

PROJECT BRIEF

1. Identifiers

Project Number:

Project Name: *In situ* Conservation of Native Cultivars and their Wild Relatives

Duration: Five years

Implementing Agency: United Nations Development Programme

Executing Agency: INIA (National Institute for Agricultural Research)

Requesting Country: Peru

Eligibility: CBD ratification: 11 May 1993

Focal Area: Biodiversity

Programming Framework: Operational Program No. 1
(Arid and Semi-arid Ecosystems)¹

2. Summary

The long-term goal of this project is the conservation of agrobiodiversity in Peru, one of the world's most important centers of origin of crop and plant genetic diversity. This project will target 11 important crop species, including several local varieties and wild relatives, for conservation of their genetic diversity within functioning agroecosystems. The project will focus activities in six key geographic areas (or micro-gene centers) and implement a series of strategic measures aimed at developing a comprehensive *model or package of interventions* designed to counteract threats to long-term conservation of genetic diversity from a variety of economic and cultural trends. Strategic measures include, providing specific standing to these areas as *Special Management Areas*, as well as targeted incentives to participating farmer communities and organizations to conserve crop genetic diversity; increasing the market acceptability of a broader range of native cultivars both within the six target areas and outside; maintaining gene flows through traditional practices within and between the target areas; and developing a sound information base and monitoring system to document genetic diversity, the traditional knowledge systems which sustain it, and experiences with marketing of traditional crops, as well as to provide a mechanism from which to feed lessons learned and best practices back to the stakeholder organizations and institutions of the six areas.

3. Costs and Financing (Million US\$)

GEF:	Project	USD\$ 5.049 m
	(of which administrative costs are:	USD\$ 0.211 m)
	PDF	USD\$ 0.172 m
Co-financing: Donors ²		USD\$ 0.700 m
Government		USD\$ 0.500 m

¹ Most of the project sites can be classified as arid and semi-arid ecosystems, based on rainfall data. One of the sites, however, is in a transition zone between premontane and tropical forest.

	Total Project Cost: (Including PDF)	USD\$ 6.421 m
4.	<u>Associated financing (Million US\$)</u>	USD\$ 6.029 m

5. Operational Focal Point Endorsement (Annex 5)

Name: Mr. Paul Remy Title: Secretario Ejecutivo

Organization: CONAM Date: November 11, 1997

6. IA Contact

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List of Acronyms and Abbreviations

CBD	Convention on Biological Diversity
CCTA	Coordinating Commission for Science and Technology in the Andes (Coordinadora de Ciencia y Tecnología en los Andes)
CERRGETYR	Regional Center for Genetic Resources of Tubers and Roots (Centro Regional de Recursos Genéticos de Tuberosas y Raíces)
CGIAR	Consultative Group on International Agricultural Research
CICA	Center for Research on Andean Crops (Centro de Investigación de Cultivos Andinos)
CIP	International Potato Center (Centro Internacional de la Papa)
CONAM	National Environmental Commission
CONDESAN	Partnership for Sustainable Development in the Andean Ecoregion (Consortio para el Desarrollo Sostenible para la Ecología Andina)
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
IBPGR	International Board for Plant Genetic Resources
IIAP	Institute for Research on the Peruvian Amazon (Instituto de Investigaciones de la Amazonia Peruana)
INIA	National Institute for Agricultural Research (Instituto Nacional de Investigación Agraria)
M&E	Monitoring and Evaluation
NGOs	Non-government Organizations
PDF	Project Development Facility
PIR	Portfolio Implementation Review
PIU	Project Implementation Unit
PPER	Project Performance Evaluation Report
PRATEC	Project for Andean Peasant Technologies (Proyecto Andino de Tecnologías Campesinas)
PRONAMACH	National Program for Watershed Management and Soil Conservation (Programa Nacional de Manejo de Cuencas y Conservación de Suelos)
PRONARGE	National Program for Research on Genetic Resources and Biotechnology (Programa Nacional de Investigación de Recursos Genéticos y Biotecnología)
TPR	Tri-Partite Review
UNALM	La Molina National Agricultural University (Universidad Nacional Agraria La Molina)
UNDP	United Nations Development Programme
UNSAAC	National University San Antonio Abad del Cusco (Universidad Nacional San Antonio Abad del Cusco)
USD	US Dollars

1. BACKGROUND AND CONTEXT

Biodiversity

1. The Peruvian Andes comprise a significant part of one of the world's most important Vavilov Centers of Diversity and rival the Indo-Malayan and Mediterranean regions in terms of crop genetic diversity². Vavilov Centers have been identified as locations of highly diverse crop genetic resources and are characterized by a long agricultural history, ecological diversity, and cultural diversity. The importance of the Andean region as a center of origin and domestication of crops is due to its extraordinary geographical contrasts. Farmers work across a range of microclimates turning this to their advantage, as climatic conditions causing poor harvests in one area could produce bumper crops in another. This practice of maintaining fields at different elevations and environmental conditions has resulted in the development of a broad range of crop varieties that are widely adaptable.

2. The total number of native plant species found in Peru is estimated at 4,500. Of these, 787 are food plants, or other cultivated plants and their wild relatives³. Several of the species have been introduced to other continents. The global significance of the germplasm embodied in these native crops and varieties is already acknowledged by the worldwide spread of Andean crops such as potatoes, lima beans, peppers and tomatoes. Many other native crops have the potential for becoming useful new crops in other parts of the world such as the tropical highlands of Asia, Central Africa, and Central America, as well as different regions of industrial countries. For example, since the early 1980s quinoa has been cultivated on a trial basis at high altitudes in the San Luis valley in the Colorado Rockies. Commercial production began in the mid-1980s and has been expanding steadily since⁴.

3. This project focuses on preserving the biological diversity of native crops, varieties and wild relatives that are of current or potential use to global agriculture and food security. The project will target eleven species that have originated and/or diversified in Peru, including local varieties and wild relatives, in six genetically important areas across the Peruvian Andes. These areas, identified through detailed consultations and investigation during the PDF Block B phase, contain a significantly large number of native varieties and wild relatives of the target species and are important areas for conserving the gene pool *in situ*. These areas also have a critical mass of farmers that are conservation-oriented and are willing to participate in and promote *in situ* conservation of native crops and varieties. Project success is predicated on the active involvement of farmers in agrobiodiversity conservation and subsequent dissemination of conservation techniques by farmers themselves.

Cultural and socioeconomic context

4. The crop evolutionary system of the Andes consists not only of domesticated native crops and the non-cultivated relatives of domesticated species, but also the indigenous

² Source: Davis, S.D. and others (eds.). *Centres of Plant Diversity: A Guide and Strategy for their Conservation. Volume 3 The Americas*. WWF and IUCN. Page 291.

³ Antonio Brack. Personal Communication. February 12, 1998.

⁴ Source: National Research Council. 1989. *Lost Crops of the Incas: Little-known Plants of the Andes with Promise for Worldwide Cultivation*. National Academy Press: Washington, DC.

knowledge systems that sustain them. One of the prime reasons for the success of the Incas as master agriculturists was their method of disseminating crops together with farmers so as to spread both species and agricultural knowledge. This integrated system has generated genetic resources in the past and continues to do so today. A declining appreciation of traditional culture and knowledge systems today is an important factor underpinning genetic erosion in Peru.

5. Native crops are generally grown on small farms and family gardens with the wild relatives existing in field borders and natural areas. Traditional farming systems often involve the cultivation of dozens of different varieties and species in a single field and the tolerance and use of a wide variety of wild species occurring within the field, at field edges and in natural habitats. Although farm production is primarily for subsistence, virtually all households sell some of their production, particularly potatoes, in local or regional markets. The relative isolation of these areas results in a high level of dependency on local markets and complex barter or exchange systems, particularly for foodstuffs. Exchanges between different agroecological zones and across the landscape for different products at different times contribute to overall food security and the flow of genetic material.

6. Peru has a GNP per capita of US\$ 2,310 (1995) and 49.4% of its people live on less than \$1 a day (data for 1981-95 in PPP terms). In 1990 36% of the Peruvian labor force was employed in agriculture and this sector contributed to 7% of GDP in 1995. Peru has a dual economy: a relatively modern sector on the coastal plains and a subsistence sector in the mountains of the interior. According to the 1993 census, of the 7.1m economically active population aged 14 and over, 20% were unskilled and 19% skilled agricultural workers. The country has been severely affected by *El Niño* that on the one hand has made increased demands on government resources and on the other has reinforced greatly the importance of a diverse crop genetic base to counteract climatic fluctuations.

Legislative context

7. Peru has made legal commitments towards the conservation and sustainable use of biodiversity, both at the international and national levels. In the international context, Peru has ratified the Convention on Biological Diversity, adopted Agenda 21 and subscribed to the FAO *Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture*. An equally significant agreement related to the conservation of agrobiodiversity is Decision 391 of the *Acuerdo de Cartagena*, regarding a common system of access to genetic resources, and Decision 345 regarding a common system of property rights for developers of new plant varieties.

8. At the national level, the 1993 Constitution and the Environment and Natural Resources Code of 1990 specifically set out provisions relating to the conservation of biological diversity and genetic diversity, respectively. In addition, legislative Decree 682 directly addresses the issue of conservation of the genetic stock of crops and native species. Several national decrees addressing intellectual property rights as they relate to native varieties have also been developed. In particular, Executive Decree 008-96-ITINCI on the rights of developers of plant varieties, and Legislative Decree 823 make judicial provisions for the protection of indigenous knowledge. Community initiatives to improve seeds and genetic stocks are addressed under Executive Decree 945-93-AG.

9. While demonstrating Peru's commitment to addressing agrobiodiversity conservation needs, the policy and legislative framework falls short of achieving full protection of genetic resources due to ambiguities and contradictions. More significantly, the main actors of *in situ* conservation (namely, traditional farmers and communities) have a poor understanding of the scope of rights under the laws or mechanisms contained in national legislation. As a result the legal framework cannot achieve its full potential in terms of effectiveness. This is particularly pronounced within indigenous and peasant communities due to factors such as distances between communities, weak communication systems, difficult access to information as well as high costs associated with its dissemination. Public awareness of the law will need to be enhanced if national legislation is to serve as an effective tool for agrobiodiversity conservation.

2. BASELINE COURSE OF ACTION

10. In Peru threats to cultivation and conservation of crop genetic resources (native varieties and their wild relatives) stem from a variety of economic and cultural factors. The traditional management strategy and cultivation practices of the Andean farmer have evolved over centuries and reflect a preference for genetic diversification. The decision to plant native varieties makes imminent sense given that these crops are well adapted to difficult local conditions. However, any production system is susceptible to changing cultural, social and economic environments. Over the past decades, agricultural development policy has tended to favor commercial production for both internal consumption and export revenues, leading to progressive expansion of monospecific cropping systems and a sharp reduction in the area planted to native crops. Given their higher yields and marketability, improved cultivars, accompanied by subsidized fertilizers and pesticides, have been progressively adopted by farmers on the more productive agricultural lands, while, at the same time, leaving "islands" of agrobiodiversity on marginal lands. On these, native crops are relatively more competitive in relation to improved cultivars, as the former are better adapted to marginal conditions and require fewer inputs. However, even in these areas more conducive to the cultivation of native crops, there are emerging concerns about genetic erosion. The main immediate threats to crop genetic resources, both cultivated and wild, can be summarized as follows:

- (i) Replacement of native varieties by modern varieties
- (ii) Loss of traditional knowledge about the cultivation of native varieties
- (iii) Expansion of farms into refuges for wild relatives
- (iv) Overgrazing

Underlying causes of agrobiodiversity loss

11. The causes underlying the above proximate threats are summarized below.

- a) The underlying causes for the replacement of native crops by higher yielding, improved varieties are agricultural programs and incentives coupled with market forces and consumer demand that favor a reduced number of introduced varieties. There is steady devaluation and loss in prestige in cultivating and consuming native crops among farmers and the general public. Macro economic policies relating to

- food imports, prices, subsidies and taxes are also contributory factors. Furthermore, farmers have reduced access to seeds of native varieties due to a breakdown of traditional seed routes and other mechanisms for exchanging genetic material.
- b) There is steady erosion of traditional culture and knowledge of native varieties and associated cultivation techniques. A combination of factors precipitating this erosion include migration away from rural areas and weakening social structures in communities.
 - c) In the target sites, increasing food demand is the underlying cause for the expansion of farms into surrounding areas harboring wild relatives, as farmers elect extensification over sustainable intensification to meet this demand. In addition, the decline in the use of cropping systems based on multiple and inter-cropping, cover crops, and polycultures, and a reduction in fallow cycles, produces adverse impacts on soil structure and fertility, in turn reducing yields.
 - d) Grazing pressures from livestock are destroying the habitat of wild relatives around field borders and on marginal lands, particularly in the highlands. Problems include overgrazing and trampling of shrubs. Unrestricted grazing in areas considered refuges for wild relatives is the result of the declining quality of existing pastures and poor management of livestock numbers. In addition, the replacement of camelids by sheep and goats is reducing pasture quality because the latter uproot plants while grazing.
12. These threats and underlying causes are largely common to all target sites, occurring with greater or lesser intensity. Also, these threats do not affect all target species equally. Annex 10 provides site-specific details on threats. Annex 6 gives more details on threats and underlying causes and how the project proposes to address these.
13. As a result of these threats and underlying causes, the last few decades have witnessed an accelerated process of genetic erosion of native crops and their wild relatives. Plant genetic resources found on-farm, where they have developed their distinctive properties, continue to be lost, though at an undetermined pace.
14. The conventional approach to the conservation of plant genetic resources in Peru has been *ex situ* conservation with a significant amount of resources being devoted to this approach over the years. Peru has 56,333 accessions of 104 domesticated species, held at different institutions including the National Institute for Agricultural Research (INIA), Universities, and CIP. The composition of the collections varies and includes wild relatives, local or traditional varieties, improved varieties, and improved or introduced material. The collections represent different levels of genetic variability - regional, national, and global. These collections have been supported by funds from the International Board for Plant Genetic Resources (IBPGR), the National Treasury, resources of national institutions, and funds from international development cooperation⁵.
15. However, *ex situ* conservation is highly infrastructure-dependent and can only hold a fraction of existing germplasm. On the other hand, *in situ* conservation not only maintains the genetic diversity of native varieties, but also the evolutionary interactions

⁵ Source: Peru's National Report on Plant Genetic Resources submitted to the Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture.

that allow it to adapt continuously to changing environmental conditions, as well as the traditional knowledge systems through which the varieties have evolved. On-farm genetic resources continue to interact with pests and pathogens, thus developing genotypic resistance. Furthermore, *in situ* conservation of agrobiodiversity within traditional agroecosystems maintains the wild relatives of domesticated species that are important for maintaining traditional cultivars and for improving modern cultivars. *In situ* and *ex situ* conservation, thus, have been accepted as complementary and necessary strategies for preserving the crop evolutionary system in centers of crop origin.

16. Under the baseline course of action, insufficient attention is given to on-farm conservation of agrobiodiversity, despite the fact that this is an essential component of an integrated strategy for agrobiodiversity conservation. At the level of government agencies, INIA (a decentralized agency of the Ministry of Agriculture) is responsible for technological development of the agricultural sector, ensuring its competitiveness and productivity through strategic alliances with public and private sector entities at national and international levels. INIA has eight experimental stations in different parts of the country. Although their main focus is *ex situ* conservation, they also have a mandate for strengthening *in situ* conservation in different parts of the country.

17. Through the National Program for Watershed Management and Soil Conservation (PRONAMACH), the government also devotes significant resources to containing soil erosion and degradation particularly in the Andean highlands. An important part of the solution to genetic erosion on farms and in surrounding areas is the application of improved soil and water management techniques. Practices such as converting hillsides into terraces and building channels to store rainwater have a direct impact on the productivity of farms. Similarly, the plantation of grasses and reforestation with native species arrests soil erosion and degradation. Arguably, by affecting farm productivity, these activities generate significant domestic benefits and should therefore be undertaken as part of the sustainable development baseline. Indeed, in the baseline, the government will undertake activities to improve soil management and conservation. These activities create concurrent benefits. Improved productivity of farms and pastures in the highlands results in domestic benefits that accrue directly to farmers. The global community also benefits from these actions: improved productivity provides an incentive to farmers to continue cultivating native crops and avoid extensification, thus generating global benefits from a secure and reliable supply of vital germplasm.

18. In addition, Peru has a system of protected areas that includes national parks, reserves, sanctuaries, protected forests, and communal reserves. Although the designation of these special areas may not be motivated specifically by the conservation of wild relatives of domesticated crops, they nevertheless constitute important repositories, affording a level of protection to wild crop genetic resources. These protected natural areas secure the conservation of a much wider genetic base than would be possible through on-farm conservation efforts alone. A strategy for on-farm conservation which includes efforts near protected areas would benefit from synergies between on-farm conservation and the protection of wild relatives within established protected areas.

19. NGO involvement in the sphere of *in situ* agrobiodiversity conservation is also

relatively recent. Various efforts are taking place independent of one another in different parts of the Peruvian Andes. These efforts largely relate to the dissemination of seeds with some assistance being provided in organizing seed fairs for exchange of genetic material.

20. In the academic arena, some universities have research programs and resources devoted to *in situ* conservation. The National University of San Antonio Abad del Cusco (UNSAAC) includes *in situ* conservation of Andean agrobiodiversity in its professional courses in Agronomy at the Research Center on Andean Crops (CICA) and the Regional Center for Genetic Resources of Tubers and Roots (CERRGETYR). La Molina National Agricultural University (UNALM) has mainly *ex situ* conservation programs such as herbariums, germplasm banks, and botanical gardens, with *in situ* conservation of woody plant species in the dry woodlands of the north coast, and of forest timber species in San Ramón and Satipo.

21. In addition, the International Potato Center⁶ (CIP) has formed a Partnership for Sustainable Development in the Andean Ecoregion (CONDESAN) that consists of a group of institutions which executes a collaborative program called Biodiversity Conservation and Use of Andean Roots and Tubers. Their approach includes *in situ* and *ex situ* conservation, virus control, seed production and marketing

22. The above-described incipient *in situ* conservation initiatives are weak in several respects: they do not encompass a broad enough set of species and varieties, largely pertain to roots and tubers, and are limited in their financial scale and geographic spread to adequately capture varietal diversity. Furthermore, they lack an emphasis on market and non-market incentives to encourage or sustain proactive participation by farmers and communities in conservation efforts. Without attention to the development of markets for native crop species, varieties, and their products, and the skill and knowledge barriers to do so, one of the most fundamental factors causing a replacement of native crops and varieties is not being addressed. Similarly, the issue of targeted benefits to these *de facto* curators of plant genetic resources is not being considered by baseline efforts, with the result that incentives for farmer-initiated conservation are extremely weak. Farmers can get indirect benefits from the collection and *ex situ* utilization of genetic resources; however, these are not sufficient in themselves to ensure adequate conservation of biodiversity important to agriculture.

23. Both government and civil society organizations are demonstrating a growing interest and commitment to *in situ* agrobiodiversity conservation. Baseline activities, however, lack an integrated approach that addresses the immediate threats and underlying causes at critical sites in order to maintain the diverse portfolio of native species, varietal diversity within species, and the traditional knowledge system that sustains these plant genetic resources. In the absence of a GEF-financed intervention, significant genetic erosion will continue to occur, though mitigated to a slight degree by current activities of government institutions and NGOs. There is a need to develop an integrated strategy towards *in situ* conservation, a strategy that must develop as a partnership between government, agrarian universities, NGOs and conservationist communities.

⁶ Headquartered in Peru, CIP is one of ten international institutions forming the CGIAR.

3. ALTERNATIVE STRATEGY

24. The alternative strategy is to strengthen *in situ* conservation embodied in on-farm activities and in the immediate surrounding natural environment. In this context the project shall complement existing *ex situ* conservation efforts and conservation of wild relatives secured through protected areas. It will concentrate on the conservation of native crops, varieties and processes within functioning agroecosystems by building on the conservation-oriented aspects of farmers' activities (for example, the cultivation of native varieties under a dynamic process of experimentation), and by addressing the adverse influences triggering a move away from these practices. The activities will be situated primarily in areas in the upper reaches of micro watersheds more suitable for the cultivation of native crops and varieties⁷. The soil, microclimate and topography in these areas are such that native crops have a competitive advantage over modern, introduced varieties. These traditional systems maintain significantly more intra-specific and inter-specific diversity, as well as landscape heterogeneity than modern agricultural systems based on monoculture.

25. Given the global benefits of conserving *in situ* these crop genetic resources and the growing threats to them, there is an urgent need to promote an alternative strategy that can mitigate genetic diversity loss. The project strategy is to target six key areas and implement strategic measures for the long-term protection of genetic diversity. The application of these measures in the six genetically important areas will demonstrate *in situ* conservation practices and how they can complement the conservation of wild relatives that occurs in protected areas. One of the key outcomes will be a tested package of interventions that can be adapted and implemented elsewhere in the Andes with necessary modifications. Efforts to include Universities and NGOs in the implementation of project activities will ensure that these organizations can take the lead in replicating this model in areas where INIA may not have an institutional presence. The strategic measures include:

- a) Providing special status and targeted incentives to these areas as “safe havens” (Special Management Areas).
- b) Increasing the market potential for a broader range of native cultivars both within the six target areas and outside.
- c) Maintaining gene flows and traditional practices within and between the target areas.
- d) Developing a sound information base and monitoring system to document on-farm native species and varieties and wild relatives that occur *in situ*, progress in enhancing market potential for some of these species and varieties, as well as to provide a mechanism from which to feed lessons learned and best practices back to the stakeholder organizations and institutions of the six areas.

26. The project will work in close partnership with communities and farmers to promote on-farm agrobiodiversity conservation. Given the inextricable link between cultural diversity and biological diversity important to agriculture, the project will focus on both human cultural resources (i.e., traditional knowledge) and plant genetic

⁷ As opposed to the lower valleys more suited to intensive cultivation of high yielding varieties that require abundant application of other agricultural inputs. These lower valleys typically have deeper soils and more water.

resources maintained within traditional agroecosystems. Moreover, it is imperative to understand and document precisely how traditional farming techniques conserve agrobiodiversity, so as to better identify, based on farmer experience, the best and most cost-effective options in support of agrobiodiversity conservation. At the end of the project, it is expected that farmers in target sites -- the main stakeholders of the conservation process -- will continue conservation-oriented activities within a sustainable production system. This implies that project activities, even by focusing on 11 species, will benefit other native crops cultivated by farmers alongside the target crops. Associated crops in each micro gene center are presented in Annex 7, and details on wild relatives in Annex 9.

27. The project will focus on 11 predominant native crops that have originated or diversified in Peru, several local varieties of them, and their wild relatives (see Table 1). These crops have been selected based on factors such as actual or potential importance to long-term global food security, variability within each of the species, extent of genetic erosion, endemism, and social and cultural importance. For example, potato, maize, quinoa, bean, sweet potato, manioc, cañihua, and maca have been included for their significant contribution to the human diet as staple foods; arracacha for the extent of genetic erosion; and camu-camu and passionfruit for their adaptability to various ecosystems and potential for commercial production. For each species between 2 and 500 varieties have been distinguished (see Annex 8). The project will cover a broader set of species and varieties than those considered by existing *in situ* programs in order to ensure that important segments of the germplasm are not lost.

Table 1. Target Germplasm of the Project

	COMMON NAME		TAXONOMIC NAME
Fruits	Camu-camu	(O)	<i>Myrciaria dubia</i>
	Passionfruit	(O)	<i>Passiflora ligularis</i>
Grains	Cañihua	(O)	<i>Chenopodium pallidicaule</i>
	Maize	(D)	<i>Zea mays</i>
	Quinoa	(O)	<i>Chenopodium quinoa</i>
Legumes	Bean	(O)	<i>Phaseolus vulgaris</i>
Roots	Arracacha	(O)	<i>Arracacia xanthorrhiza</i>
	Maca	(O)	<i>Lepidium meyenii</i>
	Manioc	(D)	<i>Manihot esculenta</i>
	Sweet potato	(D)	<i>Ipomoea batatas</i>
Tubers	Potato	(O)	<i>Solanum spp.</i>

Note: O = species that have originated in Peru;

D = species that have diversified in Peru.

28. The selection of the target areas of the project proceeded in two steps. The **first step** was to identify genetically important areas (henceforth, referred to as micro gene centers) or “hot spots” based on the following criteria:

- Presence of a significantly large number of native varieties of one or more of the 11 target species.
- Species endemism⁸.
- Existence of conservation-oriented farmers or communities that manage a number of species and varieties.
- Presence of traditional agricultural systems.
- Include diverse agroecological zones.
- Some traditional form of seed exchange through “seed routes”.

29. The **next step** was to select specific sites and communities within the larger micro gene centers where on-farm agrobiodiversity conservation activities could take place. Each site is roughly about 35 hectares in size, on average (including farms and immediate surrounding areas). The target sites have been selected to include the maximum genetic diversity of the target crops, both between species and within species diversity. The sites encompass a range of topography, climate conditions, species, and varieties (see Annex 7 for a description of the sites). By working in several sites which differ in socio-economic conditions such as proximity to markets and the structure of community-level associations, the project will develop a range of experiences of *in situ* conservation under varying conditions and situations. These factors will be useful for drawing lessons from experience and identifying best practices for replication elsewhere.

30. To ensure cost-effectiveness, the project will work in sites where participating institutions are already working on issues other than agrobiodiversity conservation. By taking advantage of existing working relationships the project will be implemented in a more efficient manner. For many of the proposed outputs (particularly those relating to

⁸ For example, maca is endemic to the area around Lake Junin, cañihua to the high plateau, and camu-camu to the area of Jenaro Herrera.

consolidating, disseminating, and raising awareness about traditional knowledge, and testing market potential for native crops) project implementation will benefit from economies of scale by operating in several sites.

31. The process of site selection involved several workshops and numerous meetings between INIA, NGOs working in micro gene centers, local institutions, and farmer groups. Visits were made to each site to assess community receptivity to sharing traditional knowledge and practices that promote *in situ* conservation. An important reason for not restricting project activities to a few locations is in the interest of maximizing intraspecific diversity. For each crop there exists intraspecific diversity within sites and between sites. For example, although the potato is cultivated all along the Andes, specific native varieties are located only in certain areas and at any one site several varieties co-exist. Therefore, in order to maximize *in situ* conservation of native varieties the project must focus its efforts on several locations. Furthermore, climatic variations such as untimely freezes, hailstorms, droughts, and floods may temporarily jeopardize activities in certain areas, making it important to spread project efforts in more than one location.

Project components and expected results

32. The overall project purpose is the conservation of native crops, varieties and their wild relatives within productive agroecosystems. This will be achieved through the following components and outputs derived from a logical framework exercise and which address the proximate threats and underlying causes discussed earlier. It is expected that these components and related outputs will provide a *model* or *package of interventions* that could be implemented elsewhere, with some modifications where necessary.

- Component 1** Agrobiodiversity located in farms and borders is conserved by farmers through improved management of species and habitats.
- Component 2** Traditional knowledge, techniques, and organizations required for the maintenance of agrobiodiversity are strengthened.
- Component 3** Awareness of the ecological, cultural, and nutritive value of wild relatives and native crops is enhanced at the local and national levels and mainstreamed into the programmes of educational and research institutions.
- Component 4** Policies, norms and mechanisms to motivate farmers to conserve agrobiodiversity are established.
- Component 5** Incipient market for native crops at the regional and national levels is strengthened.
- Component 6** An information and monitoring system is established as a management tool for coordinating and planning agrobiodiversity conservation activities.

Component 1: Agrobiodiversity located in farms and borders is conserved by farmers through improved management of species and habitats.

33. To ensure heterogeneity of the agroecosystem, activities under this component will focus on threats adversely affecting traditional on-farm management of agrobiodiversity

and on enhancing farmers' access to genetic material of native crops. Due to increased food demands and low productivity, farmers are faced with the need to expand production onto uncleared lands. Grazing pressures are steadily increasing with a serious effect on habitats of wild relatives. By improving land use and pasture management in ways that maintain species and genetic diversity, this component will empower farmers to adapt their management strategy to growing food demands. These activities are not aimed at improving the productivity of farms and pastures *per se*, but are specifically targeted at alleviating pressures on agrobiodiversity.

34. This particular component raises the issue of concurrent benefits. As highlighted in paragraph 17 above, improvement in the management of soil and water on farms and pasturelands generates domestic benefits. At the same time, these activities, by improving farm productivity, provide incentives for farmers to continue cultivating native crops and varieties while avoiding the need to enter uncleared land. To achieve global biodiversity objectives (heterogeneity of species, varieties and wild relatives), the successful implementation of these baseline activities is critical. The GEF intervention will therefore limit itself to complementing baseline activities, and will also leverage co-financing for those activities liable to generate concurrent benefits.

Outputs:

- 1.1 Compendium of agronomic, and soil and water management techniques - intercropping, polycultures, agroforestry, organic fertilizers, terracing, etc - developed in each micro gene center and, in consultation with conservationist farmers, development of strategies for application of priority techniques.
- 1.2 On-farm training programmes developed with extension services and NGOs to provide technical advice and support to farmers on rangeland management techniques for improving the condition of natural pastures (such as zoning or installation of enclosures). The experience generated by this activity will be linked to workshops facilitating exchange of information and experience within and between target sites (to be organized as part of Component 2).
- 1.3 Series of communal seed fairs organized to promote the exchange of genetic material and the cultivation of different native varieties.
- 1.4 Seed routes identified, along with status of current use and limitations, and strengthened as appropriate. The primary traditional method for exchanging genetic material is through the use of seed routes connecting different regions, thus maintaining diversity and building resistance to diseases. Disruption in these routes restricts farmers' access to genetic material.
- 1.5 Gaps in current practices for disease-control identified in conjunction with farmers, and viable technologies for pest and disease reduction introduced. In many sites local varieties are being attacked by diseases (such as 'polilla de la papa' and 'gorgoja de los Andes') introduced as a result of adopting commercial varieties. Traditional farmers lack the capacity to control these pests and diseases and need to be assisted with biological control techniques⁹. The combination of modern, simple

⁹ Examples of biological control techniques include use of native plants with insecticidal properties to improve

and economic techniques with traditional technology will result in healthy good-quality seeds for further propagation.

Component 2: Traditional knowledge, techniques, and organizations that maintain the diversity of the agroecosystem are strengthened.

35. Traditional agroecological knowledge is the backbone of the Andean cropping system. However, due to the changing social, cultural and political environment this knowledge base is losing its scope and vitality. Primarily as a result of migration, the transfer of this knowledge from one generation to the next is being eroded. One of the criteria for selecting the target sites within the six micro gene centers was the presence of conservation-oriented farmers, as they can become leading actors and partners in consolidating and disseminating this knowledge base. This component will identify and document agrobiodiversity-friendly traditional practices and encourage their exchange and dissemination.

36. Particular attention will be given to women in consolidating and documenting traditional knowledge as they play an important role in the management, selection, and propagation of native crops and varieties, especially in family gardens (*huertos*).

Outputs:

- 2.1 Establishment and/or consolidation of conservation-oriented organizations within communities in target sites, whose strengths and needs were analyzed during project preparation. These organizations will be the project's primary implementing agents. These strengthened organizational structures are particularly important to facilitate decision-making regarding the establishment of norms to regulate activities relating to agrobiodiversity conservation.
- 2.2 Compendium of traditional practices recognized as effectively contributing to the conservation of agrobiodiversity, related to crop management, planting and storage, water and soil management, and integrated management of diseases and pests (to be done in conjunction with Output 1.1).
- 2.3 Training workshops bringing together farmers and technicians from local institutions within or serving target sites. These will act as forums for training, exchange of techniques and experiences, and for disseminating traditional knowledge.
- 2.4 Workshops to exchange experiences between sites. This is particularly important as the target sites reflect a range of socio-economic, climatic, and topographical features, and therefore are likely to generate different experiences that would be useful to share.

Component 3: Awareness of the ecological, cultural, and nutritive value of wild relatives and native crops is enhanced at the local and national level and mainstreamed into the programmes of education and research

storage of seeds. These are all tried methods that have no adverse ecological impact and do not involve the use of introduced species.

institutions.

37. One of the primary reasons for the declining abundance and variety of native crops is a loss in prestige among farmers of growing these crops. There is a rising perception that native crops are somehow inferior, with farmers and consumers in towns and cities influenced by their sizes and shapes. Consumers at large are generally not accustomed to the unfamiliar and irregular shapes of native varieties with bumps and ridges making them difficult to prepare for cooking. Insufficient emphasis is accorded to the cultural and distinctive nutritive value of these crops and the role they play in maintaining a diverse agroecosystem. These factors contribute to a low market demand for native crops, thus creating an added disincentive to cultivate them. Evidence indicates that local varieties disappearing from farms are those that have lower market demand relative to others. There is therefore a pressing need to redress current perceptions which militate against native crops and varieties. Awareness raising will be an important factor in enhancing local and regional market demand for these crops and in turn for the development of required market incentives. This awareness-raising component is equally crucial for ensuring that agrobiodiversity conservation activities outlive the life span of the project.

Outputs:

- 3.1 Informative materials in the form of brochures, radio programs and videos prepared in local languages for dissemination to producers and consumers. This will facilitate awareness raising and appreciation among the general public about the benefits from conservation and use of native varieties. These materials will also raise awareness about the importance of wild relatives and the natural habitats in which they exist.
- 3.2 University, Primary and Secondary School courses and/or modules integrated into school curricula on the value of Peru's agrobiodiversity and *in situ* conservation of native varieties and wild relatives.
- 3.3 Links (MoUs) established with regional, national, and international research programs for mutual exchange of information, lessons and expertise to strengthen existing agricultural research and extension programs aimed at improving the performance of native crops and varieties and to ensure the participation of indigenous communities in planning and implementation of research programs addressing the performance of native crops and varieties.

Component 4: Policies, norms and mechanisms that motivate farmers to conserve agrobiodiversity are established.

38. Economic policies and programs on preferential access to micro-credit, agricultural input subsidies, agricultural pricing and other issues have a direct impact on the cropping decisions of farmers and communities. These government programs are driven by the need to enhance food production and availability and, as such, reflect national priorities. The result is an increasing emphasis on subsidizing cultivation in fertile, well-irrigated valleys (through subsidized inputs and secure markets), with local varieties being relegated to marginal fields on steep slopes with poorer soils. In order for these

“islands of agrobiodiversity” not to disappear completely, it is important that these areas (where the “biodiversity pay-off” is much higher) also receive economic support through targeted programs. INIA, the executing agency of the project, is part of the Ministry of Agriculture and it is the latter which will take the lead in supporting decisions relating to agricultural policies that provide incentives for the cultivation of native varieties.

39. The communities in the six areas need to be recognized as de facto “curators” of genetic diversity, with incentives and programs designed in concordance with this role. This component will provide a clearer understanding of the different incentives necessary to maintain local varieties, the specific modifications to economic programs, and the benefits to be derived from their application.

Outputs:

- 4.1 Official designation of the six micro gene centers as Special Management Areas for agrobiodiversity conservation (similar to the status of irrigation or soil conservation districts) and recommendations for enabling legislation for institutional and programmatic support. Designation as Special Management Areas will provide a strategic framework for planning, conservation and resource allocation at national and local levels.
- 4.2 Recommendations for incentive measures for agrobiodiversity conservation identified through community/farmer meetings and workshops. These events aim at enhancing the understanding of how national economic policies affect the conservation of native varieties, as well as identifying viable modifications to existing policies from the point of view of future implementers and stakeholders. For example, current programs addressing the terms and availability of credit to farmers - as part of the national rural development strategy - could be modified to introduce added incentives for growing native varieties in those areas particularly suited to their cultivation.
- 4.3 Options and recommendations detailing the most viable political-judicial modalities for intellectual property rights and benefit sharing in relation to crop genetic conservation. This will entail awareness raising activities in relation to existing intellectual property rights legislation; the manner in which current laws affect stakeholders; as well as an assessment of the positive and negative impacts of potential intellectual property alternatives on crop genetic conservation. This component is aimed at facilitating informed decision-making, effective stakeholder representation in legislative deliberations pertaining to intellectual property rights; the identification of recommendations reflective of local communities and farmers interests; and to enable legal instruments to realize their true potential.
- 4.4 Mechanisms and norms, consistent with national legislation, whereby benefits resulting from the collection, *ex situ* utilization and commercialization of plant genetic resources are returned to the conservation-oriented communities and organizations. This will provide the basis for developing links and partnerships between these areas and *ex situ* centers. Such a system of targeted incentives (or compensation packages) will encourage farmers to grow native crops and varieties,

and nurture wild relatives in field borders.

Component 5: Incipient market for native crops at the regional and national levels is strengthened.

40. The rapid integration into the market economy has meant that farmers are not immune to consumer tastes and preferences as evidenced in local and regional markets. The market can therefore provide an important incentive to adopt and cultivate native varieties, provided this opportunity is appropriately developed. Local varieties have distinctive tastes and small local markets exist for these varieties, with limited penetration into urban markets as well. These local and urban markets (for native crops and products based on them) need to be developed further, particularly by tapping the consumer segment that has migrated from rural areas into towns and cities and specialized restaurants and supermarkets. Cultivating this “niche” market that knows and appreciates the characteristic tastes of a large set of native varieties will create an optimum and positive change in the demand for native varieties and provide a much longer-term incentive for *in situ* conservation of them.

41. Entry into markets entails significant initial investments and risks. In addition, there is a range of associated procedures such as product processing, packaging, and organic or other certification to benefit from a green premium. Farmers will require training regarding these processes and the opportunities available to them. These barriers, and those relating to lack of information and knowledge on how to develop market potential, must be addressed for markets to provide an effective incentive to agrobiodiversity conservation.

Outputs:

- 5.1 Market analysis regarding the potential of different native crop varieties and their products in national and international markets. This will be undertaken for an initial set of several promising varieties of the 11 target species.
- 5.2 Communities trained in reduction of transaction costs associated with joint ventures between private sector entities and communities for product processing and certification. GEF resources will go towards brokering an initial set of these agreements, and training stakeholders.
- 5.3 Analysis and recommendations regarding the use of a mechanism whereby a percentage of benefits generated from introducing products (based on native crops) into markets are reinvested into the Special Management Areas and participating communities and organizations. This will aim at securing, over the long-term, a sustainable source of funds for the recurrent costs of agrobiodiversity conservation programmes. For instance, the recurrent costs associated with the application of agronomic techniques to ensure on-farm heterogeneity in terms of species, varieties, and productive landscapes.
- 5.4 Training workshops to familiarize communities with issues relevant to introducing products into the market such as joint ventures, production cycles, product certification, and such. These workshops will involve farmers, and representatives

of the government and private sector.

Component 6: An information and monitoring system is established as a management tool for coordinating and planning agrobiodiversity conservation activities.

42. Given the predominant focus on *ex situ* conservation there is a lack of readily accessible information on issues relevant to *in situ* conservation. There is, therefore, a need to compile and organize existing information (such as that on species, varieties, uses, and abundance) and to regularly update it with new experiences and lessons learned through the implementation of project activities. To establish a foundation for on-going planning and coordination of *in situ* conservation, this component will facilitate the compilation of information obtained during and after the project. Project activities will coordinate closely with stocktaking and other activities realized as part of the preparation of the National Biodiversity Strategy and Action Plan.

43. The database will be located in and managed by INIA (the National Institution for Agricultural Research) in its capacity as the primary national institution responsible for germplasm conservation. The information system will draw on existing databases and information collected at project sites. Given its mandate, specific budgetary allocation and experimental stations in each of the six micro gene centers, INIA is well placed to coordinate the maintenance and upkeep of the information system after project completion. The NGOs working in the micro gene centers will undertake activities relating to data collection and monitoring. In addition, information from the system will be drawn upon to produce quarterly reports on the status of and trends affecting agrobiodiversity, to be published on the project's Web site and disseminated to farmer groups and other stakeholders. This information system will be linked with existing databases on *ex situ* and *in situ* efforts in collaboration with *ex situ* conservation institutions.

Outputs:

- 6.1 Map-based inventories with local farmers depicting the wild relatives and local varieties of native crops. This activity will provide the basic information and baseline data required to monitor project impact over time. The snapshot of the beginning-of-project situation will be the basis for continuous objective assessments of percent improvements in the indicators specified in the logframe matrix.
- 6.2 Local farmers trained in monitoring techniques to track the overall impact of project activities on on-farm heterogeneity.
- 6.3 Database with the following information to be used for planning and coordination:
 - a) Status of genetic resources in the target areas (for example, landrace characteristics, seed availability).
 - b) Degree of genetic erosion.
 - c) Experiences with marketing native varieties and their products.
 - d) Lessons learned and experience with land use and rangeland management practices (develop a set of "good" practices).

- e) Agrobiodiversity conservation and agricultural development programs and projects.
- f) Centers of excellence, NGOs and expertise in formal and non-formal education on rural development and conservation; agricultural and environmental research related to crop genetic resources (at national, regional and international levels).

End of project situation

44. By the end of the five-year time period the project will have achieved the following results, which in conjunction will provide a comprehensive model or package of interventions for potential replication both within Peru and other countries forming part of Vavilov centres of origin.

- Local farmers and communities in the target areas will be empowered to sustain traditional farming practices promoting a diversity of native species, varieties, and wild relatives in and around their production units.
- Farmers have the technical capacity to address the proximate threats to genetic erosion on farms.
- Traditional methods of exchanging genetic material namely, seed fairs and seed routes are reinvigorated.
- Traditional practices conducive to maintaining agrobiodiversity on farms are documented in different media to facilitate dissemination, not only amongst farmer groups but also academic institutions, agricultural technicians, groups involved in rural development, etc.
- A strong farmer network, both between and within target sites, exists as a result of interactive workshops and meetings organized by the project.
- The motivation and commitment of farmers to support project objectives are strengthened through awareness raising efforts and by ensuring that farmers are the primary beneficiaries of the process.
- Concrete suggestions on how existing government programs can be modified to provide greater incentives for adopting agrobiodiversity-friendly activities have been prepared and are under review by the appropriate governmental bodies for approval.
- Farmers, as de facto “curators” of agrobiodiversity, have begun to receive compensation for genetic resources collected from their sites.
- The opportunities offered by the market in terms of long-term incentives to cultivate native species and varieties are tapped.
- A mechanism directing resources generated through entry into the market into community-level agrobiodiversity conservation efforts is established. This will ensure the financial sustainability of processes set in motion by the project by meeting recurrent costs.
- Target sites within the micro gene centers enjoy status as Special Management Areas for agrobiodiversity conservation.
- Strong national capacity for information and advisory services exists through the documentation of traditional practices, awareness raising and dissemination activities, and the information system established by the project.
- The project will develop a range of experiences with *in situ* conservation under different climatic, topographical, social, and economic conditions. This package

of interventions, along with lessons learned and “good practice” guidelines may then be replicated in other areas of the Central Andes.

Rationale for GEF Financing

45. For arid and semi-arid ecosystems, the GEF Operational Strategy explicitly calls for special attention to the demonstration and application of techniques, tools, and methods to conserve traditional crops in their original habitats. The project approach is consistent with Operational Program 1 on arid and semi-arid zone ecosystems. OP 1 recognizes that many important food crops originate from drylands, and that indigenous crops and fruit from drylands are known for their resistance to disease, stress, and adaptability and are valuable sources for plant breeding. In addition, arid land species are notable for their within-species diversity, restricted geographical distribution, and a wide range of morphological, physical, and chemical adaptation to their harsh environment. The operational program specifically calls for “demonstrating and applying techniques to conserve biodiversity important to agriculture” and “supporting capacity building efforts that promote the preservation and maintenance of indigenous and local communities’ knowledge, innovation, and practices relevant to conservation of biological diversity, with their prior [and] informed consent and participation”. The project strategy has been developed in line with the above principles, and one of its cornerstones is the partnership it will establish with farming communities in achieving commonly desirable objectives.

46. The preliminary operational policy note on the treatment of agrobiodiversity¹⁰ notes that traditional farming communities and their agricultural practices have made a significant contribution to the conservation and enhancement of biodiversity and can provide important lessons for the development of environmentally sound agricultural production systems. Recognition of this is reflected in the overall project strategy and approach. Project activities are aimed at alleviating proximate threats to agrobiodiversity by modifying current practices with respect to farmland and rangeland management. Project activities will address the following issues identified by the operational policy note:

- Demonstrating and applying techniques to sustainably manage biodiversity important to agriculture.
- Supporting capacity building efforts that promote the preservation and maintenance of indigenous and local communities’ knowledge, innovation, and practices relevant to the conservation and sustainable use agrobiodiversity, with their prior informed consent and participation.
- Country driven information, advisory and extension services that draw special attention to viable farming practices that help to conserve agrobiodiversity.
- Development of necessary human and institutional capacities to promote sustainable solutions in agrobiodiversity conservation, including training, demonstration, and know-how transfers.
- Advisory services to facilitate policy reform that would support the conservation and sustainable use of agrobiodiversity.

¹⁰ GEF Secretariat. March 25, 1998. *A Framework for GEF Activities Concerning Conservation and Sustainable Use of Biological Diversity Important to Agriculture*. GEF Secretariat: Washington, DC.

- Introducing incentives for agrobiodiversity-enhancing production systems.
- Promoting the development of markets and business opportunities for diverse organic agricultural products.
- Raising consumer awareness and improving demand in favor of diverse varieties instead of uniform products.
- Activities to enable the reduction of transaction costs in biodiversity promoting farming systems, i.e., support for the establishment of appropriate production, marketing, trading, and distribution techniques.

47. The project seeks to accomplish relevant aims and objectives set out in the *Convention on Biological Diversity* and the *Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture*. In particular, Section 8a establishes the commitment of Contracting Parties to identify those areas where special measures need to be taken to conserve biological diversity (Section 8a); and to respect, preserve and maintain the knowledge, innovations and practices of indigenous communities that allow the conservation and sustainable use of biological diversity (Section 8j).

48. In line with the *Global Plan of Action*, the project encourages conservation and sustainable utilization of agrobiodiversity. It is targeted at encouraging a greater diversity of crops and at the need to promote commercial development of underutilized species and varieties. Peru ratified the *Convention on Biological Diversity* (May 11, 1993) and has also adopted the FAO Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources.

4. RISKS AND SUSTAINABILITY

49. The primary vehicle by which sustainability of *in situ* agrobiodiversity conservation activities initiated by the project will be ensured is by involving and empowering the primary actors whose decisions have a direct bearing on agrobiodiversity, namely, farmers and communities. The long-term financial viability of project objectives will be secured by the following factors: a) progressive incorporation of native varieties and products into local, national and international markets, b) partnerships with private sector operators and the equitable distribution of benefits resulting from these new commercial ventures, and c) a mechanism that ensures benefits from entry into markets is redirected to community-level conservation initiatives. By involving the primary government body responsible for the conservation of plant genetic resources, INIA, the project will strengthen relevant in-country human and institutional capacity. The involvement of the main NGOs active in this field and agrarian universities will also ensure institutional sustainability. Risks associated with achieving project components and activities are presented in the Logical Framework matrix (Annex 2).

5. STAKEHOLDER PARTICIPATION AND IMPLEMENTATION ARRANGEMENTS

50. Project stakeholders include the traditional farming communities and cooperatives, local institutions, agrarian universities and national agencies and non-government institutions involved in, or responsible for, agricultural development and agrobiodiversity conservation in the target sites.

51. The support of traditional farming practices will benefit local communities by helping them sustain a production system that is well adapted to local environmental conditions. Additionally, the demonstration of *in situ* conservation at selected target sites, along with lessons learned, can potentially be replicated in other areas of the Central Andes thus encompassing a much larger set of potential local beneficiaries. Local communities will benefit from the identification of greater marketing opportunities for native varieties and from partnerships with the private sector. The private sector will in turn benefit from new opportunities afforded by the project. Through this demonstration of *in situ* conservation, local institutions, national agencies, agrarian universities and non-government institutions will build their technical capacity in this area through a process of learning-by-doing. The global community will benefit from a steady and secure supply of genetic resources that will ensure sustainability of plant breeding efforts in other regions of the world.

52. This project was designed in collaboration with the stakeholder groups in each of the six micro gene centers, as well as representatives of agricultural development institutions, NGOs (both at the municipal and national levels), academic institutions, and leading authorities in agrobiodiversity conservation. 30 project design and consultative workshops were conducted to identify threats to agrobiodiversity conservation as well as existing gaps in the baseline with communities playing an active role. Logical framework exercises were held with the participation of stakeholder groups and the project development team.

53. Project implementation will be overseen by a **Steering Committee**, a **Consultative Committee** and a **Project Implementation Unit**. The project **Steering Committee** will consist of four representatives of the following bodies:

- National Commission for Biodiversity chaired by CONAM and the National Environment Council
- INIA, in its capacity as the executing agency.
- National Network of NGOs active in agrobiodiversity and agroforestry activities.
- Representatives of conservation-oriented communities and organizations
- UNDP

54. The **Steering Committee** will meet every four months to review progress. Their responsibilities include designation of a project manager and 3 local facilitators (each facilitator being responsible for 2 micro gene centers) based on a competitive selection process; review and approval of annual work plans; approval of Terms of Reference for contracts and sub-contracts; and overseeing monitoring and evaluation of project activities, including commissioning of independent evaluations.

55. The **Consultative Committee** will track the progress of the project in terms of its global impact and how it can ensure long-term sustainability of activities initiated by the project. The committee's role is mainly advisory in nature and its composition will include national and regional agrarian Universities, communal and local authorities, conservationist groups, NGOs, private agribusiness representatives, and governmental institutions. This will be a more flexible entity with the possibility of expanding members on the recommendations of the steering committee and/or the project

manager. The Committee will meet once a year, during or immediately after the harvest season, and submit evaluations and recommendations to the Steering Committee. The first meeting will be during the first quarter of the execution of the project. The secretary of this Committee will be the project manager who will organize meetings and distribute the necessary reports two weeks prior to scheduled meetings.

56. The **Project Implementation Unit (PIU)** -- consisting of a project manager, the three local facilitators, and support staff -- will be accountable for project implementation. As such, the PIU will implement activities directly and be responsible for supervising subcontracts. In this regard, the PIU will negotiate terms of reference for contracts and subcontracts approved by the steering committee. During execution of contracts and subcontracts the PIU will ensure that Terms of Reference are being fulfilled, and it will also be responsible for payments and logistical support as required. Most importantly, the PIU will be responsible for monitoring tasks and will make detailed presentations at steering committee meetings on progress in each of the micro gene centers in terms of the indicators identified in the logical framework matrix of the project. At the community level, the PIU will work with conservationist organizations (see activity 2.1) to implement project activities. The location of the PIU will be defined by the steering committee.

6. INCREMENTAL COSTS AND PROJECT FINANCING

57. The incremental cost analysis for the project has been prepared in standard format and is presented in Annex 1. The indicative budget, in thousands of USD and by project component, is outlined below. It includes project support costs at the rate of 3.5%.

	GEF Contribution	Non-GEF Contribution	TOTAL
Component 1	898	1,000	1,898
Component 2	869	200	1,069
Component 3	865		865
Component 4	495		495
Component 5	742		742
Component 6	969		969
Project support costs	211		211
TOTAL	5,049	1,200	6,249

7. MONITORING , EVALUATION AND DISSEMINATION

58. The project's Monitoring and Evaluation (M&E) arrangements encompass the collection, analysis, and dissemination of data and information on issues related to implementation progress and impact assessment (indicators along with sources of verification are outlined in the logical framework matrix in Annex 2). The Project Implementation Unit (PIU) will monitor the progress of project implementation and impact in the middle, at the end, and after completion of the project.

59. Critical to effective monitoring and evaluation will be the participation of affected stakeholders in determining, assessing, and analyzing project progress and overall impact. Consequently, the M&E strategy will include an independent stakeholder task force responsible for providing substantive feedback to the PIU on a biannual basis with

recommendations and practical alternatives. These will be analyzed and reflected in annual work plans and project implementation strategies. The lessons learned from implementation of activities will be compiled, published and disseminated to raise public awareness of the Project and substantiate its credibility.

60. Current UNDP project monitoring and reporting strategies (Tripartite Project Review, Program Performance Evaluation Reports, Mid Term- and Final independent Reviews) will be applied and complemented by GEF M&E procedures such as the annual Project Implementation Review (PIR).

ANNEX I

INCREMENTAL COST ASSESSMENT

1. BROAD DEVELOPMENT GOALS

1. The government of Peru is committed to the conservation and sustainable use of biodiversity. It ratified the Convention on Biological Diversity as early as 1993 and is in the process of preparing a Biodiversity Strategy and Action Plan. The country's unique geographic, soil and climatic conditions have earned it recognition as one of the mega-diversity countries of the world. Moreover, Peru is also a global center of origin for important agricultural crops. The importance of this germplasm for food security, both national and global, has prompted the government to institute policies that embrace the conservation of traditionally cultivated varieties and their wild relatives. For instance, the Environment and Natural Resources Code (1990) sets out rules relating to the conservation of genetic diversity, and Legislative Decree 682 directly addresses the issue of conserving genetic heritage of crops and native species.

2. Peru has also adopted the *FAO Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources*. The *Global Plan of Action* has four major elements that call for *in situ* conservation and development, *ex situ* conservation, utilization of plant genetic resources, and related institutional and capacity-development needs. Peru clearly recognizes the importance of its genetic resources for generating local and global well being.

2. BASELINE

3. The rich heritage of wild relatives and native varieties in Peru is suffering from a steady process of genetic erosion¹¹. There are many factors at work that in combination are undermining genetic diversity and foreclosing future use options for Peru and the global community.

4. Agrobiodiversity and plant genetic resources -- contained in productive agroecosystems (farms and bordering areas), and in natural areas -- are facing a number of threats. Threats range from a rapidly rising trend towards cultivating modern varieties, land clearing and habitat degradation, to the loss of traditional knowledge and management systems. The management strategy and cultivation practices of the Andean farmer have evolved over centuries and reflect a preference for genetic diversification. The decision to plant native varieties makes imminent sense given that these crops are well adapted to local conditions. However, any production system is susceptible to the changing cultural, social and economic environment. Farmers, in response, are increasingly opting for the cultivation of non-native varieties. This rapid trend is a cause for international concern given the importance of the genetic material of agriculturally important crops for food security.

5. There are a number of underlying factors causing and exacerbating these proximate threats. The replacement of native varieties is linked to market signals that favor products of non-native varieties, government policies that favor improved varieties, and

¹¹ It is not possible to state precisely the rate at which diversity is being lost, because there is no comprehensive and exhaustive inventory of genetic resources found *in situ*.

a breakdown in cultural and social structures that is eroding the traditional knowledge base regarding cultivation systems and practices. The fading of this knowledge base has meant that farming practices become increasingly incompatible with the cultivation of native varieties and are also more inimical to the survival of wild relatives that exist in areas bordering farms. Further, farmers are faced with a declining supply of seeds for traditionally cultivated varieties as a result of the breakdown in traditional seed routes and other mechanisms for seed exchanges between farmers of different areas.

6. In the recent past, government efforts have tended to focus more on *ex situ* conservation activities. The National Institute for Agricultural Research (INIA) maintains a database of 56,333 registered entries from 104 cultivated species housed in University collections, the International Potato Center (CIP), NGOs, private firms, and at INIA headquarters, providing an important information source on existing collections and characterizations. While *ex situ* collections are an important component of any agrobiodiversity conservation strategy, they must be accompanied by *in situ* conservation efforts, as it is the latter which maintains the evolutionary interactions that allow varieties to adapt to changing environmental conditions. More importantly, *in situ* conservation provides a critical additional benefit of maintaining and supporting the indigenous knowledge systems associated with the cultivation of native varieties. These knowledge systems are integral to the success of promoting the cultivation of native varieties.

7. Some amount of conservation of biodiversity important to agriculture will occur within designated protected areas even though the purpose of these areas is not particularly focused on the agrobiodiversity contained therein. However, establishing more protected areas with the express purpose of conserving agrobiodiversity is not a feasible option, given the finite availability of land and the need for food production. Therefore, the most practical approach is one of promoting on-farm agrobiodiversity conservation while at the same time meeting food requirements, by encouraging traditional practices that are complemented with improved practices as appropriate.

8. In the baseline there will be some ad hoc *in situ* conservation initiatives focusing on strengthening the use and maintenance of agrobiodiversity in the six genetically important areas (micro gene centers), and, to a very limited extent, on exploring mechanisms to capture benefits at the community level. The government, with donor support, initiated nascent *in situ* conservation initiatives in 1993, jointly with a Cooperative Program on Biodiversity. Annex 13 provides details of the ad hoc *in situ* conservation programs. These programs primarily relate to dissemination of seeds and organization of seed fairs, with some of them also addressing awareness raising and documentation of traditional practices. Since most of these programs address objectives that fall under more than one project component they have been listed separately in Annex 13, and the incremental cost matrix below describes the gaps in baseline programs to achieve project objectives. Significant resources will also be devoted to soil and water management to address the problems of soil degradation and erosion, issues that are in the national sustainable development interest, through the National Program for Watershed Management and Soil Conservation (PRONAMACH). However, these efforts in themselves are not sufficient to promote *in situ* conservation of agrobiodiversity. They do not address fundamental issues relating to marketability and

public perceptions of produce from native varieties, and incentive systems that would encourage the conservation of agrobiodiversity. These latter aspects are critical for ensuring sustainability of conservation processes established by the project. Baseline efforts will firstly, need to be scaled-up in the six genetically important areas and secondly, they must be complemented with activities that address market potential and policy and incentive systems necessary for farmer-initiated conservation efforts.

9. Clearly, the government has taken initial steps towards the conservation of agrobiodiversity. The focus on *ex situ* collections reflects a more general international phenomenon wherein *in situ* conservation has received far less attention. Projects and activities have been implemented on a piecemeal basis and lack an overall long-term vision and a coherent strategy that addresses the immediate threats and underlying causes of the problem.

3. GLOBAL ENVIRONMENTAL OBJECTIVE

10. The global environmental objective of this project is to conserve, enhance and sustainably manage 11 agriculturally important native species and their wild relatives. The key to food security, globally and nationally, lies in continuous advancements in developing disease-resistant, environmentally-adapted crop varieties with improved yields, and this in turn depends on the availability of genetic material of native crops and their wild relatives. In keeping open options for research and development the genetic material is of course critical, but the traditional knowledge systems about native varieties and wild relatives is of equal importance. If current trends relating to the erosion of traditional culture and knowledge continue, this too will result in global welfare losses. In addition, the adoption and spread of traditional cultivation practices that are more suited to the local environment will also play an important role in addressing the problem of land degradation.

4. ALTERNATIVE

11. The alternative strategy is to work in partnership with farmers to complement existing *ex situ* efforts and widen the net of baseline *in situ* conservation initiatives by focusing on specific sites within six genetically important areas¹². Outputs will address the immediate threats and underlying causes of genetic erosion, such as the loss of traditional culture and farming practices, barriers to promoting the marketability of native varieties, and limited non-market incentives to cultivate native varieties.

12. In particular, the alternative strategy will focus on: (i) management of agrobiodiversity on farms and bordering areas through adaptive management of farms and pasture land, (ii) recovering, developing and disseminating traditional conservationist knowledge and techniques to encourage agrobiodiversity-friendly practices, (iii) building awareness of the ecological, cultural, and nutritive importance of native varieties and the role of traditional farming practices, (iv) reviewing policies and programs and establishing norms and mechanisms that encourage more farmers to

¹² These micro gene centers have been selected based on detailed criteria, the most important one being areas that have a high concentration of the 11 native species, varieties and their wild relatives. The 11 species, in turn, have been chosen based on their contribution to staple food supply, variability within each species, and the extent of genetic erosion they are suffering.

conserve agrobiodiversity, (v) exploring market opportunities for native varieties, (vi) developing an information and monitoring system (with data on genetic resources, threats, experience with commercialization and land-use and rangeland management, and on-going agricultural and agrobiodiversity initiatives) to serve as a planning tool to identify and prioritize needs in the six micro gene centers. These efforts will meet the stated project purpose of conserving *in situ* native crops, varieties and their wild relatives.

13. By focusing on the six genetically important areas the project will secure and ensure a gene pool that is continuously adapting to changing environmental conditions, and engender mutual benefits between *in situ* and *ex situ* conservation efforts within Peru and in other parts of the world.

5. SCOPE OF ANALYSIS

14. The scope of the incremental cost analysis covers all activities, country- and donor-funded, that are directly relevant to the project objective of *in situ* conservation of native varieties and their wild relatives and coincide with the five year implementation period of the project. The geographical area considered in the analysis includes the six micro gene centers and the target sites therein (forty sites, each site is approximately 35 hectares on an average). Benefits will accrue beyond the five-year duration of the project given the momentum that will be created by the revival of traditional culture, knowledge systems, and organizations.

6. INCIDENTAL DOMESTIC BENEFITS

15. By promoting *in situ* conservation there are likely to be some domestic benefits arising from the use of cultivation practices that have evolved over centuries and are therefore more conducive to local conditions. Such benefits include reduced production risk from the cultivation of locally-adapted varieties, enhancement of the ecological potential of agricultural landscapes, stabilization of watersheds, the maintenance of traditional culture and knowledge systems, improved awareness about the importance of agrobiodiversity resources and the role of traditional farming practices in conserving them, and improved human resource capacities to address crucial issues related to agrobiodiversity conservation. These benefits, however, are not certain, cannot be quantified at this stage, and cannot be realistically separated from the global benefits this project is intended to produce.

7. COSTS AND INCREMENTAL COST MATRIX

16. The cost of the baseline course of action amounts to US\$ 6 million. With the decision to adopt the alternative course of action, costs rise to US\$ 12 million. Therefore the incremental costs are US\$ 6 million. Cofinancing is estimated at US\$ 700,000 from multilateral and bilateral donors and US\$ 500,000 from the government. Details of the precise components covered by different co-financiers are provided in the matrix below.

INCREMENTAL COST MATRIX (Annex I continued)

Benefit/ Cost	Baseline (B)	Alternative (A)	Increment (A-B)
Global benefits	<ul style="list-style-type: none"> Steady erosion of genetic material in one of the main global centers of origin for globally important agricultural crops. Erosion of traditional culture and farming practices. Resilience of agroecosystem to biological and climatic stress is at risk. 	<ul style="list-style-type: none"> Process of genetic erosion is checked. Diversity and resilience of agroecosystem is maintained. Revitalization of traditional culture and knowledge systems essential for <i>in-situ</i> conservation. Improved farmer management of native varieties, and habitats. 	<ul style="list-style-type: none"> Present and future options for global agricultural development and food security are maintained. Control of land degradation.
Domestic benefits	<ul style="list-style-type: none"> Increased agricultural production as a result of programs targeted at soil erosion and degradation. Some native varieties are conserved through farmer efforts. Loss of ecological potential of agricultural lands. 	<ul style="list-style-type: none"> Increased adoption of native crops and varieties, particularly in the upper reaches of micro watersheds. Spread of cultivation and management practices that are more suited to local conditions. 	<ul style="list-style-type: none"> Improved resilience to disease. Stabilization of watersheds. Reduced degradation of inland waters.
Costs/ Outputs			
1. Agrobiodiversity located within the production units and borders is conserved and enriched by farmers.	Efforts to arrest problems of land degradation and soil erosion through terracing etc.; ad hoc investments in <i>in situ</i> conservation; not focused in the six genetically important areas. 4,545,000	Improved capacity and ability among farmers, and technicians from local institutions to address threats to agrobiodiversity from poor farm and pastureland management, and to implement <i>in situ</i> conservation within agroecosystems. 6,442,755	Cofinance: 1,000,000 GEF: 897,755
2. Recover and develop traditional conservationist knowledge, techniques, and organizations in the target sites to improve current management practices of the agroecosystem.	Ad hoc activities to document and disseminate traditional knowledge and practices, and organize seed fairs for native varieties. 719,000	Establish conservationist committees; document, disseminate and exchange traditional practices within and between target areas; modify current practices as necessary; emphasis on seed fairs and supporting traditional 'seed routes'. 1,788,419	Cofinance: 200,000 GEF: 869,419

Benefit/ Cost	Baseline (B)	Alternative (A)	Increment (A-B)
3. Improve awareness of the cultural, nutritive, and ecological value of native crops and their wild relatives and mainstream into agendas of educational and agricultural research institutions.	Current programmes and activities regarding the role of native varieties and their wild relatives in maintaining global food security are ad hoc and insufficient. 656,200	Awareness and information dissemination activities extended not only to farmers, but also consumer groups and decision-makers to improve the appreciation of the cultural, nutritive and ecological significance of native varieties; increased emphasis on agrobiodiversity in academic institutions and agricultural research programs. 1,521,626	Increment: 865,426
4. Review policies and establish norms and mechanisms that motivate farmers to conserve agrobiodiversity.	Awareness raising activities and programmes detailing the impact of national economic policies and intellectual property right legislation amongst farmers and communities are limited in substance and coverage; limited activities aimed at maximizing benefits from <i>in situ</i> conservation at the community level. 24,000	Enhance understanding of impacts of economic policy instruments (such as credit schemes) and legislation relating to intellectual property rights at the community-level; evaluate and develop specific mechanisms to provide targeted incentives to the <i>de facto</i> curators of crop genetic diversity. 518,529	Increment: 494,529
5. Expand the market potential for native crops at the regional, national, and international levels.	In the genetically important areas identified, limited resources allocated to developing market potential for Andean roots and tubers, and camu-camu. 52,600	Comprehensive analysis of the marketability options of selected native varieties of the 11 target species, to create market incentives in favor of native varieties for farmers in target sites. 794,394	Increment: 741,794
6. Establish an information system as a management tool for coordinating, planning, and monitoring agrobiodiversity conservation activities.	Information dissemination activities relating to <i>in situ</i> conservation of agrobiodiversity is incomplete and limited in availability; insufficient farm-level information on wild relatives and local varieties. 32,700	Improved information (linked with existing <i>ex situ</i> and <i>in situ</i> databases) on the status of <i>in situ</i> plant genetic resources in the six genetically important areas, along with supporting information on success with commercialization, farm and pastureland management, on-going programs -- to serve as a planning tool, identify gaps, and prioritize needs; improved capacity to monitor project impacts at farm-level. 1,001,977	Increment: 969,277
TOTAL	Total for baseline: 6,029,500	Total for alternative: 12,067,700	Total: 6,038,200 +Project support costs 211,337 = 6,249,537 Of which: GEF: 5,049,537 Cofinance: 1,200,000

ANNEX II

LOGICAL FRAMEWORK MATRIX

Intervention Logic	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<u>Development Objective</u>			
Enhancement of global food security and maintenance of future options for agricultural developments benefiting the global community.			
<u>Project Purpose</u>			
Native varieties and their wild relatives (of the target species) in and around the farm are conserved <i>in situ</i> .	At the end of the project, the area planted in native species and varieties increases by 25% in target sites.	Information from implementing institutions and random sample surveys of fields.	Positive project impacts will disseminate to other communities and regions outside the immediate target sites, including more farmers in the exchange dynamics relating to native varieties. Political conditions remain stable in the target areas.
<u>Component 1</u>			
Agrobiodiversity located in farms and borders is conserved by farmers through improved management of species and habitats.	After 5 years, the spread of farms into borders and habitats of wild relatives will be arrested, and the quality of pastureland will improve.	Reports of implementing institutions.	Farmers are favorably disposed to systematically document the agrobiodiversity in the target site.
	Number of seed fairs and number of participating farmers increases in the target sites annually by: Year 1 2 3 4 5 % increase 0 5 5 10 10	Reports of institutions organizing the seed fairs.	

Intervention Logic	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<u>Component 2</u> Traditional knowledge, techniques, and organizations that maintain the diversity of the agroecosystem are strengthened.	After 5 years, the number of conservation-oriented farmers in each target site will increase by at least 25%.	Reports of implementing institutions.	Non-conservationist farmers are receptive to traditional practices of conservation, and there is a positive climate among farmers and communities to increase appreciation of traditional knowledge.
<u>Component 3</u> Awareness of the ecological, cultural, and nutritive value of wild relatives and native crops is enhanced at the local and national level and mainstreamed into the programmes of education and research institutions.	<p>The percentage of publications and informative material promoting native varieties increases relative to those that promote non-native varieties.</p> <p>By the 3rd year, 75% of the major agricultural education and research institutions have integrated the promotion of native varieties in their curricula.</p>	<p>Publication statistics of implementing institutions.</p> <p>Review of University and primary and secondary school courses in comparison to current curricula.</p>	<p>Agricultural institutions and collaborators are committed to include concepts relating to native varieties and <i>in situ</i> conservation practices.</p> <p>Agribusinesses concerned with non-native varieties do not actively impede dissemination activities favoring native varieties.</p>
<u>Component 4</u> Policies, norms and mechanisms that motivate farmers to conserve agrobiodiversity are established.	<p>At the end of five years, there will be a list of suggested modifications to current agricultural policies and programs.</p> <p>Eight micro gene centers are officially designated as special management districts.</p>	<p>Reports of implementing institutions and random sample surveys of target communities.</p> <p>Official designation is announced in "El Peruano".</p>	<p>Positive political environment and receptive communities.</p> <p>Government decision-makers and planning officials are receptive to proposed designations and expedite approval.</p>
<u>Component 5</u> Incipient market for native	After five years, at least six	Reports of products and sales of the	Consumers, intermediaries,

Intervention Logic	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
crops at the regional and national levels is strengthened.	products (raw or processed) of native species or varieties that have not yet entered the market are found in the national market (Lima, Arequipa, Trujillo, Cusco).	larger supermarkets.	and processors participate in programs of orientation and dissemination. Transportation infrastructure can support the transfer of commodities and products to markets. Establishment of specialized consumer demand as a result of awareness-raising activities.
Component 6			
An information and monitoring system is established as a management tool for coordinating and planning agrobiodiversity conservation activities in Special Management Areas and at the national level.	<p>At the end of three years, there will exist an inventory of the native varieties and wild relatives that exist in each target site.</p> <p>Databases established and links are created with existing ones (including those of <i>ex situ</i> centers).</p> <p>A web site is established.</p> <p>All stakeholder groups receive quarterly reports by the 3rd year.</p>	<p>Progress report of implementing institution.</p> <p>Random sample surveys of different user groups.</p>	Farmer groups and other users make use of the information provided by the quarterly reports, and provide feedback to improve the system.

Components	Outputs
<u>Component 1</u> Agrobiodiversity located within the production units and borders is	1.1 Compendium of agronomic, and soil and management techniques - inter-cropping,

Components	Outputs
conserved and enriched by the farmers.	<p>polycultures, agroforestry, organic fertilizers, etc - developed for each micro gene center and, in consultation with conservationist farmers, strategies for implementation of priority techniques.</p> <p>1.2 On-farm training programmes developed with extension services and NGOs to provide technical advice and support on rangeland management techniques for improving the condition of natural pastures (such as zoning or installation of enclosures). The experience generated by this activity will be linked up with the workshops facilitating exchange of information and experience within and between target sites (to be organized as part of Component 2).</p> <p>1.3 Series of communal seed fairs organized to promote the exchange of genetic material and the cultivation of different native varieties.</p> <p>1.4 Seed routes identified, along with status of current use and limitations, and strengthened as appropriate. The primary traditional method for exchanging genetic material is through the use of seed routes connecting different regions, thus maintaining diversity and building resistance to diseases. The disruption in these routes is restricting farmers' access to genetic material.</p> <p>1.5 Gaps in current practices for disease-control identified in conjunction with farmers, and viable technologies for pest and disease reduction introduced. In many sites local varieties are being attacked by diseases (such as 'polilla de la papa' and 'gorgoja de los Andes') introduced as a result of adopting commercial varieties. Traditional farmers lack the capacity to control these pests and diseases and need to be assisted with biological control techniques. The combination of modern, simple and economic techniques with traditional technology will result in healthy good-quality seeds for further propagation.</p>
<p><u>Component 2</u></p> <p>Traditional knowledge, techniques, and organizations that maintain the diversity of the agroecosystem are strengthened</p>	<p>2.1 Establishment and/or consolidation of conservation-oriented organizations within communities in target sites, whose strengths and needs were analyzed during project preparation. These organizations will be the project's primary implementing agents. These strengthened organizational structures are particularly important to facilitate decision-making regarding the establishment of norms to regulate activities relating to agrobiodiversity conservation.</p> <p>2.2 Compendium of traditional practices recognized as effectively contributing to the conservation of agrobiodiversity, related to crop management, planting and storage,</p>

Components	Outputs
<p>water and soil management, and integrated management of diseases and pests (in conjunction with output 1.1).</p> <p>2.3 Training workshops bringing together farmers and technicians from local institutions within or serving target sites. These will serve as forums for training, exchange of techniques and experiences, and for disseminating traditional knowledge.</p> <p>2.4 Workshops to exchange experiences between sites. This is particularly important as the target sites reflect a range of socio-economic, climatic, and topographical features, and therefore are likely to generate different experiences that would be useful to share.</p> <p><u>Component 3</u></p> <p>Awareness of the ecological, cultural, and nutritive value of wild relatives and native crops is enhanced at the local and national level and mainstreamed into the programmes of education and research institutions.</p> <p><u>Component 4</u></p> <p>Policies, norms and mechanisms that motivate farmers to conserve agrobiodiversity are established</p>	<p>3.1 Informative materials in the form of brochures, radio programs and videos prepared in local languages for dissemination to producers and consumers. This will facilitate awareness raising and appreciation among the general public about the benefits from conservation and use of native varieties. These materials will also raise awareness about the importance of wild relatives and the natural habitats in which they exist.</p> <p>3.2 University, Primary and Secondary School courses and/or modules integrated into school curricula on the value of Peru's agrobiodiversity and <i>in situ</i> conservation of native varieties and wild relatives.</p> <p>3.3 Links (MoUs) established with regional, national, and international research programs for mutual exchange of information, lessons and expertise to strengthen existing agricultural research and extension programs aimed at improving the performance of native crops and varieties and to ensure the participation of indigenous communities in planning and implementation of research programs addressing the performance of native crops and varieties.</p> <p>4.1 4.1 Official designation of the six micro gene centers as Special Management Areas for agrobiodiversity conservation (similar to the status of irrigation or soil conservation districts, and/or protected areas or reserves) and recommendations for enabling legislation for institutional and programmatic support. Designation as Special Management Areas will provide a strategic framework for planning, conservation and resource allocation at national and local levels.</p>

Components	Outputs
<p>Component 5 Incipient market for native crops at the regional and national levels is strengthened.</p>	<p>4.2 Recommendations for incentive measures for agrobiodiversity conservation identified through community/farmer meetings and workshops. These events aim at enhancing the understanding of how national economic policies affect the conservation of native varieties, as well as identifying viable modifications to existing policies from the point of view future implementers and stakeholders. For example, current programs addressing the terms and availability of credit to farmers - as part of the national rural development strategy - could be modified to introduce added incentives for growing native varieties in those areas particularly suited to their cultivation.</p> <p>4.3 Options and recommendations detailing the most viable political-juridical modalities for intellectual property rights and benefit sharing in relation to crop genetic conservation. This will entail awareness raising activities in relation to existing intellectual property right legislation; the manner in which current laws affect stakeholders; as well as an assessment of the positive and negative impacts of potential intellectual property alternatives on crop genetic conservation. This component is aimed at facilitating informed decision-making, effective stakeholder representation in legislative deliberations pertaining to intellectual property rights; the identification of recommendations reflective of local communities and farmers interests; and to enable legal instruments to realize their true potential.</p> <p>4.4 Mechanisms and norms, consistent with national legislation, whereby benefits resulting from the collection, <i>ex situ</i> utilization and commercialization of plant genetic resources are returned to the conservation-oriented communities and organizations. This will provide the basis for developing links and partnerships between these areas and <i>ex situ</i> centers. Such a system of targeted incentives (or compensation packages) will encourage farmers to grow native crops and varieties, and nurture wild relatives in field borders.</p> <p>5.1 Market analysis regarding the potential of different native crop varieties and their products in national and international markets. This will be undertaken for an initial set of several promising varieties of the 11 target species.</p> <p>5.2 Communities trained in reduction of transaction costs associated with joint ventures between private sector entities and communities for product processing and certification. GEF resources will go towards brokering an initial set of these agreements, and training stakeholders.</p>

Components	Outputs
	<p>5.3 Analysis and recommendations regarding the use of a mechanism whereby a percentage of benefits generated from introducing products (based on native crops) into markets are reinvested into the Special Management Areas and participating communities and organizations. This will aim at securing a sustainable source of funds for the recurrent costs of agrobiodiversity conservation programmes. For instance, the recurrent costs associated with the application of agronomic techniques to ensure on-farm heterogeneity in terms of species, varieties, and landscapes.</p> <p>5.4 Training workshops to familiarize communities with issues relevant to introducing products into the market such as joint ventures, production cycles, product certification, and such. These workshops will involve farmers, and representatives of the government and private sector.</p>
<p><u>Component 6</u></p> <p>An information and monitoring system is established as a management tool for coordinating and planning agrobiodiversity conservation activities.</p>	<p>6.1 Map-based inventories with local farmers depicting the wild relatives and local varieties of native crops. This activity will provide the basic information and baseline required to monitor project impact over time. The snapshot of the beginning-of-project situation will be the basis for continuous objective assessments of changes effected by project activities.</p> <p>6.2 Local farmers trained in monitoring techniques to track the overall impact of project activities on on-farm heterogeneity.</p> <p>6.3 Database with the following information to be used for planning and coordination:</p> <ul style="list-style-type: none"> a) Status of genetic resources in the target areas (for example, landrace characteristics, seed availability). b) Degree of genetic erosion. c) Experiences with marketing native varieties and their products. d) Lessons learned and experience with land use and rangeland management practices (develop a set of “good” practices). e) Agrobiodiversity conservation and agricultural development programs and projects. f) Centers of excellence, NGOs and expertise in formal and non-formal education on rural development and conservation; agricultural and environmental research related to crop genetic resources (at national, regional and international levels).

ANNEX III

TECHNICAL REVIEW

In-situ Conservation of Traditionally Cultivated Varieties and their Wild Relatives in Peru

1. Scientific and Technical Soundness of Project

Peru is correctly identified as a center of agricultural biodiversity, and this biodiversity is threatened by long term trends of population growth and socio-economic and technological change. The project has been refined after an earlier technical review and is now more sound. A reduction in the number of sites and crops is a major improvement. The Project Implementation plan has been re-designed to be leaner and more effective. The technical details of the project are better presented here than in the previous proposal. The regional institutional context of the Micro Gene Centers is also improved with the selection of Micro Gene Centers in regions where INIA has experimental stations.

This project is the result of a detailed consultative process and is backed up by extensive agricultural and social scientific research on its themes. Both the consultative process and the supporting scientific research give the project a good foundation. The project is one of a very limited number of internationally supported projects of this nature, and each one of them can be seen as exploratory. The effort in Peru should also provide important lessons for similar projects in the region and elsewhere.

While few of the crops targeted by this project are currently in imminent danger of extinction, on-farm programs undertaken now can be effective in the future. Important aspects of this project are to acquire sufficient baseline data and expertise so to be able to act appropriately when more immediate dangers of genetic erosion or genetic wipeout present themselves. Techniques developed in the target sites should be easily taken to other sites in Peru (and the Andes) and replicated. Both market and non-market techniques have been devised for this purpose. Agricultural researchers in both the formal and informal sector have developed improved agricultural practices that may be used enhance production without genetic erosion. Seed fairs have a proven track record of promoting conservation of agricultural biodiversity. Small markets currently exist for traditional crops but are under-developed. The continued migration of rural people to urban areas suggest that a large and stable demand is possible.

Issues

A significant contribution of this project would be to secure a place for research on traditional crops and local varieties in the agendas of national and regional research institutions. A strong institutional base is especially relevant if this project is to have a long-term presence in tracking genetic erosion and advocating policy and technology in the future. Unfortunately, this proposal does not present a plan for strengthening the

very institutions that are most likely to succeed in the long run – the national and regional agricultural universities of Peru. INIA, the implementing agency has been seriously and adversely reduced in its technical capacity and cannot be expected to serve as the sole institutional base for this type of conservation. INIA has a poor track record of commitment to genetic resource conservation, lack of leadership in this area, and little indication of a deep institutional interest in this topic. The other elements in the proposal are NGOs, that are good service agencies but lack the necessary institutional longevity necessary for successful conservation. Several excellent efforts in non-market methods to increase value of traditional crops have been mounted in the Andes, especially by UNSAAC and UNALM. The project should balance its efforts by working closely with and strengthening on-going agricultural research programs of national and regional universities in conjunction with the INIA stations in the six regions. This is especially appropriate for the activities involving training and research – which are numerous in the proposal (e.g. 1.4, 1.5, 2.2, 2.3, 2.4, 3.2, 3.3, 5.1, 6.1, 6.2). In addition, the replicability of the project for other regions will be enhanced by university involvement, especially in regions where INIA does not have experiment stations but where universities are active.

Recommendation

The most important issue is to how insure implementation that will strengthen institutions with long-term personnel and commitment to conservation activities. Strengthening INIA and the NGOs is appropriate but would be more effective if regional and national universities were more involved in the project. At the very least, the Steering Committee should include representation from regional and national universities that have worked on this topic. In addition, I strongly recommend that the Project Implementation Unit be based at a university, preferably UNALM.

2. Global Environmental Benefits

Peru is central to the Andean hearth of crop domestication and diversity. This region has provided crop genetic resources that are important throughout the world (e.g. for potato, tomato, sweet potato, peanut and manioc). Moreover, the region has many other crops that are regionally important for the subsistence and health of the local population, especially rural people (e.g. oca, quinoa, tarwi, pepino dulce). These crops comprise an environmental system made up of crop populations, wild crop relatives, associated organisms and indigenous knowledge, and this system continues to create genetic rescues.

The global environmental benefits are the continued availability of and access to crop genetic resources and crop evolutionary processes of the Andean crop complex. These benefits are widely recognized and supported by the international community through its support for *ex situ* collections of Andean crops (e.g. CIP). The project is complementary of this support.

3. GEF Fit

The Convention on Biological Diversity is unambiguous in identifying crop genetic resources, indigenous knowledge and cultural practice and *in situ* conservation as within its purview. Other GEF projects, through the World Bank and UNDP, have targeted crop genetic resources, for instance in Turkey and Ethiopia. Thus, the fit to GEF goals is established.

4. Regional Context

Peru is the center of the agricultural complex of Andean crops and indigenous knowledge. Many of the crops identified in this project are also found in neighboring countries, particularly Ecuador and Bolivia. There is continuity of indigenous culture (e.g. Quechua, Aymara) across borders with neighboring countries. Regional projects for Andean crops (e.g. CONDESAN, CLADES) have already integrated NGOs and agricultural scientists from Peru with colleagues in Chile, Bolivia, and Ecuador. This project will, therefore, fit into a regional exchange system for technical and information and seed. Other Andean countries, particularly Ecuador and Bolivia, have active plans for similar conservation efforts, so that this project will be an important learning experience for the entire region.

5. Replicability

Other projects, funded by GEF, multilateral and bilateral initiatives, and national programs, address the *in situ* conservation of crop genetic resources, local farming practices, and indigenous knowledge. The replicability of the project will be enhanced by the ability of national and international agencies and universities to learn from the project. Thus, the participation of these agencies and universities in implementing the project is a key to its replicability. Within Peru, the project has chosen to work in six Micro Gene Centers. Extending this project to other sites in Peru should be relatively straight forward if the approach indicated here is successful and if the institutional context in the new regions is suitable. Both sister NGOs, agencies and universities exist elsewhere in Peru and could replicate what is proposed here. Likewise in other Andean countries, similar NGOs, agencies and universities are knowledgeable of the theme and could replicate this program. Beyond the region, international networks of agricultural science, conservation, and development are well established and could easily take up this approach if it proves itself.

6. Sustainability

Sustainability can be evaluated for each of the two goals of the project: A) farmer participation in conservation of agricultural biodiversity and B) incorporation of agricultural biodiversity conservation in national and regional planning.

A. Peruvian farmers have historically had the interest and capacity to increase and maintain agricultural biodiversity, and there is no reason to think that future farmers will be different in this regard. Helping to reinvigorate seed exchange and providing technical support based on agricultural research are eminently sustainable activities, given an institutional will. INIA may have weathered the systematic

reduction of its staff and activities and thus be able to offer the institutional base in the future. Adding universities to the institutional base of the project would enhance its sustainability.

- B. The informal sector of the Peruvian economy is robust. The marketing solution to promoting conservation is eminently sustainable if the market demand for traditional crops local varieties exists. And we can reasonably expect that this demand is latent and can be tapped. One essence of the market approach is that it should be self-sustaining once set in motion. The development of numerous alternative markets for specialized products and commodities in many cultural and national contexts supports the supposition that a market for at least some traditional crops and local varieties will be sustainable. Whether this approach will work for all 11 crops and in all Micro Gene Centers is doubtful, but not a reason to denigrate the project. An important product of the project will be to identify which crops can be conserved through this method and which will need other conservation methods. In Peru, NGOs, national agencies, universities and international agencies are involved in different aspects of *in situ* conservation. This involvement represents an invaluable pool of information as well as evidence of a broad private and public interest in the theme of crop genetic resource conservation. This experience and interest are two important assets in the sustainability of this project. Not only will Peru be able to draw on the experience gained here, but also on the experience and expertise of other projects. Sustainability of planning and research efforts is more uncertain than market development, and dependent on adequate funding. The loss of funding for agricultural research is a major concern. Nevertheless, the worldwide effort to identify mechanisms to compensate nations that supply valuable genetic resources, such as those addressed by this proposal, may generate a stream of funding for this research to support conservation and to benefit farmers.

7. Improved Definition and Implementation of GEF Strategies and Policies

GEF projects in Turkey and Ethiopia have focused on conserving wild relatives of crops and on institutional strengthening in agricultural science to support *in situ* conservation. This Peru project is important because it emphasizes a broader group of stakeholders and participants and because it focuses on new areas, particularly marketing and planning. With this project, GEF will have a more mature range of project directions and experiences to draw from in planning future programs in this same area.