatives from each country of the region participated in the courses. All comments and recommendations suggested by the participants were considered in the proposed strategy.

The national partners identified the following target groups for training:

- Policy-makers at national and local levels (administrative officers of Government, ministries and local authorities);
- Instructors and teachers of research and training institutions (Universities, secondary, trade, professional schools);
- Farmers and local communities;
- Employees of agriculture services, forest reserves and forestry farms.

Staff of research institutes in the region will be trained on modern techniques and methodologies in plant genetic resource assessment, conservation and use, and in application of the participatory approach in research and agrobiodiversity management. After completion of the project, maintenance costs of those centers will be covered by the national programs and by grants from international foundations. Additionally, scientific products elaborated at these centers will partially cover everyday and future expenses related to research and operational costs. Horticultural operations are expensive. Training on methods of fruit species conservation will increase opportunities to profit from research and training. Finally, training centers will be available to foreign students, which will provide an additional source of tuition income.

Training capacity will be developed through five activities:

- Improve skills of project partners to undertake targeted project activities;
- Develop training programs and manuals for different groups of trainees and types of training;
- Organize joint workshops for farmers and researchers;
- Establish regional and national training centers;
- Monitor and assess the training process.

Each of these activity areas is described below. Detailed training strategies for target groups at regional and national levels are found in Tables 3 and 4, beginning on page L-12.

### **Improve skills of project partners to undertake targeted project activities**

Existing institutions and expertise will be used as a baseline to build training capacity and meet training requirements of all stakeholder groups. Training organized at the regional level aims to capacitate participants to work as instructors in their respective countries. This approach will also facilitate relationships and exchange of information and knowledge among stakeholders at the regional level. The themes, type, and duration of training for each target group at the regional level are listed in Table 3 (page L-12). Training organized at the national level aims to cover broader stakeholder groups at project sites and to address specific national needs (Table 4, page L-15).

The Strategy offers a wide spectrum of training from short-term workshops for policy-makers to long-term and highly tailored training for scientists. Training courses emphasize an individual approach, and interactive forms and methods of training (workshops, seminars, discussions, modelling practical situations, role games).

- Policy-makers will be trained on issues related to agrobiodiversity conservation, with emphasis on the role local varieties play in stable agricultural production systems. They will also be trained on legal aspects of agrobiodiversity conservation and bio-security. The training will lead to the more efficient planning and coordination of activities on conservation and use of fruit genetic resources at national and regional levels.
- Local authorities (provincial and district levels) will be trained on the global significance of agrobiodiversity and assessment of its conservation at national workshops with further practical training at project sites. The workshops will also address the important role NGOs, local communities, and farmers have to play in the process and will encourage local authorities to ensure that these groups are participating.
- Farmers, local communities, employees of forestry farms and reserves, protected area managers, scientists, the stakeholders who are directly involved in agrobiodiversity conservation and use in their every day life, will benefit from various training opportunities. Development of training programs for these target groups requires creativity, and application of techniques and skills of different international institutions and NGOs. These include:

- Development of training programs for these target groups requires creativity, and application of techniques and skills of different international institutions and NGOs. These include:
  - Workshops on analysis of biodiversity legislation will build knowledge of scientific staff in working with policy and legal documents on conservation and use of agrobiodiversity.
  - Training on GIS and GRIS applications to assess levels of biodiversity will be provided to scientists and teachers. These systems have a great number of graphic and thematic databases, connection with modelling and calculation functions for taking decisions, and control based on three-dimensional cartographic visualization of the results of processed information.
  - Training on assessment of diversity levels and distribution of priority fruit genetic resources will be provided to researchers and instructors (scientists). Project implementers will improve their skills and knowledge on survey procedures with the help of the survey procedures developed for this project (see Annex H). Training will include field work, which will provide trainees the opportunity to put learning into practice.
  - Training on marketing will be provided to employees of agriculture services, forestry farms and reserves, and farmers and local communities. Training will build participants' knowledge on planning, agriculture and forestry management, market selection, demand identification, and sale of fruit products.
  - Training on assessment of fruit genetic resources with the use of modern techniques for molecular characterization will be provided to scientists. This is a new technique for studying PGR diversity. It includes training on the molecular basics of heredity, regularity at intraspecific hybridization, chromosomal and non-chromosomal theory of heredity, variability, heteroploid, basic concepts of population structures, genetic and statistic methods of breeding, individual methods of breeding, and genetic analysis. One representative from each country will benefit from intensive training at the Regional Training Center on Molecular Markers, and one individual from this group will be trained to the PhD level.
  - Training on socioeconomic studies will be provided to researchers and instructors (scientists). This training will cover impacts of the social, cultural, and economic factors on farmers' and local communities' management of fruit genetic resources. Issues related to gender, social, economic status of farm households, and how this impacts agrobiodiversity use and conservation will also be covered in the training program.
  - Training on computer skills, Internet use, and English will be provided to all target groups (scientists, employees of forestry operations and reserves, farmers and local communities). These skills will allow trainees to establish direct contacts with their colleagues abroad and actively participate in discussions related to decisions at many levels.

- Training on the use of participatory approaches in the study, conservation, and sustainable use of agrobiodiversity will be provided for two to three instructors who will then train a key partner from each country on the principles and methods of communicating and working with the farmers. These individuals will then serve as facilitators and instructors to train project teams in their countries. They will be selected from research institutes, universities, and NGOs. Availability of local instructors with international training will also contribute to sustainable training in the region beyond the life of the project.
- Training on traditional knowledge, including methods of pruning, processing and storing, and for combating pests and disease will be provided to scientists.

Training for farmers and local communities will be provided on:

- The new technologies of maintenance and reproduction of local varieties of horticultural crops and promising forms of wild fruit species, agrotechnical methods of horticultural crop cultivation and maintenance, and techniques of facilitation of natural regeneration of wild fruit species;
- Assessment, description, and selection of local varieties of horticultural crops and wild fruit species (traveling workshops);
- The basics of economics, in particular, establishment and management of farms, practical skills of accounting, and business planning;
- Processing and storage of horticultural products, including traditional methods;
- Establishment of cooperatives, farms, and associations to familiarize farmers with initiation procedures, statutes, filing, documents processing, and other regulations on registration.

Raising the level of stakeholders' skills and their capacity to carry out joint actions in the fields of biology, social sciences, and information management will contribute to achievement of the project objectives and lead to sustainable agricultural development.

### **Develop training programs and manuals for different groups of trainees**

Priority training themes identified during the PDF-A and PDF-B phases will be a basis for developing training programs for each target training group. Training programs will be developed by national consultants on training. A regional consultant will coordinate development at both national and regional levels. The programs will be developed in both Russian and national languages. Draft programs will be distributed among stakeholders for their review and comments. Modified programs will be submitted to the project ISC for approval, whereupon they will be used as a guide to training activity implementation.

### **Organize joint workshops for farmers and researchers**

This activity applies the participatory approach in agrobiodiversity management and will promote establishment of strong links and collaboration between scientists and farmers. Joint

training of farmers and researchers will reduce pre-conceived judgments and lower barriers of communication. This training will provide a basis for mutual benefit from scientific achievement of researchers and traditional knowledge of farmers and local communities.

### **Establish regional and national training centers**

National and regional training centers will be established within existing research institutes and universities. Involvement of local educational institutions is an important aspect of this strategy. Strengthening these institutions will enhance their leadership in distribution of knowledge on agrobiodiversity, and enhance sustainability of project activities after its completion. Further, building on existing infrastructure and personnel will be cost-effective.

During consultations with stakeholders, it was recommended that national specializations developed during the Soviet era and current expertise in educational institutions be the basis for establishing regional training centers. Three regional training centers will be established within existing institutions:

1. Pomegranate, at the Garrygala Research & Production Experimental Center on PGR (Turkmenistan);
2. Walnut, at the Research Institute of Forest and Nut Production (Kyrgyzstan);
3. Molecular Markers, at the Institute of Genetics & Experimental Plant Biology (Uzbekistan);

These are in addition to the two regional training centers established during the PDF-B phase:

4. Apricot, at the Sogdiyskiy Branch of “Bogparvar” Research and Production Association (Tajikistan);
5. Socio-economic Studies, at the Research Institute for Economy of Agroindustrial Complex and Development of Rural Territories (Kazakhstan).

Regional training center equipment needs are listed in Table 5, page L-25.

#### *Regional training center on pomegranate genetic resources*

Pomegranate, a priority horticultural crop in the region, is rich in vitamins and minerals. A valuable wood species, it has adapted to the fragile ecosystems of the Central Asian region. The largest pomegranate germplasm collection in the world was established in 1934 at the Garrygala Research and Production Experimental Centre on Plant Genetic Resources, in Turkmenistan. At present, this collection consists of 1,117 accessions of pomegranate, originating from 27 countries and four continents. The regional training center on pomegranate will be established at the Garrygala Research and Production Experimental Centre on Plant Genetic Resources.

*Regional training center on apricot genetic resources (established during PDF-B phase)*

Apricot is also a priority horticultural crop in the region. It has great importance for local nutrition and is an important source of income for rural population. The Sogdiyskiy Branch of “Bogparvar” Research and Production Association has been the leading center on the study and breeding of apricot during and since the Soviet era. The Sogdiyskiy Branch employs leading researchers on apricot and holds a vast collection of local varieties and forms.

*Regional training center on walnut genetic resources*

Walnut is widely distributed and cultivated in the region. N.I. Vavilov highlighted Central Asia as one of the most important centers of origin of cultivated walnut. Out of 254.4 thousand hectares of forest area, walnut occupies 35.1 thousand hectares. As a result of over-exploitation, nut forests are heavily degraded, which is aggravated by lack of natural seed regeneration. With a view to the study, conservation, and sustainable use of walnut agrobiodiversity, the regional training center on walnut will be established at the Institute of Forest and Nut Production of the National Academy of Sciences, in Kyrgyzstan.

*Regional training center on socioeconomic studies (established during PDF-B phase)*

Considering the importance of knowledge on socioeconomic aspects of PGR conservation and use for sustainable management of agrobiodiversity in the region, it was decided to establish the regional training center on socioeconomic studies at the Research Institute of the Agroindustrial Economy and Development of Rural Territories. It will also offer training courses on participatory approaches to management of horticultural genetic resources.

*Regional training center on molecular markers*

Training on the use of molecular markers in assessment of horticultural crops and wild fruit species genetic diversity will be offered at the Institute of Genetics and Experimental Plant Biology in Uzbekistan. This Institute is a leading institution in the field of molecular biology and genetic research.

*National training centers*

National training centers on priority horticultural crops will play a key role in organization of training for all categories of stakeholders at the national level. They will function as a supplement to the regional training centers. The national training centers will be established in those countries where there are no regional training centers on priority horticultural crops, as well as where their accessibility may be difficult (e.g., isolated Gorno-Badagshan province in Tajikistan). The national training centers will facilitate broader coverage for stakeholders at project sites.

It was agreed that the national training centers on priority horticultural crops will be established at the following institutions:

1. Turkmenistan, at the National Institute of Deserts, Flora and Fauna, and the Research Institute of Farming;
2. Kazakhstan, at the Research and Production Centre of Processing and Food Industry;

3. Tajikistan, at the “Bogparvar” Research and Production Association, and the Pamir’s Biological Institute;
4. Kyrgyzstan, at the Research Institute of Farming;
5. Uzbekistan, at the Research Institute of Forestry, and the Research Institute of Horticulture, Viticulture and Wine Making named after R.R. Shreder.

National training center equipment needs are listed in Table 6, page L-26.

### **Monitor and assess the training process**

Monitoring and assessment of the training program will enable project managers to determine strengths and weaknesses of the training structures and courses, and to modify approaches where needed. Communication with trainees will be established to allow for their feedback on the usefulness of training courses. Appropriate criteria for assessment of training will be developed during the project implementation.

During the PDF-B phase, initial training sessions were organized at the regional training centers to test and assess training approaches. Based on this assessment, the training strategy was revised. Comments received from participants and national consultants on training were considered.

Monitoring of the project training component is integrated into the project Monitoring and Evaluation strategy (see Annex M). The “Strategic Framework for IPGRI Training and Capacity Building” provides basic principles for monitoring training activities:

“...Performance indicators for capacity development, guidelines and tools will be developed and used to monitor and assess the responsiveness, effectiveness and quality of IPGRI training and capacity development. This will also provide on objective basis for measuring impact over time. Feedback mechanisms need to be built into the activities so that adjustments can be made to ensure improvement of efficiency and effectiveness. Monitoring, evaluation and impact assessment will also be built into training for PGR managers to develop capacity for more effective program management in national institutions”.

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**Table 1: Universities and Institutes providing agricultural training**

<b>Name</b>	<b>Specialty</b>
<b>Kyrgyzstan</b>	
1. Kyrgyz Agrarian University named after K. I. Skryabin	Agronomy, Forestry, Ecology
2. Kyrgyz State National University	Biology, Ecology and Natural Resource Management
3. Kyrgyz State University named after I. Arabaev	Biology, Ecology and Natural Resource Management
4. Dzhalaal-Abad State University	Agronomy, Forestry, Ecology
5. Osh Technological University	Ecology and Natural Resource Management
<b>Kazakhstan</b>	
6. Kazakh National Agrarian University	Agronomy, Crop Breeding and Biotechnology, Plant Industry, Fruit Growing, Gardening and Viticulture, Agro-ecology
7. Kazakh National University named after Al-Farabi	Biology, Biotechnology, Ecology and Natural Resource Management
8. Eurasian National University named after L. M. Gumilev	Biology, Ecology and Natural Resource Management
9. Kazakh Agrarian University named after S. Seifullin	Agronomy, Agro-ecology, Biotechnology
10. Kazakh Economics University named after T. Ryskulov	Ecology and Natural Resource Management
11. Almaty Technological University	Ecology and Natural Resource Management
12. Almaty University of Technology and Business	Ecology and Natural Resource Management
13. Western-Kazakhstan Agrarian Technical University	Agronomy, Agro-ecology, Horticulture
14. Western-Kazakhstan State University named after Utemisov	Ecology and Natural Resource Management
15. Kyzyl-Orda University	Ecology and Natural Resource Management
16. Kostanai State University named after Baitursinov	Agronomy, Animal and Crop Breeding and Biotechnology, Ecology
17. Kokshetau State University named after Ualikhanova	Agronomy, Agroecology, Ecology and Natural Resource Management
18. Pavlodar State University	Agronomy
19. Taraz State University named after Dulati	Agronomy
<b>Tajikistan</b>	
20. Khorog State University named after M. Nazarshoev	Botany, Biology, Ecology
21. Khodjent State University named after B. Gafurov	Biology
22. Tajik National University	Biology
23. Tajik Agrarian University	Agronomy
24. Tajik Pedagogical University named after K. Dzhuraev	Biology
25. Kurgan-Tjube Pedagogical University named after N. Khisrav	Biology

<b>Name</b>	<b>Specialty</b>
26. Kuljab Pedagogical University	Biology
<b>Turkmenistan</b>	
27. Turkmen State University named after Mahtumguli	Biology, Ecology
28. Turkmen Polytechnic Institute	Ecology, Environment Protection
29. Turkmen Agricultural University named after S. Niyazov	Agronomy, Horticulture, Sericulture
30. Turkmen State Pedagogical University named after Seidi	Biology
<b>Uzbekistan</b>	
31. Tashkent State Agrarian University	Agronomy, Horticulture and Viticulture, Forestry, Plant Protection
32. Samarkand Agricultural Institute	Agronomy, Horticulture and Viticulture, Agrochemistry, and Soil Science
33. Tashkent State National University named after M. Ulugbek	Biology, Ecology and Natural Resource Management
34. Samarkand State University	Biology, Agronomy with the Basics of Agriculture
35. Bukhara State University	Biology, Agronomy with the Basics of Agriculture
36. Tashkent State Pedagogical Institute named after Nizami	Biology, Ecology and Natural Resource Management
37. Andijan Agricultural Institute	Agronomy

**Table 2: Colleges and Technical Schools providing agricultural training**

<b>Name of high special school</b>	<b>Specialty</b>
<b>Kazakhstan</b>	
1. Aktubinsk Agricultural College	Agronomy
2. Akmola College of Ecology and Forestry	Protection and Rational Use of Natural Resources
3. Eastern-Kazakhstan Agricultural College	Agronomy
4. Kordai Agricultural College	Agronomy
5. International Kazakh-Turkish University named after Yasau	Plants Protection and Agroecology
6. Talgar College of Agribusiness	Agronomy Plants Protection and Agroecology Fruits and Vegetables Storage and Processing
7. Shymkent Agrarian College	Agronomy Ecology and Rational Use of Natural Resources Fruits and Vegetables Storage and Processing
<b>Kyrgyzstan</b>	
8. Bishkek Agricultural Technical School	Agronomy, Ecology and Environment Protection
9. Osh Agricultural Technical School	Agronomy, Ecology and Environment Protection

<b>Tajikistan</b>	
10. Kurgan-Tjube Agricultural Technical School	Agronomy
11. Dushanbe Polytechnic	Forestry
12. Matchi Technical School	Agronomy
<b>Turkmenistan</b>	
13. Turkmenbashi School of Agribusiness	Agronomy, Biology, Farm Management
14. Bairamali School of Agribusiness	Agronomy, Biology, Farm Management
<b>Uzbekistan</b>	
15. Tashkent Agricultural College	Agronomy, Farm Management
16. Tashkent Agricultural College of Agribusiness	Agronomy, Farm Management Agricultural Products Processing and Storage

**Table 3: Training needs at regional level**

Target Training Group	Subject of Training	Type and duration	Venue	Periodicity, year				
				1	2	3	4	5
1. Policy makers	1.1 Peculiarities of biodiversity conservation; legal aspects of PGR conservation; bio-security	2 day workshop	RTC on molecular markers	1	1	-	-	-
2. Researchers and Instructors	2.1 Analysis of legislation on agrobiodiversity conservation	5 day workshop	RTC on molecular markers	-	1	1	1	-
	2.2 Use of GIS for assessment of agrobiodiversity distribution of (together with point 2.12)	5 day training course	RTC on walnut	1	1	1	-	-
	2.3 Documentation of traditional knowledge on local varieties of horticultural crops and wild fruit species, and their analysis in agrobiodiversity assessment (together with point 4.5)	5 day mobile workshop	RTC on apricot, pomegranate, walnut	-	1	1	1	1
	2.4 Assessment of distribution and level of diversity of priority horticultural crops genetic resources with the use of new methods & technologies	5 day training course + 5 day mobile workshop	RTC on apricot, pomegranate, walnut	1	1	1	1	-
	2.5 Instructors training on participatory approach (tools) in PGR management	1-2 month training course	Training Center abroad which has participatory approach programs	1	-	-	-	-
	2.6 Communications skills with farmers (training of facilitators)	5 day training course	RTC on socioeconomic studies	-	1	1	1	1
	2.7 Participatory approach (tools) in PGR management	5 day training course	RTC on socioeconomic studies	-	1	1	1	1
	2.8 Marketing survey (together with point 4.3)	5 day training course	RTC on socioeconomic studies	-	1	1	1	1
	2.9 Horticultural crops agrobiodiversity assessment with the use of molecular markers	3 month training course with taking degree	RTC on molecular markers	-	-	1	-	-
	2.10 Horticultural crops agrobiodiversity assessment with the use of molecular markers	2 month on-the-job training	RTC on molecular markers	1	1	1	1	1
	2.11 Survey on socioeconomic factors of agrobiodiversity conservation and use	3 day training course	RTC on socioeconomic studies	-	1	1	1	-

Target Training Group	Subject of Training	Type and duration	Venue	Periodicity, year				
				1	2	3	4	5
	2.12 Documentation & information management - GRIS (together with point 2.2)	5 day training course	RTC on walnut	-	1	1	1	1
3. Farmers and local community	3.1 Technology of maintenance and reproduction of local varieties and forms of horticultural crops and wild fruit species	3 day mobile workshop	RTC on apricot, pomegranate, walnut	-	1	1	1	1
	3.2 Assessment & characteristics of local varieties & their wild relatives	5 day mobile workshop	RTC on apricot, pomegranate, walnut	1	1	1	1	1
	3.3 Methods of conservation & reproduction of wild fruit species & tradition methods of the best forms breeding (together with points 3.1 3.2)	5 day mobile workshop	RTC on apricot, pomegranate, walnut	1	1	1	1	1
	3.4 Basics of economics on PGR use and efficient farm household management	3 day training course	RTC on socioeconomic studies	-	1	1	1	1
	3.5 Methods of processing and storage of products (together with point 3.6)	3 day training course + 2 day mobile workshop	RTC on socioeconomic studies	-	1	1	1	1
	3.6 Marketing of horticultural products (together with point 3.5)	3 day training course + 2 day mobile workshop	RTC on socioeconomic studies	1	1	1	1	1
	4. Employees of forestries & reserves	4.1 Methods of conservation & reproduction of wild fruit species (together with point 4.2)	3 day mobile workshop	RTC on apricot, pomegranate, walnut	-	1	1	1
4.2 Methods of facilitation of natural regeneration wild fruit species (together with point 4.1)		3 day mobile workshop	RTC on apricot, pomegranate, walnut	-	1	1	1	1
4.3 Methods of processing & storage of products (together with point 4.4)		3 day training course + 2 day mobile workshop	RTC on socioeconomic studies	-	1	1	1	1
4.4 Marketing of nuciferous products of forestry farms (together with point 4.3)		3 day training course + 2 day mobile workshop	RTC on socioeconomic studies	-	1	1	1	1

Target Training Group	Subject of Training	Type and duration	Venue	Periodicity, year				
				1	2	3	4	5
	4.5 Documentation of traditional knowledge on local varieties of horticultural crops & wild fruit species, & their analysis in agrobiodiversity assessment (together with point 2.3)	3 day mobile workshop	RTC on apricot, pomegranate, walnut	1	1	1	1	1
	4.6 Assessment of distribution & level of diversity of priority horticultural crops genetic resources with the use of new methods & technologies (together with point 4.7)	3 day training course + 2 day mobile workshop	RTC on apricot, pomegranate, walnut	-	1	1	1	1
	4.7 Documentation & information management - GRIS (together with point 4.6)	5 day training course	RTC on apricot, pomegranate, walnut	-	1	1	1	1

**Table 4: Training needs at national level**

Target Training Group	Subject of Training	Type	Duration, days	Number of trainees	Venue	Date
<i>Kyrgyzstan</i>						
1. Policy makers	1.1 Importance of biodiversity in environment protection and securing food security; legal aspects of PGR conservation; bio-security	workshop	1	15	Kyrgyz Agrarian University	2004-2005
2. Researchers & Instructors	2.1. Utilization of GIS on assessment of agrobiodiversity distribution	training course	14	5	RTC on walnut	2004-2006
	2.2. Participatory approach in PGR management	training course	5	2	NTC on horticultural	2004-2008
	2.3..Field studies and characteristics of local varieties of horticultural and nuciferous crops and their wild relatives	mobile workshop together with point 2.10	5		NTC, Botanical Garden, State Commission on Crop Varieties Testing	2005-2008
	2.4. Undertake socioeconomic studies on PGR conservation and use	training course	5	5	NTC	2005-2008
	2.5. English language training	training course	30	10	Kyrgyz Agrarian University	2004-2008
	2.6. Utilization of computer and internet	training course	10	10	Kyrgyz Agrarian University	2005-2008
	2.7. Analysis of legislation on agrobiodiversity conservation	workshop	3	5	State Forest Service	2005-2007
	2.8. Marketing survey on nuciferous crops products	training course together with point 4.4.	5	10	NTC	2005-2008
	2.9. Documentation of traditional knowledge and their use in agrobiodiversity assessment	mobile workshop together with point 2.3	5	14	NTC	2005-2008
3. Farmers & local community	3.1. Technology of maintenance & reproduction of local varieties & forms of nuciferous crops and wild fruit species	mobile workshop	3	10	Kara-Alma Forestry, Issyk-Kul Horticultural Nursery	2005-2008
	3.2. Basics of PGR use and efficient farm household management	training course	3	10	At sites	2005-2008
	3.3. Processing & storage of local varieties & forms of nuciferous crops	training course	3	10	Kyrgyz Agrarian University	2005-2008
	3.4. Use of computer when data documenting	training course	5	10	Kyrgyz Agrarian University	2005-2006
	3.5. Assessment & characteristics of local varieties & their wild relatives	mobile workshop	5	4	NTC	2004-2008

Target Training Group	Subject of Training	Type	Duration, days	Number of trainees	Venue	Date
	3.6. Methods of facilitation of natural regeneration wild fruit species and traditional methods of the best forms breeding	mobile workshop	5	10	NTC	2004-2008
	3.7. Marketing of horticultural products	training course	3	10	NTC	2004-2008
	3.8. Use of computer and internet	training course	10	4	NTC	2004-2008
	3.9. English language training	training course	30	4	NTC	2004-2008
	3.10. Establishment of farm households, cooperatives and associations	training course	10	4	NTC	2004-2008
4. Employees of forestry operations and reserves	4.1. Conservation methods of horticultural & nuciferous crops	mobile workshop	3	10	At sites	2005-2008
	4.2. Development of activities on facilitation of natural regeneration of horticultural and nuciferous crops	mobile workshop together with point 4.3	3	10	At sites Kara-Alma Forestry	2005-2008
	4.3. Breeding of economically valuable forms of horticultural and nuciferous crops	mobile workshop together with point 4.2.	3		At sites	2005-2008
	4.4. Marketing of horticultural products of forestry (together with point 2.9)	mobile workshop	3	10	At sites	2005-2008
	4.5. Documentation of traditional knowledge on local varieties of horticultural crops & wild fruit species, & their analysis in agrobiodiversity assessment	mobile workshop	3	6	NTC, RTC	2004-2008
	4.6. Use of internet and computer	training course	10	10	RTC	2004-2008
	4.7. English language training	training course	30	10	NTC	2004-2008
	4.8. Establishment of farm households, cooperatives and associations	training course	3	4	NTC	2004-2008
<b>Kazakhstan</b>						
1. Policy makers	1.1. Peculiarities of biodiversity conservation; legal aspects of PGR conservation; bio-security	workshop	1	15	NTC	2004-2005
2. Researchers &	2.1. Analysis of legislation on agrobiodiversity conservation	workshop	2	10	RI of Agro-industrial Economy, RTC	2004-2006

Target Training Group	Subject of Training	Type	Duration, days	Number of trainees	Venue	Date
Instructors	2.2. Utilization of GIS on analysis of horticultural crops genetic resources	training course	14	5	RI of Plant Physiology, Genetics & Bio-engineering	2004-2008
	2.3. Documentation and information management	training course together with point 2.4.	5	12	NTC	2005-2008
	2.4. New methods of agrobiodiversity study	training course together with point 2.3.	5	12	NTC	2004-2008
	2.5. Conduct socioeconomic studies on PGR conservation and use	training course	5	4	RTC on socioeconomic studies	2004-2008
	2.6. Use of internet and computer	training course	14	10	NTC	2004-2008
	2.7. English language training	training course	30	10	NTC	2004-2008
	2.8. Participatory approach (tools) in PGR management at national level	training course	5	2	RTC on socioeconomic studies	2005-2008
	2.9. Market survey	training course together with point 3.4.	5	5	RTC on socioeconomic studies	2005-2008
3. Farmers, local community	3.1. Technology of maintenance and reproduction of local varieties and forms of horticultural crops and wild fruit species	mobile workshop together with point 3.2.	5	10	NTC	2004-2008
	3.2. Assessment and characteristics of local varieties and their wild relatives	mobile workshop together with point 3.1.	5	10	NTC	2005-2008
	3.3. Efficient household management	training course	5	10	RTC on socioeconomic studies	2004-2008
	3.4. Marketing survey	training course together with point 2.9..	5	5	RTC on socioeconomic studies	2005-2008
	3.5. Processing & storage of local varieties & forms of nuciferous crops	training course	5	10	NTC	2004-2008
	3.6.. Use of computer and internet	training course	14	4	RTC on socioeconomic studies	2004-2008
	3.7. English language training	training course	30	5	NTC	2005-2008
	3.8. Establishment of farm households, cooperatives and associations	training course	3	5	NTC	2005-2008

Target Training Group	Subject of Training	Type	Duration, days	Number of trainees	Venue	Date
<b>Tajikistan</b>						
1. Policy makers	1.1. Importance of PGR conservation. Legal aspects of PGR conservation; Bio-security	workshop	1	15	NTC	2004-2005
2. Researchers ,Instructors	2.1. Utilization of GIS on assessment of agrobiodiversity distribution	training course	14	8	Tajik Aero-Cosmo Geodesy	2005-2008
	2.2. Participatory methods (tools) in PGR management	training course	5	2	RTC on apricot	2004-2008
	2.3. Field studies with the use of new survey procedures and description of local varieties of horticultural crops and their wild relatives	training course together with point 2.6	5	5	NTC	2004-2008
	2.4. Conduct socioeconomic studies on horticultural crop genetic resources conservation and use	training course	5	5	RTC on apricot	2005-2008
	2.5. Documentation and information management	training course together with point 2.4	14	5	NTC	2004-2008
	2.6. English language training	training course	30	10	NTC	2004-2008
	2.7. Use of computer and internet	training course	10	10	RTC on apricot, NTC	2004-2008
	2.8. Legislation on PGR	workshop	2	10	NTC, RPA Bogparvar	2005-2008
	2.9. Marketing survey	training course together with point 3.4.	3	5	RTC on apricot	2005-2008
3. Farmers & local community	3.1. Significance of local varieties of horticultural crops and wild fruit relatives in economy, their reproduction and protection	mobile workshop together with points 3.2, 3.3	5	10	NTC	2004-2008
	3.2. Technology of maintenance horticultural crops	mobile workshop together with points 3.1, 3.3	5	10	NTC	2004-2008
	3.3. Identification of horticultural crops resistance to extreme conditions of vegetation	mobile workshop together with points 3.1, 3.2	5	10	NTC	2004-2008
	3.4. Economic analysis of farm household management	training course	3	10	RI of Economics & Agricultural Production	2004-2008
	3.5. Traditional methods of local varieties of horticultural crops processing and storage	training course	5	10	RTC on apricot	2004-2008

Target Training Group	Subject of Training	Type	Duration, days	Number of trainees	Venue	Date
	3.6.. Marketing	training course	3	10	NTC	2004-2008
	3.7. Use of computer and internet	training course	14	4	NTC	2004-2008
	3.8. English language training	training course	3	4	NTC	2004-2008
	3.9. Establishment of farm households, cooperatives and associations	training course	3	4	NTC	2004-2008
<b>Turkmenistan</b>						
1. Policy makers	1.1. Importance of conservation local varieties of horticultural crops & wild fruit species for sustainable agricultural production; legal aspects of PGR conservation; biosecurity	workshop	1	10	NTC on horticulture NTC on pistachio	2005-2008
2. Researchers & Instructors	2.1. Utilization of GIS on assessment of agrobiodiversity distribution	training course	14	5	NTC on horticulture NTC on pistachio	2004-2008
	2.2. Use of computer and internet	training course	10	10	NTC on horticulture NTC on pistachio	2004-2008
	2.3. Documentation and information management	mobile workshop together with point 2.6.	5	10	NTC on horticulture NTC on pistachio	2004-2008
	2.4. Field studies & characteristics of local varieties and forms of horticultural crops & their wild relatives with application of new methods of studying of agrobiodiversity	mobile workshop together with point 2.5.	5	10	NTC on horticulture NTC on pistachio	2005-2008
	2.5. Methods of socioeconomic studies on PGR conservation and use	training course	5	5	NTC on horticulture NTC on pistachio	2005-2006
	2.6. English language training	training course	30	10	NTC on horticulture NTC on pistachio	2004-2008
	2.7. Turkmenistan legislation on agrobiodiversity conservation	workshop	2	10	NTC on horticulture NTC on pistachio	2004-2006
	2.8 Participatory approach in PGR management	training course	5	2	NTC	2004-2008
	2.9. Marketing survey	training course together with point 4.2	5	4	NTC on horticulture NTC on pistachio	2004-2008

Target Training Group	Subject of Training	Type	Duration, days	Number of trainees	Venue	Date
3. Farmers & local community	3.1. Technology of maintenance of local varieties and forms of horticultural crops and wild fruit species	mobile workshop together with point 3.2.	5	10	NTC on horticulture	2005-2008
	3.2. Methods of facilitation of natural regeneration wild fruit species and traditional methods of the best forms breeding	mobile workshop together with point 3.1.	5	10	NTC on pistachio	2004-2008
	3.3. Basics of PGR use and efficient farm household management	training course	5	10	NTC on horticulture	2005-2008
	3.4. Methods of products processing and storage	training course	5	10	NTC on horticulture NTC on pistachio	2004-2008
	3.5. Marketing	training course together with point 4.2.	5	10	NTC on horticulture	2004-2008
	3.6. Establishment of farm households, cooperatives and associations	training course	3	4	NTC on horticulture	2004-2008
	4.1. Methods of conservation and reproduction of wild fruit species	mobile workshop	3	10	NTC on pistachio	2004-2008
4. Employees of forestry operations and reserves	4.2. Marketing	training course together with point 3.5.	5	10	NTC on horticulture NTC on pistachio	2004-2008
	4.3. Efficient management of farm household	mobile workshop	5	10	NTC on horticulture NTC on pistachio	2004-2008
	4.4. Documentation of traditional knowledge on horticultural crops & wild fruit species & their analysis in agrobiodiversity assessment	mobile workshop	5	6	NTC on horticulture NTC on pistachio	2004-2008
	4.5. Use of computer and internet	training course	14	10	NTC on horticulture	2004-2008
	4.6. English language training	training course	30	10	NTC on pistachio	2004-2008
	4.7. Establishment of farm households, cooperatives and associations	training course	3	4	NTC on horticulture NTC on pistachio	2004-2008
	<b>Uzbekistan</b>					
1. Policy makers	1.1. Importance of biodiversity conservation; legal aspects of PGR conservation; bio-security	workshop	1	8	Tashkent State Agrarian University	2004-2005

Target Training Group	Subject of Training	Type	Duration, days	Number of trainees	Venue	Date
2. Researchers & Instructors	2.1. Interpretation of policy and legislative documents	workshop	3	5	RI of Genetics & Plant Experimental Biology	2005-2007
	2.2. Utilization of GIS on assessment of agrobiodiversity distribution	training course	14	5	RI of Forestry	2005-2007
	2.3. Assessment of horticultural crops agrobiodiversity with the use of molecular markers	training course	20	20	RI of Genetics and Plant Experimental Biology	2004-2008
	2.4. Documentation and information management	training course	5	5	RI of Genetics & Plant Experimental Biology	2004-2008
	2.5. Participatory approach in studying agrobiodiversity conservation	training course	3	2	RI of Genetics & Plant Experimental Biology	2004-2008
	2.6. Conduct socioeconomic studies on horticultural crops conservation and use	training course	3	5	Institute of Market Reforms	2005-2006
	2.7. Use of computer and internet	training course	14	10	RI of Genetics & Plant Experimental Biology	2004-2008
	2.8. English language training.	training course	30	10	Training Centre of Academy of Sciences	2004-2008
	2.9. Marketing survey	training course together with point 4.2	5	4	RI of Genetics & Plant Experimental Biology	2004-2008
3. Farmers & local community	3.1. Technology of maintenance & reproduction of local varieties & forms of horticultural crops & wild fruit species	mobile workshop together with point 3.3.	3	10	NTC on horticulture	2005-2008
	3.2. Basics of accounting & economic analysis of household management	training course	3	10	NTC on horticultural	2004-2008
	3.3. Methods of facilitation of natural regeneration wild fruit species & traditional methods	mobile workshop together with point 3.1.	3	7	RI of Forestry	2004-2008
	3.4. Processing and storage of local varieties and forms of horticultural nuciferous crops	training course	3	10	RI of Genetics & Plant Experimental Biology	2004-2008
	3.5. Marketing of horticultural products	training course	3	10	RI of Forestry	2004-2008
	3.6. Use of computer and internet	training course	14	4	RI of Genetics and Plant Experimental Biology	2004-2008

Target Training Group	Subject of Training	Type	Duration, days	Number of trainees	Venue	Date
	3.7. English language training	training course	30	4	Training Centre of Academy of Sciences	2004-2008
	3.8. Establishment of farm households, cooperatives and associations	training course	3	4	NTC on horticulture	2004-2008
4. Employees of forestry operations and reserves	4.1. Methods of wild fruit species conservation and breeding of the best forms of wild fruit species	mobile workshop	3	10	RI of Forestry	2004-2008
	4.2. Marketing of wild fruit products of forestry	training course	3	5	RI of Forestry Chatkal Mining & Land-improvement Experimental Station	2005-2008
	4.3. Use of computer and internet	training course	14	10	RI of Genetics & Plant Experimental Biology	2004-2008
	4.4. English language training	training course	30	10	RI of Genetics & Plant Experimental Biology.	2004-2008
	4.5. Establishment of farm households, cooperatives and associations	training course	3	5	NTC on horticulture	2005-2008
	4.6. Documentation of traditional knowledge on horticultural crops & wild fruit species & their analysis in agrobiodiversity assessment	mobile workshop	5	6	RI of Forestry	2005-2008

**Table 5: Facilities to establish Regional Training Centres**

	Item	Regional training centers as per country					Total
		KYR	KAZ	TAJ	TUR	UZB	
		walnut	socio-economic studies	apricot	pome-granate	molecular markers	
1	Hardware	5	-	-	5	5	15
2	Laser Printer	2	-	-	2	2	6
3	Colour Laser Printer	1	1	1	1	1	5
4	Colour Bubblejet Printer	1	1	1	1	1	5
5	Scanner	1	-	-	1	1	3
6	LCD Projector	1	-	-	1	1	3
7	GPS	5	-	-	5	-	10
8	Software	1	-	-	1	1	3
9	TV-set	1	-	-	1	1	3
10	Video Recorder	1	-	-	1	1	3
11	Copy Machine	1	-	-	1	1	3
12	Furniture	5	-	-	5	5	15
13	GIS Program	1		-	1	-	2
14	Digital Video Camera	1	-	-	-	1	2
15	Digital Camera	1	-	-	1	1	3
16	UPS	5	-	-	5	5	15
17	Hardware notebook	1	1	1	1	1	5
18	Fax Machine	1	1	1	1	1	5
19	Air conditioner	1	-	-	1	1	3
20	Refrigerator	1	-	-	1	1	3
21	Plotter	-	-	-	1	1	2
22	Country Electronic Map	-	-	-	1	1	2
23	Overhead Projector	1	-	-	-	1	2
24	Slide Projector	1	-	-	1	1	3
25	Gel Electrophoresis	-	-	-	-	1	1
26	Centrifuge	-	-	-	-	1	1
27	PH meter	-	-	-	-	1	1
28	Spectroscope	-	-	-	-	1	1
29	Gel Scanner	-	-	-	-	1	1
30	Chemical Reagents	-	-	-	-	1	1
31	USB	1	1	1	1	1	5
32	High Cooling Refrigerator					1	1

**Table 6: Facilities needed to establish National Training Centres**

	Item	National training centers as per country								Total
		KYR	KAZ	TAJ		TUR		UZB		
		horticultural crops RI of Farming	horticultural crops RI of Horticulture	horticultural crops “Bogparvar” RPA	horticultural crops Pamirs Institute of Biology	pistachio NI of Deserts, Flora & Fauna	horticultural crops RI of Farming	nuciferous crops RI of Forest	horticultural crops RI of Horticulture, Viticulture & Wine Making	
1	Hardware	5	5	5	3	3	3	5	3	32
2	Laser Printer	2	2	2	1	1	1	1	1	11
3	Scanner	1	1	1	1	1	1	1	1	8
4	LCD Projector	1	1	1	1	1	1	1	1	8
5	GPS	5	5	5	5	3	3	5	5	36
6	Software	1	1	1	1	1	1	1	1	8
7	TV-set	1	1	1	1	1	1	1	1	8
8	Video Recorder	1	1	1	1	1	1	1	1	8
9	Copy Machine	1	1	1	1	1	1	1	1	8
10	Furniture	5	5	5	3	3	3	3	3	30
11	GIS Program	1	-	1	-	-	-	1	-	3
12	Digital Video Camera	1	1	1	1	-	1	-	-	5
13	Digital Camera	1	1	1	1	1	1	1	1	8
14	UPS	5	5	5	3	3	3	3	3	30
15	Hardware notebook	1	1	1	1	1	1	1	1	8
16	Fax Machine	1	1	1	1	1	1	1	1	8
17	Air conditioner	1	1	1	1	1	1	1	1	8
18	Refrigerator	1	1	1	1	1	1	1	1	8
19	Plotter	1	1	1	-	-	-	-	-	3
20	Country Electronic Map	1	1	1	-	-	-	-	-	3
21	Overhead Projector	1	1	1	1	-	-	1	1	6
22	Slide Projector	1	1	1	1	1	1	1	1	8
23	USB	1	1	1	1	1	1	1	1	8

## ANNEX M: MONITORING AND EVALUATION PLAN

The objective of monitoring and evaluation is to assist all project participants in assessing project performance and impact, with a view to maximizing both. Monitoring is the continuous or periodic review and surveillance by management of the implementation of an activity. Monitoring helps to ensure that all required actions are proceeding according to plan. Evaluation is a process for determining systematically and objectively the relevance, efficiency, effectiveness, and impact of the activities in light of their objectives. Ongoing evaluation is the analysis, during the implementation phase, of continuing relevance, efficiency, and effectiveness and the present and likely future outputs, effects, and impacts.

The general and specific objectives of the project, and the list of its planned outcomes, have provided the basis for this M&E plan. The project will be evaluated on the basis of execution performance, outputs delivery, and project impact (outcomes per the project logframe.)

### EXECUTION PERFORMANCE

Execution monitoring will assess whether the management of project activities is efficient. It seeks to improve efficiencies when needed so as to improve overall effectiveness of project implementation. It is a continuous process, collecting information about the execution of activities programmed from the annual workplans, advising on improvements to methods and performance, and comparing accomplished with programmed tasks. This activity will be the direct responsibility of the Project Implementation Unit (PIU), under the supervision of the Steering Committee. See Table 1 for the execution performance indicators. The UNEP Project management officer will, in collaboration with the PIU, track these indicators.

**Table 1: Indicators for evaluating whether the project implementation unit and steering committee are operating effectively**

Indicator	Means of Verification <sup>7</sup>
Quarterly and annual activity progress reports are prepared in a timely and satisfactory manner	Arrival of reports to UNEP
Quarterly financial reports are prepared in a timely and satisfactory manner.	Arrival of reports to UNEP
Performance targets, outputs, and outcomes are achieved as specified in the annual work plans.	Semi annual and Annual progress reports
Deviations from the annual work plans are corrected promptly and appropriately. Requests for deviations from approved budgets are submitted in a timely fashion.	Work plans, minutes of SC meetings, timely submission of revised budget to UNEP for approval
Disbursements are made on a timely basis, and procurement is achieved according to the procurement plan.	IMIS system at UNEP and Bank Account statements of executing agency
Report on the procurement of non-expendable equipment against the project budget filed in a timely manner.	Inventory of Non-Expendable Equipment reports

<sup>7</sup> The responsible officer to track this will be the GEF project task manager in consultation with the project manager.

Audit reports and other reviews showing sound financial practices.	Audit statements
International Steering Committee (ISC) is tracking implementation progress and project impact, and providing guidance on annual work plans and fulfilling TOR.	Minutes of ISC meetings
ISC is providing policy guidance, especially on achievement of project impact.	Minutes of ISC meetings

#### DELIVERED OUTPUTS

Ongoing monitoring will assess the project's success in producing each of the programmed outputs, both in quantity and quality. Internal assessment will be continuously provided by the PIU, and mid-term and final evaluations of outputs will be carried out by external consultants contracted by UNEP. See Table 2 for a summary of expected outputs by project component, and Annex G (Project Timeline) for a detailed list of project activities and corresponding outputs.

**Table 2: Description and timing of expected outputs by project component**

Project Components	Outcomes (O) and Milestones (M)
<b>1. Policy options</b>	<p><b>M</b> Full analysis of the existing national legislation on conservation of wild fruit species in protected areas and other forest lands completed in each country. Month 12, Y3</p> <p><b>M</b> Full analysis of the existing national legislation on agriculture, farm development, and Farmers' Rights completed in each country. Month 12, Y3</p> <p><b>M</b> Information about local varieties of horticultural crops and wild fruit species for publication in brochures, posters and leaflets collected. Month 12, Y2.</p> <p><b>M</b> Information about value and importance of local varieties of horticultural crops and wild fruit species collected to produce video. Month 12, Y3.</p> <p><b>M</b> Information on farmers maintaining local varieties of horticultural crops and wild fruit species, their experience and knowledge collected to produce video. Month 12, Y3</p> <p><b>M</b> Information on project activities for Web site prepared. Month 6, Y3</p> <p><b>M</b> Round tables with farmers and local communities held. Month 12, Y2</p> <p><b>M</b> Preparation for organization of agro-theaters in rural schools completed. Month 6, Y3</p> <p><b>O</b> Recommendations on enlargement of existing and establishment of new protected areas to cover diversity of wild fruit species produced. Month 12, Y4</p> <p><b>O</b> Recommendations to improve farmer's activity on conservation of local varieties of horticultural crops and wild fruit species developed. Month 12, Y4</p> <p><b>O</b> Workshops with the representatives of governments sectors organised. Month 12, Y2,3</p> <p><b>O</b> Proposals on protection of Farmers' Rights produced. Month 12, Y4</p> <p><b>O</b> Benefit sharing mechanism among partners developed. Month 12, Y4</p> <p><b>O</b> Public awareness material (brochures, posters and leaflets) developed. Month 12, Y3</p> <p><b>O</b> Public awareness material (video films) developed. Month 12, Y3</p> <p><b>O</b> Web site on project outputs for broad utilization produced. Month 12, Y3</p> <p><b>O</b> Agro-theater performances. Month 12, Y3</p>

<p><b>2. Knowledge and methodologies</b></p>	<p><b>M</b> Survey missions to assess distribution and level of diversity of target wild fruit species and local/traditional varieties of horticultural crops conducted. Month 12, Y3</p> <p><b>M</b> Information for database establishment collected. Month 12, Y3</p> <p><b>M</b> Information for brochures on description of local varieties of priority horticultural crops and wild fruit species collected. Month 6, Y4</p> <p><b>M</b> Traditional skills and knowledge of farmers and local communities on maintenance, processing, and storage of products of horticultural crops studied and documented. Month 6, Y4</p> <p><b>M</b> Missions in selected agroecological zones for establishment of demonstration plots conducted. Month 6, Y2</p> <p><b>M</b> Key farmers who maintain nurseries for planting local varieties of horticultural crops and promising forms of wild fruit species identified. Month 12, Y2</p> <p><b>M</b> Equipment and tools for nurseries provided. Month 6, Y3</p> <p><b>M</b> Requirements of farmers in planting stock of horticultural crops determined. Month 6, Y3</p> <p><b>M</b> Protocols of agreements on access to the database and uses of data developed. Month 12, Y3</p> <p><b>M</b> Facilities for farmers and local communities to access the database provided. Month 12, Y3</p> <p><b>M</b> Best varieties of horticultural crops and their wild relatives with economically valuable features identified for development of recommendations to use them for breeding purposes and non-breeding programs. Month 12, Y3</p> <p><b>M</b> Socioeconomic assessment of the status of farms undertaken. Month 12, Y3</p> <p><b>O</b> Digital database on assessment of diversity distribution and level of genetic resources of priority fruit species established. Month 12, Y3</p> <p><b>O</b> Database on adaptive traits that can improve farmers' resilience to variable <i>in situ</i>/on-farm environments established. Month 12, Y3</p> <p><b>O</b> Brochures on description of local varieties of priority horticultural crops and wild fruit species produced. Month 12, Y4</p> <p><b>O</b> Brochure and video about traditional knowledge on maintaining local varieties of horticultural crops and wild fruit species, and processing and storage of horticultural products produced. Month 6, Y4</p> <p><b>O</b> Demonstration plots and forest sites of local varieties of horticultural crops and wild fruit species established. Month 12, Y2</p> <p><b>O</b> Nurseries to reproduce local varieties of horticultural crops and promising forms of wild fruit species established. Month 12, Y3</p> <p><b>O</b> Methodologies on reproduction of local varieties of project fruit species developed. Month 12, Y5</p> <p><b>O</b> Network of databases on local varieties of horticultural crops and wild fruit species maintained on farms and in forest sites. Month 3, Y5</p> <p><b>O</b> Recommendations for using local varieties of horticultural crops and wild fruit species for breeding purposes and non-breeding programs developed. Month 3, Y5</p> <p><b>O</b> Proposals on modification of methods for running farm households developed. Month 8, Y4</p> <p><b>O</b> New technologies for producing fruit crops products and adding value promoted. Month 6, Y4</p> <p><b>O</b> Scientific guidelines on technology of growing the best local varieties of horticultural crops and promising forms of wild fruit species developed. Month 12, Y4</p> <p><b>O</b> Knowledge of farmers and local communities on marketing of fruit crop products increased. Month 6, Y4</p> <p><b>O</b> Guidelines on technology of growing the best local varieties of fruit crops developed. Month 3, Y4</p>
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<p><b>3. Broad participation and strong partnership</b></p>	<p><b>M</b> Mission to pilot sites to establish Multidisciplinary Site Committees held, members of Coordination Committees identified. Month 8, Y1</p> <p><b>M</b> Analysis of status of linkages and constraints between/among all stakeholders undertaken. Month 6, Y2</p> <p><b>M</b> Information on farmers' achievements collected. Month 12, Y3</p> <p><b>M</b> Information on farmers maintaining local varieties of horticultural crops and wild fruit species compiled. Month 12, Y2</p> <p><b>M</b> Equipment for electronic communication for partners provided. Month 6, Y2</p> <p><b>M</b> Information on partners to establish database collected. Month 12, Y1</p> <p><b>M</b> Scientific articles on agrobiodiversity prepared. Month 6, Y5</p> <p><b>O</b> Multidisciplinary Site Committees established. Month 12, Y1</p> <p><b>O</b> Site Coordination Committees established. Month 12, Y1</p> <p><b>O</b> Report on links and constraints between/among all stakeholders developed. Month 12, Y2</p> <p><b>O</b> Agreements on collaboration between institutions and countries developed. Month 12, Y2</p> <p><b>O</b> Database on farmers' achievements established. Month 12, Y3</p> <p><b>O</b> Information bulletin on farmers maintaining local varieties of horticultural crops and wild fruit species published. Month 12, Y2</p> <p><b>O</b> Database on partners for exchange of information established. Month 6, Y2</p> <p><b>O</b> Annual farmers' achievement fairs on products of on-farm conservation of horticultural crops organized. Month 12, Y3</p> <p><b>O</b> Farmer associations established and maintaining local varieties of horticultural crops in each country. Month 6, Y3</p> <p><b>O</b> Scientific and practical conferences on agrobiodiversity organized. Month 6, Y5</p>
<p><b>4. Capacity building</b></p>	<p><b>M</b> Appropriate facilities for training, field surveys and data analysis, ICT, tools for cultivating in nurseries provided. Month 12, Y1</p> <p><b>M</b> Training programs and manuals for different categories of trainees developed. Month 6, Y2</p> <p><b>O</b> Researchers with expertise on interdisciplinary approaches to <i>in situ</i>/on-farm conservation of fruit species available. Month 12, Y5</p> <p><b>O</b> Representatives of farmer associations have improved their skills in agrobiodiversity management. Month 12, Y4</p> <p><b>O</b> Three Regional Training Centers established. Month 6, Y2</p> <p><b>O</b> Eight National Training Centers on priority species established Month 6, Y2</p> <p><b>O</b> Regional Information Communication Network established. Month 12, Y2</p> <p><b>O</b> Training of identified target groups conducted Month 12, Y5</p>

## PROJECT IMPACT

Evaluation of the project's success in achieving its outcomes will be monitored continuously throughout the project through semi-annual progress reports, annual summary progress reports, a mid-term and final evaluation, all of which will use the project logframe as a monitoring, evaluation, and reporting tool (See Project Logframe, Annex B). Table 3 presents the key performance indicators. Methods of data collection must strive to ensure that reliable baseline data is collected and that data is collected regularly throughout project implementation. The list of performance indicators should also include interim indicators and numerical targets with timeframes. The UNEP project management officer will work closely together with the project coordinator to complete this task.

**Table 3. List of Key Performance Indicators**

	Key performance indicator	Baseline (if baseline is not known, please identify how and when baseline will be established)	Method of data collection/Data collection strategy (including frequency)
<i>Development objective:</i> <i>In situ/on-farm</i> conservation and utilization of horticultural crops and wild fruit species are ensured for sustainable agricultural development, food security and environmental stability	<a href="#">Sustainably maintained materials in areas covered by horticultural crop varieties and wild fruit species of the target crops in pilot sites increased by 20% (333,555 hectares)</a>  At least 50% of target farmers and forest dwellers improve their livelihood by 10% through better management and use of their fruit genetic resources	Currently about 10% (1,667,750 hectares) of the project site area is covered with horticultural crops and wild fruit species in each country.  A methodology for the study of socio-economic aspects on management of local varieties of horticultural crops was developed jointly by IPGRI and IFPRI and tested in Uzbekistan and Turkmenistan under the support of CAPRI in 2002.	Information will be provided through national reports prepared on the basis of survey missions to pilot sites on yearly basis.  Using the developed methodology, social, cultural, economic and nutritional data will be gathered and analysed during the first six months of the project and again at the end of the project to measure changes in the livelihood
<i>Project purpose (immediate objective):</i> Farmers, institutes and local communities are	<i>By 2009:</i> At least four methodologies for <i>in situ/on-farm</i> conservation of priority horticultural crops and wild fruit species are developed and made available to stakeholders in the five project countries.	Baseline does not exist. There is no separate methodology for <i>in situ/on-farm</i> conservation for horticultural crops. There are only methodologies on assessment of wild fruit species and some on-farm training guides in the countries. The regional methodology on	Review of content of existing on-farm training guides will be completed during the first year.

	<b>Key performance indicator</b>	<b>Baseline (if baseline is not known, please identify how and when baseline will be established)</b>	<b>Method of data collection/Data collection strategy (including frequency)</b>
provided with and use knowledge, methodologies, and policies to conserve <i>in situ/on-farm</i> horticultural crops and wild fruit species in Central Asia.	<p>At least two policy recommendations that support and strengthen farmers' activity on conservation of local varieties of horticultural crops and wild fruit species are developed and submitted to policy makers in each country.</p> <p>At least 20% (equivalent to 540) of farmers and forest dwellers at the pilot sites will implement the new methods to conserve and use horticultural fruit trees</p> <p>At least two associations of farmers are established and maintaining local varieties of horticultural crops in each country.</p> <p>At least two representatives of farmers' associations or individual farmers participating in national programs/committees on plant genetic resources conservation in each country.</p>	<p>assessment of diversity and <i>in situ/on-farm</i> conservation, developed within PDF B phase, will be used and improved during the project implementation.</p> <p>A list of existing laws that influence crop diversity maintenance in each country were developed during PDF B phase (see Annex E). There are currently no policy recommendations based on the cost and benefits of maintaining local crop diversity by farmers</p> <p>Baseline does not exist. No activities on training farmers and forest dwellers were held during PDF B phase, however farmers were invited and participated in the national workshops. As outlines in the Training Strategy (Annex L) farmers and forest dwellers will be trained throughout the project.</p> <p>There are no separate official farmer associations maintaining local varieties of horticultural crops, only farmer associations in each country, which deal with general agriculture issues, and individual farmers maintaining horticultural crops.</p> <p>Individual farmers have been included in national Multidisciplinary Sites Committees established in pilot sites, and participated in project activities during the PDF ? phase. No farmers are currently on the national programme committee.</p>	<p>Policy making procedures will be investigated during the first and second years of the project. Policy recommendations will be prepared on the basis of completed analyses on legislation and submitted to policy makers by year 5 of project implementation.</p> <p>Reports on number of people trained will be provided from training centers and field training, beginning in year 2 of the project.</p> <p>Registration records of farmers' associations &amp; information on farmers conserving local varieties will be established during the first year.</p> <p>Reports from Multidisciplinary Site Committees, list of members of Site Coordination Committees and National SC by year 1 of project implementation.</p>

	<b>Key performance indicator</b>	<b>Baseline (if baseline is not known, please identify how and when baseline will be established)</b>	<b>Method of data collection/Data collection strategy (including frequency)</b>
<b>Outcome 1</b> <b>Policy options for supporting farmers and local communities to conserve <i>in situ</i>/on-farm local varieties of horticultural crops and wild fruit species are available and used.</b>	1.1 At least two policy recommendations that support and strengthen farmers' activity on conservation of local varieties of horticultural crops and wild fruit species are developed and submitted to policy makers in each country by 2009.	1.1 A list of existing laws that influence crop diversity maintenance in each country were developed during PDF B phase (see Annex E). There are currently no policy recommendations based on the cost and benefits of maintaining local crop diversity by farmers	1.1 Policy making procedures will be investigated during the first and second years of the project. Policy recommendations will be prepared on the basis of completed analyses on legislation and submitted to policy makers by year 5 of the project.
	1.2 Implementation of policy recommendations begins at least in one country.	1.2 An inventory of existing policies and legislation concerning agrobiodiversity in Central Asia compiled	1.2 Data collection through consultancy reports and policy makers workshops during first and second years
	1.3 Material to help increase public awareness (brochures, leaflets, posters, one video, radio and television programs, and web presentations) about value of local varieties of horticultural crops and their wild relatives prepared, published, and disseminated in each country by 2007.	1.3 There are public awareness materials (brochures, posters, leaflets, video, mass media info) on general agriculture issues in each country, but not specific materials on value of local varieties of horticultural crops and their wild relatives.	1.3 Publications, video, and mass media info will be prepared, based on the information received from partners during the first and second years, and database on the outcomes of the project will be developed and available on website by year 3 of the project.
	1.4 At least two recommendations on establishment/development of benefit sharing mechanism are developed and submitted to policy makers by 2009.	1.4 Benefit sharing mechanism among partners in cases where genetic material is conserved by farmers and used for breeding purposes is developed in some of the countries and could be used as an example for other countries. No benefit sharing mechanism for materials used outside of breeding exist.	1.4 Benefit sharing mechanism will be based on completed analyses of national legislation and benefit sharing legislation of other countries during the first years, and recommendations will be submitted to policy makers by the end of the project.
	1.5 Benefit sharing mechanism is developed and field tested	1.5 Benefit sharing mechanism among partners	1.5 Policy makers workshops will result in the selection of

	<b>Key performance indicator</b>	<b>Baseline (if baseline is not known, please identify how and when baseline will be established)</b>	<b>Method of data collection/Data collection strategy (including frequency)</b>
	at least in one country by 2009.	in cases where genetic material is conserved by farmers and used for breeding purposes is developed and selected for field testing in some of the countries and could be used as an example for other countries.	options for field testing in some countries during the third year
<b>Outcome 2 Knowledge and methodologies on <i>in situ</i>/on farm conservation and utilization of horticultural crops and wild fruit species are available, disseminated and used.</b>	<p>2.1 Four methodologies on assessment of distribution and diversity level and status of <i>in situ</i>/on-farm conservation for project seed and stone fruits, and nut and subtropical crops<sup>8</sup> are developed and available for farmers' use by 2008.</p> <p>2.2 Five national and one regional databases on local varieties of horticultural crops and wild fruit species are developed and available for use in each country by 2008.</p> <p>2.3 Database on adaptive traits that can improve farmers' resilience to variable <i>in situ</i>/on-farm environments.</p>	<p>2.1 Baseline does not exist. There is no separate methodology for <i>in situ</i>/on-farm conservation for horticultural crops. Methodologies exist on assessment of wild fruit species and annual crop diversity maintained on farm some on-farm training guides in the countries. The regional methodology on assessment of diversity and <i>in situ</i>/on-farm conservation, developed during PDF B phase, will be used and improved during the project implementation.</p> <p>2.2 There are databases of <i>ex-situ</i> collections of the research institutes in each country and databases on wild species in some of the countries, but no database on <i>in situ</i> or on-farm material exists national or regionally.</p> <p>2.3 Preliminary survey inventory of <i>in situ</i>/on-farm varieties and wild fruit species in 8 project sites in the 5 countries during PDF B phase</p>	<p>2.1 Survey missions will be conducted during the first three years and methodologies for different groups of horticultural crops will be developed after receiving the results of the missions in the year 4 of the project.</p> <p>2.2 Data on local varieties of horticultural crops and wild fruit species in each country will be documented during first 3 years and integrated into computerized database by year 4. Protocols on agreements on access for data will be established.</p> <p>2.3 Reports by the local multidisciplinary site committees on results of evaluation of tested varieties and wild fruit species for environmental adaptation will be prepared during the first 3 years</p>

<sup>8</sup> Seed fruit crops: apple, pear, grapevine; Stone fruit crops: apricot, alycha, peach; Nut crops: pistachio, walnut, almond; Subtropical crops: pomegranate, fig

	<b>Key performance indicator</b>	<b>Baseline (if baseline is not known, please identify how and when baseline will be established)</b>	<b>Method of data collection/Data collection strategy (including frequency)</b>
	<p>2.4 Information bulletins on market preferences for fruit products for farmers' use are published annually in each country starting from 2007.</p> <p>2.5 At least two mini-nurseries for multiplication of local varieties of horticultural crops and promising forms of wild fruit species are established or strengthen existing ones in farm households and forest farms in project sites in each country by 2006.</p> <p>2.6 At least four demonstration plots of <i>in situ</i>/on farm conservation of local varieties of horticultural crops and wild fruit species are established in each country by 2007.</p>	<p>2.4 Separate bulletin for fruit products does not exist. There are public awareness material (bulletins, magazines, etc) in each country with general information on agriculture.</p> <p>2.5 There are no separate nurseries for multiplication of the best local varieties of horticultural crops and promising forms of wild fruit species in farm households and forest farms. There are some general nurseries for growth of seedlings and forest trees managed by forest departments and research Institutes.</p> <p>2.6 Two project sites were established in each country during PDF-B phase but not all stakeholders fully involved. Demonstration plots will be established on the project sites in each country.</p>	<p>2.4 Information for bulletin will be collected, annual issues published, starting from 2007.</p> <p>2.5 The number of existing nurseries, their capacity and functions will be reviewed by each country during the first six month of the Project</p> <p>2.6 Reports from national coordinators about activities implementation are provided by year 3.</p>
<b>Outcome 3 Broad participation and strong partnership/links among farmers, among farmers and institutions, between farmers and institutions, and private sector, and among countries are established.</b>	<p>3.1 At least two farmers' associations are established and maintaining local varieties of horticultural crops in each country by 2006.</p> <p>3.2 At least five agreements for collaboration on access and exchange of database information among institutions in each country and among countries are developed and adopted by 2007.</p>	<p>3.1 Farmers' Associations have their departments in all provinces of the country, including project sites, but do not systematically address issues of local varieties. There are no separate farmer associations interested in local varieties of fruit crops diversity conservation, only individual farmers interested in local varieties of fruit crops.</p> <p>3.2 There are no agreements on collaboration on access and exchange of database information currently between project partners.</p>	<p>3.1 Records of current activities of farmer associations will be compiled during the first six months of the project.</p> <p>3.2 Reports from national coordinators, agreements on collaboration on access and exchange of information will be provided by year 2 of project implementation.</p>

	<b>Key performance indicator</b>	<b>Baseline (if baseline is not known, please identify how and when baseline will be established)</b>	<b>Method of data collection/Data collection strategy (including frequency)</b>
	3.3 At least two representatives of farmers' associations or individual farmers participate in national programs/committees on plant genetic resources conservation in each country by 2006.	3.3 Farmers' responsibilities and involvement in national decision making is not known and will be determined by year 2 of project implementation, upon establishment of Multidisciplinary Site Committees in all project sites in each country. Separate farmers were involved in Multidisciplinary Site Committees in 2 pilot sites established in each country during PDF B phase.	3.3 Review of attendance lists from national committees related to biodiversity conservation and agricultural development will be completed during the first year of the project to determine the presence of farmers in these committees
	3.4 A regional digital database on project partners for information exchange is established and accessible in each country by 2007.	3.4 Digital database on partners does not exist. The stakeholders and partners were identified during PDF B phase.	3.4 Protocols for data collection will be established, digital database on partners will be developed and accessible on website by year 3.
	3.5 Multidisciplinary Site Committees are operational in all project sites to coordinate project activities at village level within six months of project initiation.	3.5 Two Multidisciplinary Site Committees were established in two pilot sites in each country during PDB phase.	3.5 Reports from national coordinators about activity implementation, list of members of all Multidisciplinary Site Committees provided by year 1.
	3.6 Site Coordination Committees are established in each county and are operating to coordinate and link the work of the Multidisciplinary Site Committees to the national management structure by 2005.	3.6 Site Coordination Committees do not yet exist.	3.6 Reports from national coordinators about activity implementation, list of members of Site Coordination Committees provided by year 1.
	3.7 Annual diversity fairs for fruit crops are organized in each partner country starting from 2007.	3.7 Diversity fairs are currently used in the region to promote general agrobiodiversity issues, but do not deal with local varieties of fruit crops.	3.7 Diversity fairs are organized starting from year 3 of project implementation; reports from national coordinators provided.
	3.8 Five national and one regional conference on agrobiodiversity are organized by 2009.	3.8 No conferences organized	3.8 Conference proceedings and publication of articles by year 5.

	<b>Key performance indicator</b>	<b>Baseline (if baseline is not known, please identify how and when baseline will be established)</b>	<b>Method of data collection/Data collection strategy (including frequency)</b>
<b>Outcome 4 Capacity for training and support activities on <i>in situ</i>/on-farm conservation and use of fruit species genetic resources is established.</b>	4.1 Three regional training programs (on priority crop species and on molecular markers) are operational by 2006.	4.1 Regional training programmes defined in Tajikistan and Kazakhstan (for apricot GR and socio-economic studies respectively) established during PDF-B phase.	4.1 Regional training centers in other 3 countries will be established by first and second years of project implementation. Annual Reports on center activities, training materials are published and disseminated.
	4.2 Eight national training programs on priority horticultural crops are operational in participating countries by 2006.	4.2 Capacity for training exists; national training research institutes exist to house the training programmes but lack adequate facilities.	4.2 National training centers will be established by first and second years. Annual Reports on centers' activities, training materials are published and disseminated.
	4.3 At least four researchers with expertise on interdisciplinary and participatory approach to <i>in situ</i> /on-farm conservation and use of fruit species are available in each country by 2009.	4.3 Currently no researchers with expertise on interdisciplinary and participatory approach within the project partners exist.	4.3 Annual Reports on centers' activities, training materials are published and disseminated.
	4.4 At least four representatives of farmers' associations or individual farmers and forest dwellers in each country have improved their knowledge and skills in agrobiodiversity management by 2009.	4.4 Representatives of farmers' associations and local farmers are not currently involved in training in agrobiodiversity management.	4.4 Annual Reports on centers' activities, training materials are published and disseminated.
	4.5 Regional ICT network is established by 2006.	4.5 No regional network exists.	4.5 ICT Network is available by year 2 and information on agrobiodiversity is being exchange through partners.

**Table 4: Monitoring, Reporting, and Evaluation Responsibilities**

<b>UNEP</b>	<b>Regional-level Project Implementation Unit (PIU)</b>	<b>National-level Project Implementation Unit</b>	<b>National Steering Committee (NSC)</b>	<b>International Steering Committee (ISC)</b>	<b>Multidisciplinary Site Committees</b>	<b>Site Coordination Committee</b>
<p>Monitor the agreed M&amp;E plan in accordance with the terms of agreement with GEFSEC.</p> <p>Receive quarterly progress and financial reports and annual summary progress reports and copies of all substantive reports from Regional-level PIU.</p> <p>Project management officer to attend and participate fully in meetings of ISC.</p> <p>Project managementto conduct annual supervision missions(oron as needed basis) with member(s) of the</p>	<p>Establish reporting guidelines for all partners in the project, ensure that they meet reporting dates, and provide reports of suitable quality.</p> <p>Prepare quarterly progress and annual summary progress reports for UNEP, and forward substantive and quarterly financial reports, with supporting documentation as appropriate, in a timely manner to UNEP.</p> <p>Carry out a program of regular visits to project sites to supervise activities, and pay special attention to those sites with serious</p>	<p>Prepare quarterly progress and annual summary progress reports for the Regional-level PIU, and forward substantive and quarterly financial reports with supporting documentation, as appropriate.</p> <p>Carry out a program of regular visits to project sites to supervise activities.</p>	<p>Receive quarterly progress and annual summary progress reports and all substantive reports and outcomes and use them to annually review the project progress at national level .</p> <p>Advise PIU on implementation problems that emerge, and on desirable modifications to the work plan for the succeeding year.</p> <p>Monitor progress in the capacity-building aspects of the national project component, and advise the PIU on steps to enhance</p>	<p>Receive quarterly progress and financial reports, annual summary progress reports and all substantive reports, and provide policy guidance to the project on any matters arising from a reading of these reports.</p> <p>Assist the PIU in developing linkages with other projects, thus ensuring the wider impact of project work.</p> <p>Provide overall guidance for the project implementation.</p>	<p>Provide the framework within which different stakeholder groups cooperate at the local level.</p> <p>Assist in implementation of the project activities.</p> <p>Provide assistance in conducting survey missions.</p> <p>Involve farmers conserving local varieties of fruit species in project activities.</p> <p>Assist in organizing demonstration plots and establishing nurseries.</p> <p>Establish relationships between project</p>	<p>Links Multidisciplinary Site Committees within the country, ensuring that lessons learned are shared among the sites and with national and regional level operations.</p> <p>Hold two meetings each year at least two weeks prior to NSC meetings to ensure delivery of all recommendations and suggestions of SCC to NSC.</p>

member(s) of the PIU to selected project sites, identify implementation problems, and suggest remedies to annual meeting of the ISC.

Engage and prepare terms of reference for independent M&E consultants to conduct the mid-term and final evaluations.

Facilitate the selective review of the project by STAP (as appropriate).

Carry out other monitoring as is determined in collaboration with the project ISC.

sites with serious implementation problems.

steps to enhance this aspect of the project.

implementers and households with gardens.

#### **Notes to Table 4:**

**National-level Project Implementation Unit** consists of: National Coordinator, Program Assistant, Short-term National Consultants. Each country has identified the Institute that will serve as the national-level Project implementing agency.

**National Steering Committees (NSC)** will be established in each participating country to provide general oversight and guidance to the project, facilitate interagency coordination, and monitor national-level activities. NSCs will hold their meetings two times per year. The Committee will include representatives from: Ministry of Agriculture, Ministry of Nature Protection, Academy of Sciences, Ministry of Education, State Forest Service, Site Coordination Committee, farmer associations, farmers, and NGOs.

**A Regional-level Project Implementation Unit (PIU)** will play a role in supporting project implementation at the regional level. The regional-level PIU will be established at the IPGRI-CWANA sub-regional office in Tashkent and appoint staff (Regional Project Coordinator, Assistant Regional Project Coordinator, and Program Bilingual Assistant) with specific project management and coordination responsibilities. The Regional Project Coordinator will coordinate implementation of work plans in all 5 countries. The Regional Project Coordinator will be responsible for developing quarterly progress and financial reports, with inputs from national management units. These reports will be important monitoring tools, as they will be carefully tracked by both the NSCs and the ISC. These bodies will be responsible for assessing successes, ensuring that effective approaches are replicated to the extent possible, and that difficulties are addressed. When problems arise, members of the NSCs and ISC are expected to help craft solutions and follow the result of their execution.

**An International Steering Committee (ISC)** will be established to oversee project implementation. It will include representatives from all implementing agencies at the national level (National Coordinators), the Regional Coordinator, as well as IPGRI and UNEP/GEF. The ISC will hold its meetings two times per year.

**Multidisciplinary Site Committees** will be established for each project site and will include representation from all key stakeholder groups, including farmers, forest residents, and local authorities.

**The Site Coordination Committee** in each country will link the Multidisciplinary Site Committees within that country, ensuring that lessons learned are shared among the sites and with national and regional level operations. The Site Coordination Committee will include one representative from each Multidisciplinary Site Committee, and one member will sit on the National Steering Committee. The Site Coordination Committee will hold two meetings each year at least two weeks prior National Steering Committee meetings to deliver all recommendations and suggestions of SCC to NSC.

**Table 5: Monitoring and progress reports**

This table describes the key content required in the quarterly progress and financial reports.

<b>Report</b>	<b>Format and Content</b>	<b>Timing</b>	<b>Responsibility</b>
<p><b>Progress Reports</b></p> <p>Document the completion of planned activities, and describe progress in relation to the annual operating work plan.</p> <p>Review any implementation problems that impact on performance.</p> <p>Summarize problems and proposed solutions.</p> <p>Provide adequate substantive data outcomes for inclusion in consolidated project quarterly and annual progress reports.</p> <p>Highlight achievements.</p>	<p>Reports will use standard UNEP Progress Report format.</p> <p>The project logframe will be attached to each report and progress reported against outcomes and output indicators.</p>	<p>Half-yearly, within 30 days of end of each reporting period.</p>	<p>Regional-level PIU.</p>
<p><b>Consolidated Annual Summary Progress Reports</b></p> <p><b>Project Implementation Review (PIR) reports</b></p> <p>Presents a consolidated summary review of progress in the project as a whole, in each of its activities and in each output.</p> <p>Provides summary review and assessment of progress under each activity set out in the annual workplan, highlighting significant results and progress toward achievement of the overall work program.</p> <p>Provides a general source of information, used in all general project reporting.</p>	<p>Per GEFSEC format.</p> <p>Reports will use a standard format to be developed following the UNEP Progress Report model.</p> <p>The project logframe will be attached to each report and progress reported against outcome and output indicators.</p> <p>A consolidated summary of the half-yearly reports.</p> <p>Summary of progress and of all project activities.</p> <p>Description of progress under each activity and in each output..</p> <p>Review of delays and problems, and of action proposed to deal with these.</p>	<p>Yearly (after project has been under implementation for one year)</p> <p>Yearly, within 45 days of end of the reporting period.</p>	<p>UNEP Project management officer</p> <p>Regional-level PIU.</p>

	Review of plans for the following period, with report on progress under each heading.		
<b>Co-Financial reports</b>			
Report on co-financing that has been provided to project as originally estimated in project proposal approved by GEF.	The required format will be provided by UNEP	Annual	Regional-level PIU.
<b>Financial reports</b>			
Details project expenses and disbursements.	Standardized UNEP format as found in project document.	Quarterly	Regional-level PIU.
	Disbursements and expenses in categories and format as set out in standard UNEP format, together with supporting documents as necessary.		
<b>Financial audits</b>			
Annual audit	Audit of accounts for project management and expenditures	Annual	Regional-level PIU.

ANNEX P – MAP OF PROJECT COUNTRIES

