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OPERATIONAL FOCAL POINT ENDORSEMENT

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Minister of Environment

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EXECUTIVE SUMMARY

Ecuador is one of the world's "mega diverse" countries, thanks to the extraordinary variety of ecosystems and species that co-exist in a relatively small territory. Over generations indigenous communities have adapted to the high biophysical diversity and have developed sophisticated agricultural and livelihood systems. The existence of serious environmental problems in Ecuador is causing the deterioration of natural ecosystems, the extinction of species, and the loss of genetic diversity of both wild and cultivated organisms.

The Northern Andean Páramos is a mountain ecosystem endemic to the Andean region which is generally characterized by a cold and humid climate and which is located between the upper tree line and the perennial snow. In Ecuador, the páramo ecosystem stretches across the highlands and surrounding high inter-valley plateaus. The páramos are characterized by their rich, sponge-like soils and vegetation that capture and retain water, acting as a buffer against floods and droughts. Replete with springs that sustain streams and rivers below, the páramos serve as a critical provider of environmental services, supplying water for irrigation, human consumption, and hydropower to large numbers of people in the lowlands.

The Ecuadorian Province of Chimborazo has the largest and best-conserved expanse of páramos in the country. Chimborazo is the second poorest province in Ecuador with an estimated 80 percent of the population living below the poverty line. Because of poverty, small landholdings and population pressure, campesinos have over time been obliged to overuse soils, eliminate fallow periods, and extend cultivated and pastoral areas into higher altitudes, at the expense of the páramos. This ongoing extension of the agricultural and pasture frontier has resulted in the loss of habitats and biodiversity, unsustainable water use practices (especially for irrigation) and reduced water flows, soil erosion and inappropriate management of the natural resources overall. The total area of páramos within Chimborazo has been decreasing rapidly in the past three decades. Between 1991 and 1999, 29,000 ha of páramos were converted into crops and pasturelands, and an additional 53,000 ha were severely eroded.

The proposed Chimborazo Natural Resources Management Project is a joint effort by the Chimborazo Provincial Council (CHPC), other national partners, FAO, and the GEF to support the conservation and sustainable management of the páramo ecosystem and its natural resources and the improvement of the livelihood situation of the local population. The proposed project will be partially blended with and co-financed by the IBRD-supported Chimborazo Productive Investment (PIDD) Programme (Loan No. 7496-EC, signed in April 2008), which objective is to increase production and market access of rural families through investments in irrigation and roads improvement. The project area includes five sub-watersheds (including the Chimborazo Fauna Reserve) within the Chambo and Chanchán river basins covering about 114,400 ha.

The project's **Global Environment Objective** is to conserve and sustainably manage the Chimborazo's páramos and the biodiversity of the mountain ecosystems and to improve local livelihoods through strengthening of necessary policy, legal and institutional frameworks and local awareness, capacities and incentives for participation in planning and sustainable natural resource management. The project's **Development Objective** is to re-establish and sustainably use the agro-biodiversity and the páramos ecosystems and to improve food sovereignty of the local indigenous population dependent on Chimborazo's mountain ecosystems applying modern watershed management approaches. The project will be implemented with the following components and sub-components:

1. Conserving the páramos and related highland ecosystems (community-based watershed management planning; organizational and institutional strengthening; pilot interventions; compensation for environmental services mechanisms; optimisation and rationalization of water use in the Province);
2. Priority actions to strengthen the management and conservation of the National Fauna Reserve of Chimborazo (elaboration and negotiation of a national plan for the management of the Vicuña in Ecuador; construction of prioritised infrastructure and equipment; study of the Chimborazo Reserve and its buffer zone; development and implementation of co-management plans; development of local capacities and provision of equipment for the capturing and shearing of the vicuña);
3. Capacity Building of the Chimborazo Provincial Council for Sustainable Natural Resources Management with focus on the paramos (strengthening of the capacities to develop policies and regulations on natural resource management (NRM); strengthening of the capacities related to methodologies and instruments for development and sustainable management of natural resources; monitoring and evaluation; and
4. Project Management and Evaluation (project management; monitoring and evaluation of the project; analysis and dissemination of project results).

The **expected outcomes and impact** of the project are: (i) 58,000 ha in areas under threat in the Chimborazo Province under improved NRM (sustainable agricultural practices, areas under local CES systems, and increased reforested areas with native species); (ii) Coverage through natural regeneration and/or reforestation with native species along watercourses is increased by 20% in the project intervention area; (iii) 56,000 ha of the National Fauna Reserve of Chimborazo with improved management effectiveness (from 50 percent to 70 percent by the end of the project using the GEF SPI Tracking Tool); (iv) the number of native grass species maintained or improved in the Chimborazo Reserve and its buffer zone (85 species in 2009); (v) Biomass (photosynthetic and non photosynthetic) and necromass per m² maintained or increased in the Chimborazo Reserve and its buffer zone by the end of the project (baseline to be established in representative m² samples in year 1); (vi) Provincial Government capable of supervising and promoting the sustainable management of natural resources in the Province (4 provincial NR local norms approved and applied by 90 percent of the local communities involved in the project; NR monitoring systems operational for three selected project sites and the monitoring information generated is systematically used to plan supervision activities and community awareness raising and capacity building); (vii) 30 communities and/or indigenous organizations have adopted and are benefiting from conservation practices (substituting non camelid livestock with llamas and alpacas grassing in the páramos; protection of slopes and areas around headwaters below the páramos with native species; application of soil conservation and water harvesting technologies; conservation and use of local agro-biodiversity to increase food sovereignty and the use of conservation agricultural practices); and (viii) vicuña fibers and tourist products and services generating USD 250 000/year in total income for the local communities and for the conservation of the Chimborazo Fauna Reserve.

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GLOSSARY OF ACRONYMS

AWP/B	Annual Work Plan and Budget
BCIO	Beneficiary Community and/or Indigenous Organization
CBD	United Nations Convention on Biological Diversity
CES	Compensation for Environmental Services
CFAA	Country Financial Accountability Assessment
CHFR	Chimborazo Fauna Reserve
CHPC	Chimborazo Provincial Council
CITES	Convention on International Trade in Endangered Species
CONDESAN	Consortium of Sustainable Development for the Andean Ecosystem
COSUDE	Swiss Cooperation Agency
FAO	Food and Agriculture Organization of the United Nations
FOMC	FAO Forestry Management Division
GEF	Global Environment Facility
GIS	Geographic Information System
GNS	GEF National Strategy
GoE	Government of Ecuador
Ha	Hectares
IBRD	International Bank of Reconstruction and Development
JICA	Japan International Corporation Agency
KOICA	Korean International Corporation Agency
LAC	Latina American and Caribbean
MAE	Ministry of Environment
masl	Meters above sea level
MEF	Ministry of Economy and Finance
M&E	Monitoring and Evaluation
NBSP	National Biodiversity Strategy and Policy
NSPA	National System of Protected Areas
NRM	Natural Resource Management
NGOs	Non-Governmental Organizations
PA	Protected Area
PB	Participatory Budget
PDC	Project Directive Committee
PEWG	Provincial Environment Working Group
PGC	Project General Coordinator
PIDD	World Bank's Participatory Investments Project
PIR	Project Implementation Review
POM	Project's Operational Manual
PPR	Project Progress Report
PRODEPINE	Indigenous and Afro-Ecuadorian Peoples Project
PROLOCAL	Poverty Reduction and Local Development Project
PSA	Payment for Environmental Services (acronyms in Spanish)
PTC	Project Technical Coordinator

PTT	Project Technical Team
QPIR	Quarterly Project Implementation Report
SENAGUA	Secretaría Nacional de Agua (National Water Secretariat)
SP	Strategic Programme
TCI	FAO Investment Centre Division
TOR	Terms of Reference
UNEP	United Nations Environmental Programme
UNDP	United Nations Development Programme
WB	World Bank
WUA	Water User's Association

1 BACKGROUND

1.1 General and sectoral context

Ecuador is one of the world's "megadiverse" countries, thanks to the extraordinary variety of ecosystems and species that co-exist in a relatively small territory. In terms of biological diversity, Ecuador ranks third for amphibians, fourth for birds, and seventh for reptiles and butterflies. Within Ecuador, highland ecosystems provide the habitat for over 3,000 species of plants (of which 628 are endemic) as well as important species of birds, mammals, and amphibians, the latter being severely endangered. Equally rich is the agro-biodiversity in Ecuador. Over generations indigenous communities have adapted to the high biophysical diversity and have developed sophisticated agricultural and livelihood systems covering all altitudinal belts as high up as 4,000 m. asl.

The existence of serious environmental problems in Ecuador is causing the deterioration of natural ecosystems, the extinction of species, and the loss of genetic diversity of both wild and cultivated organisms. Not only is the destruction of habitats causing a reduction in biological diversity, but it is also causing accelerated loss of traditional knowledge and practice, and the social and cultural disintegration of the indigenous and local communities. Ecuador's forests are disappearing at rate of nearly 200,000 ha a year, more than three times the overall rate for Latin America. According to the Ecuador National Report submitted to FAO's Forest Resources Assessment 2010, the forest coverage in Ecuador has decreased from 13,817,000 ha (48,7 percent of the country's territory) in 1990 to 9,865,000 ha (34,7 percent) in 2010.

Although the lack of scientific information prevents a precise evaluation of the state of biodiversity in the country, it is evident that the main cause of the reduction in biological diversity is the destruction or deterioration of habitats. Still, the over-exploitation of resources, the introduction of exotic species, and environmental pollution are also causing the disappearance of flora and fauna species in Ecuador. The aquatic, continental, and marine ecosystems have also suffered growing deterioration due to excessive fishing, the introduction of exotic species, and water pollution caused by agricultural, mining, and hydrocarbon-related activities. Similarly, the displacement of native crops and the "modernization" of agricultural practices are causing the accelerated disappearance of the genetic resources stored in the cultivated species and varieties.

Although the 35 protected areas that make up the State Patrimony of Protected Areas cover 18.7 percent of the national territory, several ecosystems are underrepresented, and some terrestrial and marine ecosystems in the country are not represented at all. Analysis of gaps and priorities for biodiversity conservation land in mainland Ecuador found that 7 of the 46 types of vegetation are not represented, and several other types are underrepresented in protected areas today. Accordingly, Ecuador still requires additional efforts to consolidate and complete representation of its ecological and biological diversity, terrestrial, marine, and coastal.

The Northern Andean Páramos is a mountain ecosystem located between the upper tree line and the perennial snow. This tropical ecosystem which is generally characterised by a cold and humid climate can be found between 3,200 and 4,200 m. asl. In Ecuador, the páramo ecosystems is included in eight protected areas in the State Patrimony and stretch across the highlands and surrounding high inter-valley plateaus and start on average at 3,300 m. asl. This altitude obviously varies according to the geological, climatic and anthropogenic conditions. Particularly in the southern part of Ecuador, páramo ecosystems can be found as far down as 2,800 m.asl (Beltran et al). The páramo ecosystem is restricted to the High Andes of Ecuador and Southern Colombia and is of critical ecological importance because of its high endemism (about 60 percent). The páramos are characterized by their rich, sponge-like soils and vegetation that capture and retain water, acting as a buffer against floods and droughts. Replete with springs that sustain streams and rivers below,

the páramos serve as a critical provider of environmental services, supplying water for irrigation, human consumption, and hydropower to large numbers of people in the lowlands. The intricate linkages among the moisture-retaining functions of the páramo, the low temperatures of the highlands, and the influence of the Andes on cloud formation, also contribute to mitigating global warming.

The Ecuadorian Province of Chimborazo has the largest and best-conserved expanse of páramos in the country, extending over 6,490 km² (656,000 ha) approximately 30 percent of the existing páramos in Ecuador, mainly within and around two protected areas (PAs)—Sangay National Park and the Chimborazo National Fauna Reserve. The province offers striking mountain landscapes, including the Chimborazo Volcano (the country's highest peak at 6,310 meters), unique flora and fauna such as the endangered vicuña, and an incipient ecotourism industry. The páramos of Chimborazo Province are characterised by a large number of watersheds which origin on the ridges or mountain peaks in the nival zone and which discharge through the intensively cultivated inter-Andean valleys and through the cloud forests towards the Amazon basin and the Pacific Ocean respectively. The páramos form very important recharge areas within these watersheds. Chimborazo is also one of only two provinces where “Dry Páramo” is found. The unusually dry air and low temperatures have created “small islands” or unique ecological niches and microclimates surrounding the snow-capped mountain peaks. This has resulted in the unusually high endemism within Chimborazo's páramos.

1.2 National priorities, policies and plans

The 2020 vision of Ecuador's National Biodiversity Strategy and Policy (NBSP) is conservation and sustainable use of the countries biodiversity to foster a better quality of life based on equitable distribution of the costs and benefits derived from biodiversity resources. To achieve this vision the NBSP supports 4 main strategic axes: consolidate and strengthen the sustainability of production activities based on native biodiversity; ensure the existence, integrity and functionality of all biodiversity components (ecosystems, species and genes); balance pressures from conservation and sustainable use on biodiversity; and guarantee the respect and exercise of individual and collective rights to participate in decisions relating to access and control of resources. The NBSP prioritize the páramo ecosystem among important fragile and seriously threatened ecosystems that need special strategies for in-situ conservation in the country. The páramo ecosystem is seen as particular suitable for establishment of compensation schemes for its conservation because of the water production and storage services provided by the ecosystem for agriculture production and human consumption.

Ecuador has national policies to conserve and promote the sustainable management of highland ecosystems and a working group for the páramos has been established and has proposed National Policies for the Management and Conservation of the Ecuadorian Páramo Ecosystems. The Ministry of Environment is also promoting active participation in The Mountain Partnership to foster collaboration and sharing of experiences among mountain communities, local and national governments on conservation of mountain ecosystems and local sustainable livelihoods including the páramos.

The National System of Protected Areas (SNPA) is the main tool for onsite conservation of biodiversity and ecosystems including the páramos, and consolidation is therefore a national priority, in accordance with the new constitution from 2008. SNAP's analysis of financing needs (Ministry of the Environment 2005) and Financial Sustainability Strategy identifies a set of priority actions to promote sustainable financing of the system, highlighting the importance of maintaining and improving the State's annual investment in protected areas. There is also a need to diversify sources of income for self-management involving the local population, building innovative

mechanisms such as compensation for environmental services, the provision of tourism services, and charging for additional facilities in protected areas (for example telecommunication towers), ensuring that the resources they generate are reinvested in the management of these areas and in maintaining the principle of distributing resources to those areas that, because of their special circumstances, are unable to be financially self-sustainable.

The province of Chimborazo is still lacking a provincial policy for integrated natural resource management and the capacity to implement the few existing environmental legal instruments is low. However, the current provincial development plan called “Minga por Vida” (Participatory Work for Life) includes strengthening of sustainable environmental management as part of its promotion of integrated rural development with cultural identity.

2 RATIONALE

2.1 Problems and issues to be addressed

Chimborazo is the second poorest province in Ecuador, with a per capita GDP (US\$1,222 in 2001) of about half of the national average (US\$2,436) and an estimated 80 percent of the population living below the poverty line. Poverty is concentrated in the mostly indigenous rural areas, where the index of unsatisfied basic needs is almost twice that of the capital city of Riobamba. Although agriculture (including agro-industry) accounts for 26.5 percent of provincial GDP and employs around 50 percent of its labor force, rural areas are characterized by fragmentation, overexploitation of natural resources, low productivity, and a low rate of commercialization.

The country's inadequate and ineffective Agrarian Reform process in the 1960s established small farmsteads for the mostly indigenous campesinos (farmers), but most properties awarded had low farming potential and have been successively subdivided into smaller, untenable lots. Because of poverty, small landholdings and population pressure, campesinos have over time been obliged to overuse soils, eliminate fallow periods, and extend cultivated and pastoral areas into higher altitudes, at the expense of the páramos. As a result of this process, the total area of páramos within Chimborazo has been decreasing rapidly in the past three decades. Between 1991 and 1999, 29,000 ha of páramos were converted into crops and pasturelands, and an additional 53,000 ha were severely eroded.

This ongoing extension of the agricultural and pasture frontier has resulted in the loss of habitats and biodiversity, unsustainable water use practices (especially for irrigation) and reduced water flows, soil erosion and inappropriate management of the natural resources overall. Over time, this process will result in further impoverishment, possibly leading to a crisis situation for the large number of people dependent on the natural resources, including water, provided by the páramos. Since the paramos are part of a complex highland-lowland interactive system, this pressure on the natural resources and crisis situation will inevitably have adverse off-site effects in downstream areas. The institutional mechanisms and capacity to address these trends and crisis are lacking.

Climate change is another important and emerging problem. There is evidence from many parts of the Andean Region including also from Ecuador that climate change leads to the melting of glaciers depriving mountain communities from essential perennial water supply. So far, the experience to deal with these changes and adaptation strategies are lacking. The proposed project, which will be based on the principles of integrated natural resources and collaborative watershed management, will create resilience to climate change and will pilot / test different measures for climate change adaptation.

The Chimborazo National Fauna Reserve has been created in 1987 In spite of the long existence of this Reserve there is a lack of knowledge about this vital ecosystem, particularly in terms of its faunistic resources. Also, a well developed and community-based management plan of the Chimborazo Reserve as well as basic facilities for visitors of the Reserve such as trails and a Visitor Center are so far missing. The reserve is home for an important population of the threatened vicuña camelid specie introduced in the Reserve in the late eighties. Since then the population has grown from the original 200 vicuña introduced from Peru and Chile to a population of 3.200 (2009) vicuñas. The fibres of these animals could provide an important income for the financial sustainability of the Reserve and at the same time generate income for the local population participating in its conservation based on sustainable management of the vicuña population and its habitat. However, local capacities for sustainable management of the animals, shearing and commercialization of the fibres have to be built. The proposed project will support the Ministry of Environment in upgrading the Chimborazo National Fauna Reserve and in making it an

internationally renowned site for biodiversity conservation including the vicuña through the involvement of the local communities.

Despite the formidable environmental and socio-economic problems facing the province, its institutional and governance organization is stronger and more stable than most, being based on indigenous practices of participatory decision-making. The current prefect, a strong proponent of the proposed project, is indigenous and has led the way in formulating of the provincial development plan “Minga por Vida” to promote integrated rural development with cultural identity. This plan prioritizes (i) strengthening the sustainable management of the environment; (ii) accelerating the local economy and increasing employment; (iii) improving the commercialization process; and (iv) implementing a social plan to confront poverty. The proposed GEF project is fully consistent with this plan. It will primarily support the first objective but will also address, to the extent possible, the second objective.

The proposed Chimborazo Natural Resources Management Project is a joint effort by the Chimborazo Provincial Council (CHPC), other national partners, FAO, and the GEF to support the conservation and sustainable management of the páramo ecosystem and its natural resources and the improvement of the livelihood situation of the local population. FAO will provide technical support to the project in a very broad sense, tapping into the expertise from its programmes on forestry, land and water, sustainable development, enterprise development, legal advice, etc. FAO will capitalize on previous and ongoing projects in Ecuador and in other parts of the world, especially those oriented toward collaborative and integrated watershed management.

The proposed project will be partially blended with and co-financed by the IBRD-supported Chimborazo Productive Investment (PIDD) Project (Loan No. 7496-EC, signed in April 2008), whose objective is to increase production and market access of rural families living in the province's Chambo and Chanchán-Chimbo river basins through investments in irrigation and roads improvement. Considering the numerous linkages between poverty and environmental degradation in Chimborazo, the success of the IBRD-financed project—especially in terms of: (i) securing reliable water supplies for irrigation, and (ii) improving productivity and roadways without contributing to the expansion of the agricultural frontier—is related to appropriate management of natural resources by the local indigenous population. The success of the GEF project, in turn, is dependent on the rationalized use of and eventual compensation mechanisms for water, conservation, especially for irrigation. The strategic linkage with the PIDD project will help to rationalize the water use in the province while new management approaches, including adequate incentives for conservation, will help reduce the threats. The irrigation improvements will substantially reduce water loss and increase the irrigated area. Improved irrigation will also become one of the most important incentives to local communities to adopt improved agricultural practices as proposed under the project. The GEF project will be able to enhance coordination between downstream water user associations (WUAs) -the main project partners of the IBRD loan- and indigenous communities residing in and around water sources in the páramos, with the goal of developing mechanisms to conserve water and biodiversity.

The project area includes five micro-watersheds (including the Chimborazo Fauna Reserve) within the Chambo and Chanchán river basins covering about 114,400 ha (88,800 ha in the Chambo watershed, of which 58,000 ha correspond to the Chimborazo Fauna Reserve, and 25,600 ha in the Chanchán watershed). This area was selected based on: (i) the presence of indigenous communities who participated in the elaboration of the Provincial Plan, (ii) zones containing well-preserved areas of páramos that are under high pressure, and (iii) proximity to PIDD project sites and to PAs. It is important to emphasize that the pilot projects in the micro-watersheds to be supported by the GEF project were originally conceived through the participatory planning process associated with

“Minga por la Vida.” Despite being designated as high priorities by the province's population and government, they have not yet been implemented however, due to a lack of resources and technical capacity at all levels. The CHPC has also been under pressure to focus on immediate poverty reduction goals, often having to compromise long-term environmental sustainability for short-term income generation objectives. To counter this trend, the proposed project will provide institutional and technical assistance, as well as an adequate incentives framework and monitoring system, to assist the CHPC in mainstreaming biodiversity considerations and livelihood improvement into its development program in a way that is economically feasible, environmentally beneficial, and politically palatable across the short and long run.

2.2 Project justification -incremental reasoning

2.2.1 Scenario without GEF involvement

Currently it appears that about 40 percent of the Chimborazo Province still contains undisturbed highland habitat. Under the baseline scenario without the involvement of GEF in relation to the conservation of the páramos and related highland ecosystems supported in component 1, the Provincial Government Council (CHPC), will continue financing at a small scale the reforestation with native species basically to protect water springs and as wind barriers for community organic crops, also being supported at a very small scale by the CHPC. The estimated investment by the CHPC on reforestation and sustainable agriculture over the next 5 years will not exceed USD 1 million and will not cover key watersheds for highland ecosystems conservation. NGOs like Ecociencia and COMICH will continue providing limited support for an improved NRM process in the form of technical assistance for about USD 0.25 million and local communities will provide land to develop reforestation and sustainable agriculture programs for about USD 0.1 million. Projects like Runa Kawsay, PASSE, PPD, and P.R. Bioandes will continue promoting conservation and use of agro-biodiversity for food security with some inclusion of micro watershed management but with no comprehensive land use planning process looking at the interlinked dynamics and uses of the entire watershed with headwaters in the páramos. The PIDD/WB programme will invest in Chimborazo USD 9.3 million in restoration and improvement of irrigation systems to support a more efficient use of water resources, but these infrastructure investments will not be followed by participatory water resource management looking at the conservation of the headwaters and equally distribution of benefits among users and communities involved in water resource conservation throughout the watershed. Under the baseline scenario a systematic ecological and land use planning process will not take place, productive alternatives linked to conservation practices will only slowly be developed restricted by limited resources, and no conservation activities will be sustained in the medium and long term by a functioning compensation system for environmental services (CES).

Further, under the baseline scenario in relation to priority actions to strengthen the management and conservation of the National Fauna Reserve of Chimborazo supported in component 2, the Ministry of the Environment (MAE) will be able to invest USD 0.66 million in executing the basic priority actions that have been identified in the Managerial Plan of the Chimborazo Reserve -basically those ones contemplated under the control and surveillance program, and contributing towards minimal Reserve's operational costs. No program for the sustainable management of the vicuña and shearing and commercialization of the fibres will be developed and implemented and the opportunity offered by this activity for financial sustainability of the conservation of the Reserve will continue to be untapped

In both the case of component 1 and 2, it will not be possible to develop strategies and execute demonstrative projects on integrated NRM incorporating CES as an innovative financing mechanism.

Finally, under the baseline scenario in relation to strengthening of CHPC capacities in natural resource management with focus on the páramos supported in component 3, the CHPC will be able to develop few ordinances and other legal tools on NRM investing about USD 0.6 million, but will lack the technical support to develop and effectively implement such legal tools. The development of ordinances will not be supported by a participatory process. Local NGOs will provide a modest support to developing a legal framework, and providing information for the NRM monitoring system. The CHPC has developed a GIS system with different socio-geographical and NR layers, but has no funds for the development of a NRM monitoring system related to monitoring the progress in the status of NR in specific conservation and sustainable use projects.

As described above a willingness to act and invest in favour of the conservation of the Chimborazo Province highland ecosystems is existent in the baseline scenario, but the limitations in resources would result in continuing deterioration of these ecosystems and continued loss of biodiversity, ecological functions and environmental services. Despite the increase in Ecuador's consideration for biodiversity protection, the main pressures on the area -expansion of agriculture and cattle ranching, deforestation and soil erosion- would remain and in some cases would likely increase.

Under the baseline scenario no territorial planning processes and management plans would be developed, no participatory approaches undertaken, no coordination of activities between the various key sector and actors to provide the much needed protection for the outstanding biodiversity within the Chimborazo Province, and no replication of activities to improve conservation in other regions in the country.

Regarding the indigenous organizations and communities inhabiting in the project area, under the baseline scenario there would be only limited capacity-building activities for these communities to more effectively manage their territories and interact in a more positive and environmentally sound manner with natural resources on which they depend. Indigenous territorial management priorities would not be incorporated into the provincial and national planning tools. Finally, there would be very limited support to improve the management efficiency of one of the few Fauna Reserves existing in the country, the Chimborazo Reserve, which so far has succeeded in re-introducing alpacas and vicuñas, but require further support to consolidate such efforts.

2.2.2 Alternative scenario with GEF involvement

The opportunity exists for this project to work with the Chimborazo Provincial Government to produce an innovative, sustainable and improved management model for its highland ecosystems, and thus to contribute directly to conservation of globally unique biodiversity that is under serious threat by lack of appropriate management.

Under the alternative scenario, the project would support a solid partnership between the CHPC, local indigenous organizations, the Ministry of the Environment and local private organizations, as well as an innovative approach that would seek to mainstream biodiversity in productive activities such as agriculture and tourism. The project will strongly support sector alliances, incentives for the conservation of ecological functions with global biodiversity importance, such as micro-watershed management to strengthen the Chimborazo Province's capacity to sustainably manage natural resources.

Under Component 1 (Conservation of the páramos and related highland ecosystems), the proposed approach would help to improve conservation of the globally important biodiversity of the Andean

highland ecosystems in Chimborazo and motivate other local governments throughout the country to incorporate a similar approach in their planning processes. This component's incremental cost (USD 2.3 million) would yield the following benefits: (i) setting up and application of a methodology for a micro-watershed participatory planning and management approach prioritizing conservation and sustainable use actions in accordance with the hydrological and agro-ecological dynamics of the watershed; (ii) development of demonstrative projects and strengthened capacity of local communities in land use planning and NRM to address key threats faced by the Province and the communities with livelihoods dependent on the highland ecosystems and its natural assets, seeking at a pilot level the conversion of unsustainable use practices into biodiversity-friendly, sustainable production systems; and (iii) establishment of a CES mechanism to sustain the conservation practices in the medium and long term based on compensation for ecosystem services provided.

Under component 2 (Priority actions to strengthen the management and conservation of the National Fauna Reserve of Chimborazo) the incremental cost (USD 0.7 million) benefits will be a substantial increase in the management efficiency and effectiveness of the Chimborazo Reserve through (i) improved knowledge on flora, fauna, and land property and use in the Chimborazo Reserve and its buffer zone to lay the ground for the elaboration of co-management plans with the local communities including carrying capacities of vicuñas and other camelids, flora y fauna to identify threatened species, and areas with forest vocation; (ii) vicuña sustainable management plan and capacity building to allow for taking advantage of the income opportunity from vicuña fibres to financially sustain the conservation of the Reserve and co-management by local communities; (iii) capacity building of local communities in land use planning, vicuña fibres and tourist product services micro enterprise business administration, natural resource management, ecotourism, NRM monitoring and reporting; and (iv) improved visitor center and trail infrastructure to support increased tourism activities.

Under component 3 (Strengthening of CHPC capacities in natural resource management with focus on the páramos) the incremental cost (USD 0.4 million) benefits will be that CHPC has the capacity to issue policy and regulations, support their implementation and to supervise and monitor the management status of natural resources in the Province. This will be obtained through: (i) a systematic gap analysis of the provincial legal and regulatory framework for natural resource management and conservation, development of adequate new legal tools and technical assistance to support their application; (ii) design of a natural resource monitoring system and its implementation in specific the project sites; and (iii) training of and capacity building of CHPC staff in regulatory and monitoring aspects of NRM through conventional training sessions as well as on-the-job training in relation to the implementation of project activities.

The alternative scenario would therefore support globally important biodiversity conservation of Andean highland ecosystems in selected sub-watersheds of the Chimborazo Province. In addition, the CHPC and participating NGOs would be strengthened to replicate project activities throughout the Province. Without this project and the GEF's contribution, these benefits would not happen.

2.3 Stakeholders, target beneficiaries and public participation

2.3.1 Project stakeholders

Key stakeholders include indigenous communities and second and third tier campesino (farmers) organizations; CHPC (including the Permanent Provincial Development Committee and the Provincial Council of Chimborazo); Ministry of the Environment; authorities of Provincial Councils and Municipalities; local water users associations (WUAs) working with the PIDD project; state-

run water management entities; NGOs; local watershed management committees; universities and research institutions; and private property owners with landholdings in and around project sites.

2.3.2 *Project beneficiaries*

The beneficiaries of the project will be CHPC staff involved in province NRM and environmental policies, MAE staff involved in the management of the Chimborazo Reserve and in particular local indigenous and farmers communities dependent on the Andean highland ecosystem for their subsistence. A social assessment was carried out under the preparation of the PIDD/WB Programme and has provided key information to address the social aspects at the Provincial level insuring that the Project will support activities that will have positive social impacts among poor communities in accordance with the FAO mandate and strategies on food security. Project activities will support the Prefecture policy, which is promoting social inclusion with particular attention to indigenous communities. It is important to highlight that the Province of Chimborazo has the largest indigenous population in the country accounting as much as 60 percent living in rural areas.

The CHPC has a very extensive experience with participatory processes and consultation with its constituencies (e.g. the Participatory Budgeting (2207-2008), the Participatory Strategic Development Plans (2002-2006), and the Minga for Life Development Strategy (2004). During the design of the Project participatory processes and consultations were undertaken. These included CHPC authorities and technical staff, municipalities of the selected watersheds, water users associations and indigenous organizations.

The consultations and the analysis of primary and secondary information on demographic, social, and cultural topics have supported the identification of project activities. The main topics analyzed and addressed in the analysis are the following: (i) mapping of key social actors and identification of the potential project beneficiaries at the selected sites; (ii) documentation of agricultural production systems and land use; (iii) identification of the status of the local capacity for NRM; (iv) confirmation of willingness to develop alternative sustainable NRM practices by local potential beneficiaries. The consultations and analysis have provided recommendations and a proposed social strategy seeking to ensure positive impacts for the beneficiary communities and local organizations. It provides key guidance to define capacity-building activities, and proposes ways to ensure access to the project by intended beneficiaries with special emphasis on equal access and participation of men and women and applying culturally appropriate approaches. The Strategy also proposes social indicators to be incorporated in the NRM monitoring system under Component 3, including culturally appropriate instruments and mechanisms to facilitate and support social accountability processes.

2.4 Consistency of the project with national priorities and plans

The project is consistent with the priorities of the Government of Ecuador which has identified the country's highland ecosystems as a top priority for conservation and project staff and beneficiaries will actively be participating in and contributing to the Mountain Partnership. The NBSP considers the páramos as a critical high priority ecosystem for conservation and development of innovative CES schemes as mentioned under 1.2 above. The proposed project will provide on-the-ground conservation experiences to further support the development of policies and strategies for the conservation and sustainable use of the biodiversity of the páramo ecosystems involving local communities and water users associations. In its 2006 GEF National Strategy (GNS), Ecuador's Ministry of the Environment included the proposed project on its list of priorities for funding under the Resource Allocation Framework.

The project is also consistent with the National Strategy for Sustainable Development in that it: (i) supports land use planning, considering fragile ecosystems and their effect on local economies and their global importance; (ii) promotes the development of participatory plans for sustainable natural resource use; (iii) designs and develops innovative programs to harmonize indigenous peoples' traditional practices with management of critical ecosystems; and (iv) supports and invests in programs to promote community participation in sustainable biodiversity management.

Further, the project is consistent with the Financial Sustainable strategy for the NSPA in that it will improve the financial sustainability and management effectiveness of the Chimborazo Reserve and provide local experiences with co-management and benefit sharing of biodiversity services. The project will support the communities living in the Reserve and its buffer zone to better benefit from these services in terms of tourism products and services and vicuña fibres commercialization based on micro enterprises and sustainable management of the vicuña population and conservation of their habitat.

Finally, the project is consistent with the Province of Chimborazo's "Minga for Life" Development Plan, as it emphasizes the sustainable management of the environment (including management of water, forests, and Andean fauna, along with other types of natural resources) coupled with pilot strategies to alleviate poverty, ensuring local benefits. In essence, the project will assist the CHPC in integrating biodiversity considerations into planned and ongoing development programs across sectors, with a particular focus on sub-watersheds in the páramos.

2.5 Project consistency with GEF policies and strategies

GEF eligibility

Ecuador ratified the Convention on Biological Diversity (CBD) on February 23, 1992. The project will contribute to meeting the Convention's 2010 targets by: (i) increasing the number of projects in agriculture and tourism sectors targeted to mainstreaming biodiversity; (ii) expanding the area of biodiversity-friendly managed landscapes; and increasing the percentage of communities that demonstrate improved livelihoods based on sustainable natural resource use. In accordance with paragraph 9(b) of the Instrument for the Establishment of a Restructured GEF, Ecuador is an eligible recipient of World Bank and/or UNDP technical assistance. The country is also a member nation and eligible to receive assistance from FAO.

GEF Strategy conformity

The project concept (PIF) has been approved under the GEF biodiversity Focal Area Strategic Objective 2, "*Mainstreaming Biodiversity in Production Landscapes/ Seascapes and Sectors*" Strategic Programme (SP) 4 and 5.

The project will contribute to the GEF biodiversity SP-4 "*Strengthening the policy and regulatory framework for mainstreaming biodiversity*" by: (i) facilitating internalization of biodiversity considerations into the policies and operations of the CHPC including biodiversity conservation in agriculture, forestry and tourism sectors to secure national and global environmental benefits; (ii) providing technical assistance to develop institutional capacities of CHPC and establish the provincial policy and normative and regulatory framework required to integrate the conservation and sustainable use of the biodiversity of the highland ecosystems in particular the páramos into local farming, livestock, forestry and tourism activities; and (ii) building local capacities to integrate conservation and use of highland biodiversity and ecosystems in land use planning and NRM management processes linked to the development of sustainable agriculture and livestock practices;

- (iii) supporting sub-projects demonstrating potential synergies between sustainable watershed management and economic activities.

The project will contribute to the GEF biodiversity SP-5 “*Fostering markets for biodiversity goods and services*” by promoting new and effective partnerships and approaches to sustain conservation of the páramo ecosystems and its biodiversity through the development and implementation of a compensation schemes for environmental services (mainly the production of water resources) provided by these ecosystems and protected by indigenous and local communities living and depending on the land in the upper part of the watersheds with headwater in the páramos. This CES scheme will build on previous experiences in LAC, and if successful will be replicated in other watersheds in the Chimborazo Province and could be further replicated throughout the Andean region.

The project will also support the sustainable management of vicuñas, conservation of its habitat, and marketing of vicuña and other camelid fibres from live animals, which are important biodiversity friendly product giving incentives to local communities for conserving the páramo in the Andean region. Even though the habitat of the vicuñas is protected within the Chimborazo Fauna Reserve which is part of the páramo production landscape in Chimborazo, the effective protection needs strengthening due to the weak management of the Reserve. This project will take advantage of that the Reserve now holds an important population of one of the threatened species of the páramo ecosystem, the vicuna, offering an opportunity of benefits from biodiversity goods and services provided by the páramos. These benefits will at the same time provide incentives to the local population for protection of the biodiversity in this unique ecosystem. The project will support camilid and tourism activities in the Reserve mainstreaming the protection and sustainable use of biodiversity. These are the production activities compatible with the use regulation of the Reserve and the conservation of the unique páramo ecosystem. Even though the BD SO-1 tracking tool will be used to measure the advantage in management effectiveness of the reserve as a project outcome monitoring tool, the project does not work at the PA system or network level and is as such not a BD SO 1 project.

2.6 Past and related work -coordination with other initiatives

The project will work closely with other projects working on related themes, sharing experiences and applying lessons, including the UNEP/GEF regional Páramo Andino Project,”which is coordinated regionally by the Consortium of Sustainable Development for the Andean Ecosystem (CONDESAN) and by EcoCiencia within Ecuador. Synergies between the two projects will positively affect both outcomes. For example, the proposed GEF project would promote an institutional environment that should enhance the results and replicability potential of sustainable NRM initiatives. In turn, the UNEP/GEF project would develop a regional institutional network and information management system, which would support the proposed GEF project’s overall goals.

Important coordination efforts will also take place with the WB/GEF Project “Adaptation to The Impact of Rapid Glacier Retreat in the Tropical Andes”-P098248 currently under implementation. This is a regional project working in Bolivia, Ecuador and Peru and the development objective is to contribute to the strengthening the resilience of local ecosystems and economies to the impacts of glacier retreat in the Tropical Andes, through the implementation of specific pilot adaptation activities that illustrate the costs and benefits of adaptation. In Ecuador, the project will focus on selected catchments draining the Antisana volcano, very important in the provision of water to the Quito Metropolitan Area. The planned pilot projects will include i) the development and implementation of a climate change adaptation strategy for water supply for the city of Quito and surrounding parroquias; ii) integrated watershed management plan in the Antisana microcatchments

to cope with the impacts associated with glacier retreat. The second pilot and specifically where coordination and strategic links will be established with the proposed NRM project will include, among others, the development of participatory management plans for selected microcatchments and paramo ecosystems and the implementation of a community strengthening program for each participating community.

The UNDP – GEF Project: Financial Sustainability for the National System of Protected Areas is important for the coordination with activities to be financed in component 2, where co-management experiences and experiences with income generation for local communities and conservation of the Chimborazo Reserve can benefit the UNEP-GEF project executed by the Ministry of Environment. The long term goal of the UNEP-GEF project is to improve the sustainability of the National System of Protected Areas, so that it provides development results through a healthy and sustainable environment and guarantees the Rights of Nature (as established in the Constitution). The project objective is to implement a field-tested, financial and institutionalized operational framework for an expanded Ecuadorian National System of Protected Areas within 9 selected demonstration sites based on further consultations and comprehensive technical and financial criteria to ensure that in the long term this experience can be strategically upscaled and/or replicated to the whole system. The Ministry of Environment will monitor the complementarity and promote synergies in the activities in component 2 of the Chimborazo GEF project to be implemented in the Chimborazo Reserve.

Activities will also be coordinated with the regional BioAndes Project financed by the Swiss Cooperation Agency (COSUDE) and implemented in Ecuador by Fundación Ecociencia.

There are various projects supported by international cooperations executed by CHPC with which the GEF Project will also be coordinated to create synergies. They are focused on strengthening the dynamics of rural indigenous people and improve the living conditions of the population including sustainable NRM. In particular important for coordination is the PIDD (Investment Development Project - Chimborazo) which is co-financing the GEF project and is highly complementary to the GEF. The GEF project will focus at the conservation of the water production services provided by the páramos giving sustainability to the PIDD investments and allowing for meeting the high social demand of water in a sustainable manner. In order to optimize available resources and internal control processes, the GEF Chimborazo Natural Resources Management Project will have the same institutional implementation arrangements as the WB-funded PIDD Project, with a core team to provide technical assistance to the CHPC as well as for Financial Management and Procurement. Among other projects supporting sustainable NRM in the province are the projects financed by JICA (Japanese cooperation) and KOICA (Cooperation Koreana) with focus on Ground Water conservation and management, the project of Ecociencia BioAndes and the initiatives of various NGOs, international organizations, sectoral ministries, municipal governments and Parochial with emphasis primarily on integrated rural development and poverty reduction. Under the support and coordination of the CHPC synergies will be created between these initiatives and the GEF project in overall alignment with the premise of the "Minga for Chimborazo" and the "good life" (Kichwa language: "Minka Sumak Kawsay").

2.7 FAO's Comparative Advantage

Work on watershed management has a long tradition in FAO. While in the beginning the watershed management initiatives were focused on engineering interventions and structures, over time the programme has evolved and broadened up significantly and increasingly promoted the application of integrated and participatory approaches to watershed management. Also, FAO has regularly taken the initiative to review, in close collaboration with many partners worldwide, watershed

management experiences and lessons learned and come up with recommendation for the way forward.

The last such large-scale assessment and global review was carried out under the leadership of FAO between 2002-2003, following the International Year of Mountains (2002) and on the occasion of the International Year of Freshwater (2003). The general objective of this exercise was to promote the exchange and dissemination of watershed management experiences gained during the decade from 1990 to 2000 and to contribute to the identification of the paradigm, approaches and methods of a new generation of watershed management programmes and projects. Experts from four continents were involved in the assessment and their active contribution resulted in notable outcomes. The most important product of this exercise is a resource book entitled "The New Generation of Watershed Management Programmes and Projects". The document proposes a new approach focused on collaborative watershed and natural resource management and centered on the dimension of negotiation and consensus building among diverse stakeholders which is at the basis of the operational orientation and management of the process itself. The recommendations presented in this document are now being adopted and field-tested in various countries of different regions and are producing positive results. The resource book offers a conceptual and applied framework to the Chimborazo Province for the implementation of the proposed project in the five watersheds.

As a result of its experience in watershed management, FAO was nominated Task Manager of Chapter 13, Agenda 21 ("managing fragile ecosystems – sustainable mountain development"). The preparation and celebration of the International Year of the Mountains in 2002, for which FAO served as the lead agency, gave a particular momentum to FAO's initiatives related to watershed management and mountain development and led to the establishment of a multi-agency and multi-stakeholders Mountain Partnership whose Secretariat is presently hosted by FAO. Ecuador is an active member of this Partnership.

Biodiversity conservation gets considerable attention in FAO's work programme across the different Divisions and Departments. An active inter-departmental mechanism ensures coordination and harmonization of FAO's approaches and work in this field. FAO's support to the CBD and participation in the meetings of the Convention are also shaped and prepared through this in-house mechanism. With a similar inter-departmental Working Group FAO is directly involved in the activities of the United Nations Framework Convention on Climate Change which is producing studies and analysis on present and foreseeable trends and possible strategies to adapt and mitigate the impact of the climatic change processes. FAO will ensure the technical support to the proposed project from both these inter-disciplinary mechanisms.

3 PROJECT FRAMEWORK

To reduce the threats facing Chimborazo's páramos while supporting the province's poverty reduction goals, the project will focus on integrating biodiversity considerations into policy and legal frameworks as well as sector strategies (agriculture, forestry, water, and ecotourism) that impact the páramos and surrounding productive landscapes. Demonstration conservation practices related to agricultural production projects and replicable CES models will be piloted in selected micro-watersheds where current practices are inefficient and environmentally detrimental. In addition, regulatory and policy frameworks at the provincial level will be strengthened, and incentives to further mainstream biodiversity conservation into development programs will be identified. It is anticipated that critical knowledge barriers will be removed while institutional capacities will be strengthened, resulting in improved willingness and ability to conserve the páramos. The policy framework will be oriented toward overall improvement of integrated natural resources management (NRM) while the legal framework will comprise the development of local ordinances for water tariff and forestry control, following the redistribution of institutional responsibilities to the Provincial Governments by the new constitution of 2008. All activities will be implemented through a participatory process with an emphasis on incorporating indigenous knowledge systems and techniques into improved practices, involving stakeholders at all levels in the decision-making process

3.1 Project objective/impacts

The project's **Global Environment Objective** is to conserve and sustainably manage the Chimborazo's páramos and the biodiversity of the mountain ecosystems and to improve local livelihoods through strengthening of necessary policy, legal and institutional frameworks and local awareness, capacities and incentives for participation in planning and sustainable natural resource management. The project's **Development Objective** is to reestablish and sustainably use the agro-biodiversity and the páramos ecosystems and to improve food sovereignty of the local indigenous population dependent on Chimborazo's mountain ecosystems applying modern watershed management approaches.

3.2 Project components and outputs

To address the main threats to Chimborazo's natural resources, help reduce the negative impacts on Andean ecosystems and improve the livelihood situation of the local communities, the project will develop a watershed approach to ecosystem management and sustainable development. The project area includes five micro-watersheds of 15,000 to 20,000 ha each, all of them situated within the Chimborazo Province. The Chimborazo (including the Chimborazo Fauna Reserve), Atapo and Zula Watersheds are located in the Chanchán river basin and discharge into the Pacific Ocean. The Yasipan and Rio Blanco Watersheds are part of the Chambo river system which discharges into the Amazon basin (for details about the five watersheds see annex 9). The project will apply an integrated landscape approach and will work across the different altitudinal belts located above 3,200 m.asl. Particular attention will be paid to the linkages between the different altitudinal belts and to the interface between high altitude land use systems, conservation of the páramos and the livelihood (mainly economic) situation of the local communities. The project will be implemented through the following main activities:

- Baseline analysis of the natural resources situation, the socio-economic conditions and institutional setup;
- Development of community NRM plans;
- Implementation of NRM and micro-watershed management pilot activities / models through the introduction and field-testing of new mechanisms for conservation;
- Improve the economic situation of the communities in the watersheds through the introduction and testing of new financing mechanisms such as for example CES-schemes;

- Rationalization of water use in the Province through improved irrigation infrastructure (collaboration with IBRD-supported Chimborazo Productive Investment (PIDD) Programme);
- Development of policy and legal frameworks to support conservation practices; and
- Capacity building to raise awareness and mainstream biodiversity considerations into ongoing plans and practices.

The five watersheds differ from each other in terms of their environmental characteristics, socio-economic conditions, institutional development and degree of experience with development projects. This means that although the steps and overall approach of project implementation are the same in all five watersheds, the project activities as well as the expectations from the project need to be differentiated for each of the watersheds. The activities for the project implementation have been organized in the following components and sub-components:

3.2.1 Component 1 - Conserving the páramos and related highland ecosystems (Total cost: USD 7 119 820; GEF: USD 2 344 820.).

The objective of this component is to enhance the management of the páramos and related ecosystems as well as the livelihood situation of the local communities in the five selected micro-watersheds within the Chambo and Chanchán basins. This is the most important component in terms of field activities, staff & community involvement and budget. The approaches to be followed under this component are based on the recommendation of studies undertaken by the CHPC according to which to work on management planning issues in micro-watersheds is the most effective level at which to develop an integrated approach to natural resources management, to protection of water sources in particular. Accordingly, the project will support the participatory development of natural resources management plans, the design of conservation strategies and the implementation of pilot field activities. The project implementation under this component will follow a modern watershed management approach with particular attention to activities well adapted to local conditions which combine increased local benefits with biodiversity conservation and improved natural resources management. Targeted beneficiaries will include local indigenous communities within the selected micro-watersheds who voluntarily opt to participate in project activities, including several communities who reside within the Chimborazo National Fauna Reserve.

This component will be implemented by the CHPC through a technical team hired for the implementation of the project, in close coordination with local indigenous organizations and communities. Additional technical support will be provided by universities and research institutions as well as NGOs that have experience in the development of policy frameworks for the conservation of páramos, the development of micro-watershed management plans, the establishment of CES schemes and the implementation of capacity building activities for improved NRM. The implementation of this component will be structured into the following five sub-components:

a) Community-based watershed management planning

A proper planning process is a prerequisite for successful and sustainable project implementation for NRM, conservation of the paramos and livelihood improvement. Watershed management planning requires the move from traditional village development planning, which is based on administrative boundaries, to landscape planning, which is based on a geographic delineation. Watershed management planning has to pay equal attention to all altitudinal belts articulated in the delineated watershed and typically requires the collaboration of all communities which share the resources of the particular watershed. Watershed planning is best realised through a number of participatory meetings and requires a negotiation process among all concerned stakeholders

including community members, NGOs, governmental line agencies and, if applicable, the private sector. The watershed management planning process will involve, among others, the following key activities in each watershed: (i) implement a Participatory Rural Appraisal (PRA) in the communities located in the delineated watershed; (ii) create an inventory and community map of natural assets and productive schemes, differentiated according to the altitudinal belts, while evaluating the status of páramos; (iii) analyse the institutional setup, mechanisms and dynamics (especially in the context of upstream-downstream linkages) within the delineated watershed; (iv) analyse the infrastructure situation particularly related to irrigation facilities and road network (linkages to the IBRD Project); (v) develop in a participatory way a land use map which takes into account current and forecasted land use systems, soil conservation, forest and natural resource protection, hydrology, etc.; (vi) assess the economic feasibility of improved NRM practices within the communities; and (vii) prioritise through a participatory process the key activities to be implemented within the available project resources, based on the results of the above planning process. The overarching goal of all these prioritised pilot activities should be to improve the natural resources management and to reduce the pressure on the páramo ecosystem.

b) Organizational and institutional strengthening

The activities under this sub-component will obviously result from the analysis of the institutional setup, mechanisms and dynamics to be implemented under sub-component a). Based on experiences from watershed management projects in other parts of the world it is proposed to establish a Watershed Management Committee, accredited by the provincial authorities and SENAGUA, for each of the five watersheds. The setup of these Committees should be as inter-disciplinary as possible and include membership from the communities (representatives of indigenous communities, teachers, male and female farmers, health workers, traders, etc.), line agencies, private sector, NGOs, etc. Ideally thematic interest groups are formed within the watershed management committee which pay particular attention to issues like pasture management, water use efficiency, horticulture, marketing, etc. Under the management of the Watershed Management Committee it is envisaged to establish a revolving watershed development fund which ensures the operations of the Committee beyond the life of the project. The Watershed Management Committee would be the coordinating and driving institutional mechanism for the watershed management planning process.

c) Pilot interventions

Based on the prioritisation of the key activities which will result from the community based planning process (see 3.2.1 a), specific activities will be supported and implemented. The activities will cover a variety of thematic areas including (i) sustainable production of camelids (alpacas or vicuñas) which has considerable potential to help improve NRM in the project area, as they are well adapted to local ecological conditions and are potentially quite profitable for local communities; (ii) sustainable community soil and water management, conservation and use efficiency (including water harvesting and protecting springs); (iii) using substantial counterpart funding to expand ongoing sustainable productive agriculture and forestry initiatives; (iv) agro-forestry systems; (v) organic agricultural production; (vi) conservation agriculture practices; (vii) community based tourism which in many higher-altitude areas is likely to be the only viable economic activity, as agricultural potential is very low. The activities to be implemented will be proposed as a set by the Watershed Management Committee to the Project Directive Committee. The criteria for the approval of the implementation package are (i) the diversity of proposed activities; (ii) the logic and the linkages between the different activities in a landscape and upstream-downstream context; (iii) the relevance of the activities for biodiversity conservation, NRM and increasing local benefits. Once the intervention package is approved a separate budget and operational plan for each activity have to be developed and submitted.

The field activities in the five watersheds serve as pilot, demonstration and training sites. Accordingly, these sites should be accessible and the activities visible and convincing. While the planning process and the institutional development will cover the whole watershed, the pilot activities should ideally not be too much scattered across the watershed area but have a certain geographic concentration in order to increase the visibility and demonstration effect. In order to guarantee replicability of the experiences from the pilot sites to other areas, raise the interest of neighbouring communities and ensure sustainability of the activities beyond the project duration it is essential that these activities are carried out with modest investment but rich in ideas, experimentation and innovation.

d) Compensation for Environmental Services Mechanisms

Compensation for Environmental Services (CES) is increasingly recognised worldwide as an important mechanism to improve the economic situation of rural and marginalised communities. This is particularly relevant in the context of watersheds in which upstream communities provide services to downstream users. Large parts of the paramos in the Chimborazo Province in which biodiversity is threatened are also important water supply areas for downstream water users such as irrigation systems, domestic water supply systems, hydroelectric power producers, and others. The Compensation for Environmental Services (CES) approach offers the potential of addressing both problems in a sustainable and efficient manner. The approach has been increasingly implemented in many countries in Latin America, often with GEF support. There are several examples of functioning CES mechanisms in Ecuador, at various scales.

The development of the pilot CES mechanism in the proposed project will employ a systematic process building on the experience of previous CES mechanisms in Latin America and on the groundwork undertaken during preparation. While the development of the conceptual framework and the identification and analysis of options will be implemented in all five watersheds, the actual field implementation and testing of the CES scheme will be done in at least two watersheds (at least): in the Chimborazo Watershed related to hydropower generation and water use for a cement factory and in the Rio Blanco Watershed related to a water deviation scheme for hydropower generation and irrigation. In these two watersheds, a series of preparatory activities will be implemented followed by the actual implementation of the mechanisms. Specific activities will include: (i) conduct detailed hydrological studies by compiling available information and beginning field monitoring of critical variables at a local level (including local rainfall and discharge), prepare hydrological models and estimate the impact of likely land use changes on downstream water services; (ii) conduct socio-economic evaluations of the critical areas for water service supplies to identify the specific land users who manage the land from which problems originate and the incentives and constraints they face in making land use decisions, as well as institutional arrangements among these providers; (iii) prepare a work plan for approval by the relevant water users that specifies the land uses that would be supported through the CES mechanism, the costs of doing so and the likely results that will be generated; (iv) implement and test the pilot CES mechanism, provide technical assistance to service providers on the implementation of the required practices.

e) Optimisation and rationalization of water use in the Province

Mid-altitude agricultural areas are major users of the water services that originate in the upper watersheds. This use is often inefficient, however, because of deficiencies in the irrigation infrastructure. Improving water use in these areas, in addition to itself representing a significant improvement in NRM, also has the potential to reduce pressure on more marginal upper areas by increasing labor demand in the more productive middle altitude areas. Rationalized water use also improves the potential for instituting market-based mechanisms for conservation based on payments by water users (see section d above). The proposed NRM Project will thus undertake efforts to

rationalize water use in the Province through a partial blending with the PIDD project. The PIDD's irrigation sub-component follows a demand-driven and participatory approach in which Water User Associations (WUAs) and farmer groups participate in subproject design, financing, execution, and supervision and are fully responsible for operation and maintenance. Accordingly, the activities financed by GEF resources will focus on the analysis and documentation of the lessons learned and the development of normative products for the more rational and efficient conservation, management and use of the water resources and not the actual field implementation of more efficient irrigation and other water use schemes

Training and capacity building for local authorities, technical staff and members of local indigenous and other community organizations will be mainstreamed across all activities under this component and will potentially include the following elements: (i) preparation of baseline assessment of the status of natural resources in selected sites within the project area as basis for the NRM monitoring system; (ii) animation and implementation of community NRM planning processes; (iii) formulation and implementation of micro-watershed development plans with a reinforced emphasis on biodiversity and water conservation objectives; (iv) understanding the environmental and economic significance of the páramos ecosystem while promoting sustainable land use models to improve livelihoods; (v) formulation of Action Plans (including costs, steps, and indicators) and improving the ability to seek additional resources to implement the watershed management plans in their entirety; (vi) development of CES schemes.

The outputs to be delivered by this component are: (i) at least 3 micro-watershed management plans completed for the selected project sites; (ii) 100 percent of actions given high priority in the management plans implemented; (iii) at least 30 community and/or indigenous organizations trained in sustainable land use planning and natural resource management practices; (iv) at least 30 percent of the cultivated surface of the micro watershed covered by the project benefit from improved irrigation systems managed by the users under criteria of efficiency, equity and sustainability in the use of water resources; (v) a compensation value assessment of conservation services of the headwaters provided by the mountain communities managing the ecosystems of the upper parts of the micro-watersheds including the páramos; (vi) identification and analysis of options for water users (irrigation association, hydroelectric power plants) compensation schemes and CES mechanism designed including criteria for eligibility of beneficiary communities, contract conditions, and means of verification of compliance with conservation services; and (vii) at least 2 pilot contract prepared and in initial implementation with mountain communities providing conservation services.

3.2.2 *Component 2 - Priority actions to strengthen the management and conservation of the National Fauna Reserve of Chimborazo. (Total cost: USD 1 386 600; GEF: USD 719 000).*

While project activities under component 1 will be implemented in five watersheds across the Province, component 2 will focus on the area of the Chimborazo Volcano itself, more specifically the Chimborazo National Fauna Reserve and its buffer zone. Some activities related to improving information and analysis and planning processes related to the management of the Reserve (subcomponent c and d below) will be covering the entire territory of the Reserve while activities with concrete interventions on the ground will only be implemented in the part which is situated in the Chimborazo Province (subcomponent b and e below). As stated in the rationale, the Chimborazo National Fauna Reserve has been created in 1987. However, in-depth knowledge about this vital ecosystem is lacking and a well developed and community-based management plan of the Chimborazo Reserve as well as basic facilities for the visitors are so far missing. The proposed project will support the Ministry of Environment to upgrade the Chimborazo National Fauna

Reserve and to reduce the threats to existing páramos within the Reserve. To enhance the potential for sustainable development in the Reserve's buffer zones, all of the activities to be implemented under this component will be fully consistent with the actions developed under the community NRM planning process in the Chimborazo Watershed under component 1. The implementation of this component will be structured into the following five sub-components:

a) Elaboration and negotiation of a national plan for the management of the Vicuña in Ecuador

A national norm for the management of the Vicuña exists but so far no national management plan has been elaborated. This is a prerequisite of the Convention for the Conservation and Management of the Vicuña under CITES in the process of changing the status of Ecuador to appendix II country, allowing the use of the fibres from the live animal in Ecuador. Under this sub-component of the project such a national management plan will be elaborated and presented to the parties of the convention financed by the Ministry of Environment co-financing.

b) Construction of prioritised infrastructure and equipment

Under this sub-component upgrades in administrative infrastructure, trails and basic equipment of the Chimborazo National Fauna Reserve will be supported. In particular this includes the construction of a visitor's center and an administrative office for the park management. The technical specifications and a model / drawings of the visitor's center / administrative office already exist. An important element of the visitors center will be an exhibition which (i) introduces the visitors into the Reserve, its history, its fauna and flora, the likely impacts of climate change on the ecosystem (particularly the extent of the glacier and the availability of water resources); (ii) sensitises the visitors for the fragility of the paramo ecosystem and the delicate balance of the human-nature interactions; and (iii) disseminates a "code of conduct" for the visit of the Reserve. In addition to the visitors center, the network of trails in the Reserve will be evaluated. Existing trails will be rehabilitated as necessary and possibly additional trails will be constructed. Finally, monitoring and surveillance programs will be reinforced through equipment and additional training to guards.

c) Study of the Chimborazo Reserve and its buffer zone

Under this sub-component the basic documentation about the Chimborazo Reserve will be collected, compiled and complemented as well as the knowledge about the functioning of this ecosystem increased. Studies of the Chimborazo Reserve and its buffer zone lay the ground for the elaboration of co-management plans with the local communities. The Ministry of Environment and Ecociencia have mapped part of the vegetation cover and land use in the Reserve in 2009. The CHPC has a GIS system including land use and some vegetation cover in the Chimborazo part of the Reserve. These data need to be up-dated and complemented to get a complete mapping of the Reserve. In addition, mapping and studies will include (i) community and private properties inside the Reserve; (ii) biophysical and ecosystem carrying capacities (in particular carrying capacities of vincuñas and other camelids); (iii) identification of threatened species; and (iv) areas with forest vocation.

d) Development and implementation of co-management plans

The management of nature reserves cannot be successful or sustainable without the ownership and active involvement of the local communities. The general management plan of the Chimborazo Reserve, which was elaborated in 2006, does not include concrete co-management approaches and activities. Under this sub-component, co-management plans will be developed in a participatory manner involving local communities in conservation and sustainable use of the natural resources in the Chimborazo Reserve and its buffer zone and approved by Ministry of Environment and the local communities. The co-management plans will include prioritized activities such as (i) sustainable grassing schemes (substituting cattle and sheep livestock with camelids in the páramos); (ii) land

use zoning and use regulations; (iii) conservation of headwaters; (iv) inclusion of local communities in surveillance of resources; and (v) provision of tourism services. Technical assistance will be provided to the local communities in business administration of micro enterprises and marketing of tourism products and services to improve the income generating benefits of the Reserve for the local communities. The budget for the implementation of these prioritised activities will also be included in the co-management plans, and the project will finance the implementation of priority demonstration projects.

e) Development of local capacities and provision of equipment for the capturing and shearing of the vicuña

Work under this sub-component specifically focuses on the management of the vicuña. Since late 80's where the first 200 vicuña were reintroduced to the Reserve from Peru and Chile the population has grown to 3.200 in 2009. A program for the development of local capacities, provision of equipment and implementation of capture, shearing, processing and marketing of the vicuña fibers will be developed based on equal benefit sharing. Technical assistance will be provided to the local communities in business administration of micro enterprises and marketing of the vicuña fibres. This program, which should benefit the local communities participating in the conservation of the vicuña and its habitat and the financial sustainability of the conservation of the Reserve, will be based on the sustainable management of the specie and in accordance with the CITES convention.

The outputs to be delivered by this component are: (i) National Management Plan for Vicuña elaborated and presented to the parties of the Convention for the Conservation and Management of the Vicuña under CITES; (ii) infrastructure and equipment prioritized in the management plan of the Chimborazo Fauna Reserve constructed (small visitor centre and administrative office and rehabilitation of main trails in the Reserve); (iii) studies of the Chimborazo Reserve and its buffer zone to lay the ground for the elaboration of co-management plans with the local communities including a complete mapping of vegetation cover and land use including community and private properties inside the Reserve and an evaluation of biophysical and ecosystem capacities; (iv) co-management plans developed and implemented involving at least 10 local communities in conservation and sustainable use of the natural resources in the Chimborazo Reserve and its buffer zone; and (v) program implemented for the development of local capacities, provision of equipment and implementation of capture, shearing, processing and marketing of the vicuña fibres from at least 500 vicuñas based on sustainable management of the specie and in accordance with the CITES convention and generating economic benefits.

3.2.3 Component 3 - Capacity Building of the Chimborazo Provincial Council for Sustainable Natural Resources Management with focus on the paramos (Total cost: USD 652 080; GEF:USD 423 080).

While capacity building and training activities at the watershed and Nature Reserve level will be covered by components 1 and 2, primarily, but not exclusively, the staff of the Chimborazo Provincial Council will be the target group for the training and capacity building activities under component 3. The objective of this component is to mainstream biodiversity conservation, NRM and livelihood improvement in a watershed management context into the regulatory frameworks, development plans, and ongoing activities and planning processes across multiple sectors within Chimborazo. The implementation of this component will be structured into the following three sub-components:

a) Strengthening of the capacities to develop policies and regulations on NRM considering biodiversity conservation

The policy framework for the management of key mountain ecosystems at the national level already exists. However, specific policies and ordinances at the provincial level are missing but are necessary to create awareness and regulate the activities of local stakeholders, including commercial plantation (pine and eucalyptus) owners. The capacity building under this sub-component will therefore focus on the development of policy and legal frameworks for improved NRM considering biodiversity conservation. The policy framework, devised at the Provincial level, will be oriented toward integrating NRM and biodiversity conservation objectives into existing and ongoing micro-watershed planning processes. The legal framework will comprise the development, issuance and enforcement of local ordinances or appropriate instruments for NRM and biodiversity conservation in key sectors impacting the páramos ecosystems, for example on the protection of water springs, forestry, tourism and management of camelids, based on the micro-watershed management plans.

b) Strengthening of the capacities related to methodologies and instruments for development and sustainable management of natural resources

Although some CHPC counterparts, local organizations and communities have been exposed to capacity building programs in the past, most of them are related to the development of community-based tourism and improved agricultural practices. Such programs have been implemented in very specific sites of the Province over limited period of time and their impacts in terms of improving NRM have not been adequately monitored. Given the increasing awareness related to the impacts of the severe deterioration of natural resources in the Province, the demand for capacity building and technical assistance by provincial and municipal authorities, but also by local communities, has increased substantially in the last years. Activities under this sub-component will respond to this demand: training programs on methodologies and instruments for NRM will be designed, developed and implemented for different stakeholders and partners, particularly for staff of the Provincial and Municipal authorities. Visits to the 5 watersheds, in which the practical field pilot and demonstration activities of the project will be implemented, will be an integral part of these training programs.

c) Monitoring of NRM

Under this sub-component, key indicators for assessing the status of biodiversity and natural resources will be developed, a baseline assessment in selected project sites within the five selected micro-watersheds will be conducted, information systems currently available within the CHPC will be harmonized, and a participatory monitoring and evaluation system to assess the status of biodiversity and NRM in the Province will be developed and made operational. The M&E system to monitor the outcomes and impacts of NRM initiatives, to be managed by various local stakeholders, will be fully designed by project year 2 and will track the progress made toward specific conservation targets through the implementation of the pilot interventions supported in subcomponent 1.c.

The outputs to be delivered by this component are: (i) at least 20 CHPC and local organization staff have benefited directly from Capacity building/training program in methodologies and instruments for development and sustainable management of natural resources using a watershed approach; (ii) CHCP strengthened in capacity to develop policy and regulations on NRM for the Province of Chimborazo; (iii) at least four provincial ordinances or appropriate instruments (Protection of water springs, forestry, tourism and management of camelids) developed, issued and enforced by the end of the project based on the zonong and use regulations laid out in the micro-watershed management plans for the selected project sites; and (iv) NRM monitoring system designed by the end of year two and operating for the project sites by the end of year 4.

3.3 Project outcomes and impacts

The key outcome and impact indicators include:

1. 58,000 ha in areas under threat in the Chimborazo Province under improved NRM (sustainable agricultural practices, areas under local CES systems, and increased reforested areas with native species)¹.
2. Coverage through natural regeneration and/or reforestation with native species along watercourses is increased by 20% in the project intervention area.
3. 56,000 ha of the National Fauna Reserve of Chimborazo with improved management effectiveness (from 40 percent to 70 percent by the end of the project using the GEF SP1 Tracking Tool).
4. The number of native grass species maintained or improved in the Chimborazo Reserve and its buffer zone (85 species in 2009)
5. Biomass (photosynthetic and non photosynthetic) and necromass per m² maintained or increased in the Chimborazo Reserve and its buffer zone by the end of the project (baseline to be established in representative m² samples in year 1)Provincial Government capable of supervising and promoting the sustainable management of natural resources in the Province (4 provincial NR local norms approved and applied by 90 percent of the local communities involved in the project; NR monitoring systems operational for three selected project sites and the monitoring information generated is systematically used to plan supervision activities and community awareness raising and capacity building).
6. Three years after the end of the project 30 communities and/or indigenous organizations has adopted and are benefiting from conservation practices (substituting non camelid livestock with llamas and alpacas grassing in the páramos; protection of slopes and areas around headwaters below the páramos with native species; application of soil conservation and water harvesting technologies; conservation and use of local agro-biodiversity to increase food sovereignty and the use of conservation agricultural practices)
7. Vicuña fibers and tourist products and services generating USD250,000/year in total income for the local communities and for the conservation of the Chimborazo Fauna Reserve three years after the end of the project.

3.4 Lessons learned and reflected in project design

Lessons learned from a broad array of related activities and experiences have been considered and reflected in the project design. The most important elements are presented below.

Watershed management

As presented in section 2, the recently completed FAO-led global review of watershed management experiences has resulted in the following lessons learned, new approaches and recommendations for future watershed management projects:

- Identify and treat the underlying causes and not just the symptoms of environmental degradation and poverty;

¹ Biological impact indicators will also be established and monitored in the implementation of each Micro-watershed management plan. These indicators may included: increase or at least maintenance in water flow in relation to rainfall in the mid and lower part of the watershed, decrease in number of none-camelid livestock grassing in the páramos, reduction in agriculture encroachment on the páramos.

- Focus on institution building and institutional arrangements, utilizing the positive aspects of both bottom-up and top-down processes;
- Emphasis on water resource management, as key-element for the local socio-economic development process;
- Promote the active participation and contribution of all concerned actors and stakeholders, underlining the existing links among the social, technical, institutional and policy dimensions in the framework of a pluralistic collaborative process;
- Adopt a flexible approach for the design and implementation of project/programs so as to be able to continuously adjust them to changes in legal/policy and local governance dimensions;
- Link long-term planning required by the complexity of issues to be faced, with the generation of tangible, high quality results/outputs on the short-term, so as to maintain consensus at grassroots and political levels;
- Assist local stakeholders in focusing on upstream/downstream linkages and on the long-term impact of processes coordinated at watershed or basin level;
- Promote dialogue and interchange between local and scientific knowledge, by implementing action-research programs directly involving local stakeholders;
- Offer continuous attention to conflict management techniques for problems related to access to resources, land tenure and socio-economic issues;
- Systematically focus on gender equity and gender balance in decision-making processes;
- Pay continuous attention to emerging issues like climate change impacts, and to innovative solutions/mechanisms, such as Compensation for Environmental Services and new financing schemes.

To the extent possible and relevant, these lessons learned have been reflected in the project design and will be considered during project implementation. In addition to these lessons learned and particularly critical to project success in the context of Ecuador is the empowerment of local indigenous organizations, their active participation in project implementation and the incorporation of traditional indigenous knowledge, techniques, and improved practices as demonstrated by other IBRD operations in Ecuador such as PRODEPINE and PROLOCAL. This is an effective means to ensure that local characteristics and cultural practices are integrated into conservation strategies.

Compensation for Environmental Services

The project draws on the experience of numerous previous projects that have implemented CES approaches, including Costa Rica Ecomarkets and Mainstreaming Market-based Instruments for Environmental Management, Mexico Environmental Services, and Regional Integrated Silvopastoral Ecosystem Management, as well as a best practice paper that also brings in other CES experiences worldwide (Pagiola and Platais, 2007). Also, the results of the FAO-implemented regional forum on payment schemes for environmental services in watersheds (June 2003 in Arequipa, Peru) have been very relevant for the design of this project. The broad lessons of these previous efforts that are applicable to this project include:

- *The specific needs of the service users in the watersheds must be clearly identified.* The project will work closely with water users in the pilot watersheds, including many participating in the PIDD project, to identify the specific problems they are currently facing, or are threatened by in the future.
- *It is imperative to 'get the science right'* – to clearly establish which land uses, in which areas, can help generate the specific services needed by the water users, and to quantify these impacts to the extent possible.

- For land uses that generate significant off-farm services (such as water services) to be adopted and maintained over long term, farmers need to be compensated for the costs they face in doing so (including the opportunity costs of foregone income from their most profitable alternative land use), for as long as the services are wanted – usually, indefinitely. This does not mean indefinite conservation contracts, but contracts that are renewable indefinitely, as long as both parties wish to do so, thus permitting the terms of the contract to be periodically re-negotiated in light of changing conditions and lessons learned.

Protected area management

Improved management of protected areas depends on financial sustainability, effective participatory mechanisms and awareness-raising at all levels. Lessons will be drawn primarily from the recent WB/GEF Ecuador National System of Protected Areas Project, closed on December of 2007. The most important lessons of this project are:

- The Protected Areas Fund PAF is not enough to secure the financial sustainability of the patrimony of protected areas. For this reason, the above mentioned project supported the development of a financial sustainability strategy with the participation of different actors, in such a manner as to ensure the implementation of the Protected Areas Strategic Plan and the protected areas management plans. The financial strategy has identified several mechanism of self revenue, two of which are currently operating and will strengthen PAF as an effective mechanism to cover the recurrent costs of protected areas. Furthermore, a portion of the self-generated funds of MAE are now financing the maintenance of infrastructure and basic services. These mechanisms will be further developed in the Chimborazo Reserve.
- Consulting a range of stakeholders through the Participatory Management Committees (PMCs) and other mechanisms such as the Protected Areas Advisory Committee and the agencies that actively participated in the development of the Protected Areas Financial Strategy, has strongly promoted ownership of the project objectives and activities. This combination of consulting sectors has enriched project implementation with technical, scientific and traditional knowledge and has created a space to develop innovative mechanisms for protected areas management. At the same time, it has facilitated capacity building and transfer of knowledge at the field, establishing local teams composed of protected areas staff and members of the PMCs, capable of carrying out planning and monitoring activities.
- The proposed project will attempt to replicate the NSAP project's success in enhancing collaboration and building capacity among all levels of PA management, from local volunteer park guards to decision-makers within the Ministry of the Environment.

3.5 Alternatives considered and reasons for rejection including cost-efficiency

The project strategy of integrating biodiversity conservation and livelihood improvement considerations into micro-watershed planning was selected after analyzing the following alternatives:

An integrated approach to NRM within individual sites formed the basis of the current project design, but it became apparent that a micro-watershed approach to NRM would be more effective in terms of mainstreaming biodiversity considerations into the ongoing development planning processes of the CHPC. Moreover, linkages with the IBRD PIDDP project will be clearer through a micro-watershed approach.

Addressing problems in the upper watersheds solely with short-term measures (whether TA or financial support) would have been unlikely to result in a sustainable improvement in NRM in critical areas. Sustainable long-term adoption of land use practices that are socially desirable because of the high benefits they generate (to water users, or for biodiversity conservation), but which have limited benefits for individual farmers requires long-term compensation such as CES mechanisms can provide.

Developing a province-wide CES program (similar to Costa Rica's PSA Program) would not have been feasible as water uses in Chimborazo tend to be largely independent and managed locally. Irrigation systems are managed by local WUAs, which set their own fees for operation and Maintenance, for example, while towns manage their own domestic water supply systems (unlike many other Latin American countries, Ecuador does not have a national agency with responsibility for urban water supply). Moreover, experience in other countries has shown that such broad CES systems tend to be very inefficient. Rather, the approach to be followed is to develop separate small-scale CES mechanisms for individual cases. Similarly, developing a single province-wide water tariff to pay for CES would have failed to address the different conditions in different watersheds, resulting in funding levels that would be insufficient in some cases and excessive in others.

3.6 Sustainability

Sustainability considerations have been an integral part during project design and formulation and will be mainstreamed across all components and sub-components of project implementation. One of the most important and overarching elements of project sustainability is the creation of capacities of a variety of stakeholders on NRM, biodiversity conservation, watershed management planning, development of CES mechanisms, institutional development, communication which is foreseen in all components of the project. The efforts which are in-built into the project design to capture, analyse and document the lessons learned from the work in the five watersheds and the National Fauna Reserve and to upscale these lessons for the provincial level will contribute to the overall sustainability of the project at Provincial and even national level. More specifically, project sustainability can be grouped into four clusters:

Environmental sustainability

Being a GEF project with the main objective to contribute to improved NRM and to the protection of the paramo ecosystems, all project activities will inevitably contribute to environmental sustainability as is illustrated by the following examples:

- The Provincial Plan places special emphasis on natural resource deterioration, particularly decreasing water quantity and quality, and changes in the timing of flows. The specific interventions related to NRM in the five micro-watersheds will be prioritised based on the watershed management planning exercise and based on the conservation of key ecosystems as providers of environmental services. If done correctly, this planning and prioritisation process will guarantee the environmental sustainability of the interventions. This concept finds support in the CBD, which supports integrated conservation and sustainable use practices under equitable conditions. Accordingly, activities to be supported by the project, including mainstreaming biodiversity considerations into micro-watershed planning and creating effective incentive structures and management capacity, will reduce environmental degradation in and around the selected micro-watersheds and contribute to the overall environmental sustainability of the Province.

- Sustainable production of camelids (alpacas or vicuñas) has considerable potential to help improve NRM in the project area, as camelids are well adapted to local ecological conditions, are potentially quite profitable for local communities and are compatible with conservation of biodiversity.
- An important component of the visitors center in the National Fauna Reserve Chimborazo will be an exhibition which introduces the visitors into the Reserve, sensitises them for the fragility of the paramo ecosystem and the delicate balance of the human-nature interactions and disseminates a “code of conduct” for the visit of the Reserve. Along with the co-management plan, the visitors center will thus make an important contribution to environmental sustainability of the Reserve.
- The blending of the NRM project with the PIDDD Project, which will work on the improved effectiveness of irrigation infrastructure and the increased water use efficiency, will contribute significantly to environmental sustainability: mid-altitude agricultural areas are major users of the water services that originate in the upper watersheds. The long-term sustainability of improved irrigation infrastructure in mid-altitude areas thus depends on continued provision of water services from upstream areas, and particularly from areas of páramos. Conversely, improving water use in these areas, in addition to itself representing a significant improvement in NRM, also has the potential to reduce pressure on more marginal upper areas by increasing labor demand in the more productive middle altitude areas.

Institutional sustainability

Institutional sustainability will be ensured through the fact that the Chimborazo Provincial Authorities have been involved right from the beginning in the project design and formulation as well as during the field visits. In fact, the objectives, structure, outputs and approaches of the project are those which were prioritised and endorsed by the provincial partners. The same is true for the design of component 2 related to the National Fauna Reserve Chimborazo in which staff of the Ministry of Environment has been fully involved. In particular, institutional sustainability will be promoted through:

- Establishment of multi-stakeholder watershed management committees and interest groups in the five watersheds selected for the project; it is expected that these institutional structures / mechanisms will continue beyond the duration of this project.
- Institutional strengthening of local indigenous organizations to enable them to leverage additional resources and to replicate successful pilot models with other organizations in other communities in the province;
- Reassignment of permanent staff of the Production and Environment Unit at the CHPC's to assume specific responsibilities associated with project;
- Enhanced coordination between CHPC and local organizations located near key water sources in the páramos.

Social sustainability

Social sustainability of project activities will be achieved through a participatory strategy aimed at enhancing the role of local communities and organizations in conservation and management activities, capacity-building and monitoring. In particular, the project will support:

- Gender equality in all decision making steps and project activities.

- Active participation and ownership of local indigenous communities in the development and integration of NRM plans into micro-watershed planning processes. In fact, it is the local communities which, through their active participation in the watershed management committees, guide the planning process and prioritise the activities. Furthermore, the local communities are fully responsible for the financing, execution, and supervision of the project activities in the field as well as for the operation and maintenance of equipment.
- Active participation and ownership of local communities in the development and implementation of the co-management plan for the National Fauna Reserve Chimborazo.
- Capacity building to enhance the administrative and technical abilities of local organizations and community members.
- All project activities aim at the conservation of páramos as well as at the improvement of local livelihoods.

Financial sustainability

The project will support various measures to improve the financial sustainability of NRM initiatives. The economic, financial, and sustainability analyses of the different components are closely related. Sustainability will be achieved to the extent that activities are financially viable for the parties involved – whether individual communities in the five watersheds, communities and partners in the National Fauna Reserve Chimborazo or users and providers of environmental services. Examples for financial sustainability include:

- The planning in the five watersheds and the specific prioritised activities which will be implemented under component 1 will all be selected by the communities themselves through their active participation in the watershed management committee. It is in the communities' interest to select activities that are financially viable, as beyond some initial support from the project, they will not receive any further assistance. As the specific activities to be implemented will be selected by the communities during implementation, it is impossible at this stage to foresee exactly what they will be, or to estimate their costs and benefits.
- In many higher-altitude areas, ecotourism is likely to be the only viable economic activity, as agricultural potential is very low. At the same time, the stunning scenic beauty of the region creates a very high potential for tourism. There is also considerable potential for tourism activities that incorporate local traditional cultural practices, and for indirect benefits through the sale of food, handicrafts, etc. Handled appropriately, tourism will provide significant new income sources for local communities that sustain rather than degrade the environment.
- In the CES activities under component 1d), participation will be voluntary, so that affected parties will only participate if they are confident that participation is financially viable from their perspective. Service users will, in the long run, be required to pay for both the payments to upstream service providers and the transaction costs of the payment mechanism, but again would only do so if they believe that it is in their interest. Sufficient flexibility has to be incorporated (such as providing for periodic renegotiation of contracts) to ensure that the mechanism continues to be interesting for the partners in light of changing conditions and lessons learned. To ensure the sustainability of the CES mechanisms, the project draws on lessons learned in previous CES projects. These experiences show that well-designed CES mechanisms can be sustainable because they depend on the mutual interests of service users and service providers.

- For activities in the Chimborazo National Fauna Reserve, the challenge is to ensure that the Reserve is financially sustainable. One of the main objectives of many protected areas, including the Chimborazo Reserve, is to provide recreational and tourism opportunities to visitors which can contribute significantly to the financial sustainability of those areas. In fact, tourism accounts for 95 percent of the self-generated income of the protected areas in Ecuador. Through the construction of the visitors center and the improvement of the trails in the Reserve, which will increase the number of visitors, the project will contribute to the financial sustainability of the Chimborazo National Fauna Reserve.
- Watersheds that originate in the Reserve contribute to the water supplies of numerous water users, including the town of Riobamba and a hydroelectric plant that serves a cement plant. Payments from these users could be used to pay for conservation activities in the Reserve and thus additionally contribute to the financial sustainability of the Reserve.
- Should vicuña management be approved by CITES, a management plan will be developed, including a formula to share the resulting benefits among those who contribute to vicuña management, through labor inputs or by providing the natural ecosystems in which vicuñas graze and reproduce. The Reserve would thus be expected to receive part of the resulting income – again an important contribution to the financial sustainability of the Reserve. Based on the management plan and the related regulations, the project will focus on developing the financial and commercialization strategy for the vicuña fiber.

3.7 Replicability

The project will support replicability by: (i) implementing pilot activities in five watersheds with modest investment but rich in ideas and innovation and accordingly with a high potential for replication throughout the country; (ii) implementing local CES mechanisms, again with a high potential for replication throughout the country; (iii) supporting a local community training program to build capacity on-the-ground for replication purposes; and (iv) providing assistance to the Chimborazo National Fauna Reserve to improve the management of camelids and eventually commercialize their sub-products, a highly replicable activity throughout the country, considering the large numbers of alpacas and the strong cultural affinity associated with the species throughout Ecuador.

3.8 Assumptions and risks

3.8.1 Analysis of fiduciary risks and mitigation measures

Overall, Ecuador's fiduciary environment has been diagnosed as weak by the Country Financial Accountability Assessment (CFAA). However, the WB has provided systematic and important support to the CHPC which is the first subnational government in Ecuador to have the full responsibility for the execution of a WB loan operation, the PIDD/WB Programme. As part of the preparation of the PIDD Programme and the present GEF project an assessment of fiduciary risks and CHPC capacities to comply with financial, procurement and project monitoring and reporting fiduciary standards was carried out by the WB and substantial fiduciary risks were identified. CHPC's capacity constraints identified were: (i) a limited technical and administrative organizational structure; (ii) the need to upgrade financial management information systems; and (iii) a limited knowledge and experience on natural resource management.

To mitigate the fiduciary risks, measures and an action plan for their implementation were agreed between the WB and CHPC to ensure that proper financial and procurement management arrangements were in place before the start up of the implementation of the PIDD programme signed in the beginning of 2009. This action plan has included; (i) strengthening of the technical and administrative organizational structure of CHPC to implement project activities; (ii) updating

and completion of the financial management information system platform; (iii) the chart of accounts have been customized for project information needs; (iv) an adequate Project Operational Manual (POM) has been developed guiding procurement, financial management and monitoring and evaluation procedures and processes related to project implementation; (v) standards has been met for the financial statements and the time frame for their submission to the Bank after being certified by the auditors; and (vi) extra project staff have been contracted to strengthening CHPC execution capacities.

All agreed action of the action plan has been implemented and after a start up phase with substantial support from the WB in all project management aspects, CHPC has now reach systems, procedures, and capacities to comply with multilateral fiduciary standards and the fiduciary risks are now rated to be from low to modest. During the FAO final project formulation mission in January 2010, CHPCs financial management and project progress monitoring systems based on results based management were reviewed and procedures and capacities to comply with procurement (goods and services) were assessed to be satisfactory. It was agreed that the draft Operational Manual for the GEF project will be adjusted to FAO rules and regulations and reporting formats during the project start up phase, and the CHPC financial and procurement team will be strengthened by a financial and accountant assistant and a procurement assistant to allow the CHPC financial and procurement team to take on the extra work load in relation to the GEF project execution. Likewise a procurement plan for goods, minor works and services will be prepared during the project start up phase. Further, it was agreed to include funds for technical assistants to integrate outputs and outcomes from the GEF project Results Framework in the CHPC's monitoring and evaluation system to insure adequate project progress monitoring and reporting from project start up and support the results based project management.

3.8.2 Other project risk and ratings

Project overall risk rating is moderate to substantial. The risks associated to this project are related to the following aspects: i) the implementation of new biodiversity conservation approaches that require a strong capacity building and highly participatory and consultaion processes involving local and indigenous communities; ii) the limited knowledge at the Provincial level on practices to manage natural resources on a sustainable manner; and iii) the limited experience at CHPC to carry out natural resources management. Although the overall risk is rated moderate to substantial, the project design incorporates specific measures to mitigate the risk for environmental and development objective achievement. The main risks identified during project preparation are listed in the following table together with mitigation actions:

Risks	Rating	Risk Mitigation Measures
1. Change of authorities at the Provincial level could lead to changes in local policy related to natural resources management.	S	Linking the project to a provincial plan anchored in strong local communities' participation and enhancing local ownership.
2. Existence of special interest groups and fragmented communities and the lack of understanding of NRM activities could generate tensions, conflicts with local communities and undermine proposed project activities.	S	Support to social communication, capacity building, participation, strategic alliances building, and technical assistance in conflict resolution
3. Limited technical capacity by the CHPC could hinder the development and implementation of strategies to manage natural resources sustainably.	M	Capacity enhancement in planning and management of natural resources and biodiversity conservation, coupled with the development of policy and legal frameworks, will substantially enhance the existing capabilities
4. Limited capacity of local communities for environmental administration and biodiversity conservation in communal and private territories.	M	Training/capacity building included in the project will strengthen the capacity to plan, administrate and manage community resources while improving community organization.

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		Capacity-building is an integral part of each component with a focus on “functional” learning. Replication of successful experiences in management of natural resources and in biodiversity conservation through proven capacity-building methods.
5. Hydrological knowledge insufficient to demonstrate the benefits of CES mechanisms to water users.	M	The project will support the collection and analysis of data to apply and validate appropriate models.
6. Local communities might perceive the implementation of local CES mechanisms as an intention to privatize the access to water, undermining the proposed CES mechanisms.	S	Providing training on CES at the early stage of project preparation and enforcing during the implementation period, as well as broadly disseminating the information of hydrological modeling will mitigate this perception.
7. Conflict between the Ministry of the Environment and the Provincial Council could impede the adequate implementation of the activities planned in the Chimborazo Reserve.	L	The Ministry of the Environment and the Provincial Council will sign an inter-institutional agreement where the specific supervision, implementation and monitoring roles and responsibilities will be established.
8. Insufficient project management and fiduciary (safeguards, procurement, and financial management) capacity within the CHPC.	M	Technical assistance in project implementation, procurement, and financial management, and upgrading of systems provided during preparation. Hiring of qualified personnel for the project's administration team and training of CHPC staff in safeguards, procurement, and FM has been effectuated during the start up phase of the execution of the PIDD/WB loan . A Procurement Unit (PU) has been established within the CHPC to ensure follow-up on FAO procedures and to keep a contract information system of the procurement cycle. The PU will carry out all procurement, that is, works, goods, services, and consultants' services. Establish a workflow of the procurement processes and approvals, including a time frame of each step.
Overall Risk	M-S	

H = High (greater than 75 percent probability that the outcome/result will not be achieved).

S = Substantial (50 to 75 percent probability that the outcome/result will not be achieved).

M = Modest (25 to 50 percent probability that the outcome/result will not be achieved).

N = Low or negligible (probability of less than 25 percent that the outcome/result will not be achieved).

4 IMPLEMENTATION AND MANAGEMENT ARRANGEMENTS

4.1 Institutional context

The main institutions involved in the project will be the CHPC, the Ministry of the Environment and the National Water Secretariat (SENAGUA), project's Beneficiary Indigenous and Community Organizations and local companies managing hydroelectric plants in the specific case of CES.

The Ministry of Environment Sub-secretariat of Planning is the GEF Operational Focal Point and responsible for the coordination of all GEF activities in the Country. The Sub-Secretariat of Natural Patrimony is managing the national System of Protected Areas including the Chimborazo Fauna Reserve through the regional office of the Ministry in Chimborazo. As established in the Environmental Management Act (La Ley de Gestión Ambiental), the Ministry is the normative environmental authority and issues norms and regulations for conservation and use of threatened species and vulnerable ecosystems including vicuña and the páramos. The Ministry coordinates the national decentralized system of environmental administration.

As a provincial government the CHPC is responsible for integration of the principles of conservation, development and sustainable use of natural resources in provincial planning processes in coordination with the municipal governments as established in the Environmental Management Act and the Provincial Regime Act (Ley de Régimen Provincial). For this end, the provincial government is recommended to establish an Environmental Management Unit and should formulate provincial environmental policies in consultation with the indigenous and local communities and may issue local ordinances or other legal instruments within the framework of the National Constitution and Environmental Act.

SENAGUA was created by Executive Decree 1088 of May 15, 2008 at the level of Ministry and with the mandate to lead and coordinate the processes of management of the national water resources in an integrated and sustainable manner. The water resource management should be decentralized using the watersheds as the management unit and under the responsibility of local watershed management committees accredited by SENAGUA. The responsibilities of SENAGUA include the regulation of water concessions and options for requesting compensation from water users for conservation of resources. SENAGUA is leading the process of formulation and proposal of a new water law which will further detail the roles and responsibilities in water resource management, which will be taken into account during project execution.

4.2 Implementation arrangements

4.2.1 GEF Agency

The Food and Agriculture Organization (FAO) will be the GEF Agency for the project. FAO will provide supervision and technical guidance services during the project execution. Administration of the GEF grant will be in compliance with the rules and procedures of FAO, and in accordance with the agreement between FAO and the GEF Trustee.

As the GEF agency for the project, FAO will:

- Manage and disburse funds from GEF in accordance with the rules and procedures of FAO;
- Enter into an Execution Agreement with Chimborazo Provincial Council (CHPC) as the national executing agency for the provision of services to the project;
- Oversee project implementation in accordance with the project document, work plans, budgets, agreements with co-financiers and the rules and procedures of FAO;

- Provide technical guidance to ensure that appropriate technical quality is applied to all activities concerned conservation and sustainable management of the Chimborazo mountain ecosystems;
- Carry out at least one supervision mission per year; and
- Report to the GEF Secretariat and Evaluation Office, through the annual Project Implementation Review, on project progress and provide financial reports to the GEF Trustee.

The FAO Representative in Ecuador, working in close consultation with the FAO Project Task Manager (see below), will be responsible for the management of the GEF resources and all aspects in the Execution Agreement that will be signed between FAO and CHPC. As a first step in project start-up, the FAO Representation in Ecuador will establish an interdisciplinary Project Task Force within FAO to guide the implementation of the project. Disbursement of funds for the provision of goods, minor works, and services to the project will be carried out by the FAO Representative in accordance with the provisions of the Agreement. The disbursement will be carried out upon submission by the CHPC to the FAO Representation of quarterly financial statements of expenditures, procurement and contract documentation, and disbursement requests based on a detailed budget for the following quarter to be cleared and approved by the Representative and a Project Progress Report to be approved by the FAO Lead Technical Unit (LTU) (see also section 5.5 below on financial management and section 6.4 on reporting).

A Project Task Manager will be appointed by FAO in the FAO Office in Ecuador, in consultation with the LTU and the GEF Unit, to support the FAO Representative in the supervision and provision of technical guidance to the project, in close consultation with the LTU, the Forestry Management Division (FOMC) of the Forestry Department, and the multidisciplinary Project Task Force which will be constituted within FAO. The Project Task Manager will be paid from GEF fee resources. The FAO Project Task Manager will:

- Review project progress reports from CHPC and submit them to the LTU for approval and subsequently to the GEF Coordination in the Investment Centre Division (TCI) for final approval and uploading on the FPMIS;
- Review, revise and give no-objection to annual work plans and budgets in consultation with the LTU and the GEF Coordination;
- Review procurement and contract documentation for procurement and contracts to be financed by GEF resources and obtain internal FAO approval;
- Review CHPC project expenditures using GEF resources in accordance with the annual work plan;
- Review reports on executed co-financing to be submitted by CHPC and the MAE;
- Conduct periodic supervision missions;
- Prepare quarterly project implementation reviews (QPIRs) to be submitted to the LTU and the FAO GEF Coordination;
- Support the LTU in preparation of the annual Project Implementation Review (PIR) report
- Represent FAO in the Project Directive Committee and interview and selection panels for key project positions to be financed by GEF resources;
- In consultation with the FAO Evaluation Office, the LTU and the GEF Coordination, support the organization of mid-term evaluation and the final evaluation, contribute to the development of an eventual agreed adjustment plan in project execution approach and supervise its implementation.

The FAO Lead Technical Unit, Forestry Management Division (FOMC), will provide technical backstopping to the project and support the FAO Project Task Manager in responding to requests from CHPC for guidance on specific technical issues during project execution. The LTU will:

- review and give no-objection to TORs for consultancies and contracts to be performed under the project and to CVs and technical proposals shortlisted by the CHPC for key project positions, goods, minor works, and services to be financed by GEF resources;
- supported by the FAO Project Task Manager, review and clear final technical products delivered by consultants and contract holders financed by GEF resources before the final payment can be processed;
- assist with review and provision of technical comments to draft technical products/reports on request from the CHPC during project execution;
- review and approve project progress reports submitted by CHPC to the FAO Representation in Ecuador in coordination with the FAO Project Task Manager;
- support the FAO Project Task Manager in reviewing, revising and giving no-objection to annual work plans and budgets submitted by the CHPC and to be approved by the Project Directive Committee;
- prepare the annual Project Implementation Review report, supported by the FAO Project Task Manager and inputs from the CHPC, to be submitted for clearance and completion by the GEF Coordination (TCI) which will subsequently submit the PIR to the GEF Secretariat and Evaluation Office as part of the Annual Monitoring Review report of the FAO-GEF portfolio. The LTU must ensure that CHPC has provided information on co-financing provided during the course of the year for inclusion in the PIR;
- field at least an annual project supervision mission or more frequently as needed;
- review and give no-objection to the TORs for the mid-term evaluation, participate in review mission including the mid-term workshop with all key project stakeholders, development of an eventual agreed adjustment plan in project execution approach, and supervise its implementation supported by the FAO Project Task Manager

4.2.2 Executing Partner

CHPC will be the project Executing Agency directly responsible for technical implementation of project activities, day-to-day monitoring as well as financial management and purchase of goods, minor works, and services (procurement) in accordance with rules and procedures as established in the Project's Operational Manual (see section 3.8.1 above). CHPC will enter into an Execution Agreement with FAO allowing for the purchase of goods, minor works, and services needed to execute the project.. FAO will ensure that the rules and procedures set out in the Project's Operational Manual are acceptable in accordance with FAO rules and regulations and GEF minimum fiduciary standards, and CHPC will follow in particular rules defined in the Execution Agreement. The Execution Agreement will outline in details the roles and responsibilities of CHPC and procedures with respect to financial management, procurement, recruitment, project progress reporting, financial reporting and audit, copyright, and other legal aspects of collaboration.

The institutional arrangements for project implementation provide for the use of the existing structure within the CHPC, thereby avoiding the creation of new ones, such as a project implementation unit. The technical implementation of the GEF project will be under the Environment Unit. Regular staff of this Unit and of other Directorates and Units at the executive, advisory, support and operational levels in the CHPC will assume specific responsibilities under project execution and will be supported by external specialists (a project technical coordinator, a financial accounting assistant and a procurement assistant) to be hired financed by GEF resources that will strengthen the CHPC's capacity to comply with all FAO rules and procedures under the execution of the GEF funds.

CHPC will jointly execute the GEF project and the co-financing PIDD programme financed by the World Bank using the same financial management, output and outcome monitoring, and procurement systems and procedures as established in the Project's Operational Manual and adjusted to FAO Rules. As mentioned in section 3.8.1 above the World Bank has supported CHPC in the successful implementation of an action plan to strengthen execution and project management capacities and mitigate any fiduciary risks including implementation of a financial management information platform, a project planning and monitoring system based on the project's Results Framework, and procurement (goods, minor works, and services) standards and procedures in compliance with World Bank policies and norms.² In the Project's Operational Manual for the FAO-GEF project these standards and procedures will be adjusted to FAO rules.

CHPC will submit quarterly statements of expenditures, procurement and contract documentation, and disbursement requests based on a detailed budget for the following quarter, and annual audited financial statements to the FAO Representation in Ecuador. Further, CHPC will prepare and submit to the FAO Representation Project Progress Reports, annual Work Plans and budgets, and all documentation needed for the preparation of the annual PIR (see section 6.4 below).

Project Directive Committee (PDC): The PDC is the same committee operating under the PIDD programme. The PDC will make decisions on the overall management of both projects. The Provincial Prefect will preside over the PDC, which will be composed of eleven additional members (3 members of the Provincial Council that will rotate their participation on an annual basis); Coordinators of the Divisions of (i) Public Works, (ii) Environment, and (iii) Finance (3 in total); and 3 representatives of the Provincial's Participatory Budget Forums (that will rotate their participation on an annual basis),³ which represent the civil society across the key sectors attended by the project (irrigation, roads and environment). In addition, in all aspects concerning the GEF project three additional members will be included in the PDC: the director of the regional office of the Ministry of Environment in Chimborazo, 1 representative from the Organizations co-financing the project and one representative from FAO as the GEF Agency. The PDC will be responsible for maintaining the strategic focus of the project as for specific operational tasks.

Project Coordination: The Project General Coordinator (PGC) will be the coordinator of the Environment Unit who will work closely with the Coordinator of the Division of Public Works who is the Coordinator of the PIDD Project, in order to secure a good coordination between these two operations.

Project Technical Coordinator (PTC): The PTC will work under the direct supervision of the Project General Coordinator and will lead the Project's Technical Team (PTT). The PTC supported

² These norms are very similar to the norms established in the Ecuadorian public contracting law "Ley Orgánico del Sistema Nacional de Contratación Pública" which in its article 3 allows for the use of norms of international organisations in cases where these organisations are providing project or programme resources.

³ The Participatory Budget (PB) is an innovative tool utilized by the CHPC which is a participatory methodology involving peasant and indigenous organizations, non governmental organizations, community leaders, CHPC staff, Provincial Counselors and Parroquial Boards to define prioritize and supervise programs, plans and projects to be financed by the CHPC in each budget cycle. The PB methodology is based on input from sectoral forums (irrigation, roads, environment, tourism, education, health and poverty) which are composed of representatives of municipalities, sectoral experts, NGOs, Second Tier Organizations and of parroquial boards. The forums assess the technical proposals to be presented to the PB Provincial Assembly (an extraordinary session of the Provincial Council), and nominate one forum representative per sector to attend the Provincial Assembly. The PB is a governance tool to promote and consolidate the participatory democracy and social responsibility in Chimborazo as a general practice.

by the PTT will be responsible for the overall planning and coordination of the implementation of all project activities, including: (i) the preparation and follow-up on Annual Work Plans and procurement plans; (ii) the eventual update in Project's Operational Manual (POM) to be cleared by FAO; (iii) disbursements and financial execution; (iv) supervision of procurement (goods and services) procedures; (v) managing a financial information system to track project accounting and disbursements; (vi) manage a contract information and project results system to monitor implementation and project results; (vii) the preparation of monitoring and project progress reports to be presented to the Environmental Unit for their assessment and submitted to FAO and provision of any project related information required by FAO and/or GEF; (viii) the preparation of all contractual arrangements and institutional agreements needed to execute project activities at the provincial and local level; (ix) the preparation and development of project supervision missions and mid-term evaluation mission of the FAO; (x) develop and supervise the implementation of the work plans of all PTT members; (xi) ensure that CHPC has arranged for annual external audit of the project and that the audit reports are provided to FAO in a timely manner; (xii) the facilitation of the preparation and implementation of training/capacity building events; (xiii) make sure that the appropriate approaches are followed during project implementation (participatory and integrated approaches, multi-stakeholder participation, etc.); and (xiv) convene on a regular basis meetings of the PTT in order to coordinate activities, exchange lessons learned and harmonize approaches.

Project Technical Team (PTT): The project will not create a project implementation unit. Instead it will operate through a Project Technical Team (PTT) composed of external experts hired by the Project to strengthen the CHPC's institutional capacity to execute the project. This team will be directly supervised by the PTC. Regular staff of the CHPC located in several Directorates and Units will provide additional technical support and will be fully involved in project implementation. The PTT will be composed by 3 external consultants contracted by the project financed by GEF resources, as follows: one Andean agro-ecosystem specialist, one watershed land use planning and NRM specialist; and one social specialist (community promotion/ communication and workshop facilitator). The project will share procurement and financial management specialists with PIDD Project. The PTT will: (i) undertake the operational implementation of the project under the coordination of the PTC; (ii) prepare the Annual Work Plans and budgets, the procurement plans, and the project progress reports; (iii) provide coordinated technical advice maximizing synergies between all project activities; (iv) facilitate all procurement (goods and services) processes required under project implementation; and (v) provide all required information and reports requested by the PDC, PTC and by the FAO.

The Ministry of the Environment (MAE): MAE will be responsible for the technical execution of component 2 strengthening the management and conservation of the Chimborazo Nature Reserve. MAE operates each protected area in the National PA system including the Chimborazo Reserve under decentralized arrangements through provincial offices. Each protected areas office is staffed with a Biodiversity Leader, a Manager, and park guards. The first two are the ultimate responsible for planning, budget allocation and the implementation of the Annual Operational Plans⁴. For this particular project, MAE will participate through the office located in Riobamba. The administration of funds for component 2 will be fully under CHPC, thus, there will be no transfer of funds to MAE for the implementation of the activities in the Chimborazo Reserve. However, the Reserve's staff, in coordination with the Environment Unit, PDC and the PTT, will help to plan, supervise and monitor the overall design and implementation of such activities and their outputs. To clearly set up the roles and responsibilities, prior to declaring the project operational CHPC and MAE will sign an

⁴ The annual operational plan is a tool developed by MAE at each protected areas to implement agreed activities following the priorities of the protected areas management plans.

inter-institutional agreement (or memorandum of understanding (MOU)), which will detail the activities to be implemented, allocation of funds and the planning, implementation, supervision and monitoring roles during the execution of component 2. This agreement will be integrated in the Project's Operational Manual. This agreement will also spell out the safeguard issues to be observed under the different activities supported by the project.

The Provincial Environment Working Group (PEWG) recently established and led by the CHPC, will oversee and provide technical guidance on project overall implementation in close coordination with the PDC, PTC and PTT. Periodically the PEWG will review project implementation progress and report to the Provincial Prefect and heads of CHPC's Directorates.

At the local level, particularly under Component 1 and 2 of the project, **Beneficiary Community and/or Indigenous Organizations (BCIO)** will be responsible for the implementation and monitoring in the field of the local CES agreements, improved land use demonstrative projects, co-management projects of the Chimborazo Reserve, and other priority activities identified under the micro-watershed management plans. Based on the weak institutional, technical and administrative characteristics of the majority of BCIOs, the PTT will provide technical assistance and support, among other aspects: (i) the preparation of management plans through an ecological land use planning process and (ii) the implementation of the pilot/demonstrative projects.

5 FINANCIAL PLANNING MANAGEMENT AND REPORTING

5.1 Financial planning

The total cost of the project will be USD 10.31 million, to be financed through a USD 3.87 million GEF grant and USD 6.44 million in co-financing from: (i) The IBRD Chimborazo Productive Investment (PIDD) Programme (USD 3.2 million); (ii) the CHPC (USD 2.23 million); (iii) the Ministry of Environment (USD 0.66 million); iv) Ecuadorian NGOs (USD 0.25 million); and v) local communities and organizations (USD 0.1 million). Table 1 below shows the cost by component and outputs and by sources of financing and table 2 shows the sources and type of confirmed co-financing. The FAO will, as the GEF Agency, **only be responsible** for the execution of the GEF resources.

Table 1 Project cost by component and subcomponent

Component/output	PIDD/WB	CHPC	MEA	Others	GEF	Total	%
Component 1: Conserving the páramos and related highland ecosystems	3,000,000	1,495,000	-	280,000	2,344,570	7,119,570	69
1.1 and 1.3 Watershed management plans		95,000		167,000	396,375	658,375	6
1.2 Implementation of management plan's priority actions and community training		1,100,000		93,000	1,666,000	2,859,000	28
1.4 Improved irrigation systems	3,000,000	300,000		5,000		3,305,000	32
1.5-7 CES pilot				15,000	282,195	297,195	3
Component 2: Priority actions to strengthen the management and conservation of the National Fauna Reserve of Chimborazo	-	-	657,600	10,000	718,875	1,386,475	13
2.1 National management plan for vicuña			121,000			121,000	1
2.2 Constructions in the Chimborazo Reserve			393,000		245,000	638,000	6
2.3 Studies of the Chimborazo Reserve and buffer zones			20,000		94,500	114,500	1
2.4 Implementation of co-management activities				10,000	195,475	205,475	2
2.5 Management and use of vicuña			123,600		183,900	307,500	3
Component 3: Strengthening of CHPC capacities in natural resource management with focus on the páramos	-	165,000	4,000	60,000	423,455	652,455	6
3.1 CHPC staff trained in NRM		60,000		48,400	42,500	150,900	1
3.2 CHPC strengthened in NRM policies and regulations		45,000	1,000	11,600	78,455	136,055	1
3.3 Provincial NRM ordinances developed		45,000	1,000		77,000	123,000	1
3.4 NRM monitoring system		15,000	2,000		225,500	242,500	2
Project management	200,000	570,000			383,100	1,153,100	11
Total	3,200,000	2,230,000	661,600	350,000	3,870,000	10,311,600	100

Table 2 Sources of confirmed co-financing

<i>Name of Co-financier (source)</i>	<i>Classification</i>	<i>Type</i>	<i>Project USD</i>	<i>%</i>
World Bank PIDD	Multilateral	Loan	3 200 000	50 %
Provincial Government of Chimborazo	Local government	In-kind	791 000	12 %
Provincial Government of Chimborazo	Local government	Cash	1 439 000	22 %
Ecociencia	Local NGO	In-kind	100 000	2 %
Ministry of Environment	Government	In-kind	274 600	4 %
Ministry of Environment	Government	Cash	387 000	6 %
COMICH	Local NGO	In-kind	150 000	2 %
Local beneficiaries	Beneficiaries	In-kind	37 000	1 %
Local beneficiaries	Beneficiaries	Cash	63 000	1 %
Total Co-financing			6 441 600	100 %

5.2 GEF input

The GEF contribution to the project will be used to support activities that produce global environmental benefits and cannot be adequately funded by local stakeholders at present. These activities will complement the PIID/WB, inputs to the project, which will be more focused on increasing the efficiency in water use to increase agriculture production and improved access to markets for farmer's products.

A major part of the contribution will be used for demonstration projects of biodiversity conservation practices based on participatory land use planning and watershed management processes and sustained by improved economic situation of the local communities and by CES schemes. This input will have significant importance for the adoption of conservation practices by Communities and/or indigenous organizations such as substituting non camelid livestock with llamas and alpacas grassing in the páramos; protection of slopes and areas around headwaters below the páramos, soil conservation and water harvesting measures; conservation and use of local agro-biodiversity to increase food sovereignty and the use of conservation agricultural practices.

The GEF contribution will also complement investments in infrastructure and management of the Chimborazo Reserve by the Ministry of Environment and initiatives to obtain better financial sustainability of the conservation of the Reserve highland ecosystems through co-management with local communities and benefit sharing of incomes generated from commercialization of vicuña fibres and tourist product and services.

5.3 Government inputs

The Ministry of Environment has confirmed co-financing amount to USD 661 600, 10 percent of the total co-financing for the project. This amount will mainly cover the National Management Plan of Vicuña, part of the vicuña management programme in the Reserve, and part of the infrastructure investments. MAE will also provide in-kind contributions in terms of staff time from Park personnel.

The CHPC will contribute with more than USD one million in cash mainly for materials and equipments for the demonstration conservation projects in the selected micro-watersheds and staff

for project management and administration and for strengthening the provincial natural resource management with focus on the páramos ecosystems. CHPC will also provide in-kind contributions in terms of the provincial Government's GIS systems, design studies for irrigation systems, and office space and facilities for project management. The total CHPC contributions amount to USD 2.23 million, 34 percent of the total co-financing for the project.

5.4 Other co-financing inputs

The PIDD/WB Programme will contribute with USD 3.2 million in cash, 50 percent of the total co-financing, to finance small irrigation systems optimizing the efficiency in the use of water resources and project management services. Two Ecuadorian NGOs, Ecociencia and COMISH will provide USD 0.1 million and USD 0.15 million respectively to finance community planning and NRM processes, community conservation activities, training and technical assistance. The local beneficiaries, BCIOs, will provide USD 0.1 million in-kind in terms of sharing of local information and data and labor, and in cash for materials needed in conservation activities.

5.5 Financial Management of and reporting on GEF resources

Financial management and reporting in relation to the GEF resources will be carried out in accordance with FAO's rules and procedures and as described in the Execution Agreement between FAO and CHPC. In accordance with the project budget, FAO shall provide cash advances in US dollars up to the total of USD 3 870 000.

CHPC shall provide project execution services in accordance with regulations, rules and procedures as defined in the Project's Operational Manual and the Execution Agreement to ensure that the project funds are properly administered and expended. CHPC shall maintain a project account for the funds received from FAO in accordance with accepted accounting standards.

Financial statements and reporting

All financial reporting shall be in US dollars, and any exchange differences accounted for within the GEF-approved US dollar project budget. Within one month of the end of each quarter, i.e. on or before 31 April, 31 July, 31 October and 31 January, CHPC shall submit quarterly statements of expenditure of GEF resources to the FAO Project Task Manager.

The purpose of the financial statement is to list the disbursements incurred on the project on a quarterly basis so as to monitor project progress and to reconcile outstanding advances during the quarter. The financial statement shall contain information that forms the basis of a periodic financial review and its timely submission will be a prerequisite to the continued disbursements of funds to CHPC.

CHPC shall prepare annual financial reports on the use of the GEF resources to be submitted with the annual Project Progress Report, showing amount budgeted for the year, amount expended since the beginning of the year, and separately, the un-liquidated obligations (commitments) as follows:

1. Details of project expenditures on an output-by-output basis, reported in line with project budget lines as set out in the project budget included in the Project Document annex 2, as at 31 December each year.
2. A final statement of account in line with the project budget included in the Project Document annex 2, reflecting actual final expenditures under the project, when all obligations have been liquidated.
3. An annual budget revision will be prepared for review and clearance of the FAO Representation in Ecuador, LTU, and the GEF Coordination. The budget revision will be posted in the FPMIS by the GEF Coordination.

These financial reports are submitted by the CHPC to the FAO Representation in Ecuador and reviewed by the FAO Representative and Project Task Manager and monitored by the LTU and FAO GEF Coordination.

Financial reports for submission to the donor (GEF) will be prepared in accordance with the provisions in the GEF Financial Procedures Agreement and submitted by the FAO Finance Division (CSFE).

Disbursements of Funds

FAO shall transfer the amount of **USD 3 870 000**, of GEF funds payable in instalments as outlined below, to CHPC to carry out the GEF financed project activities as described in this Project Document. CHPC shall prepare and submit to FAO together with the Annual Work Plan a detailed budget to facilitate the predictability of the needed funds for the year. The first instalment of USD 387 000 (10 percent of the approved GEF amount) shall be advanced to CHPC within two weeks following signature of the Execution Agreement.

Subsequently, CHPC shall prepare and submit to FAO disbursement requests based on a detailed work plan and budget for the following quarter together with the quarterly statements of expenditures of GEF resources. The second and subsequent instalments shall be advanced to the CHPC within two weeks upon submission of a satisfactory financial statements of expenditures report, project progress reports (see section 6.4 below), and work plan and budget for the following quarter. The FAO Representative in Ecuador supported by the FAO Project Task Manager should certify that reporting requirements under the terms of the Execution Agreement have been met and that project progress reports for the activities completed have been submitted to and accepted by FAO as showing satisfactory management and use of GEF resources. Reports should be submitted to the LTU, and the GEF Coordination for review. All reports should be posted on the FPMIS.

Responsibility for Cost Overruns

CHPC shall utilize the GEF project funds in strict compliance with the project document. CHPC shall be authorized to make variations not exceeding 10 percent on any total output budget line of the project budget provided that the total allocated for the specific budgeted project component is not exceeded. Any variations exceeding 10 percent on any total output budget line, that may be necessary for the proper and successful implementation of the project, shall be subject to prior consultations with and approval by FAO. In such a case, a revision to the FAO-GEF budget in the project document should be prepared by CHPC and approved by the FAO Representation in Ecuador, the LTU and the GEF coordination. Cost overruns shall be the sole responsibility of CHPC.

Audit

CHPC will ensure external audit of its accounts and records in relation to activities and expenditures related to the project. The audit reports will be provided to FAO and may be shared with the GEF Trustee if this is requested. CHPC shall submit to FAO an annual audited statement of accounts of the organization within six months following the completion of each annual accounting period during the project.

6 OVERSIGHT, MONITORING, EVALUATION AND REPORTING

Monitoring and evaluation of progress in achieving project results and objectives will be done based on the targets and output and outcome indicators established in the Project Results Framework (Annex 1). The project's M&E system will be put in place during the first 6 months of project implementation and will feed back into project implementation. This system will be housed within CHPC's Directorate of Planning, which carries out the M&E functions for CHPC. Technical assistance for the design and administration of the project M&E system, training, and procurement of equipment to administrate the information system will be provided.

The M&E system will be structured in a way that combines traditional on-going monitoring of project activities, external/participatory impact evaluations and social accountability mechanisms (veedurías ciudadanas). The monitoring and evaluation system will also facilitate learning and generation of knowledge necessary for the replication of highland ecosystem and biodiversity conservation approaches including CES mechanism in other micro-watersheds in the Province and in the Andean region. The project Monitoring and Evaluation Plan has been budgeted at USD 189 100.

Beside the project monitoring and evaluation system, a natural resource management monitoring system will be designed and implemented in at least 3 sub-project sites to monitor on-the-ground impacts of conservation practices on the status of biodiversity and natural resources as part of component 3 budgeted at USD 225 500. Monitoring of compliance and service delivery within CES mechanisms will be conducted within each mechanism by means appropriate to the situation, which may rely on the broader M&E of NRM in the province, or may be through specific local arrangements. CES mechanisms rely on monitoring of land-user compliance with their conservation contracts, as payments are conditional, and on monitoring of service delivery (usually by the service users themselves), as payments by service users are also conditional on their receiving the desired services. Appropriate M&E arrangements will be developed as part of the design process for each pilot CES mechanism as part of component 1 budgeted at USD 130 000. Both the natural resource management monitoring system and the M&E arrangement for the CES mechanism will feed data into the project M&E system.

6.1 Indicators

The project indicators are selected to both capture progress in capacity building in biodiversity conservation, land use planning and NRM and on-the-ground impacts of conservation measures and management practices. Progress in capacity building will be monitored via process and institutional indicators capturing tools developed (monitoring system of natural resource management; micro-watershed management plans; CES contracts signed and under implementation; Chimborazo Reserve studies and co-management plans; vicuña management plan, and provincial NR conservation ordinances or other appropriate legal instruments) and levels of created capacities (communities with operating watershed management committees; communities trained in land use planning and NRM and adopting conservation practices; CHPC and local organization staff trained in policies, regulations, methodologies and instruments for development and sustainable management of natural resources using a watershed approach).

On-the-ground impact indicators will capture socioeconomic aspects (increased income generated from vicuña fibres and tourist products and services for the local communities; and increase in food sovereignty in communities involved in sub-projects) as well as decrease in threats on biodiversity and highland ecosystems (ha of páramo and its areas of influence under threat in the Chimborazo Province under improved NRM; ha of the Chimborazo Reserve with improved management effectiveness measured by the GEF SP1 Tracking Tool; biomass (photosynthetic and non

photosynthetic) and necromass per m² in the Chimborazo Reserve and its buffer zone; the number of native grass species in the Chimborazo Reserve and its buffer zone and encroachment rate of the páramos in the Chimborazo Reserve and grassing of non-camelid livestock in the páramos). With the participation of local communities, a baseline will be established in the case of each sub-project to allow for the monitoring of these indicators and other on-the-ground impact indicators adequate for each conservation intervention. This monitoring will be supported by the natural resource management monitoring system.

6.2 Evaluations

An independent mid-term evaluation will be undertaken at the beginning of the third year of project implementation. The evaluation will determine progress being made towards achievement of objectives, outcomes, and outputs, and will identify corrective actions if necessary. It will, *inter alia*:

- a) review the effectiveness, efficiency and timeliness of project implementation;
- b) analyze effectiveness of implementation and partnership arrangements;
- c) identify issues requiring decisions and remedial actions;
- d) identify lessons learned about project design, implementation and management;
- e) highlight technical achievements and lessons learned; and
- f) propose any mid-course corrections and/or adjustments to the implementation strategy as necessary.

An independent final evaluation will take place three months prior to the terminal review meeting of the project partners and will focus on point d and e listed above. In addition, the final evaluation will review project impact, analyze sustainability of results and whether the project has achieved its environmental and development objectives. The evaluation will furthermore provide recommendations for follow-up actions. Some critical issues to be emphasized in both the mid-term and the final evaluations will be:

- i. representation and the level of participation of female as well as male farmers in watershed planning processes and the implementation of sub-projects for conservation practices;
- ii. level of understanding among local communities of the services provided by the highland ecosystems including the páramos and measures and practices for the conservation of these services;
- iii. quantity of communities involved in highland ecosystem conservation and their adoption of biodiversity and NR conservation technologies and practices, and improvements in their food sovereignty and income generation;
- iv. reduction in encroachment on the Chimborazo Reserve and grassing of non-camelids livestock;
- v. level of awareness and involvement of local communities in co-management activities of the Reserve;
- vi. sustainability of the management and business approach to commercializing vicuña fibre and tourist products and services and the level of income generated;
- vii. level of strengthened NRM capacities in the CHPC;
- viii. level of application of NR conservation ordinances in beneficiary communities; and
- ix. implementation of the natural resource monitoring system and how the generated information is used by the CHPC to strengthen NRM in the province.

Draft Terms of Reference (TOR) for the Mid-term and Final Evaluation will be prepared by CHPC and finalized in close consultation with the FAO Project Task Manager in the FAO representation in Ecuador, the FAO LTU, the GEF Coordination, and under the ultimate responsibility of the FAO

Office of Evaluation, in accordance with FAO evaluation procedures and taking into consideration evolving guidance from the GEF Evaluation Office.

6.3 Monitoring Responsibilities and Information Sources

Monitoring of project progress and outcomes will be a central function of the CHPC Project Technical Team lead by the Project Coordinator and will be supported at the country level by the FAO Project Task Manager. Specific monitoring tasks will be defined in the Annual Work Plan (AWP).

Indigenous and local communities will also be involved in the monitoring and evaluation process. Various processes are used to actively engage community members in monitoring and evaluating the impacts on the conservation of natural resources and highland ecosystems within each micro-watershed. The communities will be involved in the identification of indicators to monitor the progress in implementation of watershed management plans and collection of base line and periodic monitoring of impact indicators on biodiversity and NR conservation adjusted to the specific conservation practices and threats identified in each watershed during the planning process.

Monitoring information sources will be evidence of outputs (reports, watershed management plans and Chimborazo Reserve co-management plans, lists of participants in participatory planning and training activities, CES contracts, provincial NR conservation ordinances etc.). To assess and confirm the congruence of outcomes with project objectives, physical inspection and/or surveying of activity sites and participants will be carried out. This latter task will be undertaken by the CHPC Project Technical Team supported by the FAO Project Task Manager. Under the guidance of the Project Technical Team and with participation local communities collection of baseline data will be carried out and compiled into a base document for each sub-project in accordance with the indicators established to monitor on-the-ground impacts of conservation practices being applied. By the end of each sub-project data to monitor the development in the performance and impact indicators will be collected by local communities supported by project staff. However, in some cases it will only be possible to evaluate on-the-ground impacts 1-3 years after project termination.

6.4 Reporting Schedule

Specific reports that will be prepared under the M&E program are: (i) project inception report; (ii) Annual Work Plan and Budget (AWP/B); (iii) Project Progress Reports (PPRs); (iv) quarterly project implementation reports (QPIRs); (v) annual project implementation review (PIR); (vi) technical reports; (vii) co-financing reports; and (viii) terminal report.

Project Inception Report:

After FAO approval of the project and signature of the Execution Agreement an inception workshop will be held. Immediately after the workshop, CHPC will prepare a project inception report in consultation with the FAO Project Task Manager and other project partners. The report will include a narrative on the institutional roles and responsibilities and coordinating action of project partners, progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation. It will also include a detailed First Year Annual Work Plan and Budget (AWP/B) and a plan with all monitoring and supervision requirements. The draft report will be circulated to FAO and the Project Directive Committee for review and comments before its finalization.

Annual Work Plan and Budget (AWP/B):

CHPC PTT will submit to the FAO Representation in Ecuador an Annual Work Plan and Budget which will be divided into monthly timeframes detailing the activities and progress indicators that

would guide implementation during the year of the Project. As part of the AWP/B, a detailed project budget for the activities to be implemented during the year should be included together with all monitoring and supervision activities required during the year.

Project Progress Reports

CHPC PTT will submit to the FAO representation in Ecuador Project Progress Reports which are used to identify constraints, problems or bottlenecks that impede timely implementation and take appropriate remedial action. PPRs will be prepared based on the systematic monitoring of output and outcome indicators identified in the project Results Framework. The FAO Project Task Manager will review the progress reports and submit them to the Lead Technical Unit (LTU) for approval and subsequently to the GEF Coordination for information.

The yearly project progress reporting cycle consists in:

1. A simple 1-2 page first quarter progress report covering the period from 1 January – 31 March and to be submitted no later than 30 April
2. A 8-12 pages six monthly progress report covering the period 1 January – 30 June and to be submitted no later than 31 July
3. A simple 1-2 page third quarter progress report covering the period from 1 July – 30 September and to be submitted no later than 31 October
4. A detailed end of the year progress report covering the period 1 January - 31 December and to be submitted no later than 31 January. This report should accompany the following year's draft annual work plan and budget (AWP/B), for review and no-objection by FAO. This will be done no later than the end of February. The annual PPR will serve as the main input to the Project Implementation Review (PIR) to be prepared by the LTU supported by the FAO Project Task Manager.

Quarterly Project Implementation Reports

The FAO Project Task Manager, with inputs from CHPC Project Progress Reports and supervision activities will prepare quarterly reports which entail regular review of the project to compare approved work plans with actual performance, and to take corrective action as required.

Project Implementation Review

The LTU supported by the FAO Project Task Manager, with inputs from CHPC/PTT, will prepare an annual Project Implementation Review (PIR). The PIR will be submitted to the GEF Coordination in TCI for review and approval. The GEF Coordination will submit the final report to the GEF Secretariat and Evaluation Office as part of the Annual Monitoring Review report of the FAO-GEF portfolio.

Technical Reports

Technical reports will be prepared to document and share project outcomes and lessons learned. The drafts of any technical reports must be submitted by CHPC/PTT to the FAO Representation in Ecuador who will share it with the LTU and the GEF Coordination for review and clearance, prior to finalization and publication. Copies of the technical reports will be distributed to the Project Directive Committee and other project partners as appropriate. These will also be posted on the FAO FPMIS.

Co-financing Reports

CHPC will be responsible for collecting the required information and reporting on in-kind co-financing provided by CHPC, MEA, local NGOs, the PIDD/WB Programme and local beneficiaries. CHPC will provide the information in a timely manner and will transmit such

information to FAO. The report is to be considered as part of the annual PPR in the year the mid-term evaluation takes place and again as part of the annual PPR in the final project year.

Terminal Report

Within two months of the project completion date CHPC will submit to FAO a draft Terminal Report, including a list of outputs detailing the activities taken under the Project, “lessons learned” and any recommendations to improve the efficiency of similar activities in the future. This report will specifically include the findings of the final evaluation as described above. A final project review meeting is expected to take place mid 2015.

Table 2 below provides a summary of the main M&E reports, responsible parties and timeframe.

6.5 Monitoring and Evaluation Plan Summary

Type of M&E activity	Responsible Parties	Time-frame
Inception Workshop	CHPC/PTT, FAO Project Task Manager, LTU, GEF Coordination (TCI), FAO Representation Ecuador	Within two months of project start up
Project Inception Report	CHPC/PTT, FAO Project Task Manager, LTU, GEF Coordination (TCI)	Immediately after workshop
Field based impact monitoring	CHPC/PTT, local beneficiary communities, farmers	Continually
Quarterly Project Implementation Reports - QPIR	FAO Project Task Manager with inputs from CHPC PMU	Quarterly
Project Progress Reports - PPRs	CHPC/PTT	Quarterly, semi annual and annual (see above)
Project Implementation Review - PIR	LTU, FAO Project Task Manager	Annual
Cofinancing Reports	CHPC/PTT	At mid-term and at end of project based on annual tracking of co-financing execution
Steering Committee Meetings		Twice a year
Technical reports	CHPC/PTT, FAO Project Task Manager, LTU	as appropriate
Supervisory visits to project and field sites	FAO Project Task Manager, LTU	Yearly or as required
Mid-term evaluation	CHPC/PTT, FAO Project Task Manager, LTU in consultation with the project team and other partners	At mid-point of project implementation
Final evaluation	External Consultant, FAO independent evaluation unit in consultation with the project team and other partners	At the end of project implementation
Terminal Report	CHPC/PTT, LTU, FAO Project Task Manager	At least one month before end of project

6.6 Communication and Visibility - Analysis and dissemination of project results

The results of the project and the lessons learned from the work in the five watersheds promise to be very diverse and rich. Particular attention will be paid under this sub-component to capture and document the lessons learned, to analyse and synthesise them, to upscale them for the provincial level and to disseminate them. A dedicated project website and a regular newsletter will be key instruments for the dissemination of lessons learned. In addition, the lessons learned will be used to formulate recommendations for national level strategies and policies for the conservation of the páramos in a watershed management context, specified according to different ecological zones of the Ecuadorian Andes. In addition to this analysis and dissemination of lessons learned, the formal reports to FAO and other relevant partners as well as the inputs for the mid-term and final project evaluations will be produced and submitted under this sub-component.

ANNEXES

Annex 1: Results Framework

Impact	Baseline 2010	Outcome indicators
<p>Global Environment Objective to conserve and sustainably manage the Chimborazo's páramos and the biodiversity of the mountain ecosystems and to improve local livelihoods through strengthening of necessary policy, legal and institutional frameworks and local awareness, capacities and incentives for participation in planning and sustainable natural resource management</p>	<p>Limited community management of NR and reforestation with native species (Los Atapos and Rio Chimborazo Watershed communities), CES system non existent</p> <p>50% management effectiveness</p> <p>Ordinance for the sustainable management of Chimborazo's páramos exists but is not applied, no NR monitoring system exists</p>	<p>58,000 ha of páramo and its areas of influence under threat⁵ in the Chimborazo Province under improved NRM (sustainable agricultural practices, areas under local CES systems, and increased reforested areas with native species)⁶.</p> <p>Coverage through natural regeneration and/or reforestation with native species along watercourses is increased by 20% in the project intervention area.</p> <p>56,000 ha of the Chimborazo Reserve with improved management effectiveness (from 50% to 70% by the end of the project using the GEF SP1 Tracking Tool).</p> <p>The number of native grass species maintained or improved in the Chimborazo Reserve and its buffer zone (85 species in 2009)</p> <p>Biomass (photosynthetic and non photosynthetic) and necromass per m² maintained or increased in the Chimborazo Reserve and its buffer zone by the end of the project (baseline to be established in representative m² samples in year 1)</p> <p>Provincial Government capable of supervising and promoting the sustainable management of natural resources and biodiversity conservation in the Province (4 provincial NR local norms approved and applied by 90% of the local communities involved in the project; NR monitoring systems operational for three selected project sites and the monitoring information generated is systematically used to plan supervision activities and community awareness raising and capacity building)</p>
<p>Project Development Objective to reestablish and sustainably use the agro-biodiversity and the páramos ecosystems and to improve food sovereignty of the local indigenous population dependent on Chimborazo's mountain ecosystems applying modern watershed management approaches.</p>	<p>More than 25 communities of Chimborazo are involved in the projects Runa Kawsay, PASSE, PPD, and P.R. Bioandes promoting conservation and use of agro-biodiversity for food security. In some cases the participating communities are managing micro-watersheds but there is no systematic approach towards the conservation of the páramos and NRM. Other communities (Zula and Guasuntos) have initiated community management of the páramos however they lack compensation mechanism to sustain their efforts.</p> <p>A few communities are generating some income from selling alpaca wool products to tourists visiting the Chimborazo Fauna Reserve. No income from vicuña fibers.</p>	<p>Three years after the end of the project 30 communities and/or indigenous organizations has adopted and are benefiting from conservation practices (substituting non camelid livestock with llamas and alpacas grassing in the páramos; protection of slops and areas around headwaters below the páramos with native species; application of soil conservation and water harvesting technologies; conservation and use of local agro-biodiversity to increase food sovereignty and the use of conservation agricultural practices)</p> <p>Vicuña fibers and tourist products and services generating USD250,000/year in total income for the local communities and for the conservation of the Chimborazo Fauna Reserve three years after the end of the project</p>

⁵ Areas under threat refer to specific sited selected within the Chambo and Chanchán watersheds, not included in the Chimborazo Reserve, holding important extensions of páramos, but under strong pressure and threat due to agricultural frontier expansion and over-grazing.

⁶ Biological impact indicators will also be established and monitored in the implementation of each Micro-watershed management plan. These indicators may included: increase or at least maintenance in water flow in relation to rainfall in the mid and lower part of the watershed, decrease in number of none-camelid livestock grassing in the páramos, reduction in agriculture encroachment on the páramos.

Intermediate outcomes	Intermediate outcome indicators	Assumptions	Use of intermediate outcome monitoring
Component 1: Conserving the páramos and related highland ecosystems			
Communities and/or indigenous organizations adopting conservation practices (substituting non camelid livestock with llamas and alpacas grassing in the páramos; protection of slopes and areas around headwaters below the páramos, soil conservation and water harvesting measures; conservation and use of local agro-biodiversity to increase food sovereignty and the use of conservation agricultural practices) improving their economic situation based on participatory watershed management plans and CES schemes	20 communities by the end of year 3 and at least 30 communities by the end of the project	Communities take ownership of micro-watershed management plans and the willingness to compensate for the conservation of water resources is maintained when concrete CES schemes has to be implemented	<u>Year 1:</u> assess the progress in elaboration of micro-watershed management plans and if needed adjust the scope and methodology as to start implementation of the plans in year 2 and 3. <u>Year 2:</u> assess the progress in selection of pilot compensation scheme and definition of criteria for eligibility, contract conditions, and means of verification as to negotiate contracts and start pilots in year 3 and 4 <u>Year 3 and 4:</u> monitor implementation of management plan priority actions and training activities and redefine approaches if necessary <u>Midterm evaluation:</u> review implementation of management plans priority actions and progress in CES pilots and redefine priorities and training approaches if necessary. Assess the quantity and level of involvement of communities, their adoption of conservation technologies and practices, and improvements in their economic situation, and redefine approaches if necessary
Component 2: Priority actions to strengthen the management and conservation of the National Fauna Reserve of Chimborazo			
Agriculture encroachment of the páramos in the Chimborazo Reserve and grassing of non-camelid livestock in the páramos located in the Reserve stopped by the end of the project. Vicuña fibers and tourist products and services generating at least USD100,000/year in total income for the local communities and for the conservation of the Reserve by the end of the project	50% reduction by the end of year 3, 80% reduction by the end of year 4, no encroachment or grassing of non-camelids livestock by the end of the project USD 15,000/year by the end of year 3, USD 50,000/year by the end of year 4, and USD 100,000/year by the end of the project	Communities take ownership of co-management activities of the Chimborazo reserve. The vicuña fibers market prize stays at around USD 600/kg	<u>Year 1 and 2:</u> assess the progress in baseline studies of the area of the Chimborazo Reserve and the development of co-management plans and if needed adjust the scope and methodologies as to start implementation of priority activities in year 3 <u>Year 3 and 4:</u> monitor implementation of priority surveillance, conservation and sustainable use activities and the level of adoption by local communities and redefine approaches if needed <u>Midterm evaluation:</u> Review implementation of co-management activities, the reduction in encroachment or grassing of non-camelids livestock, the level of awareness and involvement of local communities, the sustainability of the management and business approach to commercializing vicuña fibers and tourist products and services and the level of income generated. Adjust capacity building approaches and participatory methods applied if necessary.
Component 3: Strengthening of CHPC capacities in natural resource management with focus on the páramos			
CHPC has the capacity to issue policy and regulations and to supervise and monitor the management status of natural resources considering biodiversity conservation in the Province.	By the end of year 4, four provincial NR ordinances are approved and applied and M&E system operational in three project sites	CHPC has been empowered in NR Management and its M&E system is institutionalized	<u>Year 1:</u> assess the progress in the gap analysis of NR regulations and the design of the M&E system and if needed adjust the scope and methodologies to allow for development of ordinances or appropriate instruments and implementation of the M&E system in year two. <u>Year 2 and 3:</u> Evaluate the acquired capacities of training beneficiaries and adjust training approach if necessary. <u>Midterm evaluation:</u> Review the level of strengthened capacities in the CHPC, the development and application of ordinances in beneficiary communities and the implementation of the M&E system and how the generated information is used by the CHPC to strengthen NRM in the province. Adjust capacity building approaches if needed.

Arrangements for Results Monitoring

	Baseline	Target Values					Data Collection and Reporting	
		Year 1	Year 2	Year 3	Year 4	Year 5	Data Collection Instruments, Frequency and Reports	Responsibility for Data Collection
Component 1: Conserving the páramos and related highland ecosystems								

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Outputs and targets:								
At least 3 micro-watershed management plans completed for the selected project sites based on needs assessments, participatory land use planning, zoning and priority setting processes.	1 land use plan exists for Rio Chimborazo micro-watershed elaborated with support from Ecociencia which needs to be updated and strengthened in its implementation	2 draft plans	2 plans completed and approved by CPCH and MEA. 1 additional draft plan	3 plans completed and approved by CPCH and MAE			Approved plans, Annual Project Progress Report (APPR)	CHPC and community organizations
100 % of actions given high priority in the management plans implemented	Some actions from the Rio Chimborazo micro-watershed management plan has been implemented including biodiversity management			30%	70%	100%	Verification in the field, management plan annual monitoring report, six monthly Project Progress Report (PPR)	CHPC and community organizations
At least 30 community and/or indigenous organizations trained in sustainable land use planning and natural resource management practices.	Some communities involved in the project Runa Kawsay , PASSE, PPD,and P.R. Bioandes, have received limited training in management of micro-watersheds as part of sustaining the conservation of agro biodiversity. Other communities (Rio Blanco and Cebadas) have received some training in management of micro-watersheds and the páramos.	10	15	20	25	30	Training material and modules used, list of participants in each module, six monthly PPR	CHPC and community organizations
At least 30% of the cultivated surface of the micro watershed covered by the project benefit from improved irrigation systems managed by the users under criteria of efficiency, equity and sustainability in the use of water resources	5%	10%	15%	20%	25%	30%	Verification in the field, PIDDD APPR	CHPC and water users organizations
Compensation value assessment of services conserving the headwaters provided by the mountain	No assessment of the value exists	Assessment completed					Assessment report	CHPC

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communities managing the ecosystems of the upper parts of the micro-watersheds including the páramos								
Identification and analysis of options for water users (irrigation association, hydroelectric power plants) compensation schemes and design of the CES mechanism including criteria for eligibility of beneficiary communities, contract conditions, and means of verification of compliance with conservation services	Compilation of PES/CES experiences from other regions and preliminary identification water users and compensation sources	Identification and analysis of options for compensation schemes	Participatory selection of pilot compensation scheme and definition of criteria for eligibility, contract conditions, and means of verification				Analysis of compensation/payment scheme option report, CES mechanism design report, APPR	CHPC
At least 2 pilot contract prepared and in initial implementation with mountain communities providing conservation services	No contract exists			Negotiation and signature of 2 pilot contracts	Implementation and monitoring of compliance with contracts	Implementation and monitoring of compliance with contracts	Signed pilot contracts, biannual contract monitoring reports, six monthly PPR	CHPC, water users and community organizations
<u>Intermediate outcomes:</u>								
At least 30 communities and/or indigenous organizations involved in conservation practices (including substituting non camelid livestock with llamas and alpacas grassing in the páramos; protection of slopes and areas around headwaters below the páramos, soil conservation and water harvesting measures, conservation and use of local agro-biodiversity to increase food security and the use of conservation agricultural practices) improving their economic situation based on participatory watershed management plans and CES schemes	Communities involved in the project Runa Kawsay, PASSE, PPD, P.R. Bioandes (more than 20) by promoting conservation and use of agro-biodiversity for food security. In some cases the participating communities are managing micro-watersheds but there is no systematic approach towards the adoption of conservation practices. Other communities (Rio Blanco and Cebadas) have initiated community management of the páramos however they lack compensation	5	10	20	25	30	Verification in the field (midterm evaluation and final evaluation), Micro-watershed management plan annual monitoring report, biannual CES contract monitoring reports, APPR	CHPC and community organizations

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	mechanism to sustain their efforts.							
Outcome:								
58,000 ha of páramo and its areas of influence under threat ⁷ in the Chimborazo Province under improved NRM (sustainable agricultural practices, areas under local CES systems, and increased reforested areas with native species). ⁸	Limited community management of NR and reforestation with native species (Los Atapos and Río Chimborazo communities), CES system non existent			25,000 ha	45,000 ha	58,000 ha	Verification in the field (midterm evaluation and final evaluation), Micro-watershed management plan annual monitoring report, biannual CES contract monitoring reports, APPR	CHPC and community organizations
Coverage through natural regeneration and/or reforestation with native species along watercourses is increased by 20% in the project intervention area.	Baseline to be established in year 1			5%	13%	20%		CHPC and community organizations
Component 2: Priority actions to strengthen the management and conservation of the National Fauna Reserve of Chimborazo								
Outputs and targets:								
National Management Plan for Vicuña elaborated and presented to the parties of the Convention for the Conservation and Management of the Vicuña under CITES	A national norm exists but no national management plan. Ecuador has the support of member countries of the Vicuña Convention in the process of change to appendix II, (allowing for using the fibres from the live animal), when an appropriate management plan has been presented to the CITES COP, it is	National Plan developed and presented to the parties of the Convention					Plan document, minutes from meeting of the parties of the convention, APPR	CHPC, MoE

⁷ Areas under threat refer to specific sited selected within the Chambo and Chanchán sub watersheds, not included in the Chimborazo Reserve, holding important extensions of páramos, but under strong pressure and threat due to agricultural frontier expansion and over-grazing.

⁸ Biological impact indicators will also be established and monitored in the implementation of each Micro-watershed management plan. These indicators may included: increase or at least maintenance in water flow in relation to rainfall in the mid and lower part of the watershed, decrease in number of none-camelid livestock grassing in the páramos, reduction in agriculture encroachment on the páramos.

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	noted that a pilot phase is allowed.							
Infrastructure and equipment prioritized in the management plan of the Chimborazo Fauna Reserve constructed (small visitor centre and administrative office, rehabilitation of main trails in the Reserve)	The Technical specifications and drawings of the Visitor Centre exist. Trails are badly maintained and marked	Planning and execution of the rehabilitation and construction works.	Visitor centre and administrative offices finished	Trails rehabilitated			Verification in the field, termination of constructions and trails reports, six monthly PPR	CHPC, MoE
Studies of the Chimborazo Reserve and its buffer zone to lay the ground for the elaboration of co-management plans with the local communities including a complete mapping of vegetation cover and land use including community and private properties inside the Reserve and an evaluation of biophysical and ecosystem capacities (carrying capacities of vicuñas and other camelids, flora y fauna to identify threatened species, and areas with forest vocation).	MoE and Ecociencia mapped part of the vegetation cover and land use in the Reserve in 2009. The CHPC has a GIS system including land use and some vegetation cover in the Chimborazo part of the Reserve. These data needs to be up-dated and complemented to get a complete mapping of the Reserve.	Complete mapping of vegetation cover and land use and an evaluation of biophysical and ecosystem capacities validated with MoE, CHPC and the local communities					Mapping and ecosystem evaluation reports, six monthly PPR	CHPC, MoE
Development and implementation of co-management plans involving at least 10 local communities in conservation and sustainable use of the natural resources in the Chimborazo Reserve and its buffer zone including: sustainable grassing schemes (substituting cattle and sheep livestock with camelids in the páramos); land use zoning and use regulations; conservation of headwaters; inclusion of local communities in surveillance of resources and provision of tourism services.	The Chimborazo Reserve has a general management plan elaborated in 2006, which does not include concrete co-management approaches and activities		Participatory developed co-management plans including prioritized activities and budget for their implementation approved by MoE and local communities	Priority conservation and sustainable use activities implemented with 3 local communities	Priority conservation and sustainable use activities implemented with 7 local communities	Priority conservation and sustainable use activities implemented with 10 local communities	Approved co-management plans, biannual monitoring reports of the implementation of the co-management plans, six monthly PPR	CHPC, MoE, and community organizations
Program for the development of local capacities, provision of equipment and implementation of capture, shearing, processing and marketing of the vicuña fibers from at least 500 vicuñas based on sustainable management of the	Since late 80's where the first 200 vicuña were reintroduced to the Reserve from Peru and Chile the population has grown to 3.200 (2009). There has previously not		Agreement with local communities on roles and responsibilities in the conservation and	Business plan for vicuña fibres developed. Equipment and training provided and 100 vicuñas	Business plan adjusted based on experiences. Equipment and training provided and 300 vicuñas	500 vicuñas sheared and the fiber is processed and commercialized	Approved agreement and business plan, monitoring report of the conservation and sustainable use of	CHPC, MoE, and community organizations

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specie and in accordance with the CITES convention generating economic benefits.	been any harvesting of the fibres, but the population now has a size which allows for this activity which in accordance with the CITES convention should benefit the local communities participating in the conservation of the specie.		sustainable management of the vicuña population, harvesting of the fibers and sharing of the income generated	sheared and the fibres processed and commercialised	sheared and the fibres processed and commercialised		vicuñas, six monthly PPR	
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Intermediate outcomes:								
Agriculture encroachment of the páramos of the Chimborazo Reserve and grassing of non-camelids livestock in the páramos located in the Reserve stopped by the end of the project	Baseline to be established in year 1			50% reduction in encroachments and grassing of non-camelids	80% reduction in encroachments and grassing of non-camelids	encroachments and grassing of non-camelids stopped	Land use mapping and monitoring, APPR, midterm evaluation	CHPC, MoE, and community organizations
Vicuña fibers and tourist products and services generating at least USD100,000/year in total income for the local communities and for the conservation of the Reserve by the end of the project	Some communities are generating some income from selling alpaca wool products to tourists visiting the park. No income from vicuña fibers.			USD 15,000/year	USD 50,000/year	USD 100,000/year	Annual accounts from community micro-enterprises for vicuña fibers and tourism products, APPR, midterm evaluation and final evaluation	CHPC, MoE, and community organizations
Outcome:								
56,000 ha of the Chimborazo Reserve with improved management effectiveness (from 40% to 70% by EOP using the GEF SP1 Tracking Tool).	50% management effectiveness 2010		55%	60%	65%	70%	GEF BD SP1 Tracking Tool filled out during project preparation, at midterm evaluation and by the end of the project.	CHPC, MoE, and community organizations
The number of native grass species maintained or improved in the Chimborazo Reserve and its buffer zone	85 species in 2009	Indicators and baseline established		85 or more		85 or more	Vegetation studie and monitoring, midterm evaluation and final evaluation	CHPC, MoE, and community organizations
Biomass (photosynthetic and non photosynthetic) and necromass per m ² in the Chimborazo Reserve and its buffer zone	Baseline to be established in representative m ² samples in year 1	Baseline established				Baseline maintained or increased	Biomass sample studie; final evaluation	CHPC, MoE
Component 3: Strengthening of CHPC capacities in natural resource management with focus on the páramos								
Outputs and targets:								
At least 20 CHPC and local organization staff have benefited directly from Capacity building/Training program in methodologies and instruments for	Low capacity in NRM and watershed managment	10 staff have received formal training and on-the-job training by participating	15 staff have received formal training and on-the-job training by participating	20 staff have received formal training and on-the-job training by participating	20 staff have consolidated capacities through 2 years on-the-job	20 staff have the required capacities to apply methodologies	Training material and modules used, list of participants in each module,	CHPC

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development and sustainable management of natural resources using a watershed approach.		in the development of Micro-watershed Management Plans and training of local communities in NRM	in development and implementation of the Micro-watershed Management Plans, training of local communities in NRM, and the design and negotiation of the CES scheme	in implementation of the Micro-watershed Management Plans, training of local communities in NRM, and the negotiation of contracts under the CES scheme	training participating in implementation of the Micro-watershed Management Plans, training of local communities in NRM, and the monitoring of the implementation of the CES scheme	and instruments to facilitate the development and sustainable management of natural resources using a watershed approach in the Chimborazo province	six monthly PPR	
CHCP strengthening in their capacity to develop Policy and regulations on NRM considering biodiversity conservation for the Province of Chimborazo.	Low capacities and very limited NRM policy	5 CHCP staff trained in NRM policies and regulation. Draft policy developed	Policy presented to the provincial council for approval				Draft policy, minutes of Council meeting, six monthly PPR	CHPC
At least four provincial ordinances or appropriate instruments considering biodiversity conservation in key sectors (Protection of water springs, forestry, tourism and management of camelids) developed, issued and enforced by the end of the project based on the micro-watershed management plans zoning and use regulations for the selected project sites	Ordinance for water spring protection exists		Regulatory gap analysis completed	Draft ordinances or appropriate instruments on biodiversity conservation in forestry, tourism and management of camelids developed and consulted	Legal instruments on biodiversity conservation in Forestry, tourism and management of camelids Completed and approved	Ordinances or appropriate instruments applied	Approved ordinances/instruments, six monthly PPR	CHPC and provincial stakeholders
Natural resources management monitoring system designed by the end of year two and operating for the project sites by the end of year 4	CHPC has a GIS of the Province including some data on land use and vegetation cover, but no systematic monitoring exists.	M&E system designed	M&E operational in one project site	M&E operational in two project sites	M&E operational in three project sites		M&E system final design report, monitoring reports produced by the system, BPPP six monthly PPR	CHPC

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Intermediate outcomes:								
CHPC has the capacity to issue policy and regulations and to supervise and monitor the management status of natural resources considering biodiversity conservation in the Province.	No NR policy exists, ordinance for water spring protection exists but is not applied, no NR monitoring system exists		NR policy presented to the provincial council		4 provincial NR ordinances or appropriate instruments are applied. M&E system operational in three project sites		Midterm evaluation, APPR	CHPC
Outcome:								
Provincial Government capable of supervising and promoting the sustainable management of natural resources in the Province	Lack of provincial NR ordinances and weak application in the communities. No systematic information on the threats and status of NR is available to support the planning of supervision activities and community awareness raising and capacity building				90% of local communities benefiting from the project know and apply the provincial ordinances or appropriate instruments	Information produced by the M&E system is systematically used to plan supervision activities and community awareness raising and capacity building	Final evaluation, APPR	CHPC

Annex 2: Detailed Budget

Componente 1: Conserving the páramos and related highland ecosystems

Output 1.1: At least 3 sub-watershed management plans completed for the selected project sites based on participatory territorial planning, zoning and priority setting processes. Training of communities in sustainable territorial planning and management

Output 1.2 and 1.3: At least 30% of the priority acts of the management plans implemented. Training of communities and NRM

Output 1.5-7: Compensation value assessment of services conserving the headwaters, identification and analysis of options for compensation payments schemes and design of the CES mechanism, and at least 2 pilot contract prepared and in implementation

Component 2: Priority actions to strengthen the management and conservation of the National Fauna Reserve of Chimborazo

Output 2.2: Infrastructure and equipment prioritized in the management plan of the Chimborazo Fauna Reserve constructed

Output 2.2: Infrastructure and equipment prioritized in the management plan of the Chimborazo Fauna Reserve constructed

Output 2.4: Development and implementation of co-management plans involving at least 10 local communities in conservation and sustainable use of the natural resources in the Chimborazo Reserve and its buffer zone

Output 2.5: Program for the development of local capacities, provision of equipment and implementation of capture, shearing, processing and marketing of the vicuña fibers from at least 500 vicuñas

Component 3: Strengthening of CHPC capacities in natural resource management with focus on the páramos

Output 3.1: At least 20 CHPC staff has benefited directly from Capacity building/Training program in methodologies and instruments for development and sustainable management of natural resources using a watershed approach.

Output 3.2: CHCP strengthening in their capacity to develop Policy and regulations on NRM for the Province of Chimborazo.

Output 3.3: At least four provincial ordinances (Protection of water springs, forestry, tourism and management of camelids) developed, issued and enforced

Output 3.4: Natural resources monitoring system designed by the end of year two and operating for the project sites by the end of year 4

Description	Unit cost	Component 1:				Component 2:					Component 3:					PM	Total GEF	Year 1	Year 2	Year 3	Year 4	Year 5
		1.1 and 1.3	1.2 and 1.3	1.5-7	Total	2.2	2.3	2.4	2.5	Total	3.1	3.2	3.3	3.4	Total							
Specialist in vicuña management, capture and shearing (3 months)	9,000	0	0	0	0	0	0	0	27,000	27,000	0	0	0	0	0	0	27,000	0	12,000	12,000	3,000	0
NRM policy and governance specialist with experience in the social context of páramos (4 months)	6,375	6,375	0	6,375	12,750	0	0	6,375	0	6,375	0	6,375	0	0	6,375	0	25,500	12,750	0	12,750	0	0
Total international Consultants	0	6,375	0	6,375	12,750	0	0	6,375	27,000	33,375	0	6,375	0	0	6,375	0	52,500	12,750	12,000	24,750	3,000	0
Project coordinator (60 months)	2,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150,000	150,000	30,000	30,000	30,000	30,000	30,000
Financial Accounting Assistance (60 months)	1,200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72,000	72,000	14,400	14,400	14,400	14,400	14,400

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Subproject Procurement Assistance (48 months)	1,200	0	48,000	0	48,000	0	0	9,600	0	9,600	0	0	0	0	0	0	57,600	0	14,400	14,400	14,400	14,400
Project monitoring specialist for setting up the monitoring system and straining of project team (4 months)	2,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,000	8,000	8,000	0	0	0	0
Andean agro-ecosystem specialist (48 months)	1,500	24,000	27,000	9,000	60,000	0	0	0	0	0	4,500	3,000	3,000	1,500	12,000	0	72,000	9,000	18,000	18,000	18,000	9,000
NRM and local land use planning specialist (59 months)	1,500	27,000	37,500	9,000	73,500	0	0	0	0	0	7,500	3,000	3,000	1,500	15,000	0	88,500	16,500	18,000	18,000	18,000	18,000
Social specialist -community promotion/ communication and workshop facilitator (55 months)	1,500	24,000	37,500	9,000	70,500	0	0	0	0	0	4,500	3,000	3,000	1,500	12,000	0	82,500	13,500	18,000	18,000	18,000	15,000
Hydrologist specialized in Andean water systems (6 months)	2,000	0	0	12,000	12,000	0	0	0	0	0	0	0	0	0	0	0	12,000	5,000	3,000	2,000	1,000	1,000
Natural resource economist (4 months)	2,500	0	0	10,000	10,000	0	0	0	0	0	0	0	0	0	0	0	10,000	6,250	2,500	1,250	0	0
Specialist in conservation and sustainable management of Andean water resources (6 months)	2,000	0	0	12,000	12,000	0	0	0	0	0	0	0	0	0	0	0	12,000	2,000	4,000	4,000	2,000	0
PES mechanism specialist (6 months)	2,500	0	0	15,000	15,000	0	0	0	0	0	0	0	0	0	0	0	15,000	0	6,000	5,000	2,000	2,000
Ecologist/biologist specialized in páramo ecosystem conservation (15 months)	2,000	0	0	0	0	0	0	30,000	0	30,000	0	0	0	0	0	0	30,000	0	8,000	8,000	8,000	6,000
Park co-management and community NR conservation specialist (15 months)	2,000	0	0	0	0	0	0	30,000	0	30,000	0	0	0	0	0	0	30,000	0	24,000	6,000	0	0
2 community promotion and communication specialist and workshop facilitator (2x12 months)	1,200	0	0	0	0	0	0	24,000	4,800	28,800	0	0	0	0	0	0	28,800	0	20,000	8,800	0	0
Rural camelid micro enterprise specialist (12 months)	2,000	0	0	0	0	0	0	0	24,000	24,000	0	0	0	0	0	0	24,000	0	6,000	6,000	6,000	6,000
Legal environmental specialist specialized in regulation of Andean NR to analyze legal NR framework and gaps in the Chimborazo province (4 months)	2,500	0	0	0	0	0	0	0	0	0	0	0	10,000	0	10,000	0	10,000	6,000	4,000	0	0	0
Total national Consultants	0	75,000	150,000	76,000	301,000	0	0	93,600	28,800	122,400	16,500	9,000	19,000	4,500	49,000	230,000	702,400	110,650	190,300	153,850	131,800	115,800
Total consultants	0	81,375	150,000	82,375	313,750	0	0	99,975	55,800	155,775	16,500	15,375	19,000	4,500	55,375	230,000	754,900	123,400	202,300	178,600	134,800	115,800

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Design and implementation of web based project monitoring system including management of organizational performance (scorecard)	26,100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,100	26,100	9,000	4,275	4,275	4,275	4,275
Sub-watershed management plans including diagnostic, land use mapping, training of local communities in sustainable territorial planning, participatory zoning and definition of use regulations and identification of priority actions, development of project profiles (5 plans)	60,000	300,000	0	0	300,000	0	0	0	0	0	0	0	0	0	0	0	0	300,000	92,000	116,000	92,000	0	0
Participatory design and technical assistance for the implementation of subprojects defined in management plans (20 sub-projects)	8,750	0	175,000	0	175,000	0	0	0	0	0	0	0	0	0	0	0	0	175,000	0	45,000	50,000	45,000	35,000
Design and construction of visitors center and administration offices (195 m2 construction)	600	0	0	0	0	117,000	0	0	0	0	117,000	0	0	0	0	0	0	117,000	70,000	47,000	0	0	0
Rehabilitation of tracks	0	0	0	0	0	55,000	0	0	0	0	55,000	0	0	0	0	0	0	55,000	30,000	25,000	0	0	0
Study of the Chimborazo Reserve and its buffer zone	0	0	0	0	0	0	70,000	0	0	0	70,000	0	0	0	0	0	0	70,000	70,000	0	0	0	0
Development of provincial ordinances and regulations for specific natural resources and ecosystems (4 ordinances)	9,000	0	0	0	0	0	0	0	0	0	0	0	0	27,000	0	27,000	0	27,000	0	20,000	7,000	0	0
Design and implementation of provincial NR monitoring system operating in 3 projects sites and including detailed system manual	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60,000	60,000	0	60,000	15,000	15,000	15,000	15,000	0
Awareness raising campaign on Páramo's environmental services	0	0	0	33,000	33,000	0	0	0	0	0	0	0	0	13,000	0	13,000	0	46,000	10,000	12,000	10,000	14,000	0
Mid Term Evaluation and Final Evaluation (external consultancy services)	22,500	3,000	3,000	3,000	9,000	3,000	3,000	3,000	3,000	12,000	3,000	3,000	3,000	3,000	12,000	12,000	45,000	0	0	15,000	0	30,000	
Total Contracts	0	303,000	178,000	36,000	517,000	175,000	73,000	3,000	3,000	254,000	3,000	3,000	43,000	63,000	112,000	38,100	921,100	296,000	284,275	193,275	78,275	69,275	
3 consultants 84 days in the field including DSA and transport (output 1.5-7)	35	0	0	8,820	8,820	0	0	0	0	0	0	0	0	0	0	0	0	8,820	1,764	1,764	1,764	1,764	1,764

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5 consultants 300 days in the field including DSA and transport (output 2.4 and 2.5)	35	0	0	0	0	0	0	0	31,500	21,000	52,500	0	0	0	0	0	0	52,500	6,500	12,000	12,000	12,000	10,000
Vicuña management specialist 3 trips to Chimborazo of 4 weeks (output 2.5)	4,800	0	0	0	0	0	0	0	0	19,200	19,200	0	0	0	0	0	0	19,200	0	6,400	6,400	6,400	0
2 study strips on vicuña management to other Andean Countries including 5 persons in 5 days (output 2.5)	7,100	0	0	0	0	0	0	0	0	14,200	14,200	0	0	0	0	0	0	14,200	0	7,100	7,100	0	0
10 observation and learning visits to other provinces in Ecuador in environmental policies and NRM including 4 persons in 3 days (output 3.2)	1,508	0	0	0	0	0	0	0	0	0	0	0	15,080	0	0	15,080	0	15,080	5,000	5,000	5,080	0	0
Support to national and local delegations in 3 International events on mountains and environment	6,000	0	0	0	0	0	0	0	0	0	0	0	18,000	0	0	18,000	0	18,000	6,000	0	6,000	0	6,000
Project management local transport	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55,000	55,000	11,000	11,000	11,000	11,000	11,000
Total travel	0	0	0	8,820	8,820	0	0	0	31,500	54,400	85,900	0	33,080	0	0	33,080	55,000	182,800	30,264	43,264	49,344	31,164	28,764
Local watershed planning and training workshops (3 workshops for each of the 3 plans)	1,000	9,000	0	0	9,000	0	0	0	0	0	0	0	0	0	0	0	0	9,000	3,500	4,500	1,000	0	0
Training and coordination workshops for subprojects implementing priority actions (3 workshops for each of the 20 subproject)	250	0	15,000	0	15,000	0	0	0	0	0	0	0	0	0	0	0	0	15,000	0	3,000	6,000	5,000	1,000
CES scheme negotiation workshops (4 workshops)	1,000	0	0	4,000	4,000	0	0	0	0	0	0	0	0	0	0	0	0	4,000	500	2,000	1,500	0	0
Local environmental table workshops (25 workshops)	600	0	0	0	0	0	0	0	0	0	0	0	15,000	0	0	15,000	0	15,000	3,000	3,000	3,000	3,000	3,000
Provincial ordinances and NR regulation consultation workshops (20 local workshops)	600	0	0	0	0	0	0	0	0	0	0	0	0	12,000	0	12,000	0	12,000	0	4,500	4,500	3,000	0
Workshops	0	9,000	15,000	4,000	28,000	0	0	0	0	0	0	0	15,000	12,000	0	27,000	0	55,000	7,000	17,000	16,000	11,000	4,000
Consultation and training of local communities in co-management and conservation practices (10 communities)	2,900	0	0	0	0	0	0	0	29,000	0	29,000	0	0	0	0	0	0	29,000	0	10,000	10,000	6,000	3,000

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Training of local communities in tourist services and products (10 communities)	2,900	0	0	0	0	0	0	29,000	0	29,000	0	0	0	0	0	0	29,000	0	10,000	10,000	6,000	3,000
Training of local communities in vicuña management, capture, shearing, processing and marketing of fibres and management of micro enterprise (13 communities)	2,900	0	0	0	0	0	0	0	37,700	37,700	0	0	0	0	0	0	37,700	0	11,000	11,000	8,700	7,000
Training of CHCP staff in NRM (15 sessions with 20 participants and on-the-job training supported by coach)	1,000	0	0	0	0	0	0	0	0	0	20,000	0	0	0	0	20,000	0	20,000	10,000	10,000	0	0
Training of local communities at project sites and CHCP staff in data collection and systematic monitoring of NR (10 training sessions)	2,500	0	0	0	0	0	0	0	0	0	0	0	0	25,000	25,000	0	25,000	0	11,000	5,000	5,000	4,000
Support to the strengthening of Local and National Capacities of REDD in Paramo's Ecosystems and Socio Paramo	0	0	0	20,000	20,000	0	0	0	0	0	0	10,000	0	10,000	20,000	0	40,000	30,000	5,000	5,000	0	0
Training	0	0	0	20,000	20,000	0	0	58,000	37,700	95,700	20,000	10,000	0	35,000	65,000	0	180,700	40,000	57,000	41,000	25,700	17,000
Project management office material	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,000	6,000	1,200	1,200	1,200	1,200	1,200
Promotion and training material (pamphlets, booklets, videos, etc)	0	3,000	3,000	1,000	7,000	0	0	3,000	3,000	6,000	3,000	2,000	3,000	3,000	11,000	0	24,000	9,000	7,500	7,500	0	0
Total Expendable procurement	0	3,000	3,000	1,000	7,000	0	0	3,000	3,000	6,000	3,000	2,000	3,000	3,000	11,000	6,000	30,000	10,200	8,700	8,700	1,200	1,200
Equipment and materials for 20 subproject defined in subwatershed management plans and 10 subprojects defined in the Reserve co-management plans**	44,000	0	1,320,000	0	1,320,000	0	0	0	0	0	0	0	0	0	0	0	1,320,000	0	350,000	470,000	350,000	150,000
Equipment for monitoring of water flows and implementation of water conservation measures	0	0	0	130,000	130,000	0	0	0	0	0	0	0	0	0	0	0	130,000	100,000	0	15,000	15,000	0
Equipment for visitor center and administration office	0	0	0	0	0	70,000	0	0	0	70,000	0	0	0	0	0	0	70,000	0	70,000	0	0	0
Field equipment	0	0	0	0	0	0	21,500	0	0	21,500	0	0	0	0	0	0	21,500	21,500	0	0	0	0
Equipment for management, capture, shearing and processing of vicuña fibres	0	0	0	0	0	0	0	0	30,000	30,000	0	0	0	0	0	0	30,000	0	12,000	10,000	8,000	0

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Equipment for NR monitoring system (server, computers, scanner, plotter)	0	0	0	0	0	0	0	0	0	0	0	0	0	120,000	120,000	0	120,000	70,000	20,000	20,000	10,000	0
Office equipment for project management*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40,000	40,000	30,000	5,000	5,000	0	0
Total non-expendable procurement	0	0	1,320,000	130,000	1,450,000	70,000	21,500	0	30,000	121,500	0	0	0	120,000	120,000	40,000	1,731,500	221,500	457,000	520,000	383,000	150,000
Equipment maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,000	6,000	1,200	1,200	1,200	1,200	1,200
communication	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,000	8,000	1,600	1,600	1,600	1,600	1,600
GOE budget	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,000	14,000	2,800	2,800	2,800	2,800	2,800
Subtotal	0	396,375	1,666,000	282,195	2,344,570	245,000	94,500	195,475	183,900	718,875	42,500	78,455	77,000	225,500	423,455	383,100	3,870,000	731,164	1,072,339	1,009,719	667,939	388,839

Subtotal Comp 1	2,344,570
Subtotal Comp 2	718,875
Subtotal comp 3	423,455
Subtotal PM	383,100
TOTAL GEF	3,870,000

* furniture, computers, printers, copy machine, digital camera

** subproject amount may vary according to watershed and co management plans(10,000 - 80,000) in designed subprojects.

Annex 3: Work Plan

Annex 3: Provisional work plan																					
Code	Sub-components	PY1				PY2				PY3				PY4				PY5			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Component 1 - Conserving the páramos																					
1.1	Community-based WM planning																				
1.2	Organizational and institutional strengthening																				
1.3	Pilot interventions																				
1.4	CES																				
1.5	Optimisation & rationalization of water use																				
Component 2 - Priority actions in the National Fauna Reserve of Chimborazo																					
2.1.	N. plan for the management of the Vicuña																				
2.2.	Construction of infrastructure																				
2.3.	Study of Chimborazo Reserve & buffer zone																				
2.4.	Co-management plans																				
2.5.	Management of vicuña																				
Component 3 - Capacity Building of the CHPC																					
3.1.	Capacities for policies & regulations on NRM																				
3.2.	Capacities for method-logies & instruments																				
3.3.	M&E																				
Component 4 - Project Management and Evaluation																					
4.1.	Project management																				
4.2.	M&E of project																				
4.3.	Analysis and dissemination																				

Annex 4: Terms of Reference of Project Directive Committee and key consultants

Management of Chimborazo's Natural Resources **CHPC-GEF-FAO Project**

#1: Draft Terms of Reference: Project Technical Coordinator (PTC)

The PTC will work under the direct supervision of the Project General Coordinator (PGC) and will lead the Project's Technical Team (PTT). Supported by the PTT, the PTC will be responsible for the overall planning and coordination of the implementation of all project activities. Specifically this will include the following tasks:

- the preparation and follow-up on Annual Work Plans and procurement plans;
- the eventual update in Project's Operational Manual (POM) to be cleared by FAO;
- the disbursements and financial execution;
- the supervision of procurement (goods and services) procedures;
- the management of a financial information system to track project accounting and disbursements;
- the management of a contract information and project results system to monitor implementation and project results;
- the preparation of monitoring and project progress reports to be presented to the Environmental Unit for their assessment and submitted to FAO and provision of any project related information required by FAO and/or GEF;
- the preparation of all contractual arrangements and institutional agreements needed to execute project activities at the provincial and local level;
- the preparation and development of project supervision missions and mid-term evaluation mission of the FAO;
- the development and supervision of the implementation of the work plans of all PTT members;
- the facilitation of the preparation and implementation of training / capacity building events;
- make sure that the appropriate approaches are followed during project implementation (participatory and integrated approaches, multi-stakeholder participation, etc.);
- Convene on a regular basis meetings of the PTT in order to coordinate activities, exchange lessons learned and harmonise approaches;
- the facilitation of the preparation of audit reports.

Duty station: Riobamba, Ecuador.

Duration: 60 months

Languages: Spanish, with working knowledge of English

Management of Chimborazo's Natural Resources
CHPC-GEF-FAO Project

#2: Draft Terms of Reference: Financial Accountant Assistant

Under general supervision of the Chimborazo Provincial Government (CHPC) and in close collaboration with the project coordinator and the PIDD Programme financial specialist, the financial Accountant Assistant will support the Project's Technical Team in financial management and accountant tasks, with the following responsibilities and functions:

1. Manage administrative, financial and accounting activities of the Project according to FAO rules and regulations.
2. Keep the financial management system updated with all required documentation to track expenditures, execution of contracts and disbursement made by CHPC against budgets, and to track funds flows.
3. Assist in the application of results based management in budgeting and financial reporting activities linking expenditures to the monitoring system of progress in achieving project outputs.
4. Assists in the preparation and timely submission of annual work plans and budgets, quarterly financial expenditure statements, quarterly disbursement requests based on a detailed work plan and budgets, annual financial reports to be submitted with the annual project progress report and final accounts for the project.
5. Assists the supervision of that GEF resources are spent in accordance with FAO rules and regulations and as set out in the project document
6. Facilitate internal and external audits.

Requirements:

Applicants must have an education in accountants or finance and at least five years of professional experience. Excellent computing skills including use of project financial management platforms, ability for team-work and committed to comply with reporting deadlines will be particularly appreciated.

Language: Spanish

Duration: 60 months subject to satisfactory performance

Headquarters: Riobamba

Management of Chimborazo's Natural Resources
CHPC-GEF-FAO Project

#3: Draft Terms of Reference: Procurement Assistant

Under general supervision of the Chimborazo Provincial Government (CHPC) and in close collaboration with the project coordinator and the PIDD Programme procurement specialist, the Procurement Assistant will support the Project's Technical Team in procurement and contracting processes of goods and services, with the following responsibilities and functions:

1. Assist in the management and administration of procurement (goods and services) activities in relation to the execution of project activities in accordance with FAO rules and regulations.
2. Keep updated the tracking system of selection and contracting processes including all documentation related to procurement (goods and services) processes including TOR for consultancy services and bidding material, publication evidence of posts and calls for proposals and CVs, evaluation criteria and rating of proposals and CVs, records and minutes from interview panels and final panel decisions, and minutes from negotiation and signature of contracts.
3. Assist in all aspects of selection and contracting processes and submission of documentation to FAO.
4. Make sure that the procurement plan is periodically updated and in line with annual and quarterly work plans and budgets

Requirements:

Applicants must have a bachelor in law or other relevant education and at least three years of professional experience. Excellent computing skills including use of systems for filing and tracking procurement processes, knowledge of FAO procurement and contracting rules and procedures, ability for team-work and committed to comply with documentation requirements will be particularly appreciated.

Language: Spanish

Duration: 48 months subject to satisfactory performance

Headquarters: Riobamba

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#4: Draft Terms of Reference: Watershed, land use planning and NRM specialist

Under the overall supervision of the PGC and the direct supervision of the PTC, this specialist will be responsible for the implementation of all project activities related to watershed management, land use planning and natural resources management. Specifically this will include the following main tasks:

- establish a baseline survey about the natural situation in the five selected micro-watersheds;
- provide technical input in natural resources management to the project team (including in the five selected micro watersheds) and to other stakeholders as appropriate;
- contribute to the participatory watershed management planning process in the five selected micro-watersheds;
- take the lead in the design and implementation of the prioritized activities in the five selected micro watersheds;
- provide technical advice to the development of CES schemes;
- review the activities under the PIDD-project related to water use efficiency and document the lessons learned;
- contribute, as appropriate, to the implementation of the priority actions in the National Fauna reserve of Chimborazo;
- take the lead in the preparation and implementation of training and capacity building activities related to watershed management, land use planning and NRM;
- contribute to the analysis and documentation of lessons learned from the project implementation in the five selected micro watersheds;
- contribute to the project progress reports, the project website and other communication products as appropriate;
- Participate in the regular meetings of the PTT;
- communicate on a regular basis all relevant information and products to the PTC;
- participate in the backstopping missions from FAO as appropriate;
- prepare annual work plans for the assignment.

Duty station: Riobamba, Ecuador.

Duration: 60 months

Languages: Spanish. Working knowledge of English will be an advantage

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#5: Draft Terms of Reference: Andean Agro-Ecosystem Specialist

Under the overall supervision of the PGC and the direct supervision of the PTC, this specialist will be responsible for the implementation of all project activities related to agriculture and agro-ecosystem management. Specifically this will include the following main tasks:

- establish a baseline survey about the agro-ecosystems and their expansion in the five selected micro-watersheds;
- provide technical input in agriculture and agro-ecosystem management to the project team (including in the five selected micro watersheds) and to other stakeholders as appropriate;
- contribute to the participatory watershed management planning process in the five selected micro-watersheds;
- contribute from the agro ecosystem perspective to the design and implementation of the prioritized activities in the five selected micro watersheds;
- provide technical advice to the development of CES schemes;
- contribute, as appropriate, to the implementation of the priority actions in the National Fauna reserve of Chimborazo;
- take the lead in the preparation and implementation of training and capacity building activities related to agriculture and agro ecosystem management;
- contribute to the analysis and documentation of lessons learned from the project implementation in the five selected micro watersheds;
- contribute to the project progress reports, the project website and other communication products as appropriate;
- Participate in the regular meetings of the PTT;
- communicate on a regular basis all relevant information and products to the PTC;
- participate in the backstopping missions from FAO as appropriate;
- prepare annual work plans for the assignment.

Duty station: Riobamba, Ecuador.

Duration: 55 months

Languages: Spanish. Working knowledge of English will be an advantage

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#6: Draft Terms of Reference: 4. Social specialist (community promotion/ communication and workshop facilitator)

Under the overall supervision of the PGC and the direct supervision of the PTC, this specialist will be responsible for the implementation of all project activities related to social issues, community mobilization and communication. Specifically this will include the following main tasks:

- conduct Participatory Rural Appraisal processes (PRA) in the five selected micro-watersheds;
- provide technical input in social, community mobilization and communication issues to the project team (including in the five selected micro watersheds) and to other stakeholders as appropriate;
- lead and animate the participatory watershed management planning process in the five selected micro-watersheds;
- take the lead in all institutional strengthening activities including the establishment of multi-stakeholder Watershed Management Committees in the five selected micro watersheds;
- lead and animate the process related to the development of CES schemes;
- ensure the collaboration between the GEF and the PIDO projects in order to maximize the blending of the two components;
- contribute, as appropriate, to the implementation of the priority actions in the National Fauna reserve of Chimborazo, particularly as it relates to the development of the co-management plans;
- coordinate the planning and implementation of all training and capacity building activities;
- take the lead in knowledge management in the project with a particular focus on the analysis and documentation of lessons learned from the project implementation in the five selected micro watersheds;
- take the responsibility for the project progress reports, the project website and other communication products as appropriate;
- Participate in the regular meetings of the PTT;
- communicate on a regular basis all relevant information and products to the PTC;
- participate in the backstopping missions from FAO as appropriate;
- prepare annual work plans for the assignment.

Duty station: Riobamba, Ecuador.

Duration: 60 months

Languages: Spanish. Working knowledge of English will be an advantage

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#7: Draft Terms of Reference: Project Directive Committee (PDC)

The PDC is the same committee operating under the PIDDD programme. The PDC, which is presided by the Provincial Prefect, will make decisions on the overall management of both projects. The PDC will be responsible for maintaining the strategic focus of the project as for specific operational tasks. More specifically and related to the GEF component, the PDC will be responsible, among others, for the following matters:

- reviewing and approving the project's annual work-plans;
- assessing progress in the implementation of the project and recommending necessary actions and measures to be taken towards smooth achievement of the project objectives;
- providing general guidance to the PTC, PGC and PTT;
- monitoring, as appropriate, project activities in the five selected micro watersheds as well as in the National Fauna Reserve of Chimborazo;
- reviewing and endorsing the watershed management plans, which will be developed for the five selected micro watersheds, as well as the co-management plan to be established for the National Fauna Reserve of Chimborazo;
- monitor the establishment of the CES mechanisms and review the appropriateness / fairness of the agreements;
- approving strategies for communication, partnerships and resource mobilisation;
- overseeing the financial management and the mobilization of the co-financing contributions.

Annex 5: Compensation for Environmental Services-CES

Management of Chimborazo's Natural Resources **CHPC-GEF-FAO Project**

1. Many of the areas in which biodiversity is threatened are also important water supply areas for downstream water users such as hydroelectric power producers, domestic water supply systems, irrigation systems, and others. The Compensation for Environmental Services (CES) approach offers the potential of addressing both problems in a sustainable and efficient manner.⁹ Under component 1, the project will develop pilot CES mechanisms in at least two micro-watersheds and create the basis for a wider CES strategy to be applied province-wide in Chimborazo.

The CES concept

2. The CES approach is an innovative approach to conservation financing that has been increasingly used in Latin America in recent years. The fundamental principles of the approach are that those who benefit from environmental services should pay for them, and that those who contribute to generating these services should be compensated for providing them. The approach thus seeks to create mechanisms to arrange for transactions between service users and service providers that are in both parties' interests (thus internalizing what would otherwise be an externality).

3. The CES approach is attractive in that (i) it generates new financing, which would not otherwise be available for conservation; (ii) it is likely to be sustainable, as it depends on the mutual self-interest of service users and providers and not on the whims of government or donor funding; (iii) it is likely to be efficient, in that it conserves services whose benefits exceed the cost of providing them, and does not conserve services when the opposite is true. Achieving these benefits, however, requires implementing the approach correctly—in particular, programs that are funded by government or donor funding rather than by service users are unlikely to have these advantages. Critical aspects include ensuring that there is a good understanding of how land use affects the desired environmental services and establishing appropriate institutional arrangements to mediate transactions between service users and providers at acceptable transaction costs. These transactions need to be voluntary, on a 'willing buyer, willing seller' basis.

4. The likely long-term sustainability of CES mechanisms financed by water users make this a particularly attractive instruments in areas where biodiversity is at risk outside protected areas. Funding sources that are specifically targeted at biodiversity conservation typically can only provide short-term funding, and thus cannot ensure the long-term conservation of biodiversity. Financing from water users, in contrast, can in principle last indefinitely as it is tied to on-going water use. As there is often a close (but not perfect) correspondence between measures that improve downstream water supplies and measures that preserve biodiversity, CES mechanisms financed by water users often have important biodiversity benefits even when it is not their main objective.

5. Over many years, FAO has built up considerable expertise in developing and testing CES mechanisms in different parts of the world. FAO has convened a number of consultations to

⁹ CES is more commonly known as 'Payments for Environmental Services (PES)'. However, the word 'payment' has some negative connotations in the project area, and so is avoided here. See also Robertson and Wunder (2005).

promote the sharing and exchange of experiences related to CES mechanisms. Particularly worth mentioning for the context of Ecuador is the Regional Forum on "Payment Schemes for Environmental Services in Watersheds" which was held in June 2003 in Arequipa, Peru.

6. The main problems involved in the development of CES mechanisms are generally (i) ensuring that the services provided are well identified and that their links to land use are well understood; and (ii) creating an appropriate institutional structure that will keep the mechanism in operation indefinitely.

7. In addition, having sufficient information on how land use changes affect hydrological flows is one of the main obstacles to the development of CES mechanisms. While there are strong reasons to believe that páramos and other high-altitude areas play a very important part in water supply, there remain important questions as to how much impact there would be on downstream water services as a result of upstream land use change. Without better information on aspects such as (i) the most sensitive areas in each watershed and (ii) the specific land uses that would be most damaging to water services, it would be difficult to design an effective CES mechanism. Any other conservation approach would also be severely hampered by the lack of such information. Fortunately, considerable progress has been made in recent years in the use of hydrological models. Such models have already been applied in Ecuador (Quintero and others, 2006) and in other Andean contexts (Rubiano and others, 2006) with good results.

Existing CES experiences in Ecuador

8. Although the fear is sometimes expressed that innovative approaches such as CES are unlikely to work in complex social contexts such as are found in the high Andes, several CES mechanisms have already been implemented in Ecuador. Indeed, one of the best documented examples of a CES mechanism is that of Pimampiro, in Imbabura Province, in a context very similar to that encountered in Chimborazo (see below). As in other Latin American countries, the bulk of CES mechanisms in Ecuador to date have focused on water services, reflecting both the urgency of addressing water issues and the relative ease with which the users of water services can be identified (Pagiola and Platais, 2007). There are also a few mechanisms that focus on carbon sequestration or biodiversity conservation.

9. All of these mechanisms are local, having been developed independently by their respective water users, sometimes with external support. The approach differs significantly from that adopted in Costa Rica (Pagiola, 2007) and Mexico (Muñoz and others, 2006), which have developed nationwide programs.

10. **Municipal water supply systems.** Municipal water supply systems have been very active in adopting CES approaches. In Costa Rica, the town of Heredia has established an 'environmentally adjusted water tariff', the proceeds of which are used to pay landholders to maintain and reforest watershed areas (Barrantes and Gámez, 2006). In Mexico, the town of Coatepec, in the state of Vera Cruz, solicited voluntary contributions for conservation through its water bills to conserve 500 ha in the watershed which supplies its water (Muñoz and others, 2006). Numerous small towns throughout the region are also using CES approaches. In El Salvador, for example, the municipality of Tacuba pays upstream farmers to safeguard the spring from which it draws potable water, and that of San Francisco de Menéndez provides funding for the El Imposible National Park to protect its water source (Rosa and others, 2003), while the town of Yamabal pays farmers to maintain conservation works that increase the recharge of its spring. PASOLAC, a Central American NGO, has been working with municipalities in Nicaragua and Honduras to develop CES programs to protect their water sources (Pérez, and others, 2002; Pérez, 2003).

11. Several of the flagship examples of municipal water supply systems participating in CES are found in Ecuador, at multiple scales. Quito (pop. 3 million), the country's capital, Cuenca

(pop. 420,000), the third-largest town in the country, and Pimampiro (pop. 13,000), a small rural township, have all established CES programs to pay for the protections of their water supplies.

Quito. In 2000, the city of Quito created a water fund (*Fondo del Agua*, FONAG) with the assistance of The Nature Conservancy (TNC) to pay for conservation in the watersheds from which it draws its water (Echevarría, 2000, 2002a, Postel and Thompson, 2005; Lloret, pers. comm., 2006). The Fund is financed primarily by the water utility, EMAAP-Q, and the electric power company, EEQ. EMAAP-Q contributes 1% of its revenues. Initially this amounted to about US\$150,000 a year, but it has since increased to about US\$720,000 a year. EMAAP-Q also provides substantial in-kind support, including office space and three full-time employees. EEQ contributes US\$45,000 a year. A bottler, Cervecería Andina, has been contributing US\$6,000 a year since 2003. TNC also contributed capital to the fund, and other donors (including USAID and COSUDE) have also provided funding – some as contributions to capital and some as project funding. Thanks to these contributions, plus capitalized interest, the fund held US\$2.7 million at the end of 2005. FONAG did not begin using its funds until 2004, however.¹⁰ Initially, funding was spent on a project basis.

Cuenca. The water and electric utility serving the city of Cuenca, ETAPA, uses part of its revenue to pay for watershed conservation (Lloret, 2002; Echevarría and others, 2004). At first, it bought land in critical portions of the watershed outright, accumulating about 8,800 ha. Cuenca has also taken over management of the Cajas National Park, where the four rivers that serve the Cuenca area originate. ETAPA has supported the establishment of a watershed council in the Machangara watershed, from which Cuenca obtains about half of its water supply. A direct payment system is being established to conserve the Yanuncay watershed, where Cuenca is developing a new water source.

Pimampiro. In 2000, the Municipality of Pimampiro, in Imbabura Province, established a payment system to protect the upper watershed of the Palaurco River, from which it obtains its drinking water, with the assistance of the Ecuadorian Corporation for the Development of Renewable Natural Resources (CEDERENA), an NGO (Echevarría and others, 2004; Wunder and Albán, 2007). As of 2007, 19 families (all indigenous) in the Nueva América community in the upper watershed were enrolled, conserving 550 ha (87% of total area). Participating households receive US\$6/year/ha of intervened forest or páramo, US\$8/year/ha of mature secondary forest, and US\$12/year/ha of primary forest or páramo. Payments are financed by a 20% water consumption surcharge on water users in Pimampiro and by the returns of interests trust fund established with financing from the Interamerican Foundation, with the municipal government paying the program's operating costs. CEDERENA has since replicated this experience in the Celica and El Chaco municipalities (Yaguache and others, 2005), while there has been spontaneous replication in El Angel, Loja, and Zamora (Wunder and Albán, 2007).

Pedro Moncayo. The municipality of Pedro Moncayo, in Pichincha Province, was one of the municipalities that received assistance from the World Bank-funded PRAGUAS project to establish an autonomous water supply agency. Management of the water supply system was transferred to a municipal enterprise with a community majority in the board of directors, which in turn contracted a private operator to provide the services. The new tariff introduced during this process includes a surcharge to capitalize a forestry fund designed to finance reforestation and

¹⁰ The delay in starting activities was due to two factors. First, FONAG was established as an endowment fund, in which only the interest on the capital is meant to be used. This meant that despite the relatively substantial flow of funding from EMAAP-Q and EEQ, it had at first relatively little available money to spend. Second, there had been no studies on what kinds of upstream watershed management activities were needed to improve downstream water supplies, so that FONAG did not know what to do with the money it had. The delay in initiating activities almost killed the mechanism, as its contributors and the Mayor of Quito grew impatient.

watershed management (WSP, 2005). Pedro Moncayo also exempts areas of forest that protect water sources from taxes (Izko and Cordero, 2006).

Others. The cantón of El Chaco, in Napo Province, is receiving support from CEDERENA to establish a CES mechanism similar to that in Pimampiro (Izko and Cordero, 2006). A municipal ordinance adopted in 2004 dedicates a portion of income from water tariffs to conservation payments in an area of 250 ha that protects the town's water sources. Other municipal water supply systems implementing CES mechanisms include Celica, El Angel, Loja, and Zamora.

12. **Irrigation systems.** Irrigation Water User Associations (WUAs) have historically been among the first to participate in CES programs; beginning in the mid-1990s, WUAs in Colombia's Cauca Valley have collected extra fees from their members to finance conservation activities in their watersheds (Echevarría, 2002b). Despite this promising beginning, very few CES programs are currently financed by irrigation water users. In Ecuador, no irrigation systems are known to be paying for watershed conservation to date.

13. **Hydroelectric power plants.** Hydroelectric power producers are also frequent participants in CES programs in Latin America. In Costa Rica, several public and private hydropower producers have contracted with FONAFIFO to make payments in their watersheds (Pagiola, 2002, 2007). These payments generate about US\$350,000 annually and conserve about 10,000 ha. In a separate initiative, hydropower producer La Manguera SA is paying the Monteverde Conservation League to maintain under forest cover the watershed from which its plant draws its water (Rojas and Aylward, 2002). In Venezuela, hydropower producer CVG Edelca is financing conservation activities by indigenous communities in the Río Caroní watershed (which includes the Canaima National Park). CVG-Edelca is planning to devote 0.6% of its operational income (about US\$2 million) to conservation of the watershed. To date, EEQ's contribution to FONAG is the only example of a hydroelectric power producer in Ecuador participating in a CES mechanism. However, Fundación Cordillera Tropical, an NGO, is preparing a proposal for a CES mechanism for the Nudo de Azuay, which is part of the watershed supplying water to the Amaluza dam on the Río Paute operated by Hidropaute, as well as the Mazar dam, which is under construction (White, 2006). If approved, the proposal would finance conservation payments to landowners in the upper watershed (including individual farmers, local communities, and the Sangay National Park).

14. **Industrial and commercial users.** Relatively few industrial and commercial water users have participated in CES mechanisms to date. In Costa Rica, bottler Florida Ice & Farm is complementing payments being made by the town of Heredia to protect the watershed from which they both obtain their water (Pagiola, 2007; Barrantes and Gámez, 2006). Several agribusinesses have also contracted with FONAFIFO to make payments in their watersheds (Pagiola, 2007). In Guatemala, Coca Cola and other bottlers in the Río Motagua valley are contributing to the establishment of a Water Fund to conserve the Sierra de las Minas range. The only industrial or commercial water user in Ecuador known to contribute to a CES mechanism is a private beer company, Cervecería Andina, which is contributing US\$6,000 annually to FONAG.

15. **Carbon sequestration.** Ecuador also has experience with payments for carbon sequestration, through the PROFAFOR program. Since 1993, the Forests Absorbing Carbon-dioxide Emissions Forestation Program (PROFAFOR), an Ecuadorian company acting in extension of the Forests Absorbing Carbon-dioxide Emissions (FACE) consortium, financed by Dutch electricity companies to offset their carbon emissions (Milne, 2002; Milne and Arroyo, 2003; Wunder and Albán, 2007). Since 1993, PROFAFOR has signed 152 contracts with private landowners and communities for carbon sequestration through reforestation and afforestation, covering 22,287 ha. The bulk of these contracts (145, or 95%) have been in the highlands, including several sites in Chimborazo Province. Participants receive payments of US\$100-150/ha in the first year, as well as in-kind support, an additional US\$25-30 after three years if a minimum survival rate of 75% is demonstrated, and 70% of the revenues from the sale of harvested trees at

the end of the cycle (15-20 years), or 100% if they replant trees after harvest. Participants also receive the returns from thinning and pruning prior to harvest. PROFAFOR stopped signing new contracts in 2002 because of reduced competitiveness following dollarization of the Ecuadorian economy.

16. **Biodiversity conservation.** Ecuador has a rich biodiversity, much of which is threatened. As elsewhere, arranging payments specifically for biodiversity conservation has been difficult. Conservation International (CI), with the assistance of the German aid agency GTZ, has established a payment mechanisms with three Chachi communities in the Chocó region to conserve 7,200 ha in the buffer zone of the Cotacachi-Cayapas Ecological Reserve in Northwestern Ecuador (Kosmus, 2007). A Trust Fund has been established to provide the necessary long-term payment stream.

17. There is thus considerable prior experience with CES in Ecuador, including in contexts very similar to that encountered in Chimborazo Province. There are already a wide variety of examples of water users paying for conservation in Ecuador, although these funds are not always used for direct payments to land users. Many water users are still basing their conservation efforts on project-based approaches, either in part or in full.

18. A noteworthy aspect is that most existing CES mechanisms developed with external assistance. The establishment of the Pimampiro CES mechanism, for example, received technical support from CEDERENA and financial support from the Inter-American Foundation, while the establishment of FONAG was supported by TNC. Cuenca's ETAPA is the only case which developed purely independently, in part thanks to the firm's strong technical and financial capacity.

19. The Government of Ecuador's policy of decentralization has played an important role in the development of local CES mechanisms, by devolving responsibility for tasks that had previously been managed by the central state to lower levels of government. Until the mid-1990s, for example, domestic water supply systems were operated by a state agency, the Ecuadorian Institute for Sanitation Works (*Instituto Ecuatoriano de Obras Sanitarias*, IEOS). Responsibility for operating and maintaining water supply systems was transferred to municipalities and communities in the 1990s, as part of a process of decentralization. Most operated water supply systems as a part of municipal governments and funded them from their general budgets. Beginning in 2001, the World Bank financed *Rural and Small Towns Water Supply and Sanitation Project* (PRAGUAS) provided technical assistance and financial support to help municipalities delegate water services to autonomous public companies.

20. Another notable aspect of existing CES mechanisms in Ecuador is that they are most striking for their demand-side arrangements. Unlike other countries, which have focused on paying providers and neglected charging service users, the opposite is true in Ecuador. Although there are a large number of mechanisms by which service users pay for conservation, not all of these mechanisms are making direct payments to land users.

Developing CES mechanisms in Chimborazo

21. In Chimborazo, water uses tend to be largely independent and managed locally. Irrigation systems are managed by local Water Users Associations (WUAs), which set their own fees for O&M, for example, while towns manage their own domestic water supply systems (unlike many other Latin American countries, Ecuador does not have a national agency with responsibility for urban water supply). A single province-wide CES mechanism would thus not be feasible. Rather, the approach to be followed is to develop separate small-scale CES mechanisms for individual cases. There is considerable experience with the development of such small-scale mechanisms in Ecuador, though none has been in Chimborazo Province to date.

22. The Río Blanco watershed in eastern Chimborazo illustrates the potential for development of small-scale CES mechanisms. There are three main water users in the Río Blanco watershed, as well as a few smaller ones.

The Río Blanco hydroelectric plant and the Río Blanco-Quimiag irrigation project share a common water intake in the upper part of the watershed. Water flows by gravity through a canal and a tunnel first to the hydroelectric plant and then to the main canal of the irrigation system, from which it is distributed to farms through a network of secondary canals. Both users are affected by limited water availability during the dry season. There is a plan to draw additional water from the Río Oregan and the Río Collantes, bringing it to Río Blanco intake and thence to the distribution system.

The town of Quimiag has a separate water supply system, which draws water from springs in the El Toldo and San Francisco areas.

Evidence on willingness to pay

23. In Ecuador as in many other places, water users have generally drawn on existing revenue flows to finance CES mechanisms. Neither EMAAP-Q nor EEQ raised tariffs to finance their contribution to FONAG, for example. Pimampiro did raise its water tariffs by 20% when the CES mechanism was established, but the increase coincided with a substantial improvement in water supplies from the construction of a new canal. At first, the increase was simply embedded in the overall tariff, but more recently it has been split off into a separate charge. The water company serving Pedro Moncayo has also added a specific conservation fee to its water tariff.

24. Few studies of consumer willingness to pay have been conducted. Echavarría and others (2004) report that 22 of 36 individuals (61%) in Pimampiro expressed a willingness to pay for forest conservation, while 25 of 49 individuals (51%) in Cuenca expressed a willingness to pay for conservation of the Yanuncay Watershed. Neither study was a formal contingent valuation study, however. Rodríguez and others (in review) conducted a contingent valuation survey among rural households in Cotacachi and found that they were willing to pay additional water fees to ensure un-interrupted water supplies.

25. This concrete experience suggests that it should be feasible to arrive at agreements with water users for them to pay for conservation.

Institutional arrangements

26. The other major challenge in the development of CES mechanisms is the need to develop appropriate institutional arrangements, particularly to interact with potential service providers. Reaching service providers, explaining participation requirements and benefits, contracting interested farmers, monitoring compliance with contract provisions, and paying providers – all at acceptable transaction costs – requires a substantial and skilled field presence that is trusted by farmers. This task is likely to be much simpler in the project area than in many other areas where CES has been implemented, as upper watersheds are often inhabited by cohesive communities that act collectively. Thus in many water service supply areas there are likely to be only one or two interlocutors, rather than hundreds as is often the case elsewhere. Several previous CES programs, notably in Costa Rica and Mexico, have already worked with communities as service suppliers, and the Project will build on their experience. The specific compensation rules and modalities would be agreed with the potential participants.

27. Several watersheds also already have institutions linking the affected stakeholders. In Río Blanco, for example, a inter-institutional consortium has been formed by CDRH; the municipality of Riobamba; the ministries of agriculture, environment, and social well-being; CODERECH; the Riobamba Electric Company; the Río Blanco-Quimiag WUA; Fundación Natura; and others to

develop an improved management plan for the watershed and implement it. Work is also underway to establish a water fund similar to Quito's. The Fondo para la Protección del Agua del Cantón Riobamba (FOPAR) will channel contributions from various water users in and around Riobamba to watershed conservation activities.

28. Compensation in a CES mechanism can take a number of forms. Cash is the most common form, but a variety of forms in-kind compensation have also been used in many cases. In Los Negros, Bolivia, for example, service providers were compensated with beehives and training in beekeeping and honey production (Asquith and others, 2008).

29. Longer-term, a key question that the project will address is how to provide a mechanism to assist in the initial establishment of additional CES mechanisms province-wide beyond the end of the project. Efforts to establish CES mechanisms face initial costs that must be borne before any funding from service users is generated. Such efforts also require technical assistance, both on the process of developing CES mechanisms and, particularly, on conducting the detailed technical analysis required to identify the critical areas that need to be protected and the specific land use changes needed to meet the particular needs of water users. An institution that is able to provide assistance in these fields would greatly facilitate the task. During the project, the project team will undertake this role, but arrangements are needed for such assistance to continue after the project.

Workplan

30. Under component 1, the project will pilot the implementation of mechanisms of compensation for environmental services in Chimborazo. It will initially collect and update information to clarify the hydrological impacts of land use change, which are a necessary basis both for CES and for any other conservation strategy, and then pilot the development of a CES mechanism in at least two micro-watersheds: in the Chimborazo Watershed related to hydropower generation and water use for a cement factory and in the Rio Blanco Watershed related to a water deviation scheme for hydropower generation and irrigation. The approach taken will be gradual and cautious, in consultation with the affected stakeholders. It will build on the experience that has been developed on the development of CES mechanisms in Ecuador and elsewhere in Latin America, while adapting to the specific circumstances encountered in Chimborazo. It is important to note here that the pilot mechanism to be developed would not cover the entire chosen microwatershed. Even when a microwatershed includes multiple water users, these users often obtain their water from different parts of the watershed, as was documented in the inventory of water users. On the service user side, the development of a pilot mechanism will focus on the users with the greatest willingness and capacity to pay, such as the hydroelectric power producers. On the service provider side, the pilot mechanism will focus on those areas that supply water to the specific users participating in the mechanism.

31. *Understanding the hydrological impacts of land use change.* Understanding how changes in land use affect water services is fundamental to any conservation strategy. In an initial phase, the information necessary for the analysis will be collected in the two selected micro-watersheds, by compiling available information and beginning field monitoring of critical variables at a local level (including local rainfall and waterflows). Hydrological models will then be prepared, using these data. These models will then be used to estimate the impact of likely land use changes in water supply areas of each water system, including (i) retaining current land uses; (ii) likely land use changes in the absence of any intervention; and (iii) one or more 'preferred' land use change scenarios from the perspective of downstream water supply and biodiversity conservation (which could involve simply retaining current land uses, or might include actively switching to 'better' land uses). In addition, detailed socioeconomic and institutional assessments will be undertaken in the areas that provide water to the users interested in participating in a CES mechanism. These assessments will examine (i) the costs and benefits to land users of their current land uses, of land uses they may adopt or expand into new areas, and of alternative land uses that reduce

downstream impact; (ii) the farm-level constraints to land use changes, including financial, technical, institutional, and other constraints; (iii) land users' perceptions of the losses/gains associated with various land use changes; and (iv) the institutional environment in which these land users operate (eg the strength of associations, their ability to decide on and implement collective actions, etc). These assessments could be carried out through focus group discussions, if the land users in the water supply areas are communities or associations, or through household surveys, if the land users are individual farmers. Outputs will include budgets for each major current and potential land uses and tradeoff matrices.

Preparation of CES workplan. Based on these inputs, a CES workplan will be developed. This will include (i) a map of areas eligible for compensation; (ii) a menu of land use options to be supported by the CES mechanism, with estimated downstream benefits for each; (iii) proposed compensation levels for each supported land use, based on estimated downstream benefits and on-site costs; (iv) proposed implementation arrangements, including draft contracts with service providers, arrangements to monitor contract compliance, and arrangements to make payments, and the estimated recurring costs of these arrangements. The workplans will then form the basis for detailed consultations with service users and service providers.

Implementation. Once service users and service providers have agreed on a CES workplan, formal contracts can be signed and implementation can begin.

32. Replication strategy and development of institutional framework for CES. The project will only be able to pilot the development of CES mechanisms in a small portion of all potential sites within the province by EOP, so there is the need for an institutional home for continuing efforts to develop local CES mechanisms in Chimborazo beyond the end of the project. This institutional home will house the technical expertise to develop new CES mechanisms, based on the experience accumulated during the project. Possible approaches include (i) a specialized unit within the CHPC; (ii) an autonomous public agency similar to Costa Rica's FONAFIFO; and (iii) an independent agency, perhaps housed within an NGO or university. Each approach has its advantages and disadvantages (civil service salaries and work rules, for example, might prevent securing suitably trained staff in a public agency, for example, but long-term funding may be more insecure in an independent agency). A study of alternative arrangements will be conducted in PY4, based on experience within the project and lessons learned from other CES efforts. This study, and the additional experience gained in the last two years of the project, will then form the basis for the preparation of a replication strategy in PY5.

Annex 6: Root Causes, Barriers and Threats to Biodiversity Conservation in Chimborazo

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33. Although the underlying threats and causes of degradation of the páramos within the province are complex and interrelated, especially with regard to poverty, the following table highlights the main threats and barriers that the project will seek to address in order to improve conservation of this important ecosystem:

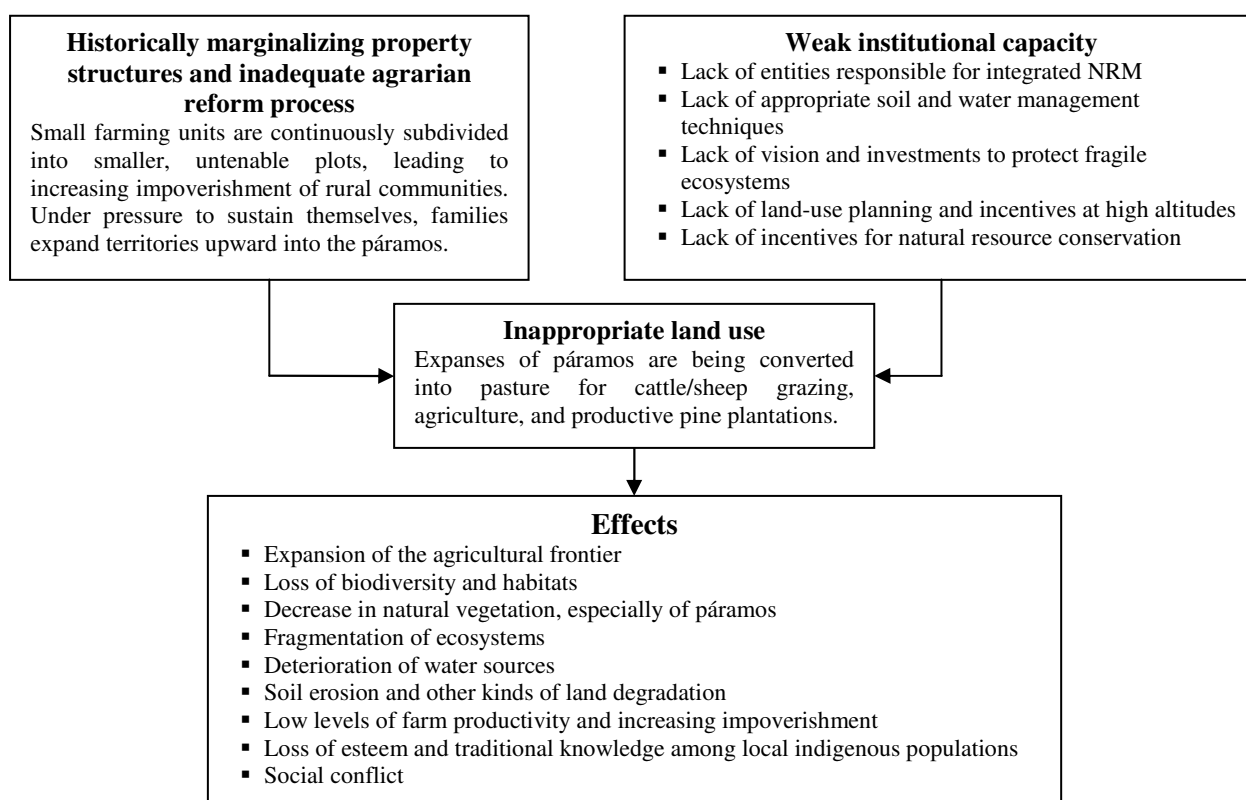
Table 1. Threats to the páramos ecosystems in Chimborazo Province			
<i>Main threats</i>	<i>Elements of threat</i>	<i>Effects</i>	<i>Project action</i>
1. Expansion of the agricultural frontier	<p>Historical/Socio-economic</p> <ul style="list-style-type: none"> - Increasingly small and untenable size of farming units, stemming from a poorly administered Agrarian Reform process. - Increasing impoverishment of rural communities <p>Environmental/Technical</p> <ul style="list-style-type: none"> - Inappropriate land use (especially for cattle grazing and agricultural purposes) - Deforestation - Slash-and-burn agriculture <p>Political/Administrative</p> <ul style="list-style-type: none"> - Lack of entities responsible for integrated NRM - Lack of appropriate management techniques for soil and water - Lack of vision and investments to protect fragile ecosystems - Lack of land-use planning at high altitudes - Lack of incentives for natural resource conservation 	<p>Rural poverty and unsustainable land practices are leading to exploitation of increasingly unsuitable lands, accelerating the conversion of páramos and posing a risk to the conservation of important ecosystems.</p> <p>Key effects:</p> <ul style="list-style-type: none"> - Loss of biodiversity and habitat - Decrease in natural vegetation, especially of páramos - Fragmentation of ecosystems - Deterioration of water sources - Soil erosion and other kinds of land degradation - Low farm productivity and increasing impoverishment - Loss of esteem and traditional knowledge among local indigenous populations - Social conflict 	<p><i>Components 1,2 &3:</i></p> <ul style="list-style-type: none"> - <i>Organize communities around NRM goals</i> - <i>Provide incentives to convert to more sustainable land use models</i> - <i>Offer sustainable economic alternatives to impoverished families</i> - <i>Implement relevant policy and legal frameworks to protect natural resources</i> - <i>Build capacity within CPCH and local authorities to enforce NRM ordinances and policies</i>
2. Extreme poverty in rural areas	<p>Historical/Socio-economic</p> <ul style="list-style-type: none"> - Lack of income generation opportunities - Increasingly small and untenable size of farmsteads - Social discrimination <p>Environmental</p> <ul style="list-style-type: none"> - Increasing land degradation and soil erosion <p>Political</p> <ul style="list-style-type: none"> - Lack of incentives to make sustainable alternatives more attractive 	<p>CHPC under pressure to compromise long-term sustainability for short-term poverty alleviation goals.</p> <p>Example: Forestry Sector</p> <p>Although the CHPC's Reforestation project initially focused on replanting with 70% native species and 30% exotic species, the need to secure additional revenues for local communities is forcing CHPC to make the ratio at least 50/50.</p> <p>Effects of reforestation with exotic species:</p> <ul style="list-style-type: none"> - Increased incomes for project participants - Accelerated conversion of páramos into productive plantations - Reduced biodiversity and loss of habitats 	<p><i>Components 1, 2 & 3:</i></p> <ul style="list-style-type: none"> - <i>Provide incentives to convert to more sustainable land use models</i> - <i>Offer sustainable economic alternatives to impoverished families</i> - <i>Build the capacity of local communities to seek additional resources for sustainable development plans</i>

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		<ul style="list-style-type: none"> - Predominance of pines and eucalyptus, which degrade soils - Depletion of water sources - Changed landscape, altering the experience for ecotourists 	
3. Unsustainable water use practices	<p>Poorly lined irrigation canals are prone to leakage</p> <p>Economic value associated with water is either zero (for human consumption) or too low (for irrigation use)</p> <p>Lack of understanding about environmental services provided by the páramos</p> <p>Inadequate and inappropriate institutional framework for efficient water resource management</p>	<ul style="list-style-type: none"> - Increasing water scarcity - Irregular flows of water - Social conflicts over water control and use - Few people conceive of water as a finite resource 	<p><i>Component 1:</i></p> <ul style="list-style-type: none"> - <i>Piloting a CES model</i> - <i>Raising awareness of the need to conserve and pay an adequate price for water</i> - <i>Enhancing coordination between lower watershed WUAs and conservation-oriented indigenous organizations in the páramos</i> <p><i>PIDD Project irrigation rehabilitation works</i></p>
4. Weak institutional capacity for NRM	<p>The limited or lack of technical knowledge about conservation strategies and practices</p> <p>Lack of community-based NRM planning and/or plan implementation</p> <p>Political/Legal</p> <p>Lack of policy and legal frameworks at the provincial level to promote and regulate the sustainable use of natural resources</p> <p>Poor enforcement of existing NRM ordinances</p> <p>Control of forestry ordinances recently delegated to CHPC by MAE</p> <p>No provincial policy for integrated NRM</p> <p>Poor inter-institutional coordination among Provincial Government, municipalities, local communities, NGOs, and other development actors</p>	<ul style="list-style-type: none"> - Poor leadership in NRM - Lack of effective inter-institutional coordination - Low operational response capacity - Lack of control over reforestation - Lack of protection of springs - Lack of political tools for conserving the páramos 	<p><i>Components 1, 2 & 3:</i></p> <ul style="list-style-type: none"> - <i>Capacity building at all levels</i> - <i>Enhancing coordination of all stakeholders</i> - <i>Improving NRM management</i>
5. Lack of adaptation strategies to the acute effect of global warming on ecosystems at high altitudes.	<p>Increased exposure of high altitude ecosystems, including important sources of water, to warming and drying effects of the sun</p>	<ul style="list-style-type: none"> - Glacial melting - Increase in temperature - Changes to cool, humid climate critical for water retention in páramos - Loss of native species and fauna, especially including amphibians 	<p><i>Component 1, 2 & 3:</i></p> <ul style="list-style-type: none"> - <i>Conserving páramos through replicable pilot projects (an adaptation strategy in itself)</i> - <i>Capacity building to raise awareness and empower authorities to take action</i>

Expansion of the agricultural frontier

34. The following diagram provides an overview of the major causes of degradation in the páramos of Chimborazo through a causal linkage of several of the threats cited in Table 1:



35. The history of land use within the páramos of Chimborazo commenced in the period of the Inca Empire (1200-1535 AD) when zones above 3,200 meters were dedicated to the production of potatoes and other vegetables, to the breeding of camelids, to the collection of firewood and straw, and to the hunting of animals such as rabbits, deer, and birds.¹¹ The agro-pastoral systems were based in the use of organic compost and manure; frequent rotations of agricultural sites; constant rehabilitation of physical infrastructure to improve soil and water management; and a well-suited management of ecological levels and niches. In addition, the Inca constructed extensive ditches, trenches, terraces, and walls to delineate property while also serving to collect and channel rainwater, to act as wind barriers, and to prevent erosion. They constructed various irrigation ducts, carefully maintained the integrity of lakes and other waterholes, and preserved vegetative cover in the micro-watersheds. The Inca model adapted to the zone ensured sufficient production for the population while offering sustainability over the long run—there is little evidence that the Inca faced problems of uncontrollable erosion and destruction of native species that confront the CHPC today.

36. During the Colonial period, the Spaniards used the highland ecosystems as pastureland for cattle and sheep, as did the *hacendados* of the following generation, resulting in significant landscape alterations in and during the sixteenth through the twentieth centuries. The new land uses produced two effects: (1) the aggressive conversion of native Andean brushwood into grasslands and crops that resulted in erosion; and (2) the substitution of manure produced by cattle for the traditional practices of using vegetable-based composts and infrastructure works to recuperate fertility. Meanwhile, the Spaniards and *hacendados* razed the Andean forests for primary wood materials demanded in urban centers and hunted the local fauna, some to near extinction. The new rapacious tendencies toward the landscape severely degraded the Andean soils, which were suddenly exposed to extreme winds and tropical rains on one of the steepest and most rugged topographies utilized for agriculture in the world. These changes also impacted the

¹¹ G. Ramón, 1994. "Tierras y manos indias." COMUNIDEC, Quito.

esteem and customs of local indigenous peoples, resulting in the gradual erosion of their traditional knowledge about sustainable land use practices.

37. The total area of páramos within Chimborazo, has been decreasing at a rapid rate over the past three decades for which data is available due to inappropriate natural resource use, poor sustainable management planning, the increasingly small and untenable size of farming land units, and other socio-economic pressures contributing to the expansion of the agricultural frontier. According to data from the farm censuses conducted during the 1974-2000 period, 7,486 ha of páramos (or 4.5% of the total páramo area in 1974) have been completely destroyed (see Table 2 below). The actual destruction is probably much greater, taking into consideration the land use conversions resulting from the extension of the agricultural frontier by 91,000 ha from 1974-2000. As evidenced by Table 3 below, between 1991 and 1999, 19% of Chimborazo was subject to some type of land use conversion. The páramos ecosystem was most affected by this process: during that decade alone, 53,177 ha of páramos became eroded, while an additional 28,880 ha of páramos were transformed for crops and pastures.

Table 2: Land use 1974-2000 in the Province of Chimborazo

<i>Land use</i>	<i>1974 Census</i>		<i>2000 Census</i>	
	<i>Area (ha)</i>	<i>% of total</i>	<i>Area (ha)</i>	<i>% of total</i>
Permanent crops	3,433	0.90	5,630	1.19
Transitional crops	106,144	27.92	96,951	20.56
Rest	17,654	4.64	28,387	6.02
Cultivated pastures	29,549	7.77	54,052	11.47
Natural pastures	25,374	6.68	53,613	11.37
Páramos	164,870	43.37	157,384	33.38
Shrubs and forests	24,337	6.40	65,559	13.91
Other uses	8,759	2.30	9,868	2.09
Total	380,120	100.00	471,444	100.00

Source: INEC, 1974 and 2000 Farm Census.

Table 3: Land use change during 1991-1999

<i>Land use in 1991</i>	<i>Land use in 1999</i>	<i>Area (ha)</i>	<i>Conversion %</i>
Crops and pastures	Stripped eroded / sandy soils	8,360	1
Páramo	Crops and pastures	28,880	5
Páramo	Stripped eroded / sandy soils	53,177	8
Herbaceous to arboreal evergreen vegetation	Crops and pastures	22,424	4
Herbaceous to arboreal evergreen vegetation	Stripped eroded / sandy soils	8,655	1

Source: DYA-Proyectos / ODEPLAN, Cartography y Delimitation ZEE, 2002

38. The accelerated process of soil erosion since the mid-twentieth century is primarily due to poor land distribution under the country's inadequate and ineffective Agrarian Reform process. Most properties awarded had low farm potential; are located in the same latitudinal level in the Andean highlands; and have been successively subdivided into smaller, untenable-sized lots. Thus, small farmstead owners are obliged to overuse soils and eliminate fallow periods due to lack of available space, thereby accelerating soil degradation. Over time, this degradation has resulted in the extension of cultivated and pastoral area into higher altitudes, at the expense of natural vegetation in the páramos. Haciendas still occupy most of the agricultural area in the province: 222 haciendas owned 179,624 ha while 57,923 Agricultural Production Units (UPAs), each consisting of less than 3 ha, occupied a total of only 61,572 ha. This indicates a clear

concentration of property in the hands of a few, evidence that the agrarian reform process did not substantially redistribute land holdings in the province.

39. The loss of productive soil is also due to inadequate soil-use practices such as cultivating or overgrazing steep slopes, using farm machinery on quickly eroding zones and páramos, applying agrochemicals excessively, burning native plant pastures, and utilizing land not suitable for farming or grazing. Combined with the heavy rains in the zone, these practices have increased the erosion and compaction of the soil, which has led to progressive deterioration of soils and decreased productivity. The end result of these processes is the expansion of the agricultural frontier upwards into the páramos at an alarming rate (Provincial Plan; Julian Quito).

40. Although the clearing of native forests, including páramos, is prohibited by the Forestry Law, it is a common practice within the province, not only for commercial purposes through the sale of wood, but also, on a larger scale, for displacing forest areas for farm use. Due to socio-economic conditions among the rural population, the need for access to economic resources in order to meet basic needs, and the lack of sustainable production alternatives, sale of wood is used as an emergency solution to the problem. In many cases, *campesinos* are forced to sell their forests, even under unfavorable conditions, to meet many economic needs. This extension has had disastrous consequences for the province's environment, such as loss of species, climate imbalance, reduced flows of underground water, soil erosion, changes in land uses, erosion of slopes, and loss of habitats and biodiversity (Julián Quito. 2007. *Inventario de los Recursos Naturales de las Cuencas de Chambo y Chanchán, Provincia de Chimborazo*).

Unsustainable water use

41. Chimborazo has one of the highest rates of irrigation access in Ecuador. Nevertheless, the irrigation systems are characterized by problems of inefficient capture, conduction, distribution, management at water sources, and administration of systems on the part of communities. The expansion of the agricultural frontier combined with inadequate micro-watershed management have limited water supplies and generated progressive loss of flow rates and deterioration of springs and páramos. Integrated, coordinated, sustainable water resource use has become a priority goal for the province. It is closely linked to efficient land use through techniques that acknowledge the agrological capacity of the land in order to design provincial space plans and generate agronomic plans for exploiting Farm Production Units based on soil conservation standards and crop types. Although underground resources are abundant in several basins of the country, there are no reliable statistics on their potential and on the volumes of water used. Likewise, few studies have been done, and experience in their use is limited, thereby hindering improved water management and development.

42. The primary barriers identified with deteriorating quality and increasing scarcity of water have been related to: (i) inadequate and inappropriate institutional framework for efficient water resource management; (ii) inadequate integral resource management that seen in the water resource issues that were identified; and, (iii) the problems associated with inefficient water resource use. Given the complexity, diversity, scarcity, and conflictive tendencies associated with resource use, having a local agency to regulate and establish a forum for conflict solution is an imperious need for adequate water management and development.

43. In general, there are no systems or entities to coordinate natural resource use and management in the watersheds of the province. Therefore, integral natural resource management systems need to be established for the basins in an orderly fashion (organizing basin use by suitability and purposes). It is also recommended that flow conservation and protection of water sources should use a watershed focus as an alternative for integral management. This approach takes into account land use, soil conservation, forest and natural resource protection, hydrology,

socio-economics, institutions, infrastructure, and services. It also includes consensus building, user participation and legal regulations (for agriculture, forest and pasture land, water resource use, mining control, environmental conservation, recreation and wildlife, and similar laws such as for rural development, roads and marketing).¹²

44. The strategic plan recently elaborated under the PIDDA Project's PHRD phase recommends that the micro-watershed planning process should support the following principles, given the social and ecological conditions of the Province:

Knowledge of appropriate land uses

The need to manage and conserve ecosystems within the hydraulic watershed in order to regulate the water supply during both wet and dry seasons. The effective protection of ecological Reserves is a major part of this strategy.

The recognition of social dynamics underlying land distribution and control (requiring a historical, cultural, economic, and organizational perspective on control over hydraulic waterways and irrigation systems).

The development needs, including economic growth, within the watershed, to be linked to a new mode of production that allows for superseding social inequalities of a structural nature.

45. The GEF project also will take these factors into consideration when mainstreaming biodiversity conservation objectives into micro-watershed development plans.

The irrigation sector

46. According to the third national agricultural census (2000), about 613,000 ha are irrigated annually in Ecuador. While irrigation concerns only 20% of cultivated land¹³ and 30% of farmers, it is responsible for 70% of the value of agriculture production and most of agricultural exports. Agriculture and irrigation production are characterized by two high land productivity belts: one in the cantons surrounding Guayaquil, a large port for exports, and another one in the cantons surrounding the capital city of Quito, with an important national market and an international airport for the exports of horticulture crops (i.e. flowers and berries).

47. Nationally, about a quarter of the irrigated land is managed under larger public irrigation systems, while the balance is managed under private or community systems. The administration and operation and maintenance (O&M) of 35 public irrigation systems were transferred to Water Users Associations (WUAs) in the 90s, while 38 remain operated publicly.

48. The main issues that affect the irrigation sector in Ecuador are: (a) the lack of an central institution responsible for irrigation and drainage; (b) the lack of a national irrigation strategy and plan; (c) inequitable water rights¹⁴ with a bias against small scale irrigation organizations and

¹² Provincial Plan, 2001; Julian Quito, 2007.

¹³ Cultivated land includes land under permanent and temporary crops, and excludes permanent pastures, meadows and fallows.

¹⁴ Ecuador's Water Law (1972) stipulates and controls the right to use water resources for domestic, industrial, irrigation and other uses. Water concessions, which are for a duration of 10 years and are renewable, are issued by the National Council of Water Resources (CNRH) based on requests by water users submitted through provincial level Water Agencies (*Agencia de Agua*). Fees are paid annually according to the concession volume. In the case of irrigation, fees are based on the size of the irrigated area as well as number of water users. The majority of water use in Chimborazo is legal, or within the water concession level. Ninety percent of the irrigation water concessions in the province are for WUAs, and the remaining 10% for individual users. In theory, WUAs are headed by an management team composed of President, Vice President, Secretary and Treasurer, which supervises the overall O&M of the system and is responsible for ensuring cost recovery for the water fee as well as for O&M activities.

without adequate regard to water balances (i.e. over-concession is common); (d) lack of equity, with regard to water distribution within the irrigation systems; (e) very low water users participation in public systems not transferred to WUAs; (f) lack of information especially on small private irrigation; (g) irrigation fees in public schemes, whether transferred or not, insufficient to ensure adequate O&M; (h) low water use efficiency (due to poor O&M, unimproved irrigation technology, low value crops); (i) some irrigation systems do not have adequate source of water supply (i.e. reduction of water flows due to competitive use, expansion of irrigation schemes); (h) no system to promote improved irrigation systems; (j) low level of administrative and organization capacity in the majority of irrigation systems and (h) lack of support to small private and community-based irrigation.

49. Chimborazo irrigates annually about 51,000 ha, or 25% of the land used for the production of crops and fodders. About 39% of the farms (31,550 farms) include some irrigated areas. This represents 1,472 irrigation schemes, the majority of which are small, private or community-based schemes, of less than 100 ha. The largest system is the Chambo-Guano system, with 4,000 ha. 60% of irrigated land is under private or community-based schemes, while the balance (9,000 ha) is managed by 4 public irrigation systems, serving 8,000 farmers. The quasi totality of irrigation systems depend on surface water and consist of a network of canals (*acequias*), generally unlined, with very rudimentary water intakes and distribution systems. About 90% of irrigated land is under traditional surface irrigation. In these systems, irrigation efficiency is very low. The use of improved on-farm irrigation technologies, such as drip and sprinkler irrigation, is increasing, but still limited. It developed in the bottom-valley, for horticulture production, for sale in the increasing urban markets.

Table 4: Characteristics of public irrigation systems in Chimborazo

<i>System</i>	<i>Canton</i>	<i>Potential irrigation land (ha)</i>	<i>Actual irrigation land (ha)</i>	<i>Water extraction (l/s)</i>	<i>No. of users</i>
Chambo-Guano	Riobamba-Guano	7,000	5,546	5,000-6,000	12,126
Quimiag	Riobamba-Chambo	2,000	1,794	1,700	2,500
Licto	Riobamba	1,750	700	1,200	1,350
Cebadas(*)	Guamote	1,000	649	600	1,765
Total		11,750	8,689		17,741

(*) This system has been transferred to users

Source: CODERECH (2005)

50. Irrigation in Chimborazo is characterized by small-scale, traditional farms primarily dedicated to food crops (potatoes, vegetables, temperate fruits and cereals) and livestock (pasture, cattle and sheep) production. About 35% of agricultural units that have irrigated land are less than 1 ha, and more than 50% less than 2 ha. Small farms, whether served by public or private/community schemes, face many difficulties accessing adequate water supply and technical and financial production means and have not received enough attention from the state considering their socio-economic importance (i.e. number of families that depend on those systems for their livelihood). Irrigation mostly produces low-value crops for farmers' self-consumption. Yields and cropping intensity are low. Overall water use efficiency is also low, mainly due to the wide use of unimproved irrigation technology and deteriorating infrastructure due to poor O&M. A significant share of the command area is not actually irrigated by lack of water due to deteriorated infrastructure and insufficient water flows. Conflicts over water use are increasing. Decreasing

water flows are due to over-concessioning of water resources and the degradation of the páramo, the source of groundwater recharge and stream base flows, due to the extension of the agricultural land and over-grazing.

51. One of the key actions in order to secure water supply and increase productivity in lower lands is to incorporate strategies to sustainably manage the highland ecosystems, particularly páramos, which as described before, have a critical role in storing water. The strategic linkage with the PIDD project will help to rationalize the use of water in the Province, while new management approaches including adequate incentives for conservation will help to reduce the threats over the páramos; the irrigation improvements will substantially reduce water loss and will increase the irrigated area in the Province. The improved irrigation systems will actually become one of the most important incentives to local communities to become actively involved in the implementation of improved agricultural practices as proposed under the project.

Economic value of water

52. In Ecuador water for irrigation use is considered a national good for public use. It is not susceptible to appropriation, though the management and laws regarding water are a constant source of conflicts in the rural sector (with the wealthy hacienda owners often exerting control over this key resource). The Water Law establishes that concessions must be controlled and designated according to priorities (human consumption, agriculture, industrial use, and energy). This law also mandates the necessity of the direct participation of the state in the planning, administration, control, and regulation of the use of water in irrigation activities.

53. Before May 2008 the Consejo Nacional de Recursos Hídricos (CNRH) was the national organization responsible for regulating the management of hydrological resources in the country, including water for human consumption, for animal consumption, for irrigation, and for industrial purposes. In Chimborazo, the Corporación Regional de Desarrollo de Chimborazo (CODERECH) was responsible for the management of infrastructure for irrigation. The Riobamba Water Agency, an entity dependent on the CNRH, was responsible for the distribution and regulation of water concessions, in the administrative mediation of water conflicts among users, and in the legal regulation of laws. But the law does not preclude the monopoly of use—an analysis of beneficiaries of irrigation reflects the structure of property and the concentration of power. Water distribution is highly unequal.

54. May 15, 2008 SENAGUA (National Water Secretary) was created by Executive Decree 1088 at the level of Ministry and with the mandate to lead and coordinate the processes of management of the national water resources in an integrated and sustainable manner. The water resource management should be decentralized using the watersheds as the management unit and under the responsibility of local watershed management committees accredited by SENAGUA. The responsibilities of SENAGUA include the regulation of water concessions and options for requesting compensation from water users for conservation of resources. SENAGUA is leading the process of formulation and proposal of a new water law which will further detail the roles and responsibilities in water resource management, which will be taken into account during project execution.

55. Currently in Ecuador there is no standard nation-wide water tariff; instead, tariffs are developed on a provincial basis. A study commissioned by the IBRD loan *Rural and Small Towns Water Supply and Sanitation Project II* (PRAGUAS) concluded that water tariffs across the country covered about 2/3 of system O&M costs in 2001. National and sub-national (provincial and municipal) government transfers were required to cover the operation and maintenance gap and to finance coverage expansion. Recently, Ecuador has been implementing policies to make water pricing more transparent and to phase out subsidies, particularly for irrigation and drinking

water. While water companies are gradually increasing their tariffs to reflect operational and maintenance costs, to date no account has been taken of watershed management costs. A recent survey of water users in Quito suggests that there is a willingness to pay higher fees for conservation purposes.

56. The CHPC recognizes that water tariffs for human consumption/sanitation and irrigation are excessively low, and has requested the World Bank's assistance in determining an appropriate economic value, taking into consideration not only O&M costs but also reinvestment schemes for improved watershed management. There is a charge for human consumption of water within the city of Riobamba where the water supplied is potable. In other areas of the province, where the water supplied is not potable, water for human consumption is free. Within Riobamba, water charges average around US\$2-8/month per family, depending on the amount consumed, and taxes are roughly US\$10 per month. These taxes cover other services such as sewage, garbage collection, and maintenance of basic equipment. There is, however, a cost for using water for irrigation purposes throughout the province, though it is so low that it does not cover the maintenance costs associated with irrigation. The revenue goes directly to the Municipality, which often subsidizes the financing gap.

Tourism in Chimborazo

57. The ecotourism zone in and around the Chimborazo National Fauna Reserve and Sangay National Park represents 33% of all tourist attractions in the Province. Four of the eleven sites (the Achipungo range, Ozogoché lakes, Cubillín snowcap, and Minsas páramos) are good for adventure tourism and for observing flora and fauna. Several studies suggest that tourism could become one of the most important sources of revenue in the province.¹⁵ Currently, however, lack of information and publicity aimed at tourists, and the low quality and supply of tourism services and infrastructure, have limited the development of this sector, making the Chimborazo province a stepping-stone on the way to other tourism destinations in Ecuador.

58. Within the framework of community ecotourism, the Organization of American States, together with the Ministry of Tourism, is implementing a survey in Chimborazo for the national registry of community ecotourism supplies. This registry is part of the National Plan to support the promotion and commercialization of community tourism products.¹⁶ Studies in other provinces reveal that marketing and commercialization constitute the primary difficulties for communities because they are far from large cities and the population lacks training.

59. In and around the Chimborazo National Fauna Reserve, ecotourism experiences have been ongoing since 1999¹⁷ with the *Federación de Organizaciones de las Faldas del Chimborazo* (FOCIFCH), made up of seven communities and/or associations covering 403 families and 1,851 inhabitants who identify as Puruhae Indigenous Peoples and speak Kichwa. In 1987, when the government involved the territory of these organizations to create the Chimborazo National Fauna Reserve, there were socio-environmental conflicts in the province due to the threats of expropriation and prohibition of farming and grazing activities due to the fragility of the area. Mobilizations by these communities lead to the signing of an agreement with the State, by which the latter agreed to respect indigenous properties and plan development with the participation of

¹⁵ Tourism Inventory for the Chimborazo Province. *Fundación Geonova*; 1995 - Memoirs of a Workshop on Sustainable Tourism: an Alternative for Community Development; *Fundación Esquel*; 2001.

¹⁶ Ministry of Tourism, OAS Project, Municipality of Colta, Workshop to register community ecotourism supplies in Ecuador, October 2001.

¹⁷ P. Noboa and M.Á. Pacheco. 2001. "Ecoturismo en los páramos de la Reserva de Producción Faunística Chimborazo: la Experiencia del FOCIFCH en GTP." *El Ecoturismo en los Páramos*, pp.72-79.

local organizations. Ecotourism, which until then had been carried out by persons from outside of the communities, became an important focus of activities to generate income in local communities, the legal owners of most of the territory involved.

60. This sustainable tourism experience began with a process of training through Native Guide and Naturalist Guide courses provided jointly with personnel from the Reserve's head office. Participatory work was then done to design tourism products (according to technical design and load capacity requirements) and develop services such as guides, lodging, food, transportation, crafts, etc. The primary objective of this sustainable tourism activity is to improve the quality of life for family members of FOCIFCH, which has received the cooperation of various institutions (*Escuela Superior Politécnica de Chimborazo, Centro de Educación y Promoción Popular, PRODEPINE, Ministry of the Environment, Ministry of Tourism, Canadian Cooperation, etc.*).

61. Several ongoing projects of FOCIFCH include: forming "conservation corps" through training in sustainable natural resource management for over 100 youth of the FOCIFCH communities; preparing páramo management plans and cultural management plans; and setting up a community tourism operator. Although FOCIFCH's experience has the support of the Ministries of Tourism and the Environment, it has still not been legalized.

Lack of adaptation strategies to global warming

62. Ecuador—and especially its highland region—is highly vulnerable to climate change impacts. Its agriculture sector is especially vulnerable to the El Niño Southern Oscillation signal, for which mounting evidence shows a link to global warming, posing a serious risk to local agricultural production and to productive infrastructure. Bradley, Vuille and Vergara (2006) have predicted rapid warming of the Andes as global warming proceeds; this will affect the sustainability of the water supply for high altitude cities and irrigation, and will threaten the integrity of Andean ecosystems. Among the key biodiversity assets contributing to the balance of the water resources in Chimborazo's highland ecosystem is the páramos and its associated vegetation, due to their high water retention characteristics. The deterioration of the páramo may be one of the reasons of the decreasing water flows in rivers, impacting the irrigated agriculture. Thus, the optimization of irrigation systems as well as conservation of the páramos may contribute to the development of adaptation strategies.

Reforestation with native species versus reforestation with exotic species

63. A prime example of the conundrum facing the provincial government is the challenge of reforesting eroded areas with a combination of native species (currently 70% of reforestation in ha) and exotic species (currently 30% of reforestation in ha). Because native species are not economically viable at present, local populations are demanding more exotic species, and the ratio will be increased to at least 50/50.¹⁸ To counter the prevalence of exotic pine and eucalyptus species in the páramos, the CHPC has enacted an ordinance to mandate the preservation or reforestation of native species around springs or other waterholes, though this regulation has been poorly enforced and quite ineffective, according to government actors.

64. The CHPC has already invested US\$500,000 into the Reforestation Macro project, and plans to increase this amount in the next few years. In order to reverse the destruction of native and planted forests, the Province's Reforestation Macro project helps communities to establish massive plantations and agro-forestry systems following long, medium and short-term planning

¹⁸ Personal communication with the Prefect of the Province of Chimborazo.

processes. The first step in this process is the implementation, management, and production of native and exotic forestry plant species in community or inter-community nurseries. These nurseries are like educational centers where the community –men, women and children–learn production technologies and methodologies to be subsequently applied in the households. Forestry plantations serve the following functions: crop protection against wind and frost; live fences; forage production in silvopastoral systems; soil protection and firewood production; and protection of springs. Depending on the conditions of each community, plantations may also produce fruit plants and install beds for lombriculture, compost, and vegetable gardens, according to whatever the community plans.

65. The GEF project will assist the CHPC in devising an incentive package to make native species planting a more attractive option in and around the delicate páramos, and will improve the CHPC's capacity to monitor and enforce both existing and newly proposed regulations. The project plans to assist the CHPC in redirecting reforestation efforts with exotic species toward extremely degraded areas at lower altitudes, far away from the páramos.

Management of camelids versus management of sheep and reforestation with exotic species

66. Although calculations demonstrate the clear economic advantage of managing and commercializing the sub products of alpacas and vicuñas over other conventional activities in the páramos (such as sheep herding or even reforestation with exotic species), a lack of capacity building and incentives framework means that few local communities have invested in camelids. Instead, they continue to sell the subproducts of their sheep—first introduced during the Colonial era—and if the opportunity presents itself, they engage in pine reforestation programs to supplement their incomes.

67. The Chimborazo National Fauna Reserve currently hosts 2,683 vicuñas that roam freely around the Reserve's 30,000 ha. Although vicuñas in Ecuador remain in Annex 1 Status ("Protection"), the case will be made to the CITA Convention in November to petition for a change of status to "Management." This status adjustment is necessary in order to begin planning for the eventual commercialization of vicuña sub products by indigenous communities in and around the Reserve.

68. Eighty percent of the Chimborazo National Fauna Reserve is the property of indigenous communities, five of which already collaborate with the Reserve to manage 500 alpacas.¹⁹ Alpacas are one of the four South American camelid species, and community members primarily utilize the wool to weave hats and other apparel or handicrafts to sell to tourists. Few locals are aware, however, that vicuña wool fetches an extremely high price on the international market: whereas sheep wool is worth US\$0.30/Kg and alpaca wool is worth US\$2/Kg, the wool of a vicuña can reach values of US\$600-1,000/Kg.

69. Since the productive potential of the páramos is not very high, introducing and exploiting alpacas, llamas, and vicuñas has turned out to be one of the few successful alternatives for these regions. These species are adapted to high altitudes, have good meat and wool production rates and are attractive to the high-quality woven goods market. Furthermore, camelids have a much more negligible environmental impact on the páramos ecosystem compared to sheep. Therefore, this is a suitable line for sustainable páramo use in order to create jobs and generate profits without greatly disturbing these ecosystems.

¹⁹ The initial investment in the alpaca management plan has been US\$450,000 to date.

70. The challenge, however, lies in organizing the communities to better market their products outside of their isolated communities. Indigenous and *campesino* people in this line of production require special marketing assessment. In the case of the domestic market, commercialization may be based on advance purchase contracts signed directly with local textile companies showing an interest in this type of product. At later stages, the project might begin manufacturing garments, which requires larger investments in infrastructure and designs. Part of the Reserve's action plan is to collaborate with many more local indigenous communities to improve the sustainable management of the more lucrative vicuñas. One specific plan is to construct a community center for collecting camelid wool for eventual export to international destinations, following the successful example of countries such as Peru. It has even been suggested that a brand name for the Chimborazo National Reserve be developed to help commercialize the products associated with the region's sustainable development.

71. To reach these conservation and livelihood improvement goals, the Chimborazo National Fauna Reserve's Action Plan recommends the following steps be taken: (i) planning development and conservation of natural páramos, intervened páramos and buffer zones of protected areas; (ii) introducing and exploiting alpacas to produce high-quality yarn; (iii) good genetic, nutritional and sanitary management of these animals; (iv) adding value to the output (primarily yarn and hides) in order to improve profitability of the chain.

Annex 7: Social Assessment

Management of Chimborazo's Natural Resources **CHPC-GEF-FAO Project**

Background

1. A Social Assessment (SA) was carried out under the IBRD-funded PIDD Project providing key information on the social and cultural aspects at the Province level. The PIDD SA served as the basis to develop the complementary SA for the specific interventions of the GEF NRM Project. The final report was disseminated among key stakeholders on a workshop held at a provincial level on June 27, 2008. Based on the information provided and consultation carried out, it can be said that Project is expected to have a positive impact among the Chimborazo's poor communities at the selected sites. It is also expected that the project will set the stage to replicate the project strategies and upscale sustainable NRM activities at the provincial level.
2. The CHPC has very extensive experience in consultation (Participatory Budgeting, Participatory Strategic, Development Plans, and Minga for Life). The consultations undertaken during the preparation identified key social issues that could be affecting the proposed project results and the indigenous peoples. The SA gathered and validated demographic, social, and cultural information. The SA involved consultations with CHPC authorities and technical staff from the municipalities represented at the selected watersheds, water users and indigenous organizations.
3. The main issues being addressed by the SA were the following: (i) mapping of main actors and potential project beneficiaries at the selected sites of project implementation; (ii) identifying current agricultural production systems and land use; (iii) assessing local capacity for NRM; (iv) assessing the local willingness to develop new sustainable NRM practices; v) proposing recommendations to ensure that the proposed activities will have positive impacts on beneficiary communities and its organizations. The SA provided guidance to work with other local participatory initiatives of the CHPC and determined specific capacity-building activities that will contribute to ensure the engagement of beneficiaries. It also established the social indicators that will be incorporated to the NRM monitoring system under Component 3, including those culturally appropriate instruments to facilitate social accountability activities.
4. During the preparation of the SA, consultation activities were undertaken to identify key social issues of the proposed project given the social, environmental, and economic factors, and assessed whether the proposed project is likely to meet its social objectives. The SA was carried out in rural areas, specifically at the five selected micro-watersheds including the Chimborazo Fauna Reserve. The assessments of key social issues are part of the project files upon completion. Interviews with different institutions, community leaders, potential environmental services providers, and other stakeholders are filed and documented.
5. The SA enabled the identification of the major risks related to the project's social dimensions, and the incorporation of risk-management measures into project design. The main issues raised by the study are the following: (i) current agricultural practices and land use that force local communities to expand the agricultural frontier towards fragile ecosystems; (ii) low NRM capacity at the community level; (iii) lack of incentives and resources for the implementation of an integrated NRM which jeopardise innovation and a territorial approach to improve current NRM. This is particularly evident in the cases of the NRM of the Chimborazo Reserve confronting a poor implementation of plans and with low sustained impacts in the field; iv) high rate of migration among the inhabitants of the selected micro watersheds and across the Province, which impacts and limits results of the local organizations and producers associations endeavours.

Social Features at the Provincial Level

6. According to the last census in Ecuador, the indigenous population is estimated to comprise nearly 7% of the total population. The estimation is based on both the number of indigenous language speakers and on self identification among indigenous individuals (Larrea & Montenegro 2006). The Ecuadorian state recognizes 13 ethnic groups (nationalities) settled across the country. The Kichwa nationality accounts for nearly 90% of the total country's indigenous population and the majority settled in the Province of Chimborazo (Uquillas and Van Nieuwkoop 2003; SIISE 2003).

7. The social indicators of the province show that rural residents face low access to public services and high rates of maternal and child mortality, illiteracy and child labor. According to the WB report on the "Economic Opportunities for Indigenous People in Ecuador" (WB 2006) as well as a number of other studies' findings, indigenous people are more likely to be engaged in occupations such as small unskilled agriculture and subsistence farming (ibid).

8. For nearly one fourth of the Chimborazo population, the Kichwa language is their primary spoken language, although most of the indigenous population is bilingual (Spanish). The Kichwa speakers in the province are concentrated in Guamote (77%), Colta (67%), Alausí (30%) and Riobamba (11%) cantons²⁰. The Kichwa communities are the main settlers of the selected sites for the project implementation, including in the buffer zones of the Chimborazo the Reserve and the Sangay National Park. The estimated number of indigenous communities in the project site is 1,544. The following table presents the distribution of the indigenous communities by cantons.

Table 1: Distribution of indigenous communities by cantons

Cantón	Communities	Population	% compared with mestizos
Riobamba	166	68,865	35.62
Alausí	69	22,413	52.34
Colta	155	46,800	100.00
Chunchi	15	4,483	35.94
Guamote	112	33,608	95.45
Guano	19	7,460	19.69
Pallatanga	9	810	7.50
Chambo	9	2,450	23.24
TOTAL	554	186,889	46.3

Fuente: Ramón, Galo, El Mapa de Territorios Étnicos del Ecuador, 1996.

9. In the Chimborazo province poverty affects nearly 87% of the population (CODERECH 2007). More than half of the population does not meet its basic needs, and the province has the second highest rate of rural indigence within the country. Evidence shows that in Chimborazo the rural indigenous population has lower levels of education when compared with national standards, and with an important gender gap. The Colta, the Alausi, and the Guamote cantons have the highest illiteracy rates in the province.

²⁰ The Kichwa indigenous nationality in Chimborazo self-identify themselves as the Puruhua *pueblo*.

Table 2: Illiteracy rates (%)

By sector		By gender		By ethnic group	
Urban	8.5	Women	18	Indigenous	38.2
Rural	23	Men	11	Mestizos	0.04

Source: SIISE (4.5)

10. Women access to education is limited, and the situation confronting indigenous men does not differ when compared with national rates. Illiteracy in the province affects 18% of indigenous rural women. School attendance among indigenous population is low and the average years of primary school attendance is four. Similarly, indigenous peoples have less access to basic infrastructure, such as water, sanitation and electricity, which is hindering their entrepreneurial activities in rural areas.

Table 3: School desertion rates (%)

	1996 - 1997	1998 – 1999	1999 – 2000
Chimborazo			
Urban	10.10	8.43	8.5
Rural	11.38	10.62	11.95
Total	10.74	9.50	10.19
National			
Urban	9.47	8.26	8.30
Rural	10.65	9.84	10.06
Total	9.85	8.76	8.86

Fuente: SINEC, 2001; elaboración: DYA - Proyectos

Local Organizations

11. There is a large number of indigenous organizations registered in Chimborazo, at the provincial level three organizations hold the largest number of associates: The Indigenous Movement of Chimborazo (MICH), which is ascribed to national organization; (ii) the provincial Association of Indigenous Evangelic Organizations at regional level; (iii) and the Chimborazo Coordinator of indigenous and peasant peoples (COPICCH), which comprise second-tier organizations and grassroots organizations.

12. Despite the large number of indigenous organizations, they have been gradually losing their role as development executing bodies, and are being replaced by the parishes (Juntas Parroquiales) and municipalities. The provinces' so-called "alternative municipalities," in Colta, Alausí, Guamote and Pallatanga have elected indigenous majors, who have prompted citizenship participation based upon the traditional social indigenous practices. Parishes and municipalities are increasingly responding to demands posed by its constituencies for "participatory democracy," which involves wide consultative processes and social accountability.

13. In 2007, there were 178 public and private institutions within the province working in development, of which 37 are delegations of the central government (20.78%), 85 are NGOs and development agencies (47.75%), and 56 are local governments (31.46%). However, there is a lack of coordination among these many players and networks in seeking to establish complementarities, though in some cases coordination and synergies have been enhanced (as in the case of the Hydro

Forum, the project of the Chanchán Cooperation, the PLANTEL project and the recent participatory budget of the CHPC).

Table 4: Development institutions in Chimborazo, by nature and sector

	Govt.	NGOs	Other	Total	%
Agriculture	2	7	10	19	8.6
Environment	1	3	1	5	2.3
Social well-being	5	0	0	5	2.3
Citizenship	13	3	22	38	17.3
Community development	0	27	27	54	24.6
Disability	0	3	4	7	3.2
Education	4	7	17	28	12.7
Women & family	1	6	10	17	7.7
Children & adolescents	2	3	4	9	4.1
Productive	2	2	13	17	7.7
Water Resource & roads	2	1	0	3	1.4
Health	2	6	3	11	5.0
Tourism	1	1	1	3	1.4
Housing	1	0	1	2	0.9
Unclassified	0	2	0	2	0.9
Total	36	71	113	220	100
%	16.4	32.3	51.4	100	

Source: Fundación Alternativa, 2002.

Map of Social Actors at the Province Level

14. **Indigenous Communities:** It is estimated that Chimborazo has 554 Indigenous communities, of which over a third are distributed among the districts of Riobamba, Colta, and Guamote.

15. **Second-tier Organizations:** They provide development resources (finances and capacity building), promote leadership and carry out social accountability. These organizations at grass-root level are regrouped in federations (third-tier organizations), and are part of the national indigenous movements, and include a number of political tendencies.

16. **Water User Associations (WUAs):** These are associations of irrigation water users, and are part of the Provincial Federation of Water User Organizations "Interjuntas de Chimborazo" operating at the provincial level. This Federation supports four main lines of action: (i) organizational strengthening of the water groups, (ii) provision of legal resources to defend users' rights, (iii) provision of mediation and arbitration services and resources for water users and access to natural resources, and (iv) support for improvements of the infrastructure. Their main actions are management and support for the irrigation system administration, O&M, water distribution, and the collection of fees of the systems. The WUAs work with local, national, and international NGOs, and with third-tier organizations. Currently there are about 200 WUAs in the province.

17. **The Third-Tier Organization:** These are organizations that encompass second-tier organization and which have religious orientations. This is the case of the Asociación Indígena Evangélica de Chimborazo (CORPOCEICH), an evangelical organization that unites about 18 groups of community churches. Despite the difficulty in achieving stable coordination among this level of organizations, they have strong abilities to bring people together, interact with the population and respond to local development demands.

18. **Parish Committees** are the local government agency for rural jurisdictions within the cantons. They have executive functions and carry out social accountability and citizen oversight activities. In Chimborazo, there are 45 Parish Committees in the rural area. The SA confirmed that

these Committees are considered and perceived by local settlers as key actors due to their capacity for interaction and channeling territorial and sectoral demands.

19. **The Parliaments or Civic Committees** with a territorial scope located in urban centers where the canton's administrative capital is based. The province has six civic committees or Parliaments that operate with relative regularity in the cantons of Guamote, Colta, Alausí, Pallatanga, Penipe, and Riobamba. For the purposes of this project, the SA identified them as key local actors due to their ability to receipt local demands and needs.

20. **Nongovernmental Organizations (NGOs):** Chimborazo is one of the provinces with the largest support from international organizations in Ecuador. Established since the 1950s, there are currently over 200 NGOs actively working on a range of sectors, implementing development projects or providing services throughout the Province. The NGOs are for example supporting micro-enterprises development, health and education services provision for children and women, environment and conservation, irrigation among others.

Table 5: Map of actors at four of the selected microwatersheds

1. Chambo Watershed		
	Rio Cebadas watershed	Rio Blanco watershed
Location	1 54'30.43" South and 78 38'27.84" East	North: upper limit is 2,380 m.a.s.l., geographic limits are the Blanco River and the Chingazo mountain, South: up to 4,400 m.a.s.l. at Pailacajas mountain East: up to 5,320 at the Altar mountain. West: up to 3,500 at the Tusapalán mountain.
Total extensión	16,272 has	14,495,10 has
Population	3.954	5,000
Area of páramos	11,672 has	5,410 has
Area of crop lands	4,600 has	4,500 has
Agricultural productive system	Extensive	Extensive
Indigenous communities	Gaurón Cochapamba, Cenán Alianza, Cabecera Parroquial, San Antonio de Cebadas, Tres Aguas, Ishbug Curiquinga, Ishbug Utucún, San Vicente de Tablillas, Coop. Ichubamba Yasipan, Reten Ichubamba:, Sector Reten, Sector Gualiñag, Sector Macalete, Pancun Ichubamba, Sector San Nicolás, Sector Tabialpamba, Sector Ichubamba, Atillo, Ozogoche	QUIMIAG, Rio Blanco, Anshical Verde Pamba, Laguna San Martín, Chañag San Miguel, Palacio San Francisco, Zoila Martinez, Chiniloma, Salí, Rayos del Sol, La Tranca, Chilcal Pucara, PENIPE-LA CANDELARIA, Releche, La Candelaria, Tarao, Gaviñay, Nabuzo
Indigenous organizations	Corporación de organizaciones Indígenas de Cebadas (COICE), grouping 24 base organizations	Consorcio Interinstitucional para el Manejo Integral de la Microcuenca del Rio Blanco. Holding 13 institutions (public and NGOs) and 2 indigenous organizations.
	Unión de Organizaciones Populares "La Minga, including 10 base organizations	Unión de Organizaciones Campesinas de Quimiag (UNOCAQ).
	Junta General de Usuarios del Sistema de riego Cebadas, formed by 800 producers Prom. different communities	Junta General de Usuarios del Sistema de Riego Rio Blanco Quimiag.
	Iglesias Unidas (UNIEPC), made up of 18 base organizations	

Source: SA Map of actors identified at the selected micro-watersheds (2008)

2. Chanchán Watershed

	Atapo-Pomachaca watershed	Zula-Guasuntos watershed
Location	1 50' to 2 14' S, 78 3' to 78 51' E	
Extension	11.713 has	13.920 has
Population	6.373 hab	12.341 hab
Surface with páramos	8.748 has	3.352 has
Area with crop lands	2.965 has	10.468 has
Agricultural productives system	Extensive	Extensive
Indigenous communities	Tixán, Aña Moyocancha, Añac, Bosilche, Busay, Carolina, Chalaguan Grande, Chiniloma, Cocan San Patricio, Curiquinge, Curiquingue, El Cortijo, Estacion De Tixan, Gasnia, Gusnia, Hacienda Pachamama, La Laguna, La Pacifica, Las Mercedes,, Llallanag , Moyacancha Chico, Pachagsi, Pachamama Chico, Pachamama Grande, Pueblo Viejo, Pungupala Alto, Pungupala Bajo, Quichud, Quislag Chico, Quislag Grande, San Carlos, San Fransisco De Pishil , San Vicente, Sanganao, Santa Cecilia, Santa Julia, Santa Lucila, Santa Lucita, Santa Rosa, Shucos, Sil Veria, Sta Cecilia, Uzuquiz, Yacupungo, Yanayacu, Yujaute Alto, Yujaute Alto, Miangus, Nausan	Guasuntos, Abogrus Chico, Abogrus Grande, Aguaisa, Canal, Cashcahuan, Cherlo, Cumbilla, Julias, La Moya, La Playa, Molobog, Niarignachi, Pashcay, Pocate, Shuid, Tolatus, Achupallas, Cuchaloma, Cullca, Esperanza, Gasatus, Gulahuaico, Guncan, Hierba Buena, Huanca, Huangra, Huangra Loma, Huasachaca, Guaylla Chico, Guaylla Grande, Juval, La Dolorosa Zula, La Estancia, Letrapungo, Llilla Chinihuaicu, Llindilig, Mapahuiña, Mor As Pamba, Osogoche Alto, Osogoche Bajo, Pacay, Pallaguchi, Palmiras, Pomacocho, Pucará, Pucará, Quishuar, San Antonio, San Antonio De Juval, San Carlos, San Francisco, San José De Guarumal, San Ramón, Saucay, Shaglay, Tauri, Timbuyacu, Totoras Corralpamba, Totoras Cucho, Totoras Huiche, Totoras Llullin, Zhumid
Indigenous Organizations	COCAN, comprising 11 base organizations and 2,439 indigenous inhabitants. INKA ATAHUALPA, holding 17 base organizations and 3,934 inhabitants	ZULA, comprising 12 base organizations and 5,867 inhabitants INGAÑAN, with 9 communities and 4,060 inhabitants RUMIÑAHUI, comprising 14 base organizations, and a population of 2,414.

Source: SA Map of actors identified at the selected microwatersheds (2008)

21. As indicated in other sections the Chimborazo Reserve and its buffer zones is inhabited by indigenous communities with similar agricultural production systems and NRM practices. These communities have been involved in the implementation of NRM projects supported by the Government and donor agencies, following the established in the Reserve's management plan²¹ (table below). Thus conservation practices themselves are not new for these communities. In the Chimborazo National Fauna Reserve and its buffer zones, ecotourism experiences have been ongoing since 1999²². This is the case for example of the indigenous organization the Federación de Organizaciones de las Faldas del Chimborazo (FOCIFCH), made up of seven communities and/or associations covering 403 families and 1,851 inhabitants, which is the most active organization on ecotourism. Since the late 1980s, ecotourism has become an important source for local income activities. The SA evidenced that the programs and projects supported by NGOs and public

²¹ According to the Environmental Management Law, the Fauna Production Reserve is a conservation category established with the sole objective of recovering and conserving native fauna species through specific management strategies developed in coordination with local communities. In this sense, the access to natural resources is not as restrictive as in a national park, although it is expected that the overall welfare of local habitats is secured in order to make feasible the conservation of critical fauna species. According to this, the main objective of the Chimborazo Reserve is to recover and conserve populations of native species, particularly camelids (vicuñas, alpacas and llamas), through promoting the breeding by local communities as an aspect strongly linked to the province's cultural identity.

²² P. Noboa and M.Á. Pacheco. 2001. "Ecoturismo en los páramos de la Reserva de Producción Faunística Chimborazo: la Experiencia del FOCIFCH en GTP." *El Ecoturismo en los Páramos*, pp.72-79.

institutions as the ones mentioned, when supports a participatory approach this reduces the risk of conflicts during the project implementation and enhances its results.

22. Indigenous Communities are the major settlers of the Chimborazo Fauna Reserve' buffer zones. Nearly 80% of the buffer zones belong to organizations, communes, cooperatives, associations. Many of these indigenous and campesinos have a communal property in the paramos (Ministry of Environment, 2004). The project's Social Assessment highlighted that 4 indigenous organizations (grouping about 38 communities), and one private company (Chimborazo Cement) share the limits and buffer zones of the Reserve belonging to 2 municipalities, 2 "juntas parishes".

Table 6: Indigenous Organizations of the Reserve's Buffer Zone

Chimborazo Fauna Reserve	UCASAJ (Union of indigenous organizations from San Juan)	28 community organizations
	FOCIFCH0 (Federation of organizations of the Chimborazo's skirts)	13 community organizations
	COICAL (Corporation of indigenous from Calpi)	17 community organizations
	CORCACH (Corporation of Indigenous from Chimborazo)	15 community organizations

Source: SA Map of actors identified at the selected micro-watersheds (2008)

23. The SA evidenced that very important alliances for community work are already established. According to the SA specific and minor conflicts among the settlers are confronted in relation to NRM. The SA also indicated that there is an overall positive relation among stakeholders that could be strengthened with the development of natural resources management strategies. Generally conflicts which have emerged as a result of local confrontations or dispute for natural resources would not pose risk to the development of the proposed project activities. However, the gradual expansion of the agricultural frontier poses challenges for the project as to what substitutive activities should be reinforced and supported by the project to ensure local income generation and conservation.

Table 7: Programs and Projects: Chimborazo Reserve Fauna

<u>Indigenous Organizations in the Buffer Zones of the Reserve</u>	<u>Projects and Programs currently been implemented</u>
UCASAJ(Union of Indigenous Organizations from San Juan)	Ecociencia: Bioandes Agroforestry and territorial planning project
COICAL(Corporation of Indigenous from Calpi)	GPCH ²³ : Protection of watersheds program CODENPE ²⁴ : water and sanitation projects SNV ²⁵ : integrated farms production
FOCIFCH(Federation of organizations of the Chimborazo's skirts)	GPCH: Protection of watersheds program, Ecociencia: Bioandes Paramos management

²³ GPCH: Provincial Government

²⁴ CODENPE: Consejo de Desarrollo de las Nacionalidades y Pueblos del Ecuador

²⁵ SNV: Servicio Holandés de Cooperación

24. The Sangay National Park was legally established in 1976 and in 1983 UNESCO declared as a “World Heritage Site”. The buffer zones currently register approximately 120 organizations of local settlers including cooperatives, pre-cooperatives, indigenous associations, and communal organizations. There are clear evidences of numerous cultural linkages between local ethnic populations and the Park, including ancestral legacies, religious myths associating the surrounding mountains: (Soroche, Sangay); lakes (Cacadrón, Culebrillas), forests (Pondoa), and wild animals with indigenous traditions and their indigenous identity features. International donors have supported conservations and development initiatives (e.g. Fundación Natura) such as ethnotourism in the buffer zones with indigenous communities.

25. The buffers zones of the Sangay National Park are less populated and the scattered local communities have been receiving the support of international donors (e.g. DGIS and Fundación Natura) for nearly a decade in conservation and development approach which has promoted ecotourism and sustainable use of natural resources. The project definition to focus the work on the Chimborazo Reserve was endorsed by the communities consulted. However, if capacity building activities could be replicated in the buffer zones of the Park, the project will support such activities in coordination with the Prefecture.

Local Participatory Planning

26. The Participatory Budgeting of the Prefecture (2006-2007) defined three main axes: (i) irrigation, roads, productive chains, (ii) education, health vulnerable population and (iii) watersheds. The programs installed forums, constituted as a space to debate, construct alliances and carry out the defined strategies, and monitor results. Along with the forums, the provincial assembly elaborated what is known as the “Mandate” for the Participatory Budgeting, endorsed by the participants on the process and presented to the Prefecture for its implementation.

Participation for the project implementation

27. It will be based on the following topics: (i) participatory and monitoring and evaluation during the project implementation; (ii) dissemination of project information in Kichwa and Spanish. The project will develop a communication strategy with the social communicators of the Prefecture in coordination with PIDD's strategy. This strategy will be consistent with other participatory process carried put by the CHPC and will address multicultural needs.

Indigenous Peoples Planning Framework.

28. During project preparation, the Provincial Council developed an Indigenous People Planning Framework which will ensure that: (i) the project will not have adverse impacts among indigenous communities as a result of the its implementation; (ii) the project will be implemented respecting and taking into account indigenous customs and local traditions; (iii) the project will ensure the participation of indigenous peoples and their organizations during the rest of the project cycle, through bilingual informative mechanisms, and using accessible information channels to reach the most isolated communities.. The project will carry out consultations when implementing the NRM activities and it will disseminate the project results. In doing so the Project assigned a budget for capacity building and dissemination purposes.

Annex 8: Status of Biodiversity and Protected Areas in Ecuador and Chimborazo

Management of Chimborazo's Natural Resources **CHPC-GEF-FAO Project**

Biodiversity: A Strategic Resource for Ecuador²⁶

72. Biodiversity constitutes a strategic resource for Ecuador's development, given the fact that it generates significant tangible and intangible benefits for society. Furthermore, because conservation of biodiversity principally involves conservation of natural habitats and ecosystems, biodiversity conservation also produces enormous positive externalities that are not, strictly speaking, attributable to diversity itself. These environmental goods and services include climatic stability, carbon sequestration, watershed protection, and control of erosion and sedimentation. These natural resources also help capture solar energy and produce biomass, store and recycle nutrients, and aid in the biological control of pests. Thus, preservation of certain vital resources that have often been considered inexhaustible, like soil, water, and air, can be enhanced through the same conservation measures needed to protect biodiversity.

73. Many productive activities like agriculture, fishing, aquaculture, and tourism are based, to a large degree, on biological resources and the environmental services generated by biological diversity and healthy ecosystems. Naturally occurring ("wild") species and varieties are a source of new medicines, oils, and fibers; and the improvements in raising crops for food requires genetic material contained in the various locations maintained and developed by farmers and indigenous communities, and in the wild relatives of the cultivated and domesticated species in natural areas.

74. While it is difficult to disaggregate the benefits of biological diversity per se from biological resources, the economic sectors that are related to and often benefit from biological diversity (agriculture, fishing, forestry, and tourism) accounted for roughly 20 percent of Ecuador's GDP between 1996 and 2000. Similarly, 16.7 percent of Ecuador's exports and 32 percent of its agricultural and marine exports in 2000 corresponded to native biological resources.

75. All of the economic sectors (agriculture, fishing, forestry, and tourism) benefit from the enormous biodiversity existing in the country. In the agricultural sector, exports of native products, such as fibrous vegetables, like the *paja toquilla* (toquilla straw); fruits like the tree tomatoes, uvillas, and chirimoyas; and short-cycle products like potatoes, corn, and quinoa, represented 5 percent of the country's exports in 2000. Similarly, almost all of the production of the fishing sector is based on the extraction of bio-aquatic resources originating in the marine-coastal and fresh-water ecosystems of the country. Close to 300 marine species contribute to the sector, although two species (tuna and shrimp) account for the majority of seafood exports of the country. The forestry sector also depends to a great extent on the resources found in native forests. In 2004, the forestry sector accounted for 2.7 percent of Ecuador's GDP, and 63.7 percent of the wood was extracted from native forests. Currently, the tourism sector contributes 2.3 percent of Ecuador's GDP, and as with other economic sectors, its growth is based on the country's extraordinary biodiversity, which is its main attraction.

Biodiversity in Danger

76. Unfortunately, the existence of serious environmental problems in Ecuador is causing the deterioration of natural ecosystems, the extinction of species, and the loss of genetic diversity of both wild and cultivated organisms. Not only is the destruction of habitats causing a reduction in biological diversity, but it is also causing accelerated loss of traditional knowledge and practice,

²⁶ World Bank-Country Environmental Analysis. June 28, 2007.

and the social and cultural disintegration of the indigenous and local communities. Ecuador's forests are disappearing at rate of nearly 1.5 percent a year, more than three times the overall rate for Latin America. According to the Ecuador National Report submitted to FAO's Forest Resources Assessment 2010, the forest coverage in Ecuador has decreased from 13,817,000 ha (48,7 percent of the country's territory) in 1990 to 9,865,000 ha (34,7 percent) in 2010.

77. Although the lack of scientific information prevents a precise evaluation of the state of biodiversity in the country, it is evident that the main cause of the reduction in biological diversity is the destruction or deterioration of habitats. Still, the over-exploitation of resources, the introduction of exotic species, and environmental pollution are also causing the disappearance of flora and fauna species in Ecuador. The aquatic, continental, and marine ecosystems have also suffered growing deterioration due to excessive fishing, the introduction of exotic species, and water pollution caused by agricultural, mining, and hydrocarbon-related activities. Similarly, the displacement of native crops and the "modernization" of agricultural practices are causing the accelerated disappearance of the genetic resources stored in the cultivated species and varieties.

The National System of Protected Areas

78. The protected areas are the primary tool for on-site conservation of biodiversity. The *National System of Protected Areas* (SNAP) of Ecuador is currently made up of the 35 protected areas which comprise the *State Patrimony of Natural Areas* (PANE), which is administered by the *National Department of Biodiversity and Protected Areas* (DNBAP) of the Ministry of the Environment.

79. Although the 35 protected areas that make up the PANE cover approximately 18.7 percent of the national territory, not all of the land and marine-coastal systems of the country are represented, and a number of ecosystems are underrepresented. An analysis of conservation gaps and priorities for land-based biodiversity in continental Ecuador revealed that 7 of the 46 types of vegetation are not represented and many types are currently underrepresented in the PANE. For example, the eastern dry mountain forest is not represented in any of the existing protected areas, while the inter-Andean dry and humid vegetation and the eastern and western dry forests are underrepresented.

80. Gaps and underrepresentations are even more serious for the marine and coastal ecosystems of the country. Only 8 protected areas in continental Ecuador's PANE include marine-coastal elements, and only two have areas that extend off the coast. These areas cover a total of 76,814, hectares, and various ecosystems are not represented within the PANE. In sum, additional efforts are still needed to consolidate and complete the ecological and biological representativeness of the SNAP, for both land and marine-coastal ecosystems.

Future Challenges for the Consolidation of the National System of Protected Areas

81. The key aspects indicated under new SNAP Strategic Plan developed by the National System of Protected Areas GEF Project and highlighted in the Country Environmental Analysis (World Bank, June, 2007) are as follows:

82. In the first stage, efforts should be focused on four priority issues: the structure of the SNAP, its financial sustainability, the management of tourism in protected areas, and the titling of land in the areas surrounding the protected areas. The new structure of the SNAP will make it possible to increase the amount of surface area that is protected, make it more ecologically representative and enhance the connectivity of the system, maintain the integrity and functionality of the ecosystems, and ensure the provision of environmental goods and service for the sustainable development of the country. This will be achieved through participation and co-responsibility on the part of a wide range of social stakeholders and through the application of various models of governance that reflect the diverse social and cultural conditions of the country.

83. It is recommended that the System's jurisdiction be expanded to include the protected areas declared by the sectional governments, the community conservation areas established by indigenous peoples, Afro-Ecuadorian groups and other local communities, and the private protected areas established by individuals or institutions. In order to implement this change, the *Forestry, Natural Areas and Wildlife Act* has to be reformed or a new *Biodiversity Act* or other specific legal instrument has to be passed (for example a *Law of Protected Areas*).

84. On the financial sustainability side, it is important to maintain and increase the State's annual investment in the protected areas, and to diversify the SNAP's own sources of income, taking advantage of innovative mechanisms like compensation for environmental services, the provision of complementary tourism services, and the optimization of the fees for infrastructure installed in protected areas (that is, antennas), ensuring that the resources generated are reinvested in the management of these areas and maintaining the principle of subsidies of the SNAP in order to distribute resources to those areas which, due to their unique circumstances, cannot achieve financial self-sustainability.

85. In addition, the capitalization of the Protected Areas Fund is recommended, which is administered by the National Environmental Fund (FAN), until reaching at least \$65 million, which will allow it to cover, with the interests of the fund, the basic recurring costs of the 35 areas that currently make up the *State Natural Areas Patrimony* (PANE) in continental Ecuador.

86. It is also important to develop a system of financial information and planning that ensures the generation, systematization, updating, and diffusion of information, in order to improve the coordination, the monitoring, and the follow-up of the investments of the State and other stakeholders in the protected areas of the country. Also, economic valuation studies should be conducted on the goods and services generated by the protected areas, in order to make their contribution to the economic and social development of the country more visible, as well as their relevance for antipoverty strategies.

87. The consolidation of the SNAP also implies strengthening the management of the protected areas so that its conservation goals can be reached, including the management of recreation and tourism activities. One of the main objectives of many protected areas is to provide recreational and tourism opportunities to visitors. At the same time, the development of recreational and tourism activities can contribute significantly to the financial sustainability of those areas. In fact, tourism accounts for 95 percent of the self-generated income of the protected areas in Ecuador. Unfortunately, reinvestment (both in terms of current expenses and capital costs) to cover the costs of managing tourism has been nonexistent or insufficient in the protected areas studied, in part due to the complex flow of resources among the different ministries—or within the Ministry of Environment itself. In most of the country's protected areas, there is no budget for managing tourism according to their real needs, and the negative impacts of the activity are not taken into account, with the related assumption that no resources have to be invested to minimize those impacts. Nevertheless, to prevent the degradation of the natural capital and improve the experience and safety of the visitors, as well as the conditions under which tourism activities are managed, increased investments are needed to guarantee an effective management of tourism in protected areas.

88. The income-generation mechanisms (like the entrance fees paid by visitors) are not based on a technical calculation that takes into account the true costs of tourism administration or the willingness of tourists to pay. In addition, the SNAP is losing significant revenue due to the lack of facilities for charging entrance fees and to limitations in the mechanisms for effective collection (including the outsourcing of fee collection), all of which are tied to the lack of a clear legal framework to solve these problems.

89. There are also legal limitations that reduce income generation from the provision of other services that are compatible with the management of the tourist sites (that is, food services, guided

hikes, or bicycle rentals). These could benefit not only the areas themselves (through outsourcing, delegation, rental, or concession of goods and services), but also the surrounding communities and private enterprises that can offer these services, which will enrich the experience of the visitors.

Protected Areas in Chimborazo

90. The Chimborazo Province holds two State-owned protected areas: the Chimborazo Fauna Production Reserve and the Sangay National Park. The main features of these protected areas are described below. The project will develop activities only in the Chimborazo Reserve as and will not include activities in the Sangay Park or its buffer zones as prioritized by MAE and CPCH.

I. Chimborazo National Fauna Reserve

91. The Chimborazo Fauna Reserve (RPFCH) was legally established in October 26, 1987 through Inter-ministerial Decree No. 437. The total surface is 58,560 ha and it is located within the provinces of Chimborazo, Tungurahua, and Bolívar. The altitude range is between 3,800 and 6,310 masl, the highest point being the Chimborazo volcano. The weather is predominantly cold, with variations between temperate humid and periodically dry. The temperature range is from 0°C to 10°C.

92. The main objective of this Reserve is to conserve the páramos as the main habitat to manage, under ecological parameters, the several species of native camelids, including vicuñas, alpacas and llamas. The purpose is to promote the breeding of these species by local communities as an aspect strongly linked to the province's cultural identity. For this purpose, the recently completed managerial plan establishes as key actions the development of infrastructure and facilities for research and development of technologies for the improved breeding of these species and further commercialization of sub-products such as fiber. To complement this effort, the managerial plan recommends the development of community based ecotourism plans and activities as economic alternatives to improve the local livelihoods.

Ecological Zones

93. The four ecological zones within the Reserve have been shaped by climate (temperature, precipitation, humidity, etc.) interrelated with factors such as latitude and expanse:

i) Steep Mountain: covers 3% of the southwestern and western sector's area and extends upward from a base altitude of 3,500 masl. The temperature is between 6°C and 12°C, with a semi-annual precipitation between 250 and 500 mm. This zone is used for pastoral and cultivating purposes—the main cultivars include mashua (*Tropeolum tuberosum*), Oca (*Oxalis tuberosa*), melloco (*Basella tuberosa*), in addition to potatoes, fava beans, and onions.

ii) Humid Mountain Forest: occupies 8% of the reserve's area in the western, northwestern, southwestern, central, north, and northeastern sectors at an altitude of 3,000 to 3,500 masl. The temperature fluctuates between 6°C and 12°C, with a semi-annual precipitation between 500 and 1,000 mm. This zone is used for pastoral and rotational cultivating of mashua, melloco, quinoa, fava beans, and chochos.

iii) Humid Sub-Alpine Forest or Puna: Covers approximately 19% of the Reserve, and is circumscribed by the western-central part of the area. It extends from 4,000 masl upward and has a temperature between 3°C and 6°C, and a semi-annual precipitation between 250 and 500 mm.

iv) Very Humid Sub-Alpine Forest: Covers 70% of the Reserve's total area, comprising half of the western area and another part of the northeastern area. It extends from 3,000 to 4,000 masl, and has a temperature between 3⁰C and 6⁰C; semi-annual precipitation is between 500 and 1,000 mm.

Fauna

94. The most important group of fauna inside the reserve is the camelids, including two primary species: llamas (*Lama glama*) and vicuñas (*Vicugna vicugna*). According to the 2004 census of vicuña within the reserve, the population included 2,331 animals distributed across three sectors (Ministry of the Environment, 2004):

i) Sector 1: Within the páramos of the sector Mechahuasca-Carihuaizaro-Razuhurco-Rumipamba 1,544 vicuñas have been counted, including a total of 706 animals divided among 140 family groups, 6 solitary males, and 7 groups of juvenile males. There is an average of 5.98 animals per family group.

ii) Sector 2: Within the páramos of El Arenal-Culebrillas-Río Colorado 310 vicuñas have been counted, comprised of 51 family groups, 3 solitary males, and 2 groups of juvenile males comprised of 8 animals. There is an average of 4.74 animals per family group.

iii) Sector 3: Within the páramos of El Sinche-Pachancho-Rumipata and its surroundings, 477 vicuñas have been counted, dispersed among 33 family groups, 1 solitary male, and 1 group of juvenile males comprised of 89 animals. The average number of animals per family group is 4.75. In this sector, alpacas complement the reintroduction of Andean camelids in this sector.

95. In addition to camelids, the Reserve also is home to important species, from the perspective of conservation, such as the deer (*Odocoileus virginianus*), wolf (*Dusicyon culpaeus*), and rabbits (*Sylvilagus brasiliensis*) (Management Plan).

The bird species include the Andean condor (*Vultur gryphus*), which is difficult to observe, and the Ecuadorian Star Hummingbird (*Oreotrochilus stella*), also sporadic. Much more abundant is the curiquingue (*Phalcoboenus carunculatus*), whose form of flight, according to the tradition, ensures the good fortune of the local communities and is always represented in the indigenous fiestas. Other hummingbirds like the *pico de espada*, along with some *gorriones* and *mirlos* that reside in the shrubs complete the list of main fauna species found within the reserve (Management Plan).

Land Uses

96. Of the 58,560 ha designated by the state as protected area and constituting the territory deemed the Chimborazo Fauna Reserve, 80% of this territory is under the control of 38 campesino organizations, communes, cooperatives, associations, and a few private property owners. The campesino organizations implement subsistence crops in the lower parts, where the altitude allows them to cultivate potatoes, fava beans, wheat, mellocos, ocas, and other agricultural products, depending on the location of the organization. In the lower parts they grow small parcels of artificial grasses, with the only purpose of feeding their guinea pigs and sheep when they have them. Many of these organizations campesinos have communal property in the páramos—this property is used as pasture for the sheep though the altitude where they are located often is a limitation in terms of providing adequate food and nutrition for the animals (Ministry of Environment, 2004).

Table 1. Area of vegetation coverage and land use in the RPFCH

Category	Description	Area
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		(ha)
Pajonal (páramos)	Highland Herbaceous vegetation (páramos), located from 3,800 to 4,500 m.a.s.l.	21,909
Crops in eroded land	Subsistence agriculture, short cycle cultivars , small to medium parcels	559
Dry lands	Desertic areas without forests or shrubby natural vegetation, with some liquens and mosses only	16,231
Crops-pastures	Predominantly short cycle cultivars combined with pastures, small to medium parcels, main cultivars include potato beans and wheat.	747
Pastures	Cultivated pastures to feed cattle	3425
Intervened páramos	Highly intervened páramos resulting from extensive production and expansion of the agricultural frontier.	5,079
Snow	Glaciers over 4,700 m.a.s.l.	2,433
Shrubby vegetation	Humid shrubby vegetation, found in the main water springs and river canyons.	1,532
Tree plantations	Areas reforested with pine trees	60
Cultivars and cattle	Subsistence agriculture and cattle breeding , small to medium parcels.	34
Pastures/cultivars	Predominantly pastures to fees cattle combined with cattle.	321
Eroded soil	Eroded soils resulting from extensive agriculture	577
Cultivars/páramos	Cultivars and páramos associated, predominantly cultivars and cattle for local subsistence.	371
Wetlands	Wetlands located within the páramos	127

Social Aspects

97. The project's Social Assessment highlights that among the 4 indigenous organizations (grouping about 38 communities), 2 municipalities, 2 "juntas parroquiales" and one private company (Cemento Chimborazo) existing within the limits and buffer zones of the Reserve, very important alliances to develop community work have been established. Very specific and minor conflicts that were registered during the data collection will not pose a risk to the development of the proposed project activities. The SA also indicates that this overall positive relation among stakeholders will be strengthened with the development of natural resources management strategies that will imply strong participation and ownership to secure sustainability.

Management Plan

98. The principal tool for taking decisions within the Chimborazo Fauna Reserve since 1992 has been the Management Plan. However, as a result of the evaluation of management efficiency, it is clear that this tool requires being revised and actualized. A priority is the elaboration of the Managerial Plan for the Reserve. Concluded in 2006, the Managerial Plan will serve as an instrument of practical, operational, and participatory planning, and will be based in the necessities and real resources of the Reserve. The Plan envisages the following priority programs:

Program to Manage the Wild Fauna

99. This program plans for the conservation, recovery, and reintroduction of wild fauna characteristic of the ecosystems of the reserve, through the elaboration and implementation of management activities. One of the most important of the wild fauna inside the area is the camelid species. Among the camelids, the focus is on the vicuña, an environmentally friendly species with a great economic potential due to the high cost of its wool. Considering the economic and cultural importance that this species has within the region, it was determined during the "Reglamento Para el Manejo y Conservación de la Vicuña en el Ecuador," published by the Official Registry 2093 on September 28, 2004, that the product of the sale of wool will be destined to benefiting the

organizations campesinos involved in the activities of conservation and management of this species.

Conservation Program

100. This program is focused on the conservation and management of natural resources and historical and cultural sites of the Chimborazo National Fauna Reserve, aimed at sustainable use for present and future generations. It is of vital importance for the municipalities, provincial councils, and *juntas parroquiales* to conserve these sources of water. Likewise, it is essential to consider that inside the PA there are 38 communities, which should be involved in the management and conservation of the area, taking care of their natural resources. This is only possible through capacity building and awareness-raising so that daily activities undertaken inside the Reserve become ecologically sustainable and economically profitable.

Tourism Program

101. Considering the important growth of tourism for the economic development of the country and the need to develop sustainable alternatives of financing for the Reserve, it is of the utmost importance that this program be implemented. The program is oriented toward improving the visitor's experience for the tourist, in terms of providing quality services and alternative visit options, with a vision that involves activities tending to improve the livelihoods of local populations. Of critical importance to the Reserve is that an Information Center be constructed in the "Arenal" entrance area where today the only visitor's facility is a trailer where entrance fees are collected (see image below).



Current entrance facility to the Chimborazo Reserve

102. The new Information Center will significantly improve the image of the Reserve in the eyes of the 15,000 annual tourists (based on 2005 data). This center also will serve as a place for local communities to sell handicrafts, especially those made with camelid wool, facilitating an increase in income generation. In addition, the center will facilitate the provision of information to tourists about other sites worth visiting throughout the province, converting Chimborazo into a more major tourist destination.

Program of Administration, Control, Monitoring, and Participative Planning

103. This program is geared toward consolidation of the park's and territory's administration. The objectives are:

- i) Strengthen coordination of Reserve's personnel with other entities of the Ministry of Environment and other institutions
- ii) Improve infrastructure and basic equipment

- iii) Improve revenues that permit a more adaptive management of the area
- iv) Appropriately manage priority management objectives of national parks system
- v) Maintain the integrity of the reserve through control of illegal activities

Community Development Program

104. Under an integrated vision of development and conservation, it is necessary that the management of the PA includes activities for improving the livelihoods of campesino communities nearby, supporting the development of technical capacities in the areas of agriculture, agro-industry, forestry, and implementation of productive projects and associated incentives.

105. With regard to agricultural production, productivity might be increased among communities located within the Reserve through the adoption of appropriate technologies, permitting a balance between modern technology and traditional knowledge. At the same time, this should diminish the advancement of the agricultural frontier, halting the destruction of páramos.

II. Sangay National Park²⁷

106. Through the Ministerial Agreement 190 on June 16, 1975, and published by the Official Registry 840 on July 7 of the same year, the Sangay Ecological Reserve was legally established. In 1976 it was recommended that the area be considered a National Park, and through the Inter-ministry Agreement 0322 published in the Official Registry 69 on November 20, 1979, it was officially designated as such, with a total area of 271,925 ha, spanning the provinces of Tungurahua, Chimborazo, and Morona Santiago.

107. In 1980 the management plan of the park was formulated and enacted, including the management objectives, the zoning and operational part of programs, subprograms, and activities to be developed over the next 5 years. In 1983 UNESCO declared the park a "World Heritage Site" due to its significant biological, ecological, and cultural importance. On May 20, 1992, the park's area was expanded to 517,725 ha to include a part of the province of Cañar.

Bio-physical Characteristics

108. The majority of the park's area is characterized by the presence of a topography that is difficult to access, including a number of waterfalls. The altitude range is between 1,000 and 6,000 masl. The main waterways of the region are: Napo, Pastaza, Palora, Volcan, Upano, Abanico, Patate, and Chambo. Complementing this hydrological network is an important expanse of wetlands formed by the lakes Atillo, Magtayán, Cubillín, and Verde Cocha.

109. Ecosystems present in the park include: the páramo located at 3,000 to 3,200 meters with low temperatures; the mountain cloud forests; and the subtropical forests of the lowlands. Fauna found within the park's boundaries include both feline species (the jaguar, *tigrillo*, puma) and primates (*chorongo*, *aullador*, and spider monkey). Other important mammals include the mountain rabbit, the páramo wolf, the *chucuri*, deer, and the spectacled bear. Reptiles include *lagartijas*, river turtles, and snakes. Birds worth highlighting include the *gallo de la peña*, *pava de monte*, and parrots.

²⁷ This section is provided only for general information as the Project will not be working in this protected area or its buffer zones.

110. In addition, the warm and humid zones of the jungle are home to a grand variety of vegetative species, whose endemic rates is one of the highest in the world.

Actual and Potential Land use

111. According to the land use study, the majority of the area within the park is land best suited for conservation and protected; that is to say, the land is neither agriculturally viable nor suitable for agriculture or forestry activities. In 1996, natural humid forests covered 273,315 ha (54%) of the park's total area. The dominant vegetation types included: páramo (142,218 ha, 29%), evergreen (81,426 ha, 16%), and natural and artificial pastures and agriculture (9,089 ha, 2%).

112. The hydrological system of the park includes 11 sub-watersheds, 69 primary sub-watersheds, 54 secondary sub-watersheds, and 8 tertiary sub-watersheds that pertain to four main watersheds of the Rivers Pastaza, Santiago, Canar, and Chimbo, representing 43.25%, 51.8%, 4.51%, and 0.44% of the park's total area, respectively.

113. The watersheds of the Rivers Pastaza and Santiago form a large part of the hydrological system Marañón - Amazonas that releases into the Atlantic Ocean. The subsystems of the River Canar and Chimbo drain into the Pacific Ocean. A large part of the hydrological resources of the park are used for irrigation and the generation of hydro-electric power.

114. Sangay National Park constitutes one of the protected areas with the greatest biodiversity within Ecuador. In three months a study identified 165 species that could be useful to humankind, though the actual potential is much higher. Rare and important plant species include: *Zinowiewia australis* (Celastraceae), *Moutabea aculeta* (Polygalaceae), *Humiristrum sp.* (Humiricaceae), *Cedrela odorata* (Meliaceae), *Tabebuia chrysantha* (Bignoniaceae), *Phytolacca sp* (Phytolaccaceae), *Dyptiocaryum lamarkianum*, *Fuchsia sp.* (Onagraceae), *Mollinedia sp.* (Monimiaceae), *Heliconia brenerii* (Heliconiaceae) y *Pitcairnia bakeri* (Bromeliaceae), *Podocarpus oleifolius*, *Ruagea pubescens*, *Neurolepis rigida* (Poaceae), *Buddleja pichinchensis*, *Calandrinia acaulis*, *Gaultheria rigida*, *G. tomentosa*, *Befaria resinosa*, *Ilex weberlingii*, *Macrocarpaea ovalis*, *Oreocallis grandiflora*, *Weinmannia fagaroides*, *W. elliptica*, *Brachyotum azuayense*.

115. The diversity of fauna also is high. Although intensive studies have not been conducted, the number of vertebrates includes 83 mammal species, 228 bird species, 33 amphibians and reptiles, and 16 fish species. Endemic fauna species include: *cuy silvestre* (*Cavia aperea*), *la musaraña del Azuay*, *Cryptotis montivaga* *Campylopterus villaviscencio* (Trochilidae), *Galbula pastazae* (Galbulidae), *Heliangelus viola* (Trochilidae), *Leptosittaca branickii* (Psittacidae), *Andigena hypoglaucia* (Ramphastidae), *Cyanolyca turcosa* (Corvidae), and *Piranga rubriceps* (Thraupinae-Emberizidae). Mammal species considered endangered or vulnerable include: *Myrmecophaga tridactyla*, *Priodontes maximus*, *Lagothrix lagothricha*, *Panthera onca*, *Puma concolor*, *Leopardus pardilis*, *Oncifelis colocolo*, *Lontra Speothos* y *venaticus longicaudis*.²⁸

Cultural Patrimony

116. In the pre-Columbian era, some areas inside the park and its buffer zones were occupied by large ethnic groups such as the Puruháes, the Cañaris in the mountains, and the Shiwiar (Shuar) in the Amazon region. In the park's buffer zones there currently exist approximately 120 organizations including colonies, cooperatives, pre-cooperatives, indigenous centers and reserves, associations, and communal organizations. There are numerous cultural linkages between local populations and the park, including stories, legends, religious myths and histories associated with

²⁸ "Diagnóstico Faunístico para la Actualización del Plan de Manejo del PNS" (Anexo 4.4.2.).

the natural resources of the park. Prominently featured in these stories are mountains (Soroche, Sangay), lakes (Cacadrón, Culebrillas), forests (Pondoa), and wild animals (San Vicente).

Main Activities and Income Sources for the Population

117. The majority of the population located in and around the park sustains itself through agricultural and pastoral activities.

Tourism and Architectural Sites

118. The most visited sites within the park are the volcanoes: Sangay, Tungurahua, and Altar. Local visitors are especially interested in fishing, primarily within the Ozogoché, Atillo, and Culebrillas lakes. The few foreigners who visit these places do so to admire the landscape, flora, and fauna while doing short hikes. In 1985, the park had 483 national and foreign visitors; in 1995, it received approximately 1,980. The deficient tourist legislation at the national level, the lack of tourist infrastructure in visitor's sites, the limited tourism capacity among the park's personnel, the lack of information about the park's resources and community organizations are major barriers to the development of tourism within the park and its buffer zones.

Principal threats and environmental impacts in the park

- i) Poverty of populations within the buffer zones
- ii) Soil erosion in the upper zones of the park.
- iii) Intensive hunting.
- iv) Fishing with inappropriate techniques
- v) Animal grazing
- vi) Presence of exotic species
- vii) Cutting of trees
- viii) Expansion of the agricultural frontier

Main Problems

119. The identification of problems affecting Sangay National Park took place with the participation of communities, organizations, government entities, NGOs, and park personnel. The macro-problem identified is the following: "Human activities incompatible with the conservation objectives of the Sangay National Park"

120. During centuries, the indigenous inhabitants of the zone below the park subsisted through techniques traditionally adapted to the ecosystem—these techniques had low levels of impact on the environment and were sustainable over time. This situation has changed, and the land has been occupied by individuals from other regions in the mountains and coast of Ecuador.

121. Indigenous communities have taken on other economic activities such as livestock grazing, the cultivation of naranjilla (an exotic fruit), and the selling of wood. These activities involve practices that degrade the natural resources in and around the park. The communities within the highest zones of the park are largely indigenous quichuas who obtained their communal territories during the Agrarian Revolution. The time required for settling, the disposable land, and the pressures of the internal market are causes underlying why their main source of work has become the cutting of forests, expanding the agricultural frontier through the introduction of crops and large-scale cattle grazing. For their part, the other settlers in the buffer

zones focus on the planting of naranjilla and pastures for the cattle—this implies a significant loss of forest and the use of chemicals. Other detrimental activities include the construction of the Guamate-Macas road and the disorderly tourism that occurs in the park.

Annex 9: Project Intervention Area

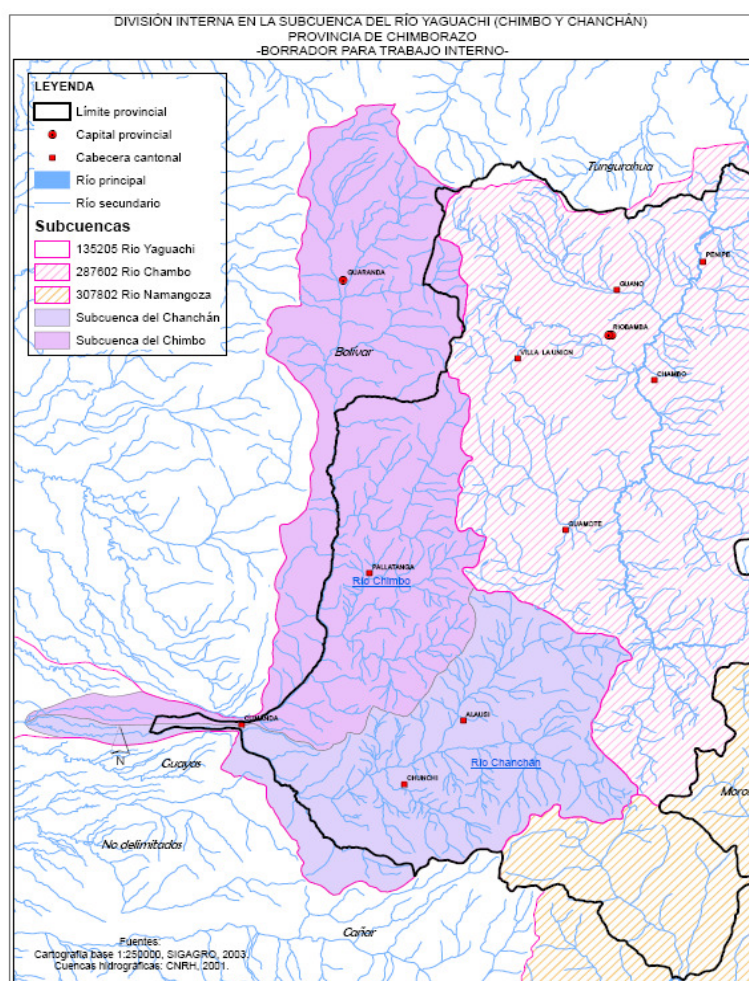
Management of Chimborazo's Natural Resources CHPC-GEF-FAO Project

Main Characteristics of the main Watersheds of Chimborazo

122. Hydrographically, the Chimborazo Province is part of the Pastaza river basin (a Chambo sub-basin river) and a small part of the Guayas river basin (sub-basins of the Chanchán and upper left flanks of the Chimborazo). The Chambo sub-basin is the only one whose waters are tributaries of the Amazon, through the Pastaza river. Around the perpetual snowcaps is the zone called the “páramo,” whose lower limit is at about 3,600 to 4,000 meters. This area is known for its frequent dense fog cover and long rains. This zone has a marked influence on the hydrological regime of the rivers, by regulating much of the runoff during dry periods and maintaining flow rates during low water-level periods.

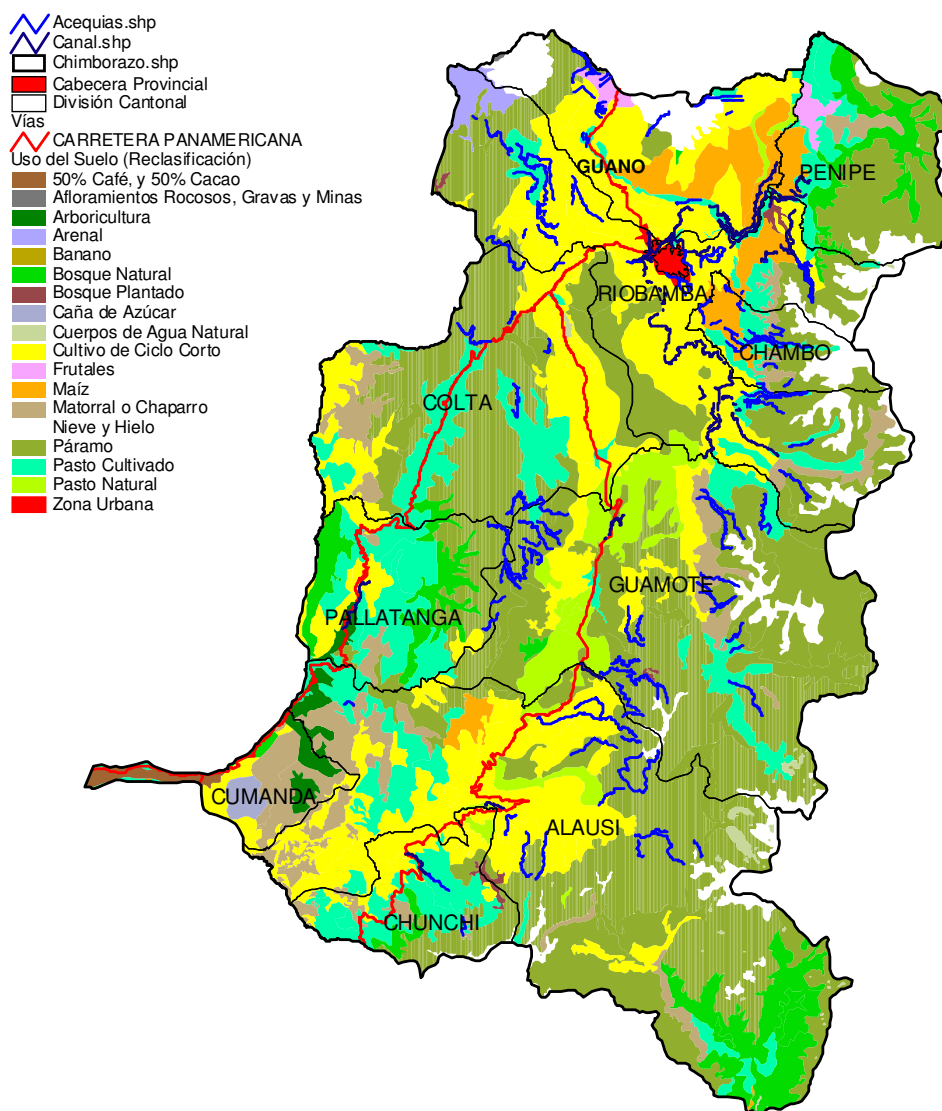
123. In general, there are no systems or entities to coordinate natural resource use and management in the watersheds of the province. Therefore, integral NRM systems need to be established for the basins in an orderly fashion (organizing basin use by suitability and purposes). The map below provides the distribution of the main watersheds within the Province.

Figure 1: Main watersheds in Chimborazo



124. The map on irrigation and land use below clearly indicates that biggest extensions and best conserved páramos are located at the Chambo watershed (Eastern region), probably providing more opportunity to develop the integrated NRM approach proposed under the project

Figure 2: Land use and irrigation in Chimborazo



Source: Cartography DYA-Proyectos / ODEPLAN, 2002

Chambo Watershed

125. Over the entire Chambo riverbed, the specific average depth is 22.5 l/s/km², which drops by almost 50% in dry periods. This basin is affected by water erosion problems in the sub-basins of the Guamote, Chibunga and Guano rivers due to the practice of cultivating the slopes. Demographic pressures and animal husbandry are factors accelerating erosion.

126. The Chambo Watershed covers a total surface of 358,961 ha, distributed among the Provinces of Chimborazo, Tungurahua, Bolívar and Morona Santiago. The extension of this watershed in the Chimborazo Province is 351,755 ha. The altitude range is between 2,000 and 6,000 masl. This watershed is formed by a complex hydrological system, having its origin in the central Andean slopes in the Ozogoeche region and in the Western slopes in the Guamote and Palmira cantons.

127. The surface of the eight cantons included in the Chambo watershed is provided in the table below:

<i>Canton</i>	<i>Total area (ha)</i>	<i>Area in the Chambo watershed (ha)</i>	<i>% of canton in the Chambo watershed</i>
Alausí	163612	12021.3	7.3
Chambo	15947	15947.0	100
Colta	83339	45863.8	55
Guamote	120235	101208.1	84.2
Guano	46243	43656.3	94.4
Penipe	38584	37004.6	99.7
Riobamba	37133	95843.8	95.2
Pallatanga	100718	209.8	0.5
TOTAL		351755.1	

Source: SIG/AGRO. 2000. SIPAE

128. The Chambo watershed covers the cantons located at the Northern region of the Province, where the majority of population is concentrated and where threats over local ecosystems are growing. The population per canton is indicated in the table below:

<i>Canton</i>	<i>Population</i>	<i>Area (Km²)</i>	<i>Population density (Hab/ Km²)</i>
Riobamba	193,315	1007,18	192
Guano	37,888	462,43	82
Chambo	10,541	159,47	66
Colta	44,701	833,39	54
Guamote	35,210	1202,35	29
Pallatanga	10,800	385,84	28
Alausí	42,823	1636,12	26
Penipe	6,485	371,33	17

Chanchán Watershed

129. The Chanchán watershed, with an area of 1,432 km², is part of the Guayas river basin, the largest hydrographic system of South America on the western slopes of the Andes mountains. Inside the sub-basin there are 38 micro-basins, distributed in six sectors. Due to its location and altitude, between 4,300 and 310 masl, the sub-basin presents typical climatic characteristics for the western slopes of the Andes, with a dry summer from August to December and relatively rainy months from January to July. Land use is unbalanced due to overuse for cultivation in land whose aptitude is for forests and maintaining natural vegetation. The primary water uses in the sub-basin are irrigation (4,700 ha) and human consumption.

130. The Chanchán watershed holds a population of 59,000 inhabitants, 80% of which are poor according to available information. The entire watershed is located in the Chimborazo province, and its primary tributaries are the Guasuntos, Alausí and Sibambe rivers.

131. Most of the watershed population lives in small towns with less than 5,000 inhabitants. This rural population totals 55,866 inhabitants, which is 1.5% of the national farming population, as gathered from data published by INFOPLAN.

132. The predominant economic activity in Chanchán is farming, within which the primary activity is agriculture, occupying 38.0% of the basin area, followed by animal husbandry according to the extension of pastureland, which occupies 14.7% of the area.

133. The incidence of poverty in rural Ecuadorian households grew from 56% in 1995 to 77% in 1999, affecting 85.4% of the inhabitants of the Chanchán river sub-basin and, of these, 94.5% of the population of the poorest micro-basins of Zula A.J. Totoras, Zula D.J. Totoras, Azuay, the Cobshe river, and the Totoras and Chorrera streams in the Guasuntos river sector. These figures mean that most *campesinos* in the sub-basin cannot adequately meet their basic needs of food, health, housing, and education.

134. The present land use is detailed in the table below. Given the extensive agricultural expansion in this watershed, only 20% of its territory is currently covered by páramos, urgent conservation actions are needed to protect these remnants.

<i>Land use</i>	<i>Surface area in ha</i>	<i>Percentage</i>
Short-cycle agriculture	41,863	29.2
Permanent agriculture	12,045	8.4
Pastures	20,990	14.7
Cultivated forests	603	0.4
Natural arboreal and associated vegetation	5,159	3.6
Underbrush	11,878	8.3
Páramo vegetation	28,745	20.1
Without farm use	21,951	15.3
TOTAL	143,234	100.0

135. According to the agricultural aptitude data, land that is only suitable for natural vegetation is 75,089 ha, which is 52.4% of the sub-basin. However, according to information compiled in the land use, areas with natural vegetation dropped to 45,782 ha by 1984, which is 32% of the sub-basin, and have continued falling since. Natural grasslands, which in 1984 were 62.8% of the natural vegetation remaining in the Chanchán sub-basin, have been perhaps the most affected by changes in land holding and use over the past 17 years as a result of social processes that ended up affecting large haciendas.

136. The Chanchán sub-basin cultivated areas are expanding to the detriment of páramo vegetation. This probably explains the decrease in water availability during dry periods and increase in destructive floods during rainy seasons, as peat bogs are the plant cover with the greatest capacity to retain rainwater and feed natural aquifers, according to research findings under the Sishilad Project by EMAAP-Quito.

Selection of Specific Project Sites

137. Based on the above information, the criteria to carry out the final selection of the project sites were discussed and established during a workshop with the CHPC and key stakeholders. The project site unit has been defined as a micro-watershed given that in most of the cases in the Chimborazo Province, indigenous communities' economic activities have been created and developed around the productive activities of the micro-watersheds. The selection criteria which have been defined during the project formulation phase and confirmed during the field mission in January 2010 are as follows:

- Zones containing well-preserved areas of páramos that are under high pressure
- Proximity to PIDD Project sites
- The existence of active community organizations that might be interested in NRM (ideally but not necessarily evidenced by ongoing NRM initiatives)

- More beneficiaries, higher poverty indices, and possibilities to improve social equity with intervention.
- The technical recommendation of experts (i.e. the results of studies conducted during the project preparation phase)
- The degree of importance of the watershed, in terms of quantity and quality of water supplied to key lower watersheds and the nature of downstream water users
- Municipalities have allocated resources to support activities related to integrated NRM.

138. The participants in the workshop recommended that at the first six criteria will be mandatory, while the last could be complementary and add value to a micro-watershed at the time of selection. Based on these criteria and the information generated so far at the level of the main watersheds (Chambo and Chanchán), a first list of nine micro-watershed was established, of which five are in the Chambo watershed and four in the Chimbo watershed as follows:

- Chambo Watershed: Río Cebadas, Río Blanco, Puela, Guamote and Alao
- Chanchán Watershed: Atapo-Pomachaca, Zula Guasuntos, Pangor and Launag

139. Based on a evaluative point methodology and using indicators that reflect the above listed criteria , the nine micro-watersheds were evaluated and assigned with a final rating. The table below details the process and results.

Chambo Watershed

<i>Indicators/Watershed</i>		<i>Río Cebadas</i>	<i>Río Blanco</i>	<i>Puela</i>	<i>Guamote</i>	<i>Alao</i>	<i>Guano</i>
Protection	20	3	3	2	2	3	2
Territory	10	4	3	2	3	3	3
Population	10	2	3	1	4	2	4
Production	20	4	4	2	3	4	2
Subtotal	60	13	13	7	12	12	11
Organizations (interest. stakeholders)	15	4	4	1	4	3	2
Experience	15	2	3	1	2	3	2
Alliances	10	3	4	1	3	3	1
Subtotal	40	9	11	3	9	9	5
	100	22	24	10	21	21	16

Chanchán Watershed

<i>Indicators/Watershed</i>		<i>Atapo - Pomachaca</i>	<i>Zula - Guasuntos</i>	<i>Pangor</i>	<i>Launag</i>
Protection	20	3	4	3	4
Territory	10	4	4	3	3
Population	10	2	4	2	1
Production	20	3	2	3	3
Subtotal	60	12	14	11	11
Organizations (interest. stakeholders)	15	4	4	3	2
Experience	15	3	2	1	2
Alliances	10	3	2	2	2
Subtotal	40	10	8	6	6
	100	22	22	17	17

140. The indicators in the tables have been defined as follows:

- Protection: status of conservation of the páramos and other natural vegetation, its value as to provide important environmental services and holding important water springs for irrigations and other services.
- Territory: balance between the remaining area of páramos and the area dedicated to agriculture. For the purpose of this project, priority has been given to the micro-watershed that still have at least 50% of its territory covered with páramos.
- Population: More beneficiaries, higher poverty indices, and possibilities to improve social equity with the project's actions.
- Production: agriculture being the main productive activity and therefore the principal means of local economy and in addition, improved agricultural practices have been implemented in view of the conservation of páramos or at least concern and awareness about conservation exists among communities..
- Organizations: The existence of active community organizations that might be interested in NRM (ideally but not necessarily evidenced by ongoing NRM initiatives).
- Experience: with previous local development projects that have included NRM components.

- Alliances: degree of relations and capacity to establish alliances with other key actors, communities, organizations and local governments inside or outside the micro-watersheds.

141. Finally, in addition to the micro-watershed which is part of the Chimborazo Reserve (and for which no detailed background information is presented here), four micro-watersheds have been selected as the project sites, namely:

- **Chambo Watershed: Río Cebadas and Río Blanco**
- **Chanchán Watershed: Atapo-Pomachaca and Zula-Guasuntos**

142. The main characteristics of the selected watersheds are as follows:

1. Chambo Watershed		
<i>Characteristics/Name</i>	<i>Rio Cebadas</i>	<i>Rio Blanco</i>
Location	1 54'30.43" South and 78 38'27.84" East	North: upper limit is 2,380 m.a.s.l., geographic limits are the Blanco River and the Chingazo mountain, South: up to 4,400 m.a.s.l. at Pailacajas mountain East: up to 5,320 at the Altar mountain. West: up to 3,500 at the Tusapalán mountain.
Total extension	16,272 has	14,495,10 has
Population	3,954	5,000
Area of páramos	11,672 has	5,410 has
Area of crop lands	4,600 has	4,500 has
Agricultural productive system	Extensive	Extensive
Indigenous communities	Gaurón Cochapamba, Cenán Alianza, Cabecera Parroquial, San Antonio de Cebadas, Tres Aguas, Ishbug Curiquina, Ishbug Utucún, San Vicente de Tablillas, Coop. Ichubamba Yasipan, Reten Ichubamba, Sector Reten, Sector Gualiñag, Sector Macalete, Pancun Ichubamba, Sector San Nicolás, Sector Tabialpamba, Sector Ichubamba, Atillo, Ozogoché	QUIMIAG, Rio Blanco, Anshical Verde Pamba, Laguna San Martín, Chañag San Miguel, Palacio San Francisco, Zoila Martinez, Chiniloma, Salí, Rayos del Sol, La Tranca, Chilcal Pucara, PENIPE-LA CANDELARIA, Releche, La Candelaria, Tarao, Gaviñay, Nabuzo
Indigenous organizations	Corporación de organizaciones Indígenas de Cebadas (COICE), grouping 24 base organizations	Consorcio Interinstitucional para el Manejo Integral de la Microcuenca del Rio Blanco. Holding 13 institutions (public and NGOs) and 2 indigenous organizations.
	Unión de Organizaciones Populares "La Minga, including 10 base organizations	Unión de Organizaciones Campesinas de Quimiag (UNOCAQ).
	Junta General de Usuarios del Sistema de riego Cebadas, formed by 800 producers Prom. different communities	Junta General de Usuarios del Sistema de Riego Rio Blanco Quimiag.
	Iglesias Unidas (UNIEPC), made up of 18 base organizations	

2. Chanchán Watershed		
<i>Characteristics/Name</i>	<i>Atapo-Pomachaca</i>	<i>Zula-Guasuntos</i>
Location	1 50' to 2 14' S, 78 3' to 78 51' E	
Extension	11.713 has	13.920 has
Population	6.373 hab	12.341 hab

Surface with páramos	8.748 has	3.352 has
Area with crop lands	2.965 has	10.468 has
Agricultural productives system	Extensive	Extensive
Indigenous communities	Tixán, Aña Moyocancha, Añac, Bosilche, Busay, Carolina, Chalaguan Grande, Chiniloma, Cocan San Patricio, Curiquinge, Curiquingue, El Cortijo, Estacion De Tixan, Gasnia, Gusnia, Hacienda Pachamama, La Laguna, La Pacifica, Las Mercedes,, Llallanag , Moyacancha Chico, Pachagsi, Pachamama Chico, Pachamama Grande, Pueblo Viejo, Pungupala Alto, Pungupala Bajo, Quichud, Quislag Chico, Quislag Grande, San Carlos, San Fransisco De Pishil , San Vicente, Sanganao, Santa Cecilia, Santa Julia, Santa Lucila, Santa Lucita, Santa Rosa, Shucos, Sil Veria, Sta Cecilia, Uzuquiz, Yacupungo, Yanayacu, Yujaute Alto, Yujaute Alto, Miangus, Nausan	Guasuntos, Abogrus Chico, Abogrus Grande, Aguaisa, Canal, Cashcahuan, Cherlo, Cumbilla, Julias, La Moya, La Playa, Molobog, Niarigñachi, Pashcay, Pocate, Shuid, Tolatus, Achupallas, Cuchaloma, Cullca, Esperanza, Gasatus, Gulahuaico, Guncan, Hierba Buena, Huanca, Huangra, Huangra Loma, Huasachaca, Guaylla Chico, Guaylla Grande, Juval, La Dolorosa Zula, La Estancia, Letrapungo, Llilla Chinihuaicu, Llindilig, Mapahuiña, Mor As Pamba, Osogoche Alto, Osogoche Bajo, Pacay, Pallaguchi, Palmiras, Pomacocho, Pucará, Pucará, Quishuar, San Antonio, San Antonio De Juval, San Carlos, San Francisco, San José De Guarumal, San Ramón, Saucay, Shaglay, Tauri, Timbuyacu, Totoras Corralpamba, Totoras Cucho, Totoras Huiche, Totoras Llullin, Zhumid
Indigenous Organizations	COCAN, comprising 11 base organizations and 2,439 indigenous inhabitants. INKA ATAHUALPA, holding 17 base organizations and 3,934 inhabitants	ZULA, comprising 12 base organizations and 5,867 inhabitants INGAÑAN, with 9 communities and 4,060 inhabitants RUMIÑAHUI, comprising 14 base organizations, and a population of 2,414.

143. The four microwatersheds described cover an area of approximately 58,000 hectares, together with the territory of the Chimborazo Reserve make up a total of 114,400 hectares, which is the total project area. The activities planned under the project will be distributed as follows within the indicated surface:

- NRM planning: will take place in the four microwatersheds described above and will affect its whole territory, this is 58,000 hectares
- NRM subprojects will take place in the four microwatersheds and in part of the Chimborazo Reserve, comprising about 80,000 hectares.
- CES pilot will cover a surface between 10,000 to 15,000 hectares
- The Improved management of the Chimborazo Reserve will cover 56,000 hectares

144. In order to establish the specific mechanisms for NRM at each micro-watershed, the CHPC will carry out additional and more specific assessments on water users and productive systems. Once the four micro-watersheds have been selected, indigenous organizations and communities will be invited to participate in the project on a voluntary basis. Communities demonstrating high levels of interest and conservation potential will be selected against the same basic criteria used to select the micro-watersheds.

145. The location of the microwatersheds which were selected as the project sites is presented in the following figure.

