



GEF

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September 17, 2001

Dear Council Member:

I am writing to notify you that we have today posted in the GEF's website at www.gefweb.org, a medium-sized project proposal from UNDP entitled *Peru: Community - based Conservation and Sustainable Use of the Atiquipa and Taimara Lomas Ecosystems*. The GEF will contribute \$750,000 towards a total cost of \$2,220,800.

The objective of the project is to protect the Atiquipa and Taimara ecosystem and its attendant biodiversity through effective conservation and sustainable management in collaboration with stakeholders. The project will specifically attempt to do this through enhancement of the capacity of communities to manage natural resources, establishment of community managed protected areas, restoration of three forest sites.

The project proposal is being posted for your information. We would welcome any comments you may wish to provide by October 9, 2001, in accordance with the procedures approved by the Council.

If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

cc: Alternates, Implementing Agencies, STAP



United Nations Development Programme
GLOBAL ENVIRONMENT FACILITY



Date: June 8, 2001.

To: Mr. Kenneth King
Assistant CEO

Attention: Program Coordination

From: Rafael Asenjo
GEF Executive Coordinator

Subject: Submission of Medium Size Project Brief for Latin America and the Caribbean: "Community-based Conservation and sustainable use of the Atiquipa and Taimara lomas ecosystems"

Enclosed is a project brief for: "Community-based conservation and sustainable use of the Atiquipa and Taimara lomas ecosystems" submitted to UNDP by Ireca-Unsa, Peru. Please note that the project has been endorsed by the GEF national operational focal points in Peru.

In accordance with the operational guidance for the preparation and approval of medium-sized projects, we are submitting this to the GEF Secretariat for action by the Chief Executive Office (CEO). We understand that the Secretariat will recommend to the CEO that the project be submitted to the Council for approval, that it be returned for revision or that it not be developed further.

We are simultaneously circulating copies to UNEP/GEF, World Bank/GEF, STAP and the Biodiversity Convention Secretariat for comments to the GEF Secretariat. We expect to receive these comments within 15 working days. Therefore, we look forward to receiving the CEO's decision on or before July 13, 01, but understand that the project will not be formally approved, even if the CEO has endorsed it, until the Council has reviewed it within the following 15-day period, namely by August 3, 01, as part of the next work programme.

Thank you and best regards.

cc: Robin Burgess, UNEP
Ahmed Djoghlaif, UNEP
Kristin Elliot, UNEP
Madhav Gadgil, STAP
Mark Griffith, UNEP
Ramon de Mesa, GEFSEC
Francine Stevens, World Bank
Lars Videus, World Bank
Hamdallah Zedan, CBD
Martha Perdomo, UNFCCC



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**PERU— Atiquipa and Taimara Lomas
MEDIUM-SIZED PROJECT BRIEF**

1. <i>Project name:</i> Community-based conservation and sustainable use of the Atiquipa and Taimara lomas ecosystems.	2. <i>GEF Implementing Agency:</i> UNDP
3. <i>Country in which the project is being implemented:</i> Peru	4. <i>Country eligibility:</i> Peru ratified the CBD on May 11 th , 1993 (Decree Law 26181)
5. <i>GEF focal area(s):</i> Biodiversity	6. <i>Operational program/short-term measure:</i> OP#1 "Arid and Semi-arid Ecosystems"
<p>7. <i>Project linkage to national priorities, action plans, and programs:</i></p> <p>Conservation and sustainable management of the Atiquipa and Taimara lomas will reverse the ongoing degradation of the largest and most diverse remnant area of coastal lomas ecosystem. Protection of these unique, fog-dependent ecosystems, found nowhere else in the world, will be a key component in Peru's efforts to preserve its environmental heritage, and to highlight the importance of the coastal desert region as one of the three key ecoregions (with the Andes and the Amazon) in Peru. In addition, an effective and sustainable management regime for the area will protect a large number of endemic plant and animal species in danger of global extinction.</p> <p>The Government of Peru (GoP), after analysis conducted by the National Environmental Council (CONAM), the National Institute of Natural Resources (INRENA) and the Conservation Data Center of the National Agrarian University, has developed and approved a "National Directory Plan for the Protected Areas of Peru". This plan, and the associated report "Biological Diversity of Peru: Priority Zones for Conservation", established 27 areas of "Very High Priority" for the GoP for the conservation of flora, fauna, and ecosystems in Peru. The lomas of Atiquipa and Taimara is one of these areas, based on its status as the largest remaining lomas area, the only remaining lomas formation with forests and aquatic ecosystems, and its very high degree of endemism.</p> <p>The Project supports reforestation and other forest recovery priorities of the GoP, including the Programa Nacional de Manejo de Cuencas y Suelos (National Program for the Management of Basins & Soils - PRONAMACHS). The Project also complies with Directing Plan for Protected Natural Areas (DPPNA), a Program of INRENA whose main objective is "to support the country's sustainable development through the preservation of a representative sample of biological diversity by developing efficacious management of protected natural areas, thus guaranteeing contribution stemming from its environmental, social, and economic benefits to the society." The Project will support Peru's Agenda 21, which uses a people-centered and ecosystem-based approach to protect and regenerate the environment while ensuring synergy between environmental, social, political and economic considerations.</p> <p>The project will contribute to achieving the biodiversity conservation objectives of the National Biodiversity Strategy and Action Plan (NBSAP), including improved knowledge and management systems, better information and institutional support mechanisms, and equitable sharing of benefits of biodiversity. The Project complies with various other biodiversity conservation statues and programs in Peru, among the most important being: the Law on Forest and Wild Fauna (Law 27308 July 16th 2000); the Law on Sustainable Conservation and Development of Biodiversity (Law No. 26 839, 1997), which establishes a legal framework for sustainable conservation and development of biodiversity; the program for Conservation of Genetic Patrimony (Legislative Decree 682); and the Law on Native Communities and Agricultural Development (Law No. 22175).</p> <p>The Project supports the GoP's efforts to ensure greater involvement of local communities in the direct management of protected areas. The community of Atiquipa has received government designation as a Comunidad Campesina. The GoP supports the establishment of communal reserves, and the equitable sharing of benefits from reserves, as part of an overall strategy for rural poverty alleviation, and as a source of recurrent revenue that it is itself unable to provide for protected areas management. Community management is a priority national objective repeatedly</p>	

reflected in the Political Constitution (1993) and legal instruments including the Law for Native Communities (Ley de Comunidades Nativas), the Law for Sustainable Use of Natural Resources (Law No. 26 821, 1997), Law on the Protection of Natural Areas (Law No. 26 834, 1997), the Directing Plan for Natural Protected Areas, and the Constitutional Law on the Development of Natural Resources. The Code of Environment and Natural Resources (Legislative Decree 653) sets forth that conservation areas may be granted in custody and under usufruct to natural and corporate persons, and the ILO 169 Convention ratified by Peru supports community based land ownership and management.

8. *GEF national operational focal point and date of country endorsement:*

Submitted: February 14, 1998
Endorsed: April 13, 1998

Acknowledged: February 14, 1998

Date of Block A Approval: July 2, 1999

9. *Project objective:* A protected Atiquipa ecosystem and its attendant biodiversity, effectively managed for conservation and sustainable use.

Indicators:

- Lomas ecosystem is not diminished within project area, and critical forest lomas areas are under strict protection
- Ecosystem productivity and water supply is recovered
- Documented conservation of key plant and animal species
- Management regime in place and all relevant stakeholders actively participating.

10. *Project outcomes*

Indicators:

i) Community-Based Conservation Established and Local Communities Have Capacity to Sustainably Manage Resources

- Evaluations showing effective role of community-based conservation & management and results to prove it
- Annual “state of the lomas” reports by “lomas keepers” and biodiversity monitoring teams trained and mobilized
- Biodiversity conservation & management plan implemented

ii) Two Community Reserves Established and Operationalized as Core Biodiversity Conservation Areas

- Land for reserves acquired and boundaries delineated and protected
- Management plan for reserves implemented and protection of forest lomas documented

iii) Recovery and Management of Three Forest Lomas Areas

- Land for sustainable management areas designated, boundaries established, and research plots laid out
- Increased productivity and ecosystem recovery documented
- Results of sustainable management practices published and disseminated to local community and others

iv) Remaining Lomas Ecosystems Under Sustainable Biodiversity-Enhancing Management

- Number of viable ecologically sustainable livelihood activities developed / enhanced
- Incremental profit from enterprises quantified and number of primary stakeholders benefited
- Value of funds accumulated for biodiversity conservation and management activities

<p><i>11. Project activities to achieve outcomes:</i></p> <p>i) Environmental Education, and Management Training & Organization, Guiding Resource-Use Decisions of Local Stakeholders (US\$232,800)</p> <p>ii) Two Core Biodiversity Conservation Areas Established Under Community Control (US\$506,200)</p> <p>iii) Lomas Ecosystem Recovery and Management Practices Being Used by Local Farmers and Herdsmen (US\$1,102,600)</p> <p>iv) Best Practices for Sustainable Agriculture and Grazing Applied by Local Stakeholders (US\$370,200)</p>	<p><i>Inputs:</i></p> <ul style="list-style-type: none"> • In-kind support from local community in staffing, manpower, land, and equipment for establishment of conservation areas and research plots • Technical assistance from local and international experts, academic institutions, NGOs, and national government for lomas ecosystem recovery and management studies • Land donated by local community and international NGO for conservation areas and research plots • Equipment and manpower provided by regional government for road building/improved access 						
<p><i>12. Estimated budget (US\$):</i></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">UNDP-GEF, Medium Size Project:</td> <td style="text-align: right;">750,000</td> </tr> <tr> <td>*Co-Financing:</td> <td style="text-align: right;">1,470,800</td> </tr> <tr> <td>Project Total Budget:</td> <td style="text-align: right;">2,220,800</td> </tr> </table> <p>*Co-Financing Sources: IRECA-UNSA (200,000), Regional Government (120,000), European Union (800,000), Community of Atiquipa (300,800), CI/ProNaturaleza/Backus (20,000), Fondo Contravalor Perú-Canadá (30,000)</p>		UNDP-GEF, Medium Size Project:	750,000	*Co-Financing:	1,470,800	Project Total Budget:	2,220,800
UNDP-GEF, Medium Size Project:	750,000						
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Project Total Budget:	2,220,800						
<p><i>13. Information on project proposer:</i></p> <p>The Regional Institute for Environmental Sciences, an institute of San Agustin State University (IRECA-UNSA), is the main project proposer. IRECA-UNSA's mandate is to study and preserve the environment of southwest Peru in order to identify priority areas in need of conservation and sustainable development, and to design and implement integrated solutions that improve the lives of local people and conserve the environment. IRECA-UNSA also promotes the conservation of regional natural resources at the local and regional level, and seeks to inform public environmental opinion and awareness regarding the fragility of regional ecosystems and the importance of aligning regional productive activities towards sustainable development. IRECA-UNSA has experience and trained personnel in a variety of environmental disciplines, particularly those relevant to the evaluation, recovery and sustainable management of arid ecosystems in southwest Peru. Specific areas of specialization include: Animal and Plant Ecology, Environmental Education, Agroecology, Agroforestry, Desertification Detection and Control, and Freshwater Pollution Control and Remediation.</p> <p>IRECA-UNSA has been working with the community of Atiquipa since 1992. During this period, IRECA conducted fog-prospecting studies in Atiquipa to determine the optimal strategies for capturing moisture from coastal fogs -- 1995-2000 European Union project on "Fog as new water resource for the sustainable development of the ecosystem of the Peruvian and Chilean coastal desert" (Contract N° TS3 CT94 0324); and the 1997-1998 project funded by the National Geographic Society on "Flora and Vegetation Project of the coastal hills of the south of the Peru" (Grant N° 6086-97). IRECA-UNSA also constructed a fogcatcher line, consisting of nine double and two single fogcatchers, to increase the community's water resources, and succeeded in capturing an average of 16 m³ of water per day, increasing the amount of irrigation water available to farmers in one area by 20% -- "Construction of fog-catching systems to increase irrigation water (agriculture and subsistence) for the community of Atiquipa" (1999-2000 project funded by the Embassy of Great Britain). IRECA has also fenced off areas of lomas from all grazing in order to assess natural recovery rates, a project for which it received active support and assistance from local farmers; has carried out studies of the floral diversity of the Atiquipa and Taimara lomas; and continues to conduct studies on phytosociology, fauna diversity, and socioeconomic and archeological issues in the area. IRECA-UNSA will take the lead role in implementing Objectives 2 & 3, establishing community forest reserves and research plots for recovery and management of the lomas ecosystem.</p>							

Two other non-profit organizations will work closely with IRECA-UNSA in implementing the Project, and each will take the lead role on one of the four main objectives of the Project. REDA (the Regional Agroecology Network of Arequipa), an organization with experience in agroecology and sustainable development projects, will manage Objective 4, training locals in increased agricultural production, soil conservation, irrigation practices, and the conservation of genetic resources. ILDER (the Labor Institute for Regional Development), an organization that works to organize and strengthen local community organizations, will manage Objective 1, providing environmental education and outreach, and training in community management and economic development issues.

14. *Information on proposed executing agency (if different from above):* N/A

15. *Date of initial submission of project concept:* June 4, 1998

16. *Project identification number:* PIMS 1427

17. *Implementing Agency contact person:*

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18. *Project linkage to Implementing Agency program(s):*

The proposed project is consistent with the GEF Operational Strategy, supporting long-term protection of globally important ecosystems (the lomas of Peru are a globally unique ecosystem), the financing of incremental costs of creating new protected areas, and efforts to ensure a meaningful level of management by local communities in order to work towards the achievement of their long-term biological and social sustainability.

The proposed project complements the current UNDP Country Cooperation Framework (CCF), both thematically, and with respect to executing arrangements. The proposed project directly addresses one of the essential elements in the CCF, namely the continuing concern for sustainability of the resource base, and the regeneration of the environment as a strategy to achieve sustained poverty alleviation and development efforts. Additionally, under the CCF, UNDP has agreed to assist Peru in meeting commitments arising out of various international agreements, including the Convention on Biological Diversity (Peru ratified the CBD on June 7, 1993). Moreover, the CCF proposes “support for the environment and natural resources conservation” as a specific programming area for UNDP support. The framework also promotes projects that combat deforestation and desertification while maintaining Peru’s biological diversity, and projects that “restore the productive capacity of the agricultural sector...” and “upgrade irrigation and drainage systems... and improve the management of water and soil”. Finally, the CCF encourages increased participation by grass-roots community organizations and non-governmental organizations (NGOs) in the execution of projects carried out with assistance of UNDP.

List of Acronyms

CDC	Conservation Data Center
CONAM	National Environmental Council
ENSO	El Niño Southern Oscillation
GEF	Global Environment Facility
GoP	Government of Peru
ILDER	Labor Institute for Regional Development
INEI	National Statistics and Information Institute
INRENA	National Natural Resources Institute
IRECA	Regional Institute for Environmental Sciences
UNDP	United Nations Development Programme
REDA	Regional Network for Agroecology
SENAMHI	National Meteorology and Hydrology Service
SFPP	Fund Service for Projects Preparation
UNDP	United Nations Development Programme
UNSA	San Agustin State University

PROJECT DESCRIPTION

1. PROJECT RATIONALE & OBJECTIVES

The proposed Project is designed to create and implement a community-organized conservation and management regime in the area of the Atiquipa and Taimara lomas in southern Peru. Lomas formations are globally unique, fog-dependent ecosystems found along the Pacific coast of Peru and northern Chile. The lomas are imperiled, with only approximately 100,000 hectares remaining worldwide, of which the largest and most diverse are the Atiquipa and Taimara lomas (approximately 10,000 hectares in an isolated location in Peru's coastal desert region). This area, due to a unique combination of location, altitudinal gradient, coastal winds and other factors, contained historically the largest and most diverse range of lomas ecosystem types found anywhere, producing a variety of ecological niches and giving rise to many unique plant and animal adaptations. Although today degraded and reduced in size (though, due to its isolation, to a lesser degree than other lomas formations), the Atiquipa and Taimara lomas remains the most important lomas formation globally and the home to many endemic, and endangered, plant and animal species.

In the past five years, Peru has begun to move away from a historic focus on the extractive use of natural resources and towards a higher priority on biodiversity conservation and sustainable use. To promote these objectives, the Government of Peru (GoP) has acknowledged the critical role of community-based management of natural resources, and has moved to establish a legal framework to support such structures. Community management is now a priority national objective reflected in numerous laws and decrees, and the GoP is promoting community-led resource management and development initiatives throughout the country.

The residents of Atiquipa, intent on preserving the ecological balance of the lomas, are working today to use this new support for community initiatives in Peru to develop and implement a community-led conservation and management regime for the area. The whole of the Atiquipa and Taimara lomas are the property of 513 persons distributed among three settlements, Atiquipa, Santa Rosa and Agua Salada, which together are referred to as Atiquipa. The community has ownership over 17,625 hectares, including all of the core 10,000 hectare lomas formation. All of this land is collectively owned and managed by the community, except for approximately 70 hectares of agricultural land that is privately owned by individuals in the community. As in all of Peru, the water in the area is technically the property of the State, but in the Atiquipa and Taimara lomas the local community manages the water supply without the involvement of any government entities.

Economic activity consists of agricultural and pastoral activities and a small service sector. Cattle and goat grazing are the most common activity and source of income, while agricultural land is limited to only 70 hectares because of water scarcity. By tradition, use of water for human consumption is given the highest priority, followed by water for livestock, and finally agricultural uses of water.

The residents of the Atiquipa and Taimara lomas are in a "downward spiral" of resource degradation that is destroying the local environment. Overgrazing and deforestation are degrading the lomas ecosystem, diminishing the ability of the lomas to capture fog water, thereby reducing the amount of water available for agriculture, and thus increasing the pressure to exploit other resources; all of which leads right back to further reductions in forest areas, and intensified and expanded grazing. In addition, resource degradation has diminished the quality of life for local inhabitants, contributing to emigration out of the area by those searching for better economic alternatives, and in the process further weakening the community structure that traditionally protected these resources.

The Project is designed to both protect and recover the Lomas ecosystems in the Atiquipa area. Local communities are leading the effort, and will donate land, manpower, and other resources to protect the Lomas. In addition, local inhabitants will adopt new resource management strategies that allow for sustainable production throughout the entire lomas ecosystem. In exchange, these communities will be assisted in developing a community-based management and control system to protect and recover the lomas ecosystem, and they will benefit from increased water supplies and agricultural output resulting from the Project's activities.

The Project is located in the coastal Sechura desert, a vast area that stretches for approximately 3,780 kilometers along the Pacific coast of Peru and Chile. The Sechura is one of the world's driest places, and other than some small rivers that flow west from the Andes to the Pacific, the only water sources are the unique lomas formations found scattered along the coastal edge of this desert. Formed on the coastal cordillera facing the sea, lomas formations are areas of herbaceous, shrubby and arboreal vegetation that have evolved to "catch" fog vapor, creating oases of moisture and abundance in an otherwise arid region.

The fogs that sustain the lomas formations are produced mainly from May to September, when cold offshore ocean currents produce advective fogs that are moved by the wind across the coastline of the cordillera. As the fogs move inland, the ambient temperature lowers and humidity increases to the point that certain plant species, particularly trees and shrubs, are able to collect water from the fog. Some of these trees and shrubs are so efficient at capturing and using water during periods of heavy and sustained fog that they create a surplus of water. This water infiltrates into the soil, replenishing the subterranean aquifer and producing springs of fresh water that foster other plant and animal life and that are employed by the local community for agricultural purposes.

In order to capture moisture from fogs as they drift inland, a rare combination of altitudinal gradient and orientation to coastal winds must both occur. This combination of factors is rare, and the few areas that can support lomas vegetation, and thus provide a high concentration of water in a highly water-limited environment, are keystone ecological features that support a high degree of endemism, provide critical forage for wildlife and livestock, and support remote human communities.

Currently, there are approximately 100,000 hectares of lomas ecosystems throughout Peru and northern Chile, down from more than one million hectares in pre-Columbian times. Most lomas ecosystems today exist in small, isolated patches, and few areas contain all of the different types of lomas ecosystems (cactus, grass, shrub and forest lomas). Of all the lomas ecosystem types, the forest lomas is most highly valued, as it is the most effective in capturing moisture, it contains the highest biodiversity, and it is now the most rare lomas type.

The Atiquipa and Taimara lomas, at 15° S in the District of Atiquipa, Province of Caraveli, Department of Arequipa (see Map 1), are the most extensive lomas formations remaining. In normal years, they cover an area of 10,000 hectares, and in El Niño years the lomas extend to a total area of 30,000 hectares. The coastal mountainsides where Atiquipa and Taimara are located have a particularly dramatic altitudinal gradient favoring lomas formation, with a rise from sea level to the peak of Cahuamarca mountain (1,297 meters) in the space of 15 kilometers (See Maps 2 & 3). The size of the Atiquipa and Taimara lomas, and its position as a biogeographic island separated by 100 kilometers of absolute desert from any other coastal hills, has fostered the greatest biodiversity and endemism of any lomas area.

The Atiquipa and Taimara lomas are of global importance for biodiversity conservation on several levels: they are the largest remaining area of a unique ecosystem; they contain specific forest habitats now found nowhere else on earth, and they harbor an outstanding array of species diversity and a high degree of endemism (including six species that exist nowhere else on the planet). As part of the Sechura Desert,

they constitute a unique component of one of the most arid deserts in the world, a region rated as “vulnerable” and “bioregionally outstanding” by Dinerstein et al. (1995).

The lomas ecosystem is a unique ecosystem globally, with a combination of trees, shrubs and herbs with special properties (particularly the ability to “catch” water vapor from fog) that allow them to thrive in an otherwise inhospitable environment. The dependence of animal and plant life on moisture from coastal fogs has resulted in the development of unique morphological and physiological adaptations among species, unusual interactions and dependencies between species, and a high percentage of endemism in lomas formations.

The lomas formations within the Project area include the last remaining lomas forest of any size in the world, with some 1,500 hectares remaining (Jimenez et al., 1997). There is one small patch (totaling 50 hectares) of Arrayán or myrtle (*Myrcianthes ferreyrae*) forest, as well as 1,000 hectares of mixed Taro (*Cesalpinia spinosa*) and Huarango (*Acacia macracantha*) forest, and a final 400 hectares of degraded Taro forest. These 1,500 hectares are by far the largest existing lomas forest in the world (no other area has more than 100 hectares).

As the largest remaining and best-conserved lomas formations, and the only ones with permanent springs of any significance, the Atiquipa and Taimara lomas contain the greatest species diversity of any lomas area. There are 38 endemic species in the Atiquipa and Taimara lomas, six of which exist nowhere else in the world: four plant species (*Myrcianthes ferreyrae*, *Nolana inflata*, *Nolana aticoana*, *Pygmaecereus familiaris*) (see Annex 2: Flora Species list); and two animal species (*Calomys sp. nov.*, *Orobothriurus sp. nov.*) (see Annex 2: Fauna Species list).

Plant biodiversity is high in the lomas formations of Peru and Chile, with 537 plant species identified, of which 225 are endemics (Gentry, 1993, Brako & Zarucchi, 1993). Wild vertebrate fauna also are well represented in lomas formations, with 103 species, 22 of which are endemic to Peru, distributed between 83 genera and 44 families. In addition, the full species diversity of the lomas formations has yet to be assessed; the two animal species unique to the Atiquipa lomas, a rodent (*Calomys sp. Nov.*) and a scorpion (*Orobothriurus sp.nov.*), were only discovered in the past three years.

Finally, the Atiquipa and Taimara lomas contain important agrobiodiversity. The area has supported human habitation for over 6,000 years and contains many varieties of crops such as potato (*Solanum* spp.), tomato (*Lycopersicum* spp.), chili (*Capsicum* spp.), pumpkins (*Cucurbita* spp. and *Cyclanthera pedata*), sweet potato (*Ipomoea batatas*), passion fruit (*Passiflora* spp.), and achira (*Canna edulis*); it also may contain unknown wild relatives of some of these crops as well.

2. PAST & CURRENT BASELINE SITUATION

The Project will conserve the total area of the Atiquipa and Taimara lomas, the last remaining lomas system in Peru of a size and condition where disparate human and environmental interests can be balanced. Other remaining coastal lomas formations, much smaller and more degraded, will in all likelihood recover only over the long term, through strict reforestation and preservation and with a larger investment. This Project, by recovering and protecting a lomas ecosystem whose water production can benefit both human and environmental interests, present a rare opportunity in Peru to strike a sustainable balance between “use” and “conservation”.

Historically, the Atiquipa and Taimara lomas covered 45,000 hectares, including 15,000 hectares of forest lomas and over 2,000 hectares under cultivation. Until the mid 20th century, the local inhabitants employed an effective strategy of communal management based on maximizing the limited water and

land resources. Higher elevation forests were protected, and the fog-derived water that they produced was funneled through spring-fed creeks and irrigation channels to provide water for cultivated land at lower elevations. Appropriate sustainable use technologies that took account of the carrying capacities of the lomas, such as terraced agriculture, multicropping, and traditional family gardens, were employed on agricultural lands and provided sustainable and effective food production and irrigation systems.

Population growth and the opening of markets for agricultural products outside of the community over the past 50 years put increased pressure on the area's natural resources. As competition for scarce resources grew, land use practices changed, and overgrazing and the cutting of forests have now reduced the forest lomas by 90% (to 1,500 hectares) and various types of herbaceous lomas by 75% (to 8,000 hectares). This accelerated process of degradation also removed many native plant species, thereby reducing the amount of moisture captured from fog and further lowering the productivity of the lomas ecosystem.

Today, the inhabitants of Atiquipa are poor even by Peruvian standards, with an average monthly family income of less than US\$100. Agricultural land is still farmed, with one cash crop (olives) and a diversity of subsistence crops (potato, sweet potato, cassava, corn, fruits, cereals and vegetables), but water shortages have reduced agricultural land to only 70 hectares, or 3% of the agricultural potential (Canziani, 1993). Grazing of cattle and goats has become more prominent as agriculture has declined, but desertification is impacting this sector as well. Fresh drinking water supplies have declined, resulting in human health impacts. As income levels have continued to fall, migration out of the community has increased (the population of 513 represents a decline of 9% since 1993), as young people move elsewhere in search of economic opportunity. Together, migration and poverty are combining to weaken the community's organizational structure, which in turn exacerbates one of the primary causes of ecosystem degradation in the area: the "open access" nature of the lomas resources.

The Atiquipa and Taimara lomas is now a truly open-access resource, where local farmers and ranchers have abandoned traditional constraints in the face of a zero-sum competition for resource usage. Overgrazing by cattle, and particularly goats, has degraded large areas of the shrub and grassland lomas, causing desertification and imperiling several endangered species. In the forest lomas, uncontrolled cutting of tree species continues, prompted by the peasant's need to satisfy their demand of firewood and wood for housing. Trees such as divi-divi, myrtle, huarango, and cascarilla, which together are the most important species for collecting fog water and maintaining ecosystem balance for the entire Atiquipa and Taimara lomas, are disappearing from the last few remaining patches of forest lomas.

The results of overgrazing and deforestation are widespread and severe. Throughout the Project area, reduced water availability is changing the vegetative landscape and reducing community croplands. Fragmentation of the remaining forest, shrub, and grassland lomas continues as native species are removed and exotic plants take hold. Already, endemic plants such as *Myrcianthes ferreyrae*; *Nolana spathulata*, *N. aticoana*, *N. volcanica*, *N. pilosa*, *N. spergularoides*, *Malesherbia arequipensis*, *Viguira weberbaueri*, *Croton alnifolius*, *Nicotina paniculata*, *Tiquila simulans*, *Verbena clavata*, and *Pygmaeocereus familiaris* are in danger of disappearing from the area, as are several wild varieties of agricultural crops (e.g. *Solanum*, *Lycopersicum*, *Cucumis* and *Passiflora* genuses).

Without effective intervention, the lomas of Atiquipa and Taimara will continue a pattern of environmental degradation and human impoverishment. In the mid-term, deforestation, overgrazing and overexploitation of water resources will result in a desertification process that will become irreversible even with human intervention. Full recovery of the whole ecosystem, and the flora and fauna species currently vulnerable and threatened, will become impossible.

Efforts to reverse this downward spiral must begin with the local community, which has ownership of the entire Atiquipa and Taimara lomas. The residents of Atiquipa have managed to conserve their ancestral

agricultural knowledge and to maintain their communal irrigation network, and the community has managed to preserve the remaining 1,500 hectares of forest lomas and 8,000 hectares of herbaceous lomas. The Executive Committee of the Rural Community of Atiquipa, an elected organizational structure which manages the area's communal resources, has taken recent steps to improve resource management, including the preparation and approval of a set of regulations and agreements designed to: control overgrazing by restricting goat pasturage to the lowland areas and cattle pasturage to selected highland areas; control deforestation by restricting firewood collection to dead wood in specific areas; and limit the extraction of freshwater to certain springs.

While the community is aware that it must take steps to change its condition, the capacity and resources to implement change does not yet exist. The Executive Committee does not have the capacity to implement the proposed changes, neither in exerting effective control over resource use nor in generating community support for such measures. Without a coordinated instrument for the management and protection of the resources in the area, and the ability to demonstrate specific benefits for local inhabitants through supporting the plan (e.g. increased water availability and quality, better agricultural and pastoral yield, reduced deforestation and desertification), the Executive Committee cannot generate the communal support and commitment necessary to success. In addition, a lack of finances has preclude detailed analysis of the resources, capacity, or management plans needed for sustainable natural resource management and conservation of the area's biodiversity.

To create this capacity and leverage new resources, the General Assembly of Atiquipa and the Executive Committee, with the active support of 80% of the community's residents, have entered into cooperative programs with IRECA-UNSA, the Regional Network for Agroecology (REDA), and the Labor Institute for Regional Development (ILDER), to undertake the proposed Project. The Project will have a Board of Directors, which will oversee project administration and coordinate activities and responsibilities among the participating institutions, consisting of three representatives of the Comunidad Campesina de Atiquipa, and one representative each from IRECA-UNSA, ILDER, REDA, the UNDP Lima office, and a project coordinator.

3. EXPECTED PROJECT OUTCOMES

The project will result in significantly enhanced community-based management capacity to conserve and sustainably utilize the resources of the Atiquipa and Taimara Lomas – an outcome that would otherwise face significant obstacles given the limited community capacity to halt and reverse the momentum of ecological destruction in the lomas formations. By strengthening community-based management in the Atiquipa and Taimara lomas, the project will have enabled local stakeholders to reestablish a common property regime capable of accommodating disparate interests and of eliminating the main threats to the lomas formation's biodiversity. In addition, the project will have established core conservation areas and ecosystem recovery areas to protect the most globally significant biodiversity of the area, and enhance the productivity of the lomas ecosystems (see Map 4).

Project Objective

A protected Atiquipa and Taimara Lomas ecosystem and its attendant biodiversity, effectively managed for conservation and sustainable use in collaboration among different stakeholders.

Project Purpose

To address and reduce habitat destruction, resource over-exploitation, and other human activities which pose a threat to the largest remaining remnant of the globally unique coastal lomas ecosystems of Peru and Chile.

Outcome 1: Community-Based Conservation Established and Local Communities Have Capacity to Sustainably Manage Resources

An organized and professional community organizational structure will result in consistent and sustainable ecosystem management and conservation initiatives that enjoy the support of key stakeholders.

Outcome 2: Two Community Reserves Established and Operationalized as Core Biodiversity Conservation Areas

Conservation areas will be established and management plans developed and implemented for two of the largest remaining patches of pristine lomas forest ecosystem (50 hectare and 200 hectare) in the world.

Outcome 3: Recovery and Management of Three Forest Lomas Areas

The Project will produce an increase of 25+% to the current forest lomas area, and produce sustainable silvicultural management on another 50+% of the current forest lomas area.

Outcome 4: Remaining Lomas Ecosystems Recovered and Under Sustainable Biodiversity-Enhancing Management

Lomas ecosystem productivity and water supply is recovered, agricultural production of Atiquipa's peasant community will have increased by 20%, and alternative sustainable economic activities are providing new sources of revenue for the local community and lomas management and conservation.

4. ACTIVITIES & FINANCIAL INPUTS NEEDED TO ENABLE CHANGES

To achieve the above outcomes, the Project will engage in four complementary areas of activity:

- Strengthening of Community-Based Conservation and Management Capacity
- Establishment and Operation of Two Community Reserves as Core Biodiversity Conservation Areas
- Recovery and Management of Three Forest Lomas Ecosystems
- Stakeholders Apply More Sustainable Resource-Use Methodologies

4.1 Strengthening of Community-Based Conservation and Management Capacity (US\$232,800 or 10% of project budget)

The Project will strengthen communal organizations in order that they may undertake management and sustainable use of the lomas. To achieve this output it is necessary to implement the following activities:

4.1.1 Strengthening of Local Resource Management Institutions and Elaboration of Management Plans

The Project will work with the existing Executive Committee of the Rural Community of Atiquipa, which has responsibility for resource management and sustainable use of the Atiquipa and Taimara lomas, to strengthen local capacity to manage and conserve the area's resources. The Executive Committee will create sub-committees composed of local inhabitants and focused on specific resource areas (agriculture, grazing, water management). Both the Executive Committee and the sub-committees will receive training on applied resource management strategies, organizational effectiveness, and leadership. The Executive Committee, with input from the subcommittees and from Project staff, will elaborate an overall

development plan, and an environmental conservation and management plan, for the Atiquipa and Taimara lomas.

The Executive Committee will use the community's traditional methods and strategies for managing the common property resources of the lomas as a base for developing the new development and management plans for the area. By applying a new organizational structure, and providing sufficient funding for implementation, monitoring, and dispute resolution, this strategy will take advantage of the strengths (and widespread local understanding) of traditional resource management practices in the coastal lomas ecosystem. This strategy also will reenergize the community's ability to apply incentives and prohibitions on behavior within the community, and will also strengthen the community capacity to revert pressure on the lomas from outsiders.

4.1.2 Elaboration and Implementation of a Community Training Program

Training will be provided to local community organizations, natural resources users (farmers, pastoralists), and the general population in sustainable resource management. Selected community leaders and Project participants will receive specialized training in conservation biology, species recovery and management, and community-based approaches to biodiversity conservation. Training in organizational management and leadership will be provided to community representatives and community outreach personnel.

4.1.3 Creation of Environmental Education Program & Code of Conduct

Communities in areas around the Atiquipa and Taimara lomas know little about the relevant laws or opportunities for conservation and sustainable development. Because an informed and educated community is more likely to recognize and abandon destructive practices, and take action against present and future threats to biodiversity, the Project will raise awareness and change behavioral norms that have led to environmentally destructive behaviors. Community-based education activities will be promoted, combining multi-media such as radio, music, newsletters, video and special events to reach target audiences. The project will focus on: improving environmental literacy, establishing environmental ethics, and increasing environmental advocacy.

The community of Atiquipa has already agreed to and supports an education and awareness program that will lead to the formulation of an environmental code of ethics for the area. The code of ethics, developing and applying specific conservation standards, will be developed through participative community outreach and will apply at the individual, family, and community level. To maximize impact, interventions will involve key figures in the social transformation process – policy-makers, business people, and educational institutions. In addition, a special effort will be made to reach out to part-time residents of the lomas, many of whom have a significant impact on (through ownership of grazing animals), and little understanding of, the local environment.

4.2 Establishment and Operation of Two Community Reserves as Core Biodiversity Conservation Areas (US\$506,200 or 23% of project budget)

4.2.1 Establishment of Two Community Reserves

Two pristine areas that encompass the highest levels of lomas biodiversity and endemism remaining in Peru will be established. The first is a 50-hectare patch of endemic lomas myrtle forest (*Myrciathes ferreyrae*), the largest such remaining forest in the world, in the Taimara lomas. An area of 1,500 hectares, including the myrtle forest, will be purchased for \$20,000 from existing private owners and annexed to the community of Atiquipa. The second is a 200-hectare patch of forest in the Atiquipa lomas,

currently collectively owned by the Comunidad Campesino de Atiquipa. Both areas will be under the ownership of the community, but will be given in use and administered by a user committees. Both areas will also receive official designation from INRENA as “Natural Protected Areas” within the SINANPE (Sistema Nacional de Areas Naturales Protegidas por el Estad).

4.2.2 Creation of Community Reserve User Committees

Stakeholders will be organized into two user committees to manage the two community reserves. The user committees will consist of representatives of the community of Atiquipa, the Province of Caraveli, INRENA, and UNSA. In the case of the 50-hectare Taimara forest, the non-profit organization that purchases the land will also participate on the user committee. To support the user committees, local school children will be organized into “Lomas Caretakers”, responsible for ensuring that water quality measurements (and other data) are taken on a regular, year-round basis, and for contributing to an annual status report. These activities will add to the local community’s sense of participation and contribution, and will provide valuable learning experiences and project management skills for the local communities.

4.2.3 Creation of Community Reserve Management Plans

The Community Reserve User Committees will develop biodiversity conservation & management plans for the reserves. Based upon analyses and field surveys to be conducted as part of a long-term monitoring and targeted research program for the Atiquipa and Taimara Lomas, the plans will be designed to support proactive conservation and preventative management.

4.2.4 Implementation of Ecosystem Conservation and Recovery Activities

Physical boundaries for the community reserves will be demarcated and reinforced with perimeter fences (built with the help of the local communities). A monitoring and enforcement program will be established to ensure that livestock are kept out of the community reserves.

Ecosystem recovery programs will be initiated, with a particular focus on a reforestation program for *Myrcianthes* (including establishment of a tree nursery for saplings), and habitat protection and improvement for the endemic *Calomys* rodent species. Evaluation and control of the ecosystem changes in the community reserves will be carried out (e.g. number of *Myrcianthes* trees, natural reproduction growth rates, vigor and rate of spread, etc.).

Information on detailed recovery processes and mechanisms for coastal lomas ecosystems will be compiled and shared with resource managers throughout Peru and Chile. It is expected that the Atiquipa and Taimara lomas will become the pilot training center for the management, conservation and sustainable use of lomas ecosystems and biodiversity, for both the international scientific community and for local communities and peasants that occupy or manage similar ecosystems.

4.3 Recovery and Management of Three Forest Lomas Ecosystems (US\$1,102,600 or 50% of project budget)

Three 400-hectare plots of degraded forest lomas have been identified as priority areas for recovery and ecological study. These plots will be donated by the community for the exclusive use of Project activities during the term of the Project. These areas were selected because of the scarcity of remaining forest lomas globally and because of their importance as water catchment zones for the Atiquipa and Taimara lomas. Project activities in these plots will result in an increase of 25+% to the current forest lomas area, and the ecological recovery of another 50+% of the area.

4.3.1 Establishment of a 400 Hectare Reforestation Area with Native Tree Species

400 hectares of degraded lomas forest on the Lloque and Cahuamarca mountains will be replanted with native species, including: myrtle (*Myrcianthes ferreyrae*), divi-divi (*Caesalpinea spinosa*), cascarilla (*Remijia peruviana Standley*), chamo cruz (*Cestrum auriculatum*), huarango (*Acacia macracantha H.&B.*) and algarrobo (*Hymenaea courbaril L.*). To achieve this output the following activities must be implemented:

- Establishment of Infrastructure: A perimeter fence will be constructed for the entire 400-hectare area. An experimental station will be constructed, with offices, a warehouse and lodging for project researchers and visitors. A micrometeorology station will be installed, and will have temperature, humidity, radiation, soil water content, wind direction and speed sensors, to measure the climate variables of the lomas and to relate them with the development of the cultivated areas installed in the reforestation area (this will be the only meteorology station in the entire coastal lomas of Peru).
- Creation of Experimental Fogcatcher System: A fogcatcher system will be built on a 960 square meter surface area, and a reservoir of 600 cubic meters capacity will be constructed. This system will collect water from fog and transport it for use in the forest and tree nursery.
- Reforestation Activities: In Year 1, seedlings will be planted at density of 1000 seedlings/hectare with the goal of producing 500 trees/hectares. Depending on the efficiency of this effort, additional plantings at different densities will be undertaken in Years 2-4.
- Establishment of Tree Nursery of Native Species: A tree nursery will be established to facilitate the recovery of the lomas ecosystem and of specific endemic species, and to increase the natural resource base of the local community.

4.3.2 Establishment of a 400 Hectare Silvicultural Management Area

400 hectares of existing lomas forest will be set aside for intensive silvicultural management and study. Research grids will be established in which pruning, thinning and other silvicultural practices will be applied, and a sustainable timber-harvesting schedule will be developed. Training in silvicultural techniques will be provided to local inhabitants, with training courses on pruning and techniques on forest revitalization.

4.3.3 Establishment of a 400 Hectare Pasture Management Area

400 hectares of existing forest lomas will be fenced and divided into plots for the study of grazing patterns and native species' carrying capacities. On some plots, grazing will be excluded entirely and the natural recovery rates of the native shrubby and herbaceous lomas species will be measured. On other plots, rotating grazing will be undertaken to measure the effects of different grazing intensities on natural ecosystem functions.

A training program for the local inhabitants will be undertaken with the goal of improving management of goats and cattle grazing. Two research herds of goats will be established, with one herd grazing and feeding exclusively on native lomas species, and the other on the normal mix of plant species that are planted and promoted by local farmers. This study will determine the effects of grazing on different plant species and mixes of species, as well as studying the nutritional values for the goats. Implementation of this program will be supported by the Peru-Canada Revolving Fund, which will provide initial capital to create a revolving credit fund.

4.4 Stakeholders Apply Sustainable Resource-Use Methodologies (US\$370,200 or 17% of project budget)

A comprehensive resource management program, restricting grazing on the highlands and emphasizing farming and sustainable water use on the lowlands, will be developed and implemented for the entire Atiquipa & Taimara lomas. These efforts will go beyond research and demonstration parcels, applying the experimental outputs of such efforts at a scale to have a significant impact on lomas ecosystem recovery. By increasing agricultural production by 20%, and preserving environmentally appropriate technologies, extractive pressure on the lomas will diminish. To achieve this output, it will be necessary to put into practice the following activities:

4.4.1 Optimal Irrigation Water Use program

Currently, water scarcity and inefficient irrigation technologies combine to force farmers to severely limit their use of irrigation, sometimes waiting up to three months between irrigating crops. The Project will introduce and monitor the use of pressurized irrigation systems that will greatly enhance water use efficiency.

4.4.2 Demonstration Agriculture and Pasture Parcels

The Project will establish demonstration agroecological parcels that will be used to train local farmers in agroecological and irrigation practices. These parcels will utilize intercropping of native species and varieties and highly efficient pressurized irrigation systems. The Project will also study and apply modernized livestock management practices for goats and cattle. For certain topics (drip irrigation, low-impact goat herding, agro-ecology), the Project will use specialists from the UNSA and other institutions. These practices will provide farmers and ranchers with the models for increasing productivity, decreasing capital investment requirements, and minimizing the risk of crop and animal losses from diseases and pests.

4.4.3 Conservation of Traditional Practices/Technologies

The Project will work with local farmers and ranchers to document and assess traditional, environmentally appropriate resource management practices. The best practices used on both agricultural lands and family gardens (e.g. intercropping of many species varieties, agroforestry), will be collected and disseminated throughout the community. Effective means for ensuring sustainable grazing on native lomas landscapes will also be investigated.

A team of agricultural/pastoral outreach coordinators will be organized and trained, drawing heavily from existing community “proposers”, or early adopters, of sustainable practices. Widespread adoption of best practices will diversify and increase production, leading to improvements in local diet, food security and income.

4.4.4 Development of Sustainable Economic Activities and Long-Term Financing Mechanisms

The Project’s work to recover and sustainably manage lomas ecosystems, and to work with stakeholders on more efficient and sustainable agricultural and pastoral practices, will combine to increase local incomes and generate ongoing support for sustainable use of the lomas’ biodiversity and other resources. Resource-use in the lomas will be re-oriented from the traditional focus on “extractive” uses of resources to a more sustainable, multiple-use approach that includes non-consumptive uses. The Project will assist the Executive Committee of Atiquipa in formulating explicit guidelines for the sharing of income

generated on communal lands and/or through communally managed activities (e.g. revenues generated in the demonstration parcels and the forest recovery and management areas during the Project).

- **Increased Agricultural Production:** Preliminary analyses of the lomas ecosystem and current resource management practices indicate that, even without an increase in water supplies, agricultural production could be increased by 20% through the application of more efficient, and less destructive, crop and grazing practices. Revenues from adoption of these practices will benefit local inhabitants and decrease the pressure to engage in destructive practices.
- **Increased Water Supply:** The Project will work to recover the natural moisture capture capacity of the lomas, will increase artificial fog catching mechanisms, and will improve water use efficiency in order to increase the overall water production of the Atiquipa and Taimara lomas. An increase in water availability will improve environmental conditions, and will increase the amount of arable agricultural land, reducing pressure to cut down remaining forests.

The Project will also develop other mechanisms for generating income to support the long-term goals of the Project, including potential revenues from ecotourism and scientific visitors, support of national and provincial conservation authorities, and long-term commitments from national and international conservation foundations (more details in section 5.2).

5. SUSTAINABILITY ANALYSIS & RISK ASSESSMENT

5.1 Institutional Sustainability

By the end of the project, there will be a replicable model for other lomas formations in Peru and Chile. In effect, the current project represents a pilot demonstration of community-based conservation and management on private lands. Key stakeholders will be driving the process, guaranteeing that it will have lasting results that are accepted by all. The active involvement of local people will provide more transparency and credibility to the decision-making process, which is especially relevant in the absence of similar experiences in the country, as well as encouraging greater commitment on the part of the community in fulfilling the agreements reached.

The local inhabitants of the lomas realize that their own poverty and the degradation of the natural resources are inextricably linked. As the project improves local environmental conditions, and the benefits of these changes to the local communities become apparent (facilitated by training and awareness building), the long-term support of local inhabitants will be assured. In addition, the Project's community-building activities, and the income that is generated by improved agricultural practices and sustainable economic activities (e.g. ecotourism), will strengthen local institutions and provide them with long-term viability.

5.2 Financial Sustainability

The Project is designed to accomplish all of the capital intensive activities required to recover and protect the Atiquipa and Taimara lomas during the term of the Project. Land acquisition, infrastructure development, major equipment purchases, training and outreach, and other costly activities will be completed using GEF and co-financing sources. Accordingly, it is expected that ongoing costs to continue the conservation and sustainable management of the area will be relatively low, given the small local population, the limited size of the area (in particular the two core conservation areas, which only total 250 hectares), and the remote location of the Atiquipa and Taimara lomas, which limits human pressures on the area.

Nevertheless, some funding will clearly be necessary to maintain protection measures and ongoing sustainable resource management and community organization. To meet these recurring costs, the Project will develop several long-term financing strategies. As an increased water supply supports agricultural expansion and higher revenues for the local community, the residents of Atiquipa will pay some of these revenues to the Executive Committee of Atiquipa for communal management (and will have a strong incentive to comply based on the direct linkage that they will see between improved communal management and a better standard of living). A small-scale ecotourism program, targeted at conservationists and scientists for general interest as well as research visits, will be investigated. The Project will also investigate the possibility of developing tourism which combines ecotourism with visits to local beaches and archaeological sites.

Designation of the two core conservation areas will generate financial commitments from INRENA (National Institute of Natural Resources) and its Fondo para las Areas Naturales Protegidas por el Estado (PROFONANPE). Although the level of support from INRENA is not likely to be large, INRENA and other government bodies may indirectly fund the area by directing additional research projects in the lomas, generating usage and permit fees for the area. The regional government, which is already a co-financing source for the Project and which has expressed its commitment to conserve the Atiquipa and Taimara lomas, and will be an active, ongoing participant on the management committees for the two community reserves. Finally, the Fundacion Pro-Naturaleza, the Fundación Backus and Conservation International have all indicated their intention to initiate projects in and support of the Atiquipa and Taimara lomas once the community reserves have been established and officially designated as protected areas.

5.3 Project Risks

There are some important risks the project has been designed to minimize and assumptions built into the design of the project and upon which its success depends. The main risks in project implementation are:

5.3.1 Opposition to Project implementation and goals by some sectors of the local community, or by outsider groups, such as cattle and goat herders and traders, and downstream water users. The former risk is addressed by the Project in its extensive community outreach activities and the participation of all of the local community leaders in the development of the Project thus far. The problems posed by outside resource users are addressed by the Project in its focus on strengthening local institutions to be able to enforce the already clearly defined ownership rights of the local community, and by the Project's activities which will increase the overall resources (e.g. water) in the Atiquipa and Taimara lomas.

5.3.2 Development and growth in and around the Project area could put increased pressure on the Atiquipa and Taimara lomas resources. Population growth and urban expansion in and around the villages of Santa Rosa and Agua Salada could increase the demand for freshwater, firewood, and hay, as well as land for grazing. The Project addresses these risks through its activities focused on creating a clearly defined and communally supported conservation and management plan for the area, as well as the institutional structure to implement and enforce the plan.

5.3.3 Mining on a small scale exists in areas near the Atiquipa and Taimara lomas, and mining within the Project area would pose a threat to water quality and produce increased demand for water. However, current mining is limited to only three residents living in the village of Santa Rosa, and neither the local nor the regional government support mining activities in the area.

6. STAKEHOLDER INVOLVEMENT & SOCIAL ASSESSMENT

Facing the continued degradation of its local resource base, the community of Atiquipa enlisted the help of IRECA-UNSA to develop a strategy to address its problems. After two participatory planning workshops, in which over 80% of the local community participated, and with the formal approval of workshop participants and the Executive Committee of the Rural Community of Atiquipa, IRECA-UNSA assisted local community leaders in developing a proposal and secure PDF-A funding as a step to development of a Medium Size Proposal to GEF.

In order to better understand the different problems present in the Atiquipa and Taimara lomas, the first step of the PDF-A was to conduct four community participation workshops, jointly organized by IRECA-UNSA, ILDER and REDA. Consultations also were held with groups of academics from the Arturo Prat and Tarapaca universities, as well as with professionals, public institutions and research institutions in order to become familiar with the level of scientific knowledge of the species present in the Lomas. Based on the results of these efforts, the project development team was able to (i) design programs and activities to conserve and manage the Atiquipa and Taimara lomas; (ii) define the willingness of different parties to be involved in the activities proposed in the project; and (iii) determine the viability of the proposal contained in the project.

Following this, three stakeholder consultation workshops were held on the design of the project and its specific content. The first workshop, held in the provincial capital of Arequipa, was addressed to regional authorities and experts who could contribute to the project. The second workshop, designed to get additional input from the local community, was carried out in Atiquipa and included representatives from the Executive Committee and other community participants. Finally, a workshop was held in Lima in which national authorities and experts reviewed and contributed to the Project elaboration.

7. INCREMENTAL COST ASSESSMENT

	BASELINE (B)	ALTERNATIVE (A)	INCREMENT (A-B)
Global Benefits	<p>Weak-to-non-existent coordination among key stakeholder institutions leads to continuing loss of globally significant biodiversity</p> <p>Limited funding available for necessary biodiversity conservation and management</p> <p>Loss of traditional sustainable technologies, such as terraced agriculture, multicropping, traditional family gardens, and use of diverse native varieties</p>	<p>New management structure, and capacity building for cooperative management, assures effective conservation and management of biodiversity.</p> <p>Sustainable economic activities & long-term financing for project goals developed; funding to establish reserves for globally unique lomas forest areas</p> <p>Documentation & dissemination of best use practices allow sustainable lomas resource use</p>	<p>Collaborative management and conservation ensures sustainable conservation of biodiversity sustainable use of natural resources.</p> <p>Sustained public and private sector co-financing for a biodiversity conservation and resource management program</p> <p>Widespread application of sustainable resource practices preserves and recovers lomas ecosystems and agrobiodiversity</p>
Domestic Benefits	<p>Open access to lomas resources by livestock and wood collectors endangering lomas function as a critical habitat and watershed</p> <p>Poverty and decreasing economic alternatives (access to resources) leading to more destructive resource use practices</p>	<p>Common property management systems assessed and reinvigorated, and appropriate resource use practices developed</p> <p>Development of alternative sustainable economic activities for local communities</p>	<p>New community resource management system in place, and sustainable resource use practices established and enforced</p> <p>Enhanced income for local households and for support of conservation and management efforts</p>

	Unsustainable resource use (deforestation and overgrazing) lowering ecosystem productivity and diminishing water supplies	New practices and constraints on resource use protect and recover ecosystem productivity and water supply	Lomas ecosystems more productive and water supply restored for human use and native flora and fauna
Outcome 1	Traditional community resource management disappearing in the face of resource scarcity, increased poverty, and migration out of area	Strengthening of the community organization to undertake the conservation and sustainable use of the lomas	Community organized and actively engaged in the conservation and use of the lomas US\$232,800 - GEF: US\$132,800 - European Union: US\$100,000
Outcome 2	Reduction or disappearance of the last remaining pristine forest lomas ecosystems	Establishment of two community forest reserves (of 50 and 200 hectares) and development of management plans to protect areas and conserve biodiversity	Two community reserves operating with effective controls and monitoring and participation of local stakeholders US\$506,200 - GEF: US\$186,200 - IRECA-UNSA: US\$50,000 - Regional Government: US\$50,000 - Atiquipa Community: US\$200,000 - CI/Naturaleza/Backus: US\$20,000
Outcome 3	Degradation of remaining 1,500 hectares of forest lomas and reduction in ecosystem productivity and water availability. Activities: - Research on fog water potential of coastal lomas ecosystems (European Union and UNSA) US\$ 650 000 - Flora and fauna inventories. - Assessments of spring water locations and yields. - Sustainable cattle and goat production and marketing (European Union, UNSA, UNDP, Nat. Geo. Society, SENASA) US\$ 230 000	Increase in total area of existing forest lomas; recovery and management of existing forest lomas; recovery strategies, silvicultural management, and forest lomas grazing practices studied	Existing forest lomas expanded by 26% of total area; 53% of existing forest lomas restored and under sustainable management; stakeholders applying sustainable management practices on other forest lomas areas US\$1,102,600 - GEF: US\$371,800 - IRECA-UNSA: US\$100,000 - European Union: US\$500,000 - Atiquipa Community: US\$100,800 - Fondo Peru-Canada: US\$30,000
Outcome 4	Decrease in lomas ecosystem productivity and continued decline in quality of life for local inhabitants Activities: - Environmental sanitation project (water/sewer) for Atiquipa (completed) - Development Plan for services and infrastructure for Atiquipa (District Municipality and the Atiquipa Community)	Agricultural productivity increases studied and implemented; ancestral technologies documented and applied; adoption of sustainable economic activities	Agricultural and grazing lands restored and effectively managed; lomas biodiversity protected; increased agricultural production and water availability; improved economic conditions for local community; decrease in migration and community dissolution

	US\$ 80 000 - Irrigation program - Agricultural development project - Installation of fogcatchers for water collection (Community of Atiquipa, British Embassy, SENASA, and UNSA) US\$ 60 000		US\$379,200 - GEF: US\$59,200 - IRECA-UNSA: US\$50,000 - Regional Government: US\$70,000 - European Union: US\$200,000
			CoFinancing: US\$1,470,800
			GEF: US\$750,000
Total Cost	Baseline: US\$1,020,000	Alternative: US\$3,240,800	Increment: US\$2,220,800

8. BUDGET

The Project requires a total increment of US\$2,220,800 over four years, and is requesting US\$750,000 (34%) of this total from GEF. The remainder of the project budget will be co-financed with funds from various local, national, and international sources, which are detailed below.

Components	GEF	Other Funds	Total
PDF-A	25 000		25 000
Personnel	149 600	70 000	219 600
Consultations	20 000	35 000	55 000
UNSA Personnel		48 000	48 000
Training/Travel Costs	53 500		53 500
Equipment	59 000	152 000	211 000
Materials	125 500		125 500
Research	18 500	695 000	713 500
Subcontracts	168 900		168 900
Vehicle Maintenance	35 500		35 500
Miscellaneous	59 500	470 800	530 300
Monitoring & Evaluation	35 000		35 000
Total	750 000	1 470 800	2 220 800

Notes on Co-Financing

IRECA-UNSA ¹	200 000
Regional Government ²	120 000
European Union ³	800 000
Community of Atiquipa ⁴	300 800
CI/ProNaturaleza/Backus ⁵	20 000
Fondo Contravalor Perú-Canadá ⁶	30 000
TOTAL	1 470 800

¹IRECA - UNSA

US \$200,000

General support for research on the environmental conditions and agroecological potential of the lomas; including personnel support and the use of equipment, laboratories and libraries.

²*Regional government*

US\$120,000

Support for environmental reparation work and construction/improvement of access roads within the Project area.

³*European union*

US\$800,000

Support for two research and management projects in the Atiquipa and Taimara lomas:

a) El Niño Project: “Regeneration of Semiarid Plant Communities: The Role of the El Niño Southern Oscillation and Herbivory Control” (INCO-DEV RTD proposal N° ICA4-2000-20040). This project is already approved, with a budget of 650,000 Euros, of which US\$130,000 will be dedicated to research in Atiquipa.

b) FOGMOD Project: “Advancing Integrated Ecological and Sociological Research Towards Modeling the Uses of Fog as a Key Water Resource for the Rehabilitation and Development of pre-Desertic Regions of South America” (INCO-DEV RTD proposal N° ICA4-2000-10232). This Project has received preliminary approval and is being prepared for final approval by the European Union. This Project has a total budget of 1,289,780 Euros, of which US\$670,000 will be used on research, infrastructure, training, management and sustainable development for the Comunidad Campesina de Atiquipa and the Atiquipa and Taimara Lomas.

⁴*Rural Community of Atiquipa*

US\$300,800

The Comunidad Campesino de Atiquipa will grant in perpetuity 200 hectares of forest lomas for the establishment of a Community Reserve, to be owned and managed by a conservation fund composed of the community, INRENA, CONAM, and IRECA-UNSA. The 200 hectares have been assigned a symbolic value of US\$1,000 per hectare (US\$200,000 total); the real value of this globally unique ecosystem cannot be calculated. In addition, the community will donate 1,200 hectares for the exclusive use of the Project (to research sustainable use and ecosystem recovery in coastal lomas systems) for a period of four years. Based on the productive use value of these lands, this transfer has been valued at US\$42/year/hectare, for a total of US\$50,400 per year or US\$201,600 for four years. However, given that the local inhabitants will also be beneficiaries of the Project, the community has agreed to donate half of the value of this land lease, putting the net value of this land donation at US\$100,800.

⁵*Conservation International/Fundacion Pro-Naturaleza/Fundacion Pro Backus*

US\$20,000

Each of these organizations has been approached to contribute towards the \$20,000 necessary to purchase a 50-hectare patch of endemic lomas myrtle forest (*Myrciathes ferreyrae*), the largest such remaining forest in the world. This land will be purchased from existing private owners and annexed to the adjacent community of Atiquipa.

⁶*Fund Contravalor Perú-Canadá*

US\$30,000

Support for programs to improve cattle and goat grazing practices, and to analyze carrying capacity and recovery patterns of lomas ecosystems subjected to grazing.

10 PUBLIC INVOLVEMENT PLAN

10.1 Key Stakeholders

The Project's primary stakeholders are the 500+ inhabitants of the local community. Other local stakeholders include several downstream communities on the coast who depend in part on the water provided by the Atiquipa & Taimara lomas. In addition, the three NGOs with the most responsibility for the Project, IRECA-UNSA, ILDER, and REDA, are key stakeholders who represent the interests of local stakeholders. Other stakeholders include the regional government, the European Union, and several conservation organizations that are providing co-financing for the Project. Details on the most important stakeholders are:

10.1.1 Local Community: The inhabitants of the Comunidad Campesina de Atiquipa will play an important role in every aspect of the Project, and will be the parties with ultimate responsibility for protecting and managing the Atiquipa and Taimara lomas. The local community has been instrumental in developing the proposed Project from the very beginning, with community leaders working closely with supportive non-profit organizations and consulting the community-at-large throughout the process (including two participative planning workshops prior to the development of the PDF-A, and four additional participative planning workshops during the PDF-A). Three community representatives will participate on the Project Board of Directors, and community members will participate in all of the environmental research, management, and conservation activities of the Project. The community will provide significant support to the Project in the form of manpower and use of equipment, the donation of 1,400 hectares of land for research and 250 hectares of land for environmental conservation. Community organizations, strengthened through the Project, will take over long-term management responsibility for the Atiquipa and Taimara lomas after the project ends.

10.1.2 IRECA-UNSA (Regional Institute for Environment Sciences - San Agustin State University): IRECA-UNSA will coordinate the conservation and resource management activities of the Project, including silvicultural management, reforestation, climate analysis, hydrological studies, and other studies and management of lomas ecosystem functions. From 1980 to the present date, IRECA-UNSA, with the financing of UNSA, the National Geographic Society, the British Embassy, and other sources, has been conducting assessments in the lomas of Atiquipa and Taimara to understand its functioning, to establish its conservation status, and to design recovery, improvement and conservation measures which may allow the area to recover its biological productivity and improve the living conditions of local communities.

10.1.3 REDA (Regional Agroecology Network of Arequipa): REDA is a non-profit organization that since 1993 has managed projects in the area of agroecology and sustainable development. REDA will help to manage agricultural and ecological activities, including soil conservation, conservation of genetic resources, use of agrochemicals, and irrigation strategies. REDA will also participate in the training of community organizations, and conduct environmental education and outreach, including public awareness campaigns on agroecology.

10.1.4 ILDER (Labor Institute for Regional Development): ILDER is a non-profit organization founded in October of 1990. ILDER will manage the Project activities designed to organize and strengthen local community organizations, and will provide training in legal, educational, human rights, and conflict resolution issues. ILDER will also develop economic initiatives to support women and the poor in the local communities.

10.2 Social Issues & Information Dissemination

The local community will be involved at all stages in the development of the community-based conservation and sustainable use activities that are the focus of the Project. Community participation will be ensured at both the individual and institutional level in the creation of a natural resource management plan and in the definition of a common property conservation and use plan for the Atiquipa and Taimara lomas. Community figures will also participate in the design of awareness-raising and information dissemination programs.

The Project will strengthen local community-based management capacities, enabling local stakeholders to sustainably manage and conserve lomas resources that belong to them. Lessons learned from these efforts will be shared with other localities throughout Peru's coastal lomas that are presently or will need to develop community-based biodiversity conservation and development plans. The Project has been endorsed by the Government of Peru as a strategic opportunity to demonstrate best practices and strengthen the limited body of experience among Peru's government agencies in implementing the biodiversity conservation and resource management in arid landscapes.

The GoP is committed to applying these best practices and new institutional capabilities to others of its programs in arid ecosystems, including: the Reserva Nacional Lachay (a coastal lomas ecosystem north of Lima); the Reserva Nacional de Paracas (protected desert ecosystem); the Santuario Nacional Lagunas de Mejía (wetlands in the southern desert coast of Arequipa); the Zona Reservada Pantanos de Villa (coastal wetlands near Lima); and the Proyecto Algarrobo (a dryland forest regeneration project on the northern Coast).

11 MONITORING & EVALUATION PLAN

IRECA-UNSA will be directly responsible to GEF for financial and non-financial oversight and overall management of the Project. IRECA-UNSA will ensure that transparent accounting and internal control systems are in place and used by all Project partners. Partner organizations and local communities will be actively involved in on-going monitoring and evaluation of the Project. Training in participatory monitoring and evaluation will be conducted among partners and communities to enhance local participation in these processes.

Monitoring and evaluation of the project's progress and workplan accomplishments will be made to both UNDP and CONAM, and will be the responsibility of the Project Coordinator and the Project Board of Directors. Reports on the Project's activities will be made on a semi-annual basis, while reports on the achievement of the Project's objectives will be made annually. In addition, a more detailed Project Mid-Term Evaluation will be completed at the end of the 2nd year of the Project, and a Project Final Evaluation at the end of the 4th (final) year of the Project.

Evaluation meetings for the Project Board of Directors and the entire Project staff will be held annually. The Project Mid-Term Evaluation report will be submitted at least one month in advance of the 2nd evaluation meeting, and the Project Final Evaluation report at least two months in advance of the final evaluation meeting.

12 PROJECT CHECKLIST

Biodiversity:	X	Climate Change	International Waters	Ozone Depletion
Protected Area zoning/mgmt.:	X	Efficient prods. & distrib.:	Water body:	Monitoring:
Buffer zone development:		Efficient consumption:	Integrated land & water:	Country program:
Inventory/monitoring:	X	Solar:	Contaminant:	ODS phaseout:
Eco-tourism:	X	Biomass:	Other:	Production:
Agro-biodiversity:	X	Wind:		Other:
Trust fund(s):		Hydro:		
Benefit-sharing:	X	Geothermal:		
Other:		Fuel cells:		
		Other:		
Institution building:				
		X		
Investments:				
Policy advice:		X		
Targeted research:		X		
Technical/management advice:		X		
Technology transfer:				
Awareness/information/training:		X		
Other:				

ANNEXES

ANNEX I: MAPS

- **MAP 1: Map of southern Peru with Atiquipa lomas geographical location**
- **MAP 2: Lomas Formation, Fog Patterns & Ocean Currents**
- **MAP 3: Fog production dynamics and its effects on the lomas**
- **MAP 4: Map of Project zones (protection, reforestation, etc.)**

ANNEX II: FLORA & FAUNA SPECIES OF THE ATIQUIPA AND TAIMARA LOMAS

- **LIST 1: Flora Species**
- **LIST 2: Fauna Species**

