INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

SMALL PROJECT DOCUMENT

TITLE	RESTORING SUB-HUMID ECOSYSTEMS IN SOUTHERN PERU THROUGH REFORESTATION WITH *Caesalpinea spinosa*
SERIAL NUMBER	PD 583/10 Rev.1 (F)
COMMITTEE	REFORESTATION AND FOREST MANAGEMENT
SUBMITTED BY	GOVERNMENT OF PERU
ORIGINAL LANGUAGE	SPANISH

SUMMARY

This project involves a demonstration activity that is consistent with the concept and principles of the rehabilitation of degraded forest lands and sustainable forest management for the production of non-timber forest products as part of the ITTO Reforestation and Forest Management Programme as it relates to climate change issues and the rehabilitation of forest landscapes in a micro-region of the Department of Arequipa, Province of Camana, Southern Peru, which, given its ecological, environmental and socioeconomic conditions, is a highly representative area of great significance for the semi-arid and arid tropical regions of Peru.

The main problems and concerns affecting the Peruvian coastal region include climate change and increased deforestation, which over the last few decades have led to total degradation or even the disappearance of special ecosystems that were previously important sources of biodiversity and goods and services for the local population in areas where extreme climate and soil conditions make restoration difficult through conventional methods. Arid and degraded ecosystems in general are less likely to be rehabilitated. However, Peru's high biodiversity and its capacity to adapt to adverse and extreme conditions represent an untapped potential as extreme environmental conditions combined with a high flora diversity capacity can lead to highly positive environmental, economic and social outcomes through the use of modern farming and irrigation techniques. This will in turn contribute to mitigating climate change, enhancing carbon sequestration and improving the living standards of the rural communities.

This project proposal has been developed in accordance with the provisions of the ITTO Manual for Project Formulation. It is based on the implementation of a reforestation system in a typical semi-arid area which was previously classified as a "*lomas*" (hilly) formation (an ecosystem developed as a result of fog condensation) using *Caesalpinea spinosa* species and automated drip irrigation. Based on the past experience of the Association for Agro-Industrial Development of Camana (APAIC), this system has great potential for the rehabilitation and valuation of sub-humid ecosystems.

EXECUTING AGENCY	APAIC – ASOCIACION PRO DESARROLLO AGROINDUSTRIAL DE CAMANA
COLLABORATING AGENCIES	--
DURATION	24 MONTHS
APPROXIMATE STARTING DATE	UPON APPROVAL

BUDGET	**Source**	**Contribution (in US$)**
	ITTO	**149,796.00**
	APAIC	158,915.00
	TOTAL	**308,711.00**

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ACRONYMS

ADEX	Asociación de Exportadores (*Exporters' Association*)
APAIC	Asociación Pro Desarrollo Agroindustrial de Camaná (*Association for Agro-Industrial Development in Camana*)
CDM	Clean Development Mechanism
EU	Executing Unit
ITTC	International Tropical Timber Council
ITTO	International Tropical Timber Organization
MINAG	Ministry of Agriculture, Peru
MINAM	Ministry for the Environment, Peru
MT	Metric ton
NGO	Non-governmental organization
PROMPEX	Programa de Promoción de Exportaciones (*Export Promotion Programme*)
PROMPYME	Organización para la Promoción de las Pequeñas y Medianas Empresas (*Organization for Small and Medium Enterprise Promotion*)
REDDES	ITTO Thematic Programme on Reducing Deforestation and Forest Degradation and Enhancing Environmental Services in Tropical Forests
TV	Television
USD	US Dollars

PART 1. PROJECT CONTEXT

1.1 Origin

This small project is a demonstration activity to promote actions and/or projects aimed at the reforestation of degraded or *eriaza* areas with potential for the development of alternative economic resources for the rural population based on non-timber forest products and for the generation of forest biomass and carbon sequestration so as to contribute to the mitigation of the greenhouse effect and to the Clean Development Mechanism process within the context of climate change. The project will be implemented in accordance with the ITTO guidelines for the rehabilitation of degraded forest lands.

Peruvian southern coastal lands located within the life zone classified as "Sub-Humid Tropical Ecosystem" in the ecological map of Peru (Tosi 1965) are very arid lands with high salt content soils. Therefore, their potential for traditional forest or agricultural uses is very complex. In the Department of Arequipa, Province of Camana, there is an area of approximately 5,000 ha that was until a few decades ago covered by the so-called "lomas" i.e. seasonal shrub and low tree vegetation cover developed as a result of fog condensation during the winter months (June-September). Unfortunately, due to overgrazing and excessive logging of small trees and shrubs for fuelwood, the vegetation in the area has been totally depleted. This has been aggravated by the effects of climate change as fog condensation effects are currently minimal or non-existent, turning these areas into a true sub-humid tropical ecosystem or *eriaza* lands that can be rehabilitated through reforestation with species that are highly resistant to arid conditions.

On the other hand, in the lower parts of the Camana Valley, water resources are plentiful and farmers are totally devoted to the growing of rice and onion crops. However, only a few farmers have access to these lands, and these crops demand extremely high water consumption and high installation and management costs that are beyond the means of most of the local populations, who are facing serious problems of unemployment and lack of sources of income, particularly for migrant communities that come down from the southern Andes region of Peru, such as the departments of Puno and Cuzco.

The Association for Agro-Industrial Development in Camana – APAIC (Asociación Pro-desarrollo Agroindustrial de Camaná) has been developing a number of proposals and alternatives for these *eriaza* (waste) lands in order to turn them into productive areas and thus generate sources of employment and income for small farmers in the region known as Pampas del Huevo. As a pilot activity, the Association has successfully introduced the growing of Tara[1] (*Caesalpinea spinosa*), a leguminous tree species, typical of the lower Andean region, that is highly resistant to water shortage and salinity, after having established an experimental plot of 14 hectares under an automated drip irrigation system and organic manure, where it was possible to obtain exceptional growth rates and where, in a space of 18 months, the plants have already started their first fruiting and production year. This has been met with great interest and enthusiasm from local small farmers, but they need financial support and technical assistance for the industrial-scale production and primary industrial processing of this species.

The objective of this project is to promote the development of a critical mass area of cultivated land (100 ha, with the direct involvement of some 20 families) that will serve as a catalyst for the growing of 1,000 hectares in the next 10 years. This will not only rehabilitate the "lomas" ecosystem, re-vegetating the coastal sub-humid tropical ecosystem of the region, but will also generate CO_2 storing biomass (an average of 10 to 15 MT per ha/year), generating sufficient employment and economic resources to support approximately 250 families. It would represent a true economic, ecological and social revolution that would break the paradigm that reforestation can only take place in the humid areas of the Peruvian Rainforest (*Selva*) and Highlands (*Sierra*) Regions.

1.2 Relevance

This project is highly relevant to the area of rehabilitation of degraded lands for reforestation and substantial soil improvement. In particular, the project represents an excellent source of income for small farmers, who as a whole can produce significant volumes to justify investments in value-added

[1] Tara is a very tough leguminous tree of great plasticity that easily adapts to different soil types and is highly resistant to droughts. Its fruits (pods and seeds) are in great demand in the international market for the production of tannin, gums and a large number of pharmaceutical products (e.g. an antibiotic called Bactrin), which in the low mountain region (low montane life zone) can produce up to 30 MT of dry matter per hectare/year under natural conditions with no irrigation.

processing[2]. In addition, the project can play a role in CO_2 sequestration, which will be assessed upon completion of the first phase.

For Peru, where coastal areas are very arid and have a critical shortage of water for agricultural purposes, human and industrial consumption, the reforestation of desert lands in the Coastal Region would represent a huge step forward in a more appropriate use of lands and the creation of significant opportunities for the generation of economic income and employment for the families that at present do not have these opportunities. Furthermore, it would open a large window in the economic, ecological and social fields, contributing to clean development and climate change mitigation in a very effective manner.

In particular, it should be pointed out that contrary to what is normally the case with Andean communities migrating to the Amazon lowlands region for the clear-cutting of forests for agricultural purposes, the same communities in this case could migrate to the coastal region to reforest.

1.2.1 Conformity with sustainable forest management objectives

Overall, this project is highly relevant to the national strategy on climate change and sustainable forest management, its Action Plan for 2008-2011, and the objectives stipulated in the ITTA 2006, in particular: (c) contributing to sustainable development and poverty alleviation; (f) promoting and supporting research and development with a view to improving forest management and efficiency of wood utilization and the competitiveness of wood products relative to other materials, as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests, for the consolidation of sustainable forest management and adoption of thematic programs, particularly to reduce deforestation and tropical forest degradation and improve environmental services. Thus, both the project concept and the biophysical and social characteristics of the target area are considered to be among the high priority activities promoted and supported by this prestigious international organization.

- **The project stems from the need to ensure the rehabilitation of degraded forest ecosystems for the restoration of degraded forest lands that may be re-incorporated into the production and biodiversity systems, thus contributing to the generation of new rural development opportunities in depressed social contexts.**

- The project is consistent with the objective of encouraging tropical timber reforestation, as well as rehabilitation and restoration of degraded forest land (Objective f), but it will have greater impact and significance in relation to the objective of encouraging the development of national policies aimed at sustainable utilization and conservation of tropical forest lands and ecosystems and their genetic resources, and at maintaining ecological balance in the regions concerned.

- The project will contribute to the process of sustainable development. Insofar as the project is based on social and economic development considerations, within the framework of sustainable forest management and participatory planning in agreement with the population, it will promote the integrated development of rural communities and will provide concrete alternatives for the settlement of internal social conflicts. At the same time, the project will generate economic resources and improve the quality of soils, in particular, and the environment, in general, to make it more efficient by restoring or improving its production potential so as to help improve the quality of life of rural communities and significantly reduce the pressure exerted on natural forests.

- The project will promote and support research and development with a view to improving forest management and efficiency of wood utilization, as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests, including non-timber forest products, environmental services, carbon sequestration and avoided deforestation.

This project is **also** consistent with the principles of the program on reducing deforestation and forest degradation and enhancing environmental services (REDDES) in tropical forests, which play a vital role in sustaining a large proportion of the global biodiversity, maintaining land and water resource use options, contributing to the carbon cycle and providing other key services to forest-dependent communities.

[2] The establishment of 50 – 100 ha plantations can justify the installation of a small industrial plant for the production of tannin (Tara powder) and industrial gums from seeds with an added value of 10 – 20 times that of the dry raw material.

1.2.2 Relevance to the submitting country's policies

This project is consistent with the national policy of ensuring the conservation of forest resources through the implementation of a sustainable forest management strategy with the active and effective participation of rural communities. This will include reforestation and rehabilitation of degraded forest habitats, development of value-added production activities in community enterprises, promotion of ecotourism and competitive trade in the national and export markets, which are all priority issues for the agricultural, production, trade and tourism sectors. Furthermore, by contributing to the conservation and restoration of degraded forest ecosystems, the project will also contribute to the preservation and conservation of the national heritage in an area that is of special cultural significance as pre-Inca and Inca civilizations developed high productivity systems based on these hilly (*lomas*) ecosystems on the Peruvian coast. Tara was a significant species in these traditional systems for the production of tannin and medicinal products, which are currently in high demand in the international market for tannin, gums and medicinal products, especially the antibiotic known as *Bactrin* as well as nearly 50 different products.

Another project element of great significance for the country's sectoral policies is its contribution to poverty alleviation, which is currently being promoted by the national government as part of its commitment to the Millennium Development Goals of the United Nations.

As a result of the establishment of new trade negotiation frameworks involving the forest sector, such as the Free Trade Agreement with the Unites States, Canada, China and very soon with the EU, the Government of Peru has adopted a new forestry law as well as several legal and administrative regulations that facilitate the implementation of trade activities in a sustainable development context, identifying new commercial opportunities and strengthening or improving its strategies for climate change mitigation within the framework of UN-REDD. This will provide a possibility for the establishment of commercial mechanisms aimed at the reduction of deforestation and the implementation of best practices to avoid forest degradation, thus allowing Peru to participate more effectively in the commitments derived from the Climate Change, Biodiversity and Desertification Conventions, the Kyoto Protocol and other processes related to the sustainable management of forest resources.

Peru is a signatory party to the Kyoto Protocol and is working on the implementation of internationally recognized environmental standards so as to participate in the economic incentives provided. In this regard, Peru's most serious concern is the accelerated destruction of its natural forests, particularly in the Peruvian Amazon region, due to the increasing use of slash-and-burn forest practices with a forest loss rate of nearly 200,000 hectares/year, which is responsible for a high percentage of Peru's greenhouse gas emissions. In the Peruvian coastal (where more than 70% of the forest cover has been lost) and highland regions, there are no forest ecosystems or forest cover left over significant areas, with the exception of small areas of native Andean forests that are in danger of extinction. It is for these reasons that both MINAG and MINAM are seriously committed to firstly mitigate and eventually revert this situation, within the context of the United Nations REDD program, by developing programs and projects aimed at controlling deforestation processes and ensuring the rehabilitation of degraded forest ecosystems.

1.3 Target Area

Geographic location of the project

The project's area of influence is located within the micro zone known as Pampas del Huevo of the Camaná Province in the south coast of Peru, on extremely arid lands with high salinity soils.

Department-Region: Arequipa
Province: Camaná
District: Camaná
Site: Pampas del Huevo
Total project area of influence in ha: 5,000
Average annual temperature: 20 degrees C
Annual precipitation : 100 mm

1.4 Expected outcomes at project completion

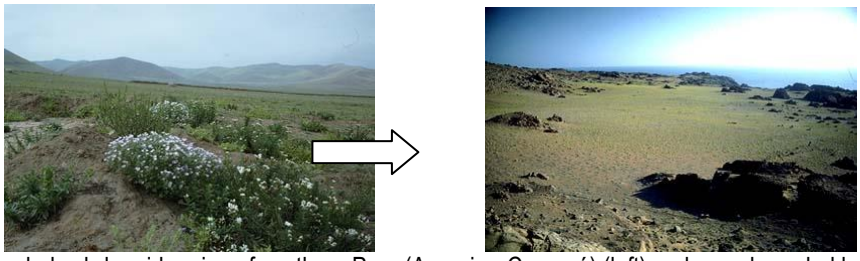
After project completion (**24** months) the following outcomes will have been achieved:

- **The project will have demonstrated that totally degraded and *eriaza* (waste) lands, under extreme soil conditions and precipitation levels, have an excellent potential for reforestation and can contribute to the generation of alternative sources of income for the rural population. The project will have consolidated a critical mass area of 100 ha of Tara plantations for the production of high-yield non-timber forest products that are in great demand in the international market, focusing exclusively on fruit harvesting and CO_2 storage.**

- The project will have created a crop potential of 1,000 ha for the direct benefit of 400 families, providing much higher income levels than those they are currently receiving through their subsistence agricultural activities, and a potential area of 5,000 ha for the next 20 years.

- The project will have created enormous opportunities for the rehabilitation and utilization of all *eriaza* lands in the Peruvian coastal region, representing nearly one million hectares.

- The project will have demonstrated that it is possible to obtain high economic returns in semi-desert conditions and with very small quantities of water (50 times less than for other crops in the Peruvian coastal region).



Hill formation in a degraded sub-humid region of southern Peru (Arequipa-Camaná) (left) and very degraded lands (right)

Site preparation in a degraded area

4 month old plant under drip irrigation system

12 month old Tara plantation

PART 2. PROJECT RATIONALE AND OBJECTIVES

The Project is not simply based on mere assumptions or hypotheses, but rather on the result of three years of work experimenting with different crops and products, and on the excellent results obtained with *Caesalpinea spinosa* (Tara) on a 14-hectare plot that is currently under production 24 months after planting.

The project rationale is based on a very specific cost-benefit analysis, which shows that with this type of crop and under these soil and climate conditions, it is possible to obtain highly successful results in the environmental, economic and social fields with substantial water savings as compared to other agricultural and forest crops. Project outputs will not only serve to assist or benefit a limited number of people or groups, but will also open up a wide range of new possibilities for development throughout the whole of the coastal area of Peru, 95% of which is currently unused, thus making it very competitive with the humid regions of the country.

2.1 Stakeholder analysis

Although during the immediate 24-month implementation period the project will only focus on about 50 families of small farmers, it is envisaged that it will have a much wider scope in the future, extending to 400 families and 1,000 ha in the near future (5 years) and to 5,000 ha within 20 years. Furthermore, the project will help to inform government authorities, local authorities and the rural communities settled along the whole Peruvian coastline, about the immediate benefits of an agro-industrial project based on a specific forest species.

In brief, project stakeholders or beneficiaries are:

- In the immediate term: 50 families of small farmers, or 250 people with an average of 2 hectares per family.
- In the short term: the national and local authorities that will benefit from the outputs of a project that offers enormous possibilities and potential for micro development at the local, regional and national levels.
- In the medium term: 400 families (1,200 people)
- In the long term: thousands of families

2.2 Problem analysis

The coastal region of Peru, sometimes referred to as the seaboard, is subject to extreme environmental conditions characterized by a marked water shortage, with annual rainfall levels of no more than 600 mm near the equator and up to 50 mm in the southern-most part of the country. Although these factors seriously limit the implementation of conventional agricultural or forestry activities, Peru is a mega diverse country with biological resources and forest species that are extremely diverse and have enormous potential for adaptation and development under extreme climate and soil conditions.

Over the last 50 years, many of the coastal ecosystems, such as the so called “lomas” (hills)[3] have been drastically reduced, and currently there are only 1 million hectares left of the 3 million hectares that were supposed to have existed towards the middle of the last century.

The potential of these micro-climates and the need to develop highly productive forestry or agroforestry activities and generate important sources of employment and income for the rural economies, require ingenious initiatives and proposals that will integrate the potential of the ecosystem to the flora diversity and the needs of the population. To this end, combining arid lands with drought resistant species that are in high demand in the international market (such as Tara) is an excellent formula to contribute to the sustainable development of the whole region.

Small scale farmers are extremely interested in this activity and are prepared to meet reforestation costs of 100 hectares, which is the target set for the project. Therefore, they only need financing for the basic infrastructure required to set up drip irrigation systems[4].

[3] *Lomas* are very special ecosystem formations that develop under climatic conditions of low rainfall levels, but that under certain conditions allow for the condensation of fog which adds moisture to the soils and allows these to develop small niches of herbaceous, shrub-like and even tree flora, which were utilized in very interesting ways by the Inca civilization. According to the forest map of Peru, they cover an area of more than one million hectares. However, at present they have been considerably reduced to give way to urban settlements and industrial parks, as well as by the effects of climate change.

Three artesian wells will be required to meet irrigation needs for 100 hectares (immediate goal) with a flow rate of 3-4lt/sec. In addition, the project will also require three pumping systems and the installation of drip irrigation systems.

2.2.1 Technical aspects

The experiences of APAIC in the southern coastal region of Peru and other private initiatives in this same region during almost three years of intensive work have shown that the adaptation of these species in the Peruvian coastal region is perfectly feasible, particularly under drip irrigation systems. These systems have achieved production within 18 months of plantation establishment, whereas in the highlands (Sierra), where the Tara species originates, production only starts after 30 months. Furthermore, the project is being developed under very conservative production estimates of 15 kg of dry pods per plant per year, whereas a plantation of 625 plants (planted at 4x4 m spacing) in the highlands region is producing more than 25 to 30 kg annually per plant without an irrigation system. Therefore, profitability is very likely to be much higher than those conservative estimates.

With regard to CO_2 sequestration for the mitigation of climate change, Tara has proven to be a highly efficient plant with uninterrupted sequestration rates of 10 to 15 MT per year based only on the fruits of the plant, without the need for tree felling, thus making it one of the best options for carbon storage. Furthermore, as it is a leguminous plant, it also absorbs great quantities of Nitrogen, which fixes to the soil and contributes to more efficient soil improvement. Even though there is the concern that leguminous plants emit N_2O, this is only true in environmental conditions of high precipitation levels. This, however, is totally irrelevant in the semi-desert conditions where this project will be implemented, as the balance between the Nitrogen that is accumulated as litter and the Carbon accumulated as green biomass (stems, branches and fruits) is clearly in favor of C and N sequestration in arid areas[5].

2.2.2 Economic aspects

According to the information directly obtained from the different plantations and wild ecosystems of *Caesalpinea spinosa*, it is estimated that a 4 to 5 year old plantation will have already reached a stable production level, with average production volumes of 30 kg of dry pods per plant/year, but there are plants that can produce up to 100 kg under special management conditions. However, in order to assess the economic returns of this demonstration activity, an average annual production level of only 15 kg per plant has been estimated. In other words, the project has estimated a much lower level than the average, but it is expected that under special management care and controlled irrigation, production could reach higher levels.

The installation cost of one hectare of Tara is US$ 3,000.00 up to the fourth year of plantation establishment (full production) and the current market price of dry pods is US$ 1.00 per kg, with an estimated production of 15 kg per plant by the fifth year, or $15.00 per plant and $10,000.00 per ha/year. From year 5 onwards, plantation maintenance and harvesting costs are reduced to $2,200.00 per hectare, which means that investment recovery time is very short and benefits or profits from year 5 onwards are excellent, reaching up to US$7,800.00/ha/year, a considerably higher profit than other agricultural crops in the region. The other advantage of this product is that it can be stored almost indefinitely in case there is a significant drop in market prices, but this is not likely to occur as the current world demand is more than 60,000 tons and the

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[4] Based on APAIC experiences, only 3,000 m^3 of water a year are needed to irrigate one hectare of Tara plantations, as compared to the 15,000 m^3 required for other traditional crops in the region, such as rice, onions, etc.

[5] Heather Erikson. Eric A. Davinson. Michael Keller: Former land-use and tree species affect nitrogen oxide emissions from a tropical dry forest (2001 Onecology)

"Species composition in successional dry forests in the tropics varies widely, but the effect of this variation on biogeochemical processes is not well known. Nitric oxide emissions increased with increasing soil moisture up to about 30% water-filled pore space then stabilized, while nitrous oxide emissions, albeit low, continued to increase with increasing soil wetness".

"N oxide fluxes were negatively and exponentially related to litter C/N ratio for these dry forests and the relationship was upheld with the addition of data from seven wet forests in northeastern Puerto Rico. This finding suggests that species determination of litter C/N ratio may partly determine N oxide fluxes across widely differing tropical environments".

Potential N_2O emissions from leguminous tree plantation soils in the humid tropics ARAI Seiko [(1)] ; ISHIZUKA Shigehiro [(2)] ; OHTA Seiichi [(1)] ; ANSORI Saifuddin [(3)] ; TOKUCHI Naoko [(1)] ; TANAKA Nagaharu [(4)] ; HARDJONO Arisman

" We compared nitrous oxide (N_2O) emissions over 1 year from soils of plantations growing acacia, which is a leguminous plant capable of symbiotic nitrogen fixation in root nodules, and secondary forests in Sumatra, Indonesia. N_2O emissions from acacia plantation soils fluctuated seasonally, from high in the wetter season to low in the drier season, whereas N_2O emissions from secondary forest soils were low throughout the year. Water-filled-pore-space data showed that denitrification contributed substantially to N_2O emissions from soils at acacia site".

current production level is less than 20,000 tons, Peru being the primary world exporter with exports of close to 16,000 tons (80% of world exports).

2.2.3 Environmental aspects

A major part of the Peruvian coastal region is severely arid, but there are almost three million hectares of dry forest formations or ecosystems, particularly in the northern coastal area and to some extent also along the south coast. However, these forests have been subjected to serious degradation processes mainly through overgrazing and excessive logging for the production of firewood, charcoal and timber, as well as through the establishment of urban areas that are displacing natural forests. Furthermore, there are almost one million hectares of special formations known as "lomas" that are plant ecosystems made of shrubs and trees (including Tara) that develop as a result of the presence and ongoing condensation of fog, which provides sufficient moisture for the development of arid climate trees. These formations were intensively logged during the Pre-Hispanic age for agricultural crop production and for the supply of construction materials, firewood and charcoal, as well as for hunting. However, today more than 70% of these formations have either disappeared or are extremely degraded. There is therefore an urgent need to rehabilitate these areas, particularly through reforestation projects using native Peruvian species such as *Caesalpinea spinosa* which, although more abundant in the highland areas, is also often found in the low-lying areas along the coast, thus showing great adaptation and development potential to contribute to the rehabilitation of degraded forest ecosystems.

In addition to the production of goods, such as non-timber forest products (fruits, seeds), this project will be able to store approximately 500 - 800 MT of CO_2 per year in the target 100-ha area to be reforested, thus contributing to climate change mitigation. However, the objective is to plant 1,000 hectares over the next 10 years, which would mean a carbon sequestration rate of approximately 5,000 - 8,000 MT/year.

2.2.4 Social aspects

The southern region of Peru, including the highland and coastal areas, is considered to be one of the poorest and socially depressed areas of the country, particularly in the highland region. The region is the source of important migrant flows towards the rainforest or Amazon region, where they rely on subsistence farming after clearing large areas of forest through slash-and-burn practices (deforestation). There are also migrations flows towards the coastal areas, resulting in increased problems of unemployment, pollution, etc., due to a lack of job opportunities. In view of this, forest plantations in coastal areas, such as Tara plantations, could become a source of employment as well as a source of much higher income levels than those currently accessed by these communities. In real terms, this would partly address the serious problem of migration flows into the Amazon region and indiscriminate logging of native forests. In the province of Camaná alone, there are more than 5,000 hectares of land potentially suitable for reforestation, but throughout the entire coastal region this figure rises to over 1 million hectares, thus making this an extremely important alternative at the national level that can contribute to the solution of many social problems, and this project can be a major catalyst for this process.

2.3 Objectives

2.3.1 Development objective

Ensure the development of activities for the rehabilitation of arid and/or degraded lands in the Peruvian tropical coastal region in accordance with the ITTO guidelines for the restoration, management and rehabilitation of degraded forest lands, generating reforestation opportunities so as to contribute to the improvement of the environment and the living conditions of the local rural population.

The project's expected impacts are above all related to the development of environmental and socioeconomic alternatives, which, in the medium term, can lead to a significant change in land use and to the generation of substantial economic income for small farmers in the province of Camaná, within the clean development mechanism and combating climate change and desertification scheme.

2.3.2 Specific objective s

Implement a forest production system in a very degraded micro coastal region using fast-growing, high commercial value forest species for the benefit of the Province of Camaná, while contributing to the mitigation of climate change effects through the production of carbon reserves.

The project seeks to promote the development of a critical mass area of cultivated land (100 ha, with 20 families) that will serve as a catalyst for the growing of 1,000 hectares in the next 10 years. This will not only restore climatic conditions in the “lomas” area, re-vegetating the coastal sub-humid tropical ecosystem of the region, but will also generate CO_2 storing biomass, employment (500 permanent workers) and sufficient economic resources to support approximately 250 families. It would represent a true economic, ecological and social revolution that would break the paradigm that reforestation can only take place in the humid areas of the Peruvian Rainforest (Selva) and Highlands (Sierra) Regions.

PART 3. DESCRIPTION OF PROJECT INTERVENTIONS

3.1 Expected outputs

3.1.1 100 ha of Tara *(Caesalpinea spinosa*) plantations on *eriaza* lands under drip irrigation systems established, including the installation of 3 artesian wells.

3.1.2 50 families directly benefitting from plantation production after **24** months and feasibility study for the establishment of 1,000 ha over the next 10 years.

3.1.3 **Feasibility study for the development of an industrial Tara processing plant and** carbon market model for non-timber forest products (fruits and seeds) and biomass under arid climate conditions.

3.2 Activities

O 3.1.1:

- Site preparation for plantation (100 ha)
- Construction of 3 artesian wells with a flow rate of 4lt/sec
- Installation of 3 irrigation water pumping units
- Installation of drip irrigation systems
- Establishment of nursery for the production of 65,000 seedlings: a nursery with 80,000 seedling capacity
- Field transplanting of seedlings

O 3.1.2:

- Registration and commitment of 50 families
- Organization of fieldwork, schedules and cultural activities: technical assistance
- Organization of harvesting system and sharing of benefits from processing and sales: technical assistance
- Development of feasibility study for rehabilitation and reforestation program using *Caesalpinea spinosa* in an area of 1,000 ha within the CDM framework

O 3.1.3:

- **Feasibility studies for the installation of an industrial Tara processing plant for the production of tannin powder.**
- Study on carbon storage estimates for soil and plants (stems, fruits, seeds) and valuation of annual production of non-carbon products and goods and services.
- **Carbon market potential assessment** within the framework of the Kyoto Protocol and CDM.

3.3 Strategies

The main project strategy is to ensure the organization and involvement of small farmers, who currently do not have significant sources of income, in agroforestry and non-timber product production activities so that they can collectively produce and process Tara fruits, with a view to rehabilitating degraded ecosystems, obtaining important economic benefits and ensuring the development of environmental services.

The general idea is to achieve a critical mass production level that will consolidate the system in both environmental and economic terms. The project will then promote the results so that a substantial number of small farmers will utilize a major part of the lands that they now consider to be *eriazas* or unusable, enhancing their capacity for the production of environmental goods and services.

The following tools will be used in order to achieve this: highly productive experimental and demonstration plots, logistic and financial support to develop a minimum area for industrial purposes, training courses, and dissemination through different print, radio and television media.

A positive result in this phase of the establishment of 100 hectares of Tara plantation will very likely be the involvement and participation of a great number of farmers who would want to replicate these experiences.

3.4 Work plan

ACTIVITY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Site preparation for plantation (100 ha)																								
Construction of three artesian wells																								
Installation of two irrigation water pumping units																								
Installation of drip irrigation systems																								
Establishment of nursery for the production of 65,000 seedlings																								
Field transplanting of seedlings & maintenance																								
Registration and organization of small farmers																								
Organization of fieldwork																								
Feasibility studies for an industrial tannin production plant																								
Organization of harvesting system, processing and sharing of benefits																								
Feasibility study for rehabilitation of 1,000 ha																								
Valuation of annual production of non-timber products and goods and services																								
Carbon market survey within the framework of the Kyoto Protocol and CDM																								

3.5 Budget

CODE	BUDGET COMPONENT							ITTO	APAIC
		Unit	Quantity	Unit cost	Total	YEAR 1	YEAR 2		
10	**Project Personnel**								
11	Project Management and Administration								
11.1	National Coordinator	Months	18	1,500.00	27,000.00	18,000.00	9,000.00	27,000.00	
11.2	Administrative Assistant	Months	18	400	9,600.00	4,800.00	4,800.00	9,600.00	
12	Professional Specialists				0.00			-	
19	**Sub-total**				**36,600.00**	**22,800.00**	**13,800.00**	**36,600.00**	
20	**Sub-contracts**				0.00			-	
21	Consultants				0.00			-	
	Tara Management Specialist		2	2,000.00	4,000.00	2,000.00	2,000.00	4,000.00	
21.1	Enterprise Development Specialist	Months	2	2,000.00	4,000.00	2,000.00	2,000.00	4,000.00	
21.2	Unskilled personnel (labour)	Days	3,000	12.00	41,000.00	26,000.00	15,000.00		41,000.00
29	**Sub-total**				**49,000.00**	**30,000.00**	**14,000.00**	**8,000.00**	**41,000.00**
30	**Duty travel**				0.00			-	
31	DSA	Days	1000	40.00	3,000.00	2,000.00	1,000.00	2,000.00	1,000.00
32	Land transport	Number	20	50.00	1,000.00	600.00	400.00	600.00	400.00
33	Air Fares – Nat.				0.00			-	
34	Air Fares – Int.				0.00			-	
39	**Sub-total**				**4,000.00**	**3,100.00**	**1,900.00**	**2,600.00**	**1,400.00**
40	**Capital Items**							-	
41	Nursery and silv. laboratory equipment				4,000.00	4,000.00		4,000.00	
42	Drip irrigation materials for 100 ha		100	1,000.00	100,000.00	75,000.00	25,000.00	25,000.00	75,000.00
43	Water pumping equipment		2	5,000.00	10,000.00	10,000.00		10,000.00	
44	Cistern tank – capacity: 20 m3		1	30,000.00	30,000.00	30,000.00		30,000.00	
49	**Sub-total**				**144,000.00**	**119,000.00**	**25,000.00**	**69,000.00**	**75,000.00**

CODE	BUDGET COMPONENT							ITTO	APAIC
		Unit	Quantity	Unit cost	Total	YEAR 1	YEAR 2		
50	**Consumable items, miscellaneous**				3,000.00	1,500.00	1,500.00	2,000.00	1,000.00
51	Materials and inputs				3,000.00	2,000.00	1,000.00	2,000.00	1,000.00
52	Equipment maintenance and service				3,500.00	2,000.00	1,500.00	2,500.00	1,000.00
59	**Sub-total**				**9,500.00**	**5,500.00**	**4,000.00**	**6,500.00**	**3,000.00**
60	**Training: workshops, courses, work experience**							-	
61	Short training courses				3,000.00	2,000.00	1,000.00	2,000.00	1,000.00
62	Dissemination materials, reports				4,000.00	2,000.00	2,000.00	4,000.00	
69	**Sub-total**				**7,000.00**	**4,000.00**	**3,000.00**	**6,000.00**	**1,000.00**
	TOTAL OPERATING BUDGET				**250,100.00**	**154,400.00**	**47,700.00**	**128,700.00**	**121,400.00**
70	**EXECUTING AGENCY MANAGEMENT COSTS (15% of operating budget)**				**37,515.00**				**37,515.00**
	ITTO ADMINISTRATION COSTS				**20,296.00**				
	Project monitoring and review				10,000.00			10,000.00	
	ITTO programme support costs (8% of ITTO budget)				11,096.00			11,096.00	
	Sub-total				**57,811.00**				
	OVERALL BUDGET				**308,711.00**				
	ITTO CONTRIBUTION				**149,796.00**			**149,796.00**	
	EXECUTING AGENCY CONTRIBUTION				**158,915.00**				**158,915.00**

3.6 Logical Framework Matrix

	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
SPECIFIC OBJECTIVE:			
Implement a forest production system in a very degraded micro coastal region using fast-growing, high commercial value forest species for the benefit of the Province of Camaná, while contributing to the mitigation of climate change effects through the production of carbon reserves.	**Plantation established and under sustainable management covering a sufficiently large area or critical mass for the development of a production ecosystem.**	**Field checking; Reports and maps.**	
EXPECTED OUTPUTS:			
3.1.1 100 ha of Tara *(Caesalpinea spinosa*) plantations on *eriaza* lands under drip irrigation systems established, including the installation of 3 artesian wells	**A total of 100 hectares planted, including: 50 hectares planted with the contribution of APAIC members and another 50 planted with ITTO contribution.**	**Field checks; overall project reports and individual family group reports.**	**ITTO resources are disbursed in a timely manner; project participants fulfill their commitments to achieve the targets set.**
3.1.2 50 families directly benefitting from plantation production after 18 months and feasibility study for the establishment of 1,000 ha over the next 10 years	**Upon project completion, 50 participating families will have established a cooperative enterprise program.**	**Registration and ongoing participation of stakeholders and achievement of targets at the family level. Feasibility study developed and under implementation for the industrial production phase.**	**Family groups have established a cooperative enterprise based on the first 100 hectares planted and are willing to continue the program during a second phase focused on production, industrial processing and export of manufactured products.**
3.1.3 Feasibility study for the development of an industrial Tara processing plant and carbon market model for non-timber forest products (fruits and seeds) and biomass under arid climate conditions	**Feasibility project developed for a larger industrial-scale program.**	**Feasibility study approved by the multi-family association and submitted to national and/or international financial agencies for consideration.**	**Consistent and relevant information has been collected for the feasibility study and the assistance of micro-enterprise development experts has been secured.**

COST-BENEFIT ANALYSIS

The cost analysis has taken into account that production will be minimal – virtually marginal – during the first year; however, from the second year onwards, production per hectare will grow exponentially and after five years, industrial plantations under more favourable climate and soil conditions would normally produce approximately 40 kg per plant[6] (625 plants per ha). Nevertheless, for this particular case, only an average production of 15 kg per plant/year has been considered, amounting to approximately 9,000 kg per ha. Thus, the resulting profitability is quite high, especially when compared to other traditional crops in the area, which require much more water, fertilizers, pest control, etc.

From the second year onwards, the estimated sale value per kg of dry pod material is US$1.0 (based on present value at processing plant door); however, based on current world trends, this figure may increase to more than $1.20/kg. By the end of 2008, the price was $1.50, but after the world economic crisis, it dropped to $0.50 in 2009.

COST-BENEFIT RATIO		Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Overall project cost for 100 ha up to year 2	307,543.00	207,543.00	100,000.00				307,543.00
Maintenance and harvesting costs up to year 5	220,000.00	10,000.00	30,000.00	60,000.00	60,000.00	60,000.00	220,000.00
Average production per ha (in kg)			500	1,500.00	5,000.00	9,000.00	
Total production for 100 ha			50,000.00	150,000.00	500,000.00	900,000.00	1,600,000.00
Sale of products ($0.8/kg)*			40,000.00	120,000.00	400,000.00	630,000.00	1,190,000.00
TOTAL OUTGOINGS		217,543.00	130,000.00	60,000.00	60,000.00	60,000.00	527,543.00
TOTAL INCOMINGS		-	40,000.00	120,000.00	400,000.00	630,000.00	1,190,000.00
PROFITS		0	-90,000.00	60,000.00	340,000.00	570,000.00	662,457.00
Net profit per hectare/year – up to year 5							1,183,375.43

* Price in field

As can be seen in the above table, by year 5 all investment costs should be recovered and substantial profits should be obtained. However, from year 6 onwards, these profits will considerably increase as installation costs incurred during the first two years will have been covered and therefore, from year 6 onward, only maintenance and harvesting costs are considered for an estimated total of $2,200 per hectare. Thus, profits may reach up to $7,500.00/ha without including the price of carbon annually stored in stems, leaves, fruits, seeds and roots.

Labour costs will be fully covered or financed by the direct beneficiaries, who will also meet 100% of the cost of the irrigation system and will build their own water reservoirs (with storage capacity of 50-75 m^3), as a pre-requisite to participate in the project and share in its benefits.

In any case, even though a part of the project objective is focused on producing economic benefits for project beneficiaries, it will be equally or even more important to demonstrate that reforestation in tropical desert areas under extreme conditions can generate benefits in the environmental, economic and social fields.

Other typical crops in this semi-arid region of Peru have much higher installation costs, for example, dessert and wine grape – US$25,000/ha, and olives – US$15,000/ha.

[6] In some cases, mature plants over 10 – 15 years of age have reported production rates of up to 80kg of pods per plant.

PART IV. IMPLEMENTATION ARRANGEMENTS

4.1 Organization structure and stakeholder involvement mechanisms

4.1.1 Executing Agency

The project executing agency will be the Association for Agro-Industrial Development in Camana (*Asociación Pro Desarrollo Agroindustrial de Camana* – APAIC), a non-profit organization with expertise in environmental and rural development projects related to reforestation, forest management and agro-industrial development activities using non-timber forest products. Even though this organization was established a relatively short time ago, its Executive Director has extensive experience in the field; has participated in specialized courses on rural development policies based on non-timber resources with special emphasis on community forest development, value-added production of timber and non-timber products, sustainable management of native tropical forests and community forestry; has coordinated participatory planning and Amazon rural development projects; and has conducted consultancies on environmental issues at the international level.

A Project Steering Committee will be established to evaluate and guide all activities aimed at the achievement of project objectives. This Committee will be made up of representatives from the main institutions involved in the project. The PSC will provide guidance to and consult with the executing agency from the project proposal development phase, and will meet at least twice a year to assess project progress.

The project will also have the technical assistance and, eventually, the financial support of the Agro-Rural Program of the Ministry of Agriculture and its General Forest and Wildlife Directorate, which are the public agencies responsible for renewable natural resources in the country. They will be responsible for regularly assessing and monitoring compliance with project goals and objectives, and will as far as possible provide support in terms of infrastructure and technical personnel, through the local Forest and Wildlife Administrations, for the implementation of training and technology transfer activities addressed to rural communities. In addition, they will provide information on concession holders, native communities and agroforestry farm owners that may participate in project activities.

Even though APAIC is an independent private association, it is the agency directly responsible for the technical and administrative implementation of the project and will coordinate with the Ministry of Agriculture (MINAG) and other relevant organizations at the national, regional and local levels, to ensure the achievement of project objectives. The Project General Coordinator, to be appointed by APAIC subject to ITTO's no-objection approval, will be directly responsible for the implementation of the project. The Coordinator's salary will not be covered by ITTO but by APAIC. The Project Coordinator will receive the support of a specialized technical team for the achievement of project objectives; the members of this team should have proven experience in all relevant aspects of the project. The Management and Industry Experts will be responsible for the implementation of actions aimed at the achievement of outputs related to the project's specific objective, with the support of expert consultants in the relevant fields as identified during the diagnosis and implementation phases.

4.1.2 Project management team

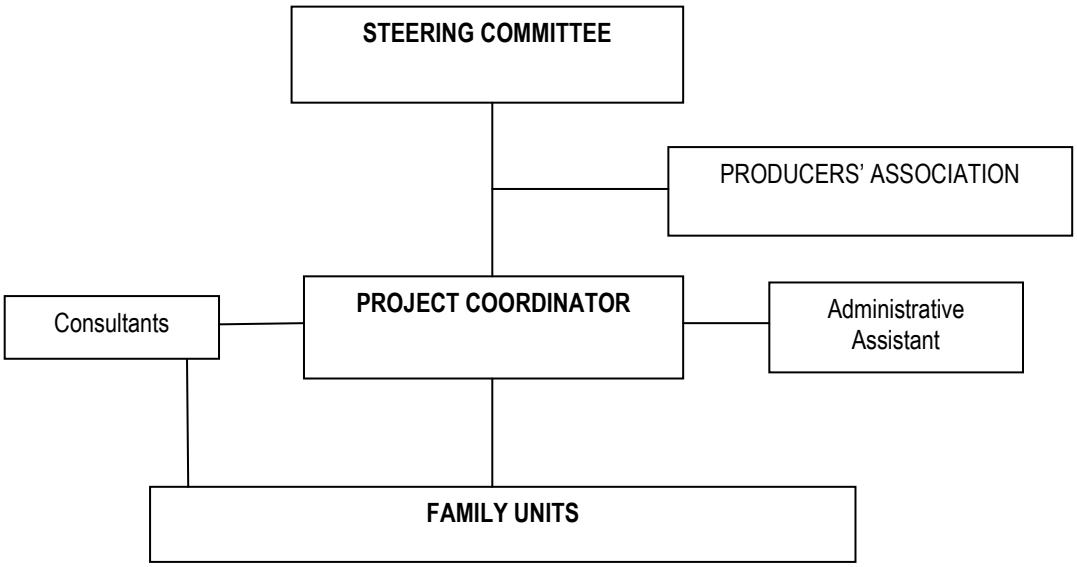
Project management will be under the responsibility of the Project Coordinator, who will work together with an administrative assistant in accounting procedures and personnel administration. In addition, the project will have the support of three national specialists in Forest Management, Environmental Services and Community Enterprise Development/Management respectively.

POSITION
PROJECT PERSONNEL
01 General Coordinator
01 Administrative Assistant
01 Forest Management Specialist
01 Community Enterprise Development Specialist

4.1.3 Project Steering Committee

The project steering committee will be the highest authority in the project policy and administration structure and will be made up of one representative each from ITTO and MINAG, a representative of project beneficiaries (APAIC) and a local government representative, as well as the Project Coordinator as the executive secretary. The committee will meet twice a year to assess project progress and provide guidance to improve project execution. The project will also have a consultative committee made up of representatives from the local communities, university, regional government, and other relevant individuals or institutions that may provide advice to the project.

4.2 Project Organizational Chart



4.3 Stakeholder involvement mechanisms

Project stakeholders include community members at the individual and family levels and entire communities as social bodies representing the organized population. The former will be the direct beneficiaries of the project participating in project activities such as seedling production, planting and plantation maintenance, and primary processing. They will also participate at an individual level in training programs, including short courses and workshops, and in forest plantation and nursery activities. In all cases, community participation will be previously coordinated with community leaders and local governments (municipalities) following the approval of the relevant work plan.

Community and local government authorities will also participate in training programs and the project steering and consultative committees.

Each of the family groups participating in the project will provide 50% of the overall plantation target set for 24 months as their counterpart contribution to the project, and the areas to be planted will be specifically established on a case-by-case basis according to their own resources and availability of land, water and irrigation equipment.

4.4 Sustainability

From the very beginning, the project will be supported by a sound institutional framework comprising a group of farmers who are totally committed to this activity and are fully aware that this is the appropriate approach to develop an alternative program for the generation of economic resources and industrial stability. Since the project is focused on the production of a permanent crop, they have undertaken a long-term commitment to continue the implementation of activities; in fact, they have decided to significantly expand their overall plantation program to reach competitive industrial-scale levels for the export market.

4.5 Risks

The project as a whole does not pose any significant risks from a social, economic or environmental viewpoint. On the contrary, an initiative such as this will open the door to important alternatives for the rehabilitation of very degraded ecosystems, which would otherwise be irreversibly lost. In this sense, the project can only provide multiple benefits.

However, a potential risk could be a sharp drop in the market price of Tara products both at the national and international levels. But even in this hypothetical case – and taking into account the high and increasing unmet demand for these products at the world level – natural and processed Tara products are not perishable and could be stored for a long time until prices increase.

Another possible risk could be the effects of climate change, including extreme temperatures and droughts. However, Tara is a very strong crop that can withstand extreme site and climate conditions.

4.6 Future operation and maintenance

The project's capital items, including demonstration plots and forest species propagation nurseries, will be transferred to and maintained by the actual land owners or holders that will have actively participated in the implementation of the project, who will be responsible for their management for their own benefit and for the benefit of the local population living in poverty. If the plots belong to native communities, they will continue to be governed by the legal framework regulating their tenure on a permanent basis.

The project executing agency will keep custody of other capital items to be used as stipulated in its articles of association and the agreement concluded with MINAG.

4.7 Administrative arrangements

Key staff

The staff of the Project Executing Unit (PEU) will be made up of four professionals, including a National Consultant (General Coordinator) and an Administrative Assistant, whose qualifications and responsibilities are briefly described in Annex 2. In addition, the project will receive the support of consultants in Forest Management, Reforestation and Rehabilitation and in Community Enterprise Development.

The project's staff requirements are shown in the following table:

POSITION	US$/MONTH	DURATION	TOTAL (US$)	FINANCED BY
PROJECT PERSONNEL				
01 General Coordinator	1,500	18 Months	36,000	ITTO
01 Administrative Assistant	400	18 Months	9,600	ITTO
01 Forest Management Specialist	2,000	2 Months	4,000	ITTO
01 Community Enterprise Development Specialist	2,000	2 Months	4,000	ITTO

4.8 Possible future actions

Upon project completion, APAIC and MINAG will continue disseminating project achievements in the rehabilitation and sustainable management of resources, as well as in non-industrial processing techniques. To this end, the institutions will use their own resources as well as funding from other sources.

The Project Executing Unit (PEU) will provide MINAG with the necessary information to replicate its achievements and contribute to the solution of future problems that project beneficiaries may face in technical aspects related to project objectives.

MINAG and APAIC will use different means of communication to continue disseminating the techniques used in the project but will particularly focus on the promotion of partnerships between local NGOs, communities and/or small farmer groups involved in the Project and similar organizations in the region or other regions of the country, with a view to developing a network of interested stakeholders. Therefore, project beneficiaries

will become trainers and promoters of the benefits of rehabilitation, management and sustainable utilization, thus contributing to strengthening the results obtained and their sustainability.

APAIC and the Vice-Ministry of Industry will continue promoting and coordinating the implementation of the "National Plan for Industrial Development and Markets for Poles and Wooden Crates", with the support of agencies such as PROMPYME (Promotion of Micro and Small Enterprises of the Ministry of Labour); PROMPEX (Promotion of Exports); and ADEX (Exporters' Association).

4.9 Reporting, review, monitoring and evaluation

Six-monthly and yearly progress reports

The Project Executing Agency will submit reports to ITTO on a six-monthly and yearly basis in accordance with Agro Rural's Project Manual. These reports will be assessed by the Project Steering Committee before their submission to Agro Rural. The reports should contain information on progress made in each project activity and should be prepared at least 4 weeks before the date of each scheduled monitoring visit.

4.10 Dissemination and mainstreaming of project learning

The project will use different means for the dissemination and mainstreaming of achievements and lessons learned, including the following:

i) Short courses and workshops, with the participation of direct project stakeholders and beneficiaries but also other invited guests such as local governments, NGOs, official agencies, universities, etc.
ii) Printed dissemination documents prepared in accordance with the training plan and technical brochures on specific topics, which will be widely distributed throughout the micro region and other adjacent and neighbouring areas.
iii) Conferences and work meetings at different levels.
iv) The Project Consultative Committee.
v) Participation in information sharing meetings and guided tours to project site for farmers from other micro regions.

ANNEX 1 – PROFILE OF THE EXECUTING AGENCY

The project executing agency is the Association for Agro-Industrial Development in Camana – APAIC (Asociación Pro-desarrollo Agroindustrial de Camana), which is an association grouping small farmers from this province on the south coast of Peru with a view to promoting agroforestry activities to ensure better land utilization and rehabilitation of degraded or *eriazo* ecosystems through agricultural and/or forestry systems that represent economic alternatives of special significance and impact on the environment and the rural economy.

In its three years of existence, APAIC has developed a number of initiatives based on agroforestry systems that may be adapted to extreme arid conditions and soils with high salt content. Thus, it has established small experimental plantations of *Casuarina esquesitifolia, Eucalyptus camaldulensis* and more recently *Caesalpinea spinosa*, a species that has shown better and even surprising results even though the seeds used were from the South Andean region of Peru (Ayacucho).

The surprising success achieved in a pilot plot of approximately 4 hectares has raised a high degree of interest among APAIC members as well as the entire province and the local government. However, it will be necessary to establish a plantation with a sufficient area and production capacity to develop industrial processing systems for value-added production and development of a whole production and value chain.

APAIC is a non-profit organization that is open to all interested stakeholders. Its membership currently comprises more than 50 small farmers with plots of up to 15 ha, amounting to a total area of 500 ha on totally degraded lands. The Association has an executive board or board of directors, with a chairperson, a secretary, a treasurer, a promotion officer and a monitoring officer. It is headquartered in the city of Camana and has been officially recognized and endorsed by the local government and the Ministry of Agriculture (MINAG).

APAIC has developed a dissemination and training program on arid land management systems. To this end, it has organized conferences, short courses and field demonstration activities in coordination with the local government (municipality) of Camana.

ANNEX 2 – TASKS AND RESPONSIBILITIES OF KEY STAFF PROVIDED BY THE EXECUTING AGENCY

PROJECT PERSONNEL	DURATION	PERIOD	TASKS
COORDINATOR	18	Throughout project duration	General technical and administrative management and coordination of project; responsible for budget execution; secretary of the Project Steering Committee; preparation of inception and six-monthly and completion reports
ADMINISTRATIVE ASSISTANT	18	Throughout project duration	Responsible for the administration and accounting of project funds; preparation of monthly and six-monthly financial reports

CONSULTANTS	DURATION (months)	PERIOD	TASKS	OUTPUTS
FOREST MANAGEMENT SPECIALIST	2	From second quarter onwards	Technical assistance in crop management and development of management plan for Tara forest plantation	Consultancy report
ENTERPRISE DEVELOPMENT SPECIALIST	2	From fourth quarter onwards	Technical assistance in the installation of a semi-industrial plant and organization of product processing and marketing	Consultancy report

CAPITAL ITEMS		VALUE IN USD	USE AND PURPOSE
Nursery and silvicultural laboratory equipment	ITTO	4,000.00	Electrical pump motor of 1.5 HP, sprinklers, germinator, hoses and plastic bags
Two water pumping units of 40HP each and water supply pipelines to individual reservoirs	ITTO	10,000.00	Water pumping from artesian wells to individual water reservoirs, which beneficiaries must build at their own expense to feed the drip irrigation system
Drip irrigation materials	APAIC	100,000.00	3,000 meters of 2, 3 and 4 inch pipes; 125,000 meters of 16 mm drip irrigation hose; 65,000 adjustable drip heads and 2,500 master valves
20 m3 cistern tank	ITTO	30,000.00	Stainless steel tank with water suction and pumping equipment

ANNEX 3 - COMMENTS OF THE 40TH EXPERT PANEL ON THE TECHNICAL EVALUATION OF THE PROJECT PROPOSAL

PD 583/10 (F) **Restoring Sub-Humid Ecosystems in Southern Peru through Reforestation with *Caesalpinea spinosa***

Assessment by the Fortieth Panel

A) Overall Assessment

The Panel recognized the importance of this small project for ensuring the rehabilitation of arid or degraded lands in the Peruvian Coastal Region so as to generate reforestation opportunities with a view to improving the environment and the living conditions of the local rural population in southern Peru. As such, it is highly relevant to ITTO's objectives and core priorities, in particular those related to the restoration, management and rehabilitation of degraded and secondary tropical forests, and the promotion of non-timber forest products. The Panel also took note that the target small farmers and their communities directly participated in the formulation of this small project via an association created solely for this purpose. It further observed that while the proposal was well written and presented, it had not included a proper estimate of the potential carbon sequestration to be provided by the rehabilitation of degraded lands with Tara, and as such thought it should be eliminated from the proposal. In addition, the Panel also viewed the project's timeframe as rather overoptimistic, as the production and planting of the Tara seedlings would take up the first six months, and then the Tara trees themselves would take another 18 months to complete one full production cycle. Moreover, the feasibility study also can only be completed after one full production cycle.

B) Specific Recommendations

The proposal should be revised taking into account the overall assessment **and** the following:

1. Extend the project's timeframe sufficiently so as to realistically be able to achieve one full production cycle and properly complete the data collection and elaboration of the feasibility study, albeit without affecting the project budget in any way;

2. Either provide proper estimates for the potential carbon sequestration to be provided by the rehabilitation of degraded lands with Tara, or eliminate it from the proposal. However, it could, and probably should, be considered as a component within the feasibility study to be developed;

3. Consider applying the ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests during the implementation of the project;

4. Include a project brief and a list of acronyms, and provide additional information as regards the institutional setup, logical framework indicators, implementation strategy, risks and the project's long-term sustainability;

5. Adjust the costs for ITTO monitoring and review to US$10,000 per year, and recalculate ITTO's Programme Support Costs so as to conform to the standard of 8% of total ITTO project costs; and

6. Include an annex that shows the recommendations of the 40th Expert Panel and the respective modifications in tabular form. Modifications should also be highlighted **(bold and underline)** in the text.

C) Conclusion

Category 1: The Panel concluded that the proposal could be commended to the Committee with incorporation of amendments.

RESPONSE TO THE EXPERT PANEL'S RECOMMENDATIONS

1. **The project duration has been extended to 24 months without increasing the budget. It should be taken into account that APAIC currently has a 30-month-old experimental plot of approximately 10 hectares, which will be used in combination with the new area to be planted by the project to complete the monitoring of one full production cycle of Tara (*Caesalpinea spinosa*) so as to implement a technical-economic feasibility study for the development of an industrial-scale project. Furthermore, APAIC is considering the implementation of a second phase (without ITTO commitment) for the industrial processing and export of Tara products.**

2. **The carbon component is no longer considered as a project objective but rather as an additional element to be taken into consideration for the feasibility study.**

3. **The proposal now explicitly states that the project will be implemented in accordance with the ITTO guidelines for the rehabilitation and restoration of degraded and secondary forests.**

4. **A list of acronyms has been included and the other improvements recommended by the Expert Panel have also been made, including the provision of a logical framework table and indicators, improved description of the institutional setup, addition of a section on risks and improved description of strategies. All of these adjustments have been marked in bold and underlined in the relevant sections.**

5. **The relevant budget adjustments have been made as recommended by the Expert Panel, without increasing the overall budget or components (except for a few minor adjustments) as can be seen in the budget table presented.**

Finally, all the modifications, improvements, adjustments, etc. have been marked in bold and underlined so as to facilitate their identification.