

# INTERNATIONAL TROPICAL TIMBER ORGANIZATION

## ITTO

### PROJECT PROPOSAL

<b>TITLE:</b>	CONSERVATION AND REFORESTATION OF THREATENED MANGROVE FOREST AREAS ALONG THE PACIFIC COAST OF PANAMA
<b>SERIAL NUMBER:</b>	PD 156/02 Rev.2 (F)
<b>COMMITTEE:</b>	REFORESTATION AND FOREST MANAGEMENT
<b>SUBMITTED BY:</b>	GOVERNMENT OF PANAMA
<b>ORIGINAL LANGUAGE:</b>	SPANISH

#### SUMMARY

This project proposal is aimed at ensuring the conservation and sustainable management of 4,000 hectares of mangrove forests and the reforestation and enrichment of 600 hectares along the Pacific Coast of Panama, specifically in threatened areas of the western region in the province of Panama and the Peninsula of Azuero, so as to alleviate the constant pressure exerted on this significant forest ecosystem. In addition, the project envisages the implementation of agroforestry and reforestation activities over an area of 650 hectares.

In order to achieve this objective, the project will ensure the participation of the local mangrove-dependent communities and will also consider the information and results of the Project on Mangrove Management, Conservation and Development in Panama. The project is basically divided into three components – mangrove management, reforestation and extension.

The project seeks to improve the welfare of mangrove-related communities, improve the conservation of the ecosystem's biological diversity and contribute to the production and export of marine resources.

**EXECUTING AGENCY:** NATIONAL ENVIRONMENTAL AUTHORITY (ANAM)

**DURATION:** PHASE I: 24 MONTHS  
PHASE II: 24 MONTHS

BUDGET AND PROPOSED SOURCES OF FINANCING:	SOURCE	CONTRIBUTION IN US\$
<b>PHASE I</b>	ITTO	491 257
	Govt. of Panama	210 290
	<b>Total</b>	<b>701 547</b>
<b>PHASE II</b>	ITTO	316 887
	Govt. of Panama	168 290
	<b>Total</b>	<b>485 177</b>
<b>PROJECT TOTAL</b>		<b>1 186 724</b>

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## **PART I: CONTEXT**

### **1. ORIGIN**

Panama has one of the most diverse shorelines in Central America. The Panamanian Pacific coast is characterised by its irregularity with a predominance of mangrove forests. Mangroves are essential resources because of their high productivity and their significance for the ecological balance and quality of life, and they also make a significant indirect contribution to economic growth in the country.

Mangrove forests are highly productive natural ecosystems. Given their high levels of organic matter, they serve as breeding ground for many fish and shellfish species, and are a natural habitat for a great variety of birds and other marine organisms. Mangroves also protect the coastline from erosion, tidal waves, storms and hurricanes, and like other plants and trees, they function as environmental lungs because they produce oxygen and sequester atmospheric carbon dioxide. Mangrove areas are used for passive recreation, water sports and tourism, and they are also important for education and scientific research.

Mangrove forest distribution and extent in our country have been documented on the basis of research coordinated by relevant institutions and organisations. Many of the activities carried out in mangrove areas have not been duly planned and have not taken into account the ecological value of these areas, thus causing their degradation and sometimes endangering them.

Mangrove forests in Panama account for approximately 5.6% of the national forest cover, i.e. some 170,000 hectares, the majority of which are located along the Pacific coast. Mangrove species diversity is high in many parts of the world, but 11 out of the 13 mangrove species occurring in the Americas are found in Panama. These ecosystems are made up of various mangrove species, with *Rhizophora mangle* and *Rhizophora racemosa* being the dominant species, as well as many other associated species.

Since colonial times, mangrove forests have provided economic benefits for the local communities, including food and timber for construction purposes. Mangrove forests contribute to the livelihood of a large number of families that depend on these resources for their various forest products such as poles, stakes, chips, props, parts, bars, charcoal and bark, among others. Furthermore, mangrove forests play a fundamental role in the reproduction of numerous shrimp and fish species of great economic significance for the country. National shrimp and fish export earnings currently amount to approximately US\$50 million per year.

However, mangrove forests are being subjected to constant pressures that lead to their degradation and destruction. The main factors causing mangrove degradation include the establishment of aquaculture farms, agricultural and cattle-raising activities, and forest product harvesting. For this reason, it is necessary to develop programmes aimed at promoting the conservation of this ecosystem, the rehabilitation of degraded areas and the search for new alternatives for the communities that depend on these natural resources.

The Project on "Management, Conservation and Development of Mangrove Forests in Panama", implemented by the National Institute for Renewable Natural Resources (now the National Environmental Authority) with the financial support of the International Tropical Timber Organization was completed in 1997. The main objective of this project was to conduct mangrove forest inventories in three regions of the country – Chiriquí, Azuero and Chame, to provide important biological and socio-economic information, a part of which has been used in the formulation of this project proposal. However, this information will be even more useful in the project implementation phase, particularly the mangrove management and reforestation components.

Based on the results of the project completed in 1997, it was recommended to develop small-scale production extractive projects for critical areas as a temporary solution, ensure the involvement of local communities in the implementation of management plans, and promote alternative production activities such as agroforestry systems. In addition, the project recommended to develop policies aimed at the conservation of mangrove forests and to encourage development aid institutions to support the conservation of this ecosystem to contribute to the welfare of the rural population. It is in this context that this project proposal has been formulated and its objectives and activities have been defined.

## **2. LEGAL ASPECTS AND SECTORAL POLICIES**

Marine coastal resources (including mangroves) are part of the national heritage and their administration, management, conservation, harvesting and rehabilitation are subject to the regulations issued by the Panamanian Maritime Authority (Autoridad Marítima de Panamá – AMP) through the General Directorate for Marine and Coastal Resources.

The responsibilities of the Panamanian Maritime Authority include promoting and coordinating plans with the National Environmental Authority to ensure the appropriate use of marine and coastal resources so as to guarantee their conservation, rehabilitation and sustainable harvesting. These provisions are stipulated by Decree No. 7 of 10 February 1998, “establishing the Panamanian Maritime Authority, consolidating the various maritime branches of the public administration sector, and stipulating other provisions”, as well as Act No. 41 of 1 July 1998, “outlining the General Environmental Law of the Republic of Panama and establishing the National Environmental Authority”.

In addition, an agreement between the National Environmental Authority and the Panamanian Maritime Authority is currently being reviewed to regulate the transfer of water and mangrove concessions. Through this agreement, both agencies agree to implement policies aimed at maintaining mangrove ecosystems and, in compliance with Act No. 41 of 1 June 1998, ANAM agrees to transfer to the Panamanian Maritime Authority all responsibilities related to the harvesting, management and conservation of marine coastal resources in the Republic of Panama.

Other important legal provisions include Article 1 of Act No. 41 of 1 July 1998, which establishes that the management of the environment is a duty of the State. Therefore, this legislation stipulates basic standards and principles for the protection, conservation and rehabilitation of the environment, promoting the sustainable use of natural resources. The National Environmental Authority is the agency responsible for the management of natural resources in the country.

Furthermore, Act No. 01 of 03 February 1994, “establishing the Republic of Panama’s forest legislation and other provisions”, defines as objectives of the State *inter alia* to ensure the protection, conservation and enhancement of existing natural resources in the country and to promote their sustainable management and harvesting, as well as harmonising national production and development plans and projects with the utilisation and conservation of forest resources.

The National Environmental Strategy was developed in 1999 to respond to the commitments emanated from Act No.41 “General Environmental Law” and to develop clear and consistent environmental policies so as to ensure the adequate protection of the environment and the improvement of the welfare of the Panamanian society. The objective of this Strategy is to provide the Panamanian State with a unique short, medium and long term environmental program with clear goals, objectives and priorities agreed on by the various social stakeholders. The aim of the National Environmental Strategy is to ensure the management of forest resources by the year 2020 as a strategic target to achieve sustainable development at the rural community level. Similarly, it is aimed at the adequate valuation of environmental services provided by forest resources and at the efficient, integrated harvesting of these resources with the participation of the communities. The actions envisaged in the National Environmental Strategy include the strengthening of sustainable management and development in marine coastal areas by establishing measures for the protection, rehabilitation and use of resources.

## **3. PROGRAMMES AND OPERATIONAL ACTIVITIES**

The national economic policy, investment priorities and social targets are established by the Ministry of Economics and Finance. This in turn is translated into the implementation of programmes and projects by national ministries and autonomous agencies.

The following projects aimed at the development of the forest sector have been implemented in the Republic of Panama with the support of ITTO:

- ◆ Management, Conservation and Development of Mangrove Forests in Panama – PD 128/91 Rev.2 (F);
- ◆ Forest Management, Community Development and Sustained Use of Forests in the Punta Patiño Forest Reserve, Darien Region, Panama – PD 35/93 Rev.4 (F), Phases I & II;

- ◆ Technical Assistance to Develop a Mapping and Inventory Project Aimed at the Sustainable Management and Administration of Forest Resources – PPD 15/96 Rev.1 (F);
- ◆ Forest Development Plan for the Sustainable Management of Forests in the District of Donoso, Panama – PPD 6/95 Rev.1 (F);
- ◆ Master Plan for the Upgrading of the Forest Industrial Infrastructure in Panama – PD 15/97 Rev.2 (I);
- ◆ Management of Cativo Forests and Non-Timber Products with the Participation of Rural and Indigenous Communities, Darien, Panama – PD 37/95 Rev.2 (F);
- ◆ Establishment of a Forest Statistics Information System; PD 44/96 Rev.2 (M).

The following ITTO-supported projects were under implementation as of 29/10/2000:

- ◆ Sustainable Forest Management in the Nargana District, Kuna Yala Indigenous Territory, Panama – PD 1/96 Rev.3 (F);
- ◆ Institutional Strengthening of the Geographic Information System (GIS) of the National Environmental Authority (ANAM) for the Monitoring and Evaluation of Panama's Forest Resources with a View to their Sustainable Management – PD 54/98 Rev.1 (F).

The results of the above projects will help to guide the consultation and support process for the development of criteria and indicators for sustainable mangrove resource management in Panama. Of particular importance will be the results of the project on Management, Conservation and Development of Mangrove Forests in Panama – PD 128/91 Rev.2 (F), which included the following studies and tests:

- Water source surveys in the project area;
- Descriptive study on land fauna associated to the mangrove ecosystem in the Chame, Azuero and Chiriquí areas;
- Economic evaluation of non-industrial fishing in the project areas: small and large scale;
- Preliminary assessment of primary litter production in the Chame, Azuero and Chiriquí areas;
- Descriptive study on marine fauna associated to the mangrove ecosystem in the Chame, Azuero and Chiriquí areas;
- Description of non-industrial mangrove harvesting techniques;
- Preliminary tests of mangrove seed germination and propagules;
- Reforestation using red mangrove species;
- Diagnosis and evaluation of activities in the project area watersheds;
- Socioeconomic diagnosis of mangrove forest beneficiaries in the Chame and Azuero areas;
- Economic contribution of the three priority areas of the mangrove project.

In 1998, the Government of the Republic of Panama developed the "National Environmental Strategy", which was approved by virtue of a Ministerial Council Resolution. This document contains the main policy guidelines and programmes in the field of environmental issues and natural resources.

This project proposal is consistent with the above environmental strategy and contributes to the achievement of the specific objective of the policy guidelines related to the protection and sustainable use of forest resources, including the conservation and rehabilitation of mangrove forests.

## **PART II: THE PROJECT**

### **1. PROJECT OBJECTIVES**

#### **1.1 Development objective**

- Ensure the conservation and sustainable management of 4,000 hectares of mangrove forests along the Panamanian Pacific Coast and implement rehabilitation activities on 1,250 hectares of degraded areas to maintain the contribution of this ecosystem to the welfare of the Panamanian society, particularly the communities that directly depend on these natural resources.

## **1.2 Specific objectives**

- Ensure the conservation of 4,000 hectares of mangrove forests in vulnerable areas or areas threatened by development activities.
- Rehabilitate, through reforestation and enrichment activities, 600 hectares of mangrove forests in degraded areas or areas disturbed by human activities, and implement agroforestry systems and reforestation activities using multiple-use forest species on 650 hectares to promote the use of alternative forest species.

## **2. JUSTIFICATION**

### **2.1 Problem to be addressed**

The problem that this project seeks to address is the high rate of destruction and deterioration of the mangrove forests situated along the Pacific coastline. According to the mangrove forests inventory carried out by the National Geographic Institute of Panama, about 6,000 hectares of mangrove forests have been lost over the past 30 years, which have been converted into agricultural and cattle raising lands and shrimp farms and have been harvested by the local communities of the area. The loss of vast areas of mangrove forests has also been due to other factors such as construction works and urban expansion, industrial pollution and oil spills such as the one that occurred in the county of Juan Diaz, in the District of Panama. Although the figures do not appear to be alarming, it is important to highlight this destruction process, given the strong relation that exists between mangrove forests and the life cycle of commercial sea species in Panama.

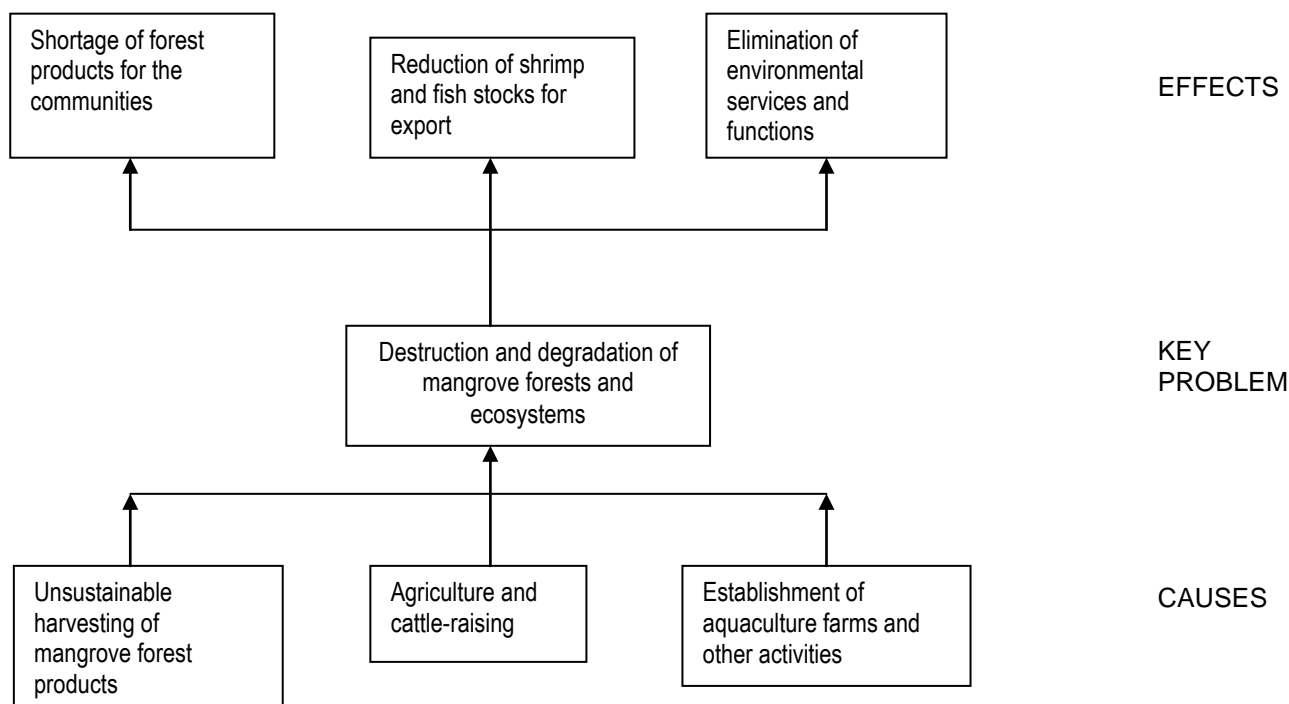
Mangrove forests carry out important functions; in particular, they act as filters for sediments and nutrients thus contributing to maintaining water quality; they protect coastal areas against water erosion; they constitute breeding grounds for many valuable marine species; they are wildlife habitats, especially for migrating bird species; and they provide food and nutrients through the decomposition of litter. Mangrove forests also provide important benefits for the neighbouring communities as they prevent the erosion of adjacent agricultural soils, filter the salt-laden winds from the sea, and improve the quality of water resources.

Currently, mangrove forests represent approximately 5.6% of the national forest cover, or in other words, about 170,000 hectares, most of which are found along the Pacific coast of the country. According to the results of the Project "Management, Conservation and Development of Panama's Mangrove Forests", which was completed in 1997, 90% of the families that depend on mangrove forests live in conditions of poverty or extreme poverty, and there is a strong pressure being exerted on these ecosystems by the local communities that cannot be ignored.

Mangrove forests contribute to the livelihood of these families, who are in fact almost totally dependent on the harvesting of their resources. Furthermore, mangrove forests play a key role in the reproduction processes of many shrimp species, which are very important as a source of export earnings for the country.

The destruction and deterioration of mangrove forests is considerably affecting the effectiveness of the natural functions of this ecosystem, the availability of raw materials for the communities and the reproduction processes of economically significant marine species.

## PROBLEM TREE



If the current situation were to continue and no appropriate measures were to be taken the result would be the total disappearance of the Azuero and Western Panama mangrove forests. As a consequence, the neighbouring communities would be deprived of the products and services provided by mangrove forests. Furthermore, the availability of marine products for export would be severely affected and the country would be deprived of the export earnings from this sector.

### 2.2 Intended situation after project completion

After project completion a sustainable harvesting system will have been established for 4,000 hectares of mangrove forests. The communities will actively participate in management activities, thus guaranteeing the continuity of the system once the project has been completed. Furthermore, at least 600 hectares of degraded mangrove forests will have been recovered through reforestation and enrichment projects.

Additionally the income levels of the communities will have been significantly improved compared to those they were receiving before the commencement of the project. Alternative activities will have been identified and implemented, such as agroforestry and reforestation with other species, so that the communities will have access to substitute products other than mangrove forest products.

Furthermore, the appropriate conditions for the reproduction processes of shrimp and fish species that are an important source of export revenue for the country, will have been improved or maintained.

### 2.3 Project strategy

The National Environmental Authority (ANAM) will be responsible for the implementation of the project. During the implementation of the project the Authority will do its utmost to ensure the participation of local communities and there will be an ongoing coordination process with all institutions that are in some way related to the project. These aspects are of vital importance to achieve project objectives and the sustainability of mangrove forest management, which is the main underlying reason for this project.



The implementation of the project will include three basic components:

- (a) **Mangrove forest management.** This includes research activities on biological and socio-economic variables that will facilitate sustainable mangrove forest utilisation practices. Full use will be made of the information generated during the implementation of the Project "Management, Conservation and Development of Panama's Mangrove Forests" (outlined in Item 3: Operational programs and activities).
- (b) **Reforestation.** The objective of this component is to select mangrove forest areas for reforestation and enrichment practices. The areas selected are appropriate for the development of agro-forestry and reforestation activities with multiple-use species and therefore should be suitable for the production of vegetative material. There is a lot of information available on reforestation and agroforestry which was generated by the MADELEÑA Project, implemented by CATIE and INRENARE between 1982 and 1994. The MADELEÑA Project developed silvicultural studies for many forest species such as *Acacia mangium*, *Eucalyptus sp.* and *Tectona grandis*, among others. The results of these studies are being applied in the reforestation programs being currently implemented in Panama. The project also implemented socio-economic studies (see further details in the annexes).
- (c) **Extension.** This component includes project training, dissemination and promotion activities with the local communities.

ANAM will be responsible for recruiting project personnel in coordination with the ITTO. It is envisaged that the project will recruit both national and international project personnel with extensive experience in research, administration and management of mangrove forests.

There may be other alternatives to reach the objectives of the project. One of these could be the direct recruitment of private consultants, together with a more rigorous application of the existing laws. However, this type of process would be more costly in financial terms and the probability of a long term success of this process is much lower.

## 2.4 Target beneficiaries

The National Environmental Authority will benefit from the project as the mangrove forests under its control will be sustainably managed.

The communities that depend on mangrove forests will also benefit as the project will improve their income levels and they will have long term access to mangrove forest resources.

Fishermen and fish and shrimp exporters will also be project beneficiaries, as they will have access to a more stable and long-term level of stocks, given that 6 to 10 fish species of high commercial value in the Pacific spend their larva stage in these mangrove ecosystems.

The project will also benefit fauna species, including both local and migratory bird species, as 227 local bird species and 92 migratory species have been identified in the mangrove ecosystems.

The society at large will also benefit, as the project will guarantee the survival of mangrove forests for future generations who will be able to benefit from the environmental services provided by these forests and from the export earnings generated by them.

## 2.5 Technical and scientific aspects

The project will follow the recommendations of the Project "Management, Conservation and Development of Panama's Mangrove Forests", which was completed in 1997, which suggested the implementation of small extractive production projects for critical areas as temporary solutions, the incorporation of the local communities into the development of management plans and the promotion of alternative production activities such as agroforestry systems.

The technical aspects will be based on the information generated by the previously mentioned project and the recommendations it proposed. The following studies, which were completed in 1996, are part of the relevant technical and scientific information from the previous project that can be used for the new project currently being proposed:

1. Study on reforestation using red mangrove species (*Rhizophora mangle*): developed recommendations on site preparation and planting techniques for this mangrove species and identified a number of pests that could affect their development.

2. Preliminary tests of mangrove seed germination and propagules. Important results on seed germination and survival rates of certain mangrove species were obtained through these tests.
3. Water source surveys in the project area. This involved the physical and chemical analysis of the water sources that flow into the mangrove areas to determine pollution levels.
4. Preliminary assessment of primary litter production in the Chame, Azuero and Chiriquí mangrove areas. This was a study on mangrove dynamics and the contribution of mangrove biomass to the ecosystem.

The information generated by these studies will be very useful for the implementation of the management and reforestation components contained in this project. Although this is a forestry-based project, every attempt will be made to involve the local communities in all stages of project implementation in order to guarantee the continuity of the mangrove forest sustainable management process after project completion.

The project will also take into account the experience gained in other countries such as Colombia and Ecuador, and will organise research trips to those countries.

## 2.6 Economic aspects

The project will have a positive effect on the well-being of the local communities of Azuero and Western Panama, which are the specific areas of influence of the project. The development of new production alternatives, the direct participation of the local communities in the project and training programs and the generation of employment by the project will all have a positive impact on the income levels and general well-being of the communities.

According to the report "Panamá en Cifras 1996-2000" (Panama in numbers 1996-2000) of the General Comptroller's Office of the Republic, the Chame District had a population of 19,625 in the year 2000, which represents a population density of 55.6 inhabitants per km<sup>2</sup>. The main economic activities are agriculture, cattle raising, fishing and trade.

The population in the Azuero region (Herrera and Los Santos provinces) is 185,960, which represents a population density of 30.25 inhabitants per km<sup>2</sup>. The main economic activities of the region are agriculture, cattle-raising and trade. As is the case in Chame, fishing is an important activity for the coastal communities.

The survey "Socio-economic diagnosis of mangrove beneficiaries" carried out in 1994 in the Chame and Azuero areas identified the following activities carried out by direct mangrove beneficiaries:

ACTIVITIES	NUMBER OF BENEFICIARIES <sup>(1)</sup>		
	Chame	Azuero	TOTAL
Shrimp collectors		35	35
Charcoal collectors	21		21
Crab collectors	1	6	7
Fishermen	6	32	38
Woodcutters	5		5
Shellfish collectors	12	15	27
Pole collectors	25		25
<b>TOTAL</b>	<b>70</b>	<b>88</b>	<b>158</b>

<sup>(1)</sup> Directly dependent on mangrove forests.

The implementation of this project will not only maintain the benefits that direct users of mangrove forests currently receive through the use of this resource and of the associated marine species, but it will also improve the availability of resources, increase income levels and improve the conditions under which these beneficiaries can maintain these activities in the long term. Furthermore, the communities (counties and districts) situated in the project area will also benefit from the training programs, the development of agro-forestry activities in the farms of local producers, the generation of part-time employment, and the improvement of environmental services provided by mangrove forests.

Furthermore, the project will indirectly benefit fishermen and shrimp and fish exporters, who will also receive important economic benefits as they will be able to maintain their income flows in the medium and long terms. Given that this component (shrimp and fish) represents an important percentage of exports (about US\$ 50 million annually), the project will have a positive impact on these exports.

## 2.7 Environmental aspects

The project will have a positive environmental impact on mangrove forests. By preserving and rehabilitating mangrove forests, the project will not only favour mangrove forest species but also the great diversity of flora and fauna species that make up this ecosystem as well as those species that use mangrove forests during their reproduction phases.

The document "Descriptive study on marine fauna associated to mangrove ecosystems in the Chame, Azuero and Chiriquí areas", identified the presence of 22 unique species in the mangrove forests of Azuero and 13 in Chame. The results of the study on mangrove land fauna identified 83 bird species, 1 mammal and 3 reptiles in Azuero and 32 bird species, 3 mammals, 2 reptiles and 1 amphibian species in Chame.

Furthermore, the results of the study "Water source survey in the Mangrove Project areas", which involved the physical and chemical analysis of the water sources that flow into mangrove areas, identified certain levels of pollution, especially pollution caused by solid waste and hydrocarbon residues.

The implementation of the proposed project can significantly contribute to mitigate the impact on the current ecosystem status and consequently maintain or improve the quality of the ecosystem.

## 2.8 Social aspects

As was previously pointed out, 90% of the families that depend on mangrove forests live in conditions of poverty and extreme poverty. According to INRENARE-ITTO (1996), the population density of Chame and Azuero was 12.9 and 22.1 inhabitants per square kilometre respectively in the mangrove dependant communities. Furthermore, mangrove related forest activities involved in one way or another 100% of the families in Chame and 82% of the families in Azuero, with fishing activities accounting for 63% and 100% respectively.

Another important aspect is that the population living in the mangrove forest areas is generally quite young. It is estimated that in 1997 the population that depended on the mangrove forests in the Chame area (Western Panama) was 373 and 391 in Azuero and that 60% of the population was under 30 years of age. This gives us an indication of the available manpower in the region for possible production activities and for the implementation of this project.

The education level of the population is quite heterogeneous and covers all levels, as summarised in the table below:

Education level	Number of persons	
	Chame	Azuero
Primary	214	236
Secondary	82	52
University	2	5
Vocational, other	---	37

As can be seen from the above table, this represents an advantage for the project as it will facilitate the implementation of training activities and will allow for a better assimilation and adoption of the techniques proposed for the sustainable management of mangrove forests.

There are several access routes and the housing facilities are quite varied in the area. In general terms, the main materials used for the construction of housing include cement, zinc, earth palm leaves or straw, depending on the purchasing power of the owners.

Active community participation is a key element in the development and achievement of project objectives. In order to achieve this goal, the project's plan of activities includes the organisation of several meetings and workshops with the communities aimed at ensuring their participation in important decision-making processes, such as the identification of priority mangrove forest areas for the implementation of management plans and areas for the mangrove reforestation and rehabilitation programs.

The project has also planned other activities aimed at ensuring the participation of the community in several technical tasks including, for example, the implementation of forest inventories and the formulation and implementation of mangrove forest management plans. Similarly, the project envisages the participation of the community in the remaining project components.

## 2.9 Risks

The success of this project could be affected if there were to be opposition from the local communities for the implementation of project activities or a change of Government policy with regard to the administration and management of mangrove forests. This, however, is highly unlikely, as the communities, as they did with the Project on mangrove forests that was concluded in 1997, have demonstrated interest in the project and are aware of the importance of good mangrove forest management practices. Furthermore, the State has adopted international commitments on the conservation of natural resources and it is therefore very unlikely that its policies in this area will change. With regard to agroforestry programs, there is good information available on the most appropriate species to be used, and as well as ensuring the sustainability of these programs the project will ensure the continuation of nursery activities for a year and a half after project completion.

## 3. OUTPUTS

### Specific objective 1

Ensure the conservation of 4,000 hectares of mangrove forests in vulnerable areas or areas threatened by development activities.

- **Output 1.1:** 4,000 hectares of mangrove forests in the region of Azuero and Western Panama suitable for the implementation of sustainable management and harvesting techniques have been selected and corresponding management plans have been developed.
- **Output 1.2:** 4,000 hectares of mangrove forests under a sustainable management and harvesting system.

### Specific objective 2

Rehabilitate, through reforestation and enrichment activities, 600 hectares of mangrove forests in degraded areas or areas disturbed by human activities, and implement agroforestry systems and reforestation activities using multiple-use forest species on 650 hectares to promote the use of alternative forest species.

- **Output 2.1:** 600 hectares of mangrove forests rehabilitated through enrichment practices and reforestation with mangrove species.
- **Output 2.2:** 650 hectares allocated to agroforestry and reforestation with multiple-use forest species.

## 4. ACTIVITIES

**Output 1.1:** 4,000 hectares of mangrove forests in the region of Azuero and Western Panama suitable for the implementation of sustainable management and harvesting techniques have been selected and corresponding management plans have been developed.

- **Activity 1.1.1:** Collect cartographic information and review previous studies on mangrove forests in Panama.
- **Activity 1.1.2:** Hold 2 meetings with ANAM's Regional Administrations, municipal and provincial authorities, and other institutions relevant to the project.
- **Activity 1.1.3:** Organise and hold meetings with the communities to brief them on the project.
- **Activity 1.1.4:** Carry out 4 reconnaissance visits to mangrove forest areas in Azuero and Western Panama.
- **Activity 1.1.5:** Hold 10 workshops/meetings with the local communities to pre-select priority mangrove areas for the implementation of management plans and the establishment of groups (committees) for mangrove management and rehabilitation.

- **Activity 1.1.6:** Carry out a preliminary reconnaissance inventory over mangrove areas with greatest potential for sustainable management.
- **Activity 1.1.7:** In coordination with the local communities, select and demarcate areas for the implementation of a sustainable mangrove forest management programme (4,000 hectares divided into 10 areas).
- **Activity 1.1.8:** Carry out a mapping survey and prepare maps of the areas selected for management.
- **Activity 1.1.9:** Hold 2 annual coordination and information meetings with other related institutions and organisations.

**Output 1.2:** 4,000 hectares of mangrove forests under a sustainable management and harvesting system.

- **Activity 1.2.1:** With the participation of the local communities, carry out detailed forest inventories and update existing forest inventories over selected areas for the implementation of sustainable forest management activities.
- **Activity 1.2.2:** Develop management plans for 4,000 hectares of mangrove forests with the participation of the communities.
- **Activity 1.2.3:** Hold 10 annual workshops with the participation of communities using mangrove forests to train them in the implementation of management plans.
- **Activity 1.2.4:** Implement 10 training workshops on sustainable harvesting for the communities.
- **Activity 1.2.5:** Carry out 10 annual field days with the participation of the communities to demonstrate the application of sustainable harvesting and management techniques
- **Activity 1.2.6:** Design and apply indicators to verify the effectiveness of management plans.
- **Activity 1.2.7:** Design a strategy to support the continuity of management after project completion.

**Output 2.1:** 600 hectares of mangrove forests rehabilitated through enrichment practices and reforestation with mangrove species.

- **Activity 2.1.1:** Hold 10 workshops/meetings with the local communities to pre-select priority mangrove areas enrichment and reforestation with mangrove species.
- **Activity 2.1.2:** Identify criteria to select suitable areas for enrichment and for the implementation of reforestation programmes using mangrove species.
- **Activity 2.1.3:** Select, with the participation of the communities, areas for the implementation of mangrove forest enrichment and reforestation activities using mangrove species.
- **Activity 2.1.4:** Mapping of selected areas.
- **Activity 2.1.5:** Select, in conjunction with the communities, 10 areas for the establishment of nurseries to produce mangrove seedlings.
- **Activity 2.1.6:** Select suitable mangrove species for enrichment and reforestation programs.
- **Activity 2.1.7:** Conduct workshops and field days with the participation of local communities on production of mangrove seedlings for reforestation.
- **Activity 2.1.8:** Produce 650,000 seedlings from various mangrove species over a period of 4 years.
- **Activity 2.1.9:** Establish an internship in Colombia or Ecuador for project technicians and community members to observe the progress made in those countries in the area of mangrove reforestation.
- **Activity 2.1.10:** Define technical criteria and strategies to be used in the implementation of mangrove forest enrichment and reforestation programs.

- **Activity 2.1.11:** Conduct 10 workshops and 10 field days with the participation of local communities to provide training on mangrove forest enrichment and reforestation.
- **Activity 2.1.12:** Carry out, with the participation of local communities, actual enrichment and reforestation activities on 600 hectares over a period of 4 years.
- **Activity 2.1.13:** Establish a monitoring, control, maintenance and management strategy for the rehabilitated 600 hectares of mangrove forests over a period of 4 years.

**Output 2.2:** 650 hectares allocated to agroforestry and reforestation with multiple-use forest species.

- **Activity 2.2.1:** Hold 10 workshops/meetings with the local communities to pre-select priority areas for agroforestry and reforestation using multiple-use forest species.
- **Activity 2.2.2:** Select forest species for reforestation and agroforestry and for the production of 700,000 seedlings.
- **Activity 2.2.3:** Conduct workshops and field days on reforestation and agroforestry techniques.
- **Activity 2.2.4:** Implement, with the participation of the local communities, agroforestry and reforestation programs with multiple-use forest species for 650 hectares over a period of 4 years.
- **Activity 2.2.5:** Monitor and record the behaviour of the forest plantations and agroforestry plots established.
- **Activity 2.2.6:** Establish a monitoring, control, maintenance and management strategy for the 650 hectares of agroforestry and reforestation areas with multiple-use species.

## 5. LOGICAL FRAMEWORK WORKSHEETS

PROJECT ELEMENT	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><b>Development objective:</b> Ensure the conservation and sustainable management of 4,000 hectares of mangrove forests along the Panamanian Pacific Coast and implement rehabilitation activities on 1,250 hectares of degraded areas to maintain the contribution of this ecosystem to the welfare of the Panamanian society, particularly the communities that directly depend on these natural resources</p>	<p>1. At least 80% of the communities properly apply management techniques.</p> <p>2. The income levels of the communities have increased by at least 20%.</p>	<p>Field reports and records prepared by project technicians and other institutions.</p> <p>Community verification and statements.</p> <p>Reports and measurements by the authorities in charge of marine and coastal resources.</p>	<p>Government policy continues to support the conservation and sustainable use of natural resources.</p>
<p><b>Specific objective 1:</b> Ensure the conservation of 4,000 hectares of mangrove forests in vulnerable areas or areas threatened by development activities</p>	<p>1. Sustainable management and conservation achieved in over 85% of selected 4,000 hectares of mangrove forests.</p>	<p>Monitoring and control reports prepared by ANAM and final reports. ITTO evaluations.</p>	<p>The local communities are interested in and willing to implement sustainable management practices in mangrove forests.</p>
<p><b>Output 1.1:</b> 4,000 hectares of mangrove forests in the region of Azuero and Western Panama suitable for the implementation of sustainable management and harvesting techniques have been selected and corresponding management plans have been developed</p>	<p>1. At the end of year 3 of project implementation, at least 85% of mangrove areas have been selected and demarcated.</p>	<p>Progress reports prepared by project management and ANAM.</p>	<p>Availability of sufficient mangrove areas suitable for sustainable harvesting and management.</p>
<p><b>Activity 1.1.1:</b> Collect cartographic information and review previous studies on mangrove forests in Panama</p>	<p>Availability of information and maps of areas from previous projects.</p>	<p>Project progress reports and maps submitted.</p>	<p>No relevant assumptions.</p>
<p><b>Activity 1.1.2:</b> Hold 2 meetings with ANAM's Regional Administrations, municipal and provincial authorities, and other institutions relevant to the project</p>	<p>2 meetings held. Institutions and authorities have been informed.</p>	<p>Minutes of meetings and project progress reports.</p>	<p>Local, municipal and provincial authorities and other institutions relevant to the project are willing to participate.</p>
<p><b>Activity 1.1.3:</b> Organise and hold meetings with the communities to brief them on the project</p>	<p>10 meetings with the communities.</p>	<p>Minutes of meetings and project progress reports.</p>	<p>The communities are willing to support the project.</p>
<p><b>Activity 1.1.4:</b> Carry out 4 reconnaissance visits to mangrove forest areas in Azuero and Western Panama</p>	<p>4 reconnaissance visits to mangrove areas.</p>	<p>Project progress reports.</p>	<p>No relevant assumptions.</p>
<p><b>Activity 1.1.5:</b> Hold 10 workshops/meetings with the local communities to pre-select priority mangrove areas for the implementation of management plans and the establishment of groups (committees) for mangrove management and rehabilitation.</p>	<p>10 meetings/workshops held and priority areas selected.</p>	<p>Project progress reports.</p>	<p>The local communities participate and agree with pre-selected areas.</p>

PROJECT ELEMENT	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<b>Activity 1.1.6:</b> Carry out a preliminary reconnaissance inventory over mangrove areas with greatest potential for sustainable management	Inventories carried out over areas with potential.	Submission of inventory documents.	Technical team hired to carry out forest inventory.
<b>Activity 1.1.7:</b> In coordination with the local communities, select and demarcate areas for the implementation of a sustainable mangrove forest management programme (4,000 hectares divided into 10 areas).	Demarcation of 10 areas for the implementation of management plans.	Project progress reports.	Technical team hired for demarcation of areas.
<b>Activity 1.1.8:</b> Carry out a mapping survey and prepare maps of the areas selected for management	Availability of detailed map for each of the selected areas.	Submission of maps and project progress reports.	Technical team hired to carry out cartographic work.
<b>Activity 1.1.9:</b> Hold 2 annual coordination and information meetings with other related institutions and organisations	2 annual meetings held to inform other related institutions and organisations.	Minutes of meetings and project progress reports.	No relevant assumptions.
<b>Output 1.2:</b> 4,000 hectares of mangrove forests under a sustainable management and harvesting system	Upon project completion, at least 85% of the selected 4,000 hectares of mangrove forests will be under sustainable management.	Progress reports and visits to project areas.	Communities and institutions strongly support the project.
<b>Activity 1.2.1:</b> With the participation of the local communities, carry out detailed forest inventories and update existing forest inventories over selected areas for the implementation of sustainable forest management activities	Detailed inventories carried out for selected areas with a view to management.	Forest inventory documents and project progress reports.	The communities actively participate in the project.
<b>Activity 1.2.2:</b> Develop management plans for 4,000 hectares of mangrove forests with the participation of the communities	10 management plans developed.	Management plan documents and project progress reports.	Technical team hired for the development of management plans.
<b>Activity 1.2.3:</b> Hold 10 annual workshops with the participation of communities using mangrove forests to train them in the implementation of management plans	10 training workshops on mangrove management held for the communities.	Project progress reports.	The communities maintain their interest in participating in the project.
<b>Activity 1.2.4:</b> Implement 10 training workshops on sustainable harvesting for the communities	10 training workshops on sustainable mangrove harvesting held for the communities.	Project progress reports.	The communities maintain their interest in participating in the project.
<b>Activity 1.2.5:</b> Carry out 10 annual field days with the participation of the communities to demonstrate the application of sustainable harvesting and management techniques	10 annual field days carried out with the communities.	Project progress reports.	The communities maintain their interest in participating in the project.
<b>Activity 1.2.6:</b> Design and apply indicators to verify the effectiveness of management plans	Management plan effectiveness indicators designed.	Monitoring visits and project final report.	No relevant assumptions.
<b>Activity 1.2.7:</b> Design a strategy to support the continuity of management after project completion	Strategy designed and approved upon project completion.	Management continuity strategy document.	No relevant assumptions.



PROJECT ELEMENT	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<b>Output 2.1:</b> 600 hectares of mangrove forests rehabilitated through enrichment practices and reforestation with mangrove species	The following will be achieved upon project completion: 1. Production of 650,000 mangrove seedlings. 2. Restoration of at least 600 hectares of mangrove forests.	Project progress and final reports prepared by ANAM and project staff.	Cooperation from the local communities.
<b>Activity 2.1.1:</b> Hold 10 workshops/meetings with the local communities to pre-select priority mangrove areas enrichment and reforestation with mangrove species	Mangrove rehabilitation areas pre-selected.	Project progress reports.	Active community participation.
<b>Activity 2.1.2:</b> Identify criteria to select suitable areas for enrichment and for the implementation of reforestation programmes using mangrove species	Selection criteria for mangrove rehabilitation areas established.	Monitoring visits and project progress reports.	No relevant assumptions.
<b>Activity 2.1.3:</b> Select, with the participation of the communities, areas for the implementation of mangrove forest enrichment and reforestation activities using mangrove species	Mangrove rehabilitation areas selected.	Monitoring visits and project progress reports.	Active community participation.
<b>Activity 2.1.4:</b> Mapping of selected areas	Mangrove rehabilitation areas demarcated.	Monitoring visits.	No relevant assumptions.
<b>Activity 2.1.5:</b> Select, in conjunction with the communities, 10 areas for the establishment of nurseries to produce mangrove seedlings	10 mangrove seedling production areas selected.	Monitoring visits and project progress reports.	Active community participation.
<b>Activity 2.1.6:</b> Select suitable mangrove species for enrichment and reforestation programs	Mangrove species selected for mangrove rehabilitation activities.	Monitoring visits.	No relevant assumptions.
<b>Activity 2.1.7:</b> Conduct workshops and field days with the participation of local communities on production of mangrove seedlings for reforestation	The communities acquire the capacity to carry out mangrove seedling production activities.	Project progress reports.	The project technical team members have experience in mangrove seedling production.
<b>Activity 2.1.8:</b> Produce 650,000 seedlings from various mangrove species over a period of 4 years	At least 650,000 mangrove seedlings have been produced.	Monitoring visits and project progress reports.	No relevant assumptions.
<b>Activity 2.1.9:</b> Establish an internship in Colombia or Ecuador for project technicians and community members to observe the progress made in those countries in the area of mangrove reforestation	Participation of 3 community members and project technicians in internships.	Certificates and project final report.	No relevant assumptions.
<b>Activity 2.1.10:</b> Define technical criteria and strategies to be used in the implementation of mangrove forest enrichment and reforestation programs	Criteria and strategies for mangrove rehabilitation defined.	Monitoring visits. Document on criteria and strategies.	No relevant assumptions.
<b>Activity 2.1.11:</b> Conduct 10 workshops and 10 field days with the participation of local communities to provide training on mangrove forest enrichment and reforestation	The communities acquire the capacity to carry out mangrove rehabilitation activities.	Project progress reports.	The project technical team members have experience in mangrove rehabilitation.

PROJECT ELEMENT	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<b>Activity 2.1.12:</b> Carry out, with the participation of local communities, actual enrichment and reforestation activities on 600 hectares over a period of 4 years	At least 150 hectares of mangrove forests are annually rehabilitated.	Monitoring visits and project progress reports.	Active community participation.
<b>Activity 2.1.13:</b> Establish a monitoring, control, maintenance and management strategy for the rehabilitated 600 hectares of mangrove forests over a period of 4 years	Monitoring strategy designed for rehabilitated mangrove forest areas.	Monitoring strategy document. Project final report.	No relevant assumptions.
<b>Output 2.2:</b> 650 hectares allocated to agroforestry and reforestation with multiple-use forest species	Upon project completion, more than 85% of selected areas will be allocated for reforestation and agroforestry purposes.	Project progress and final reports prepared by ANAM and project staff.	Cooperation from the local communities.
<b>Activity 2.2.1:</b> Hold 10 workshops/meetings with the local communities to pre-select priority areas for agroforestry and reforestation using multiple-use forest species	Areas pre-selected for agroforestry and reforestation activities.	Project progress reports.	Active community participation.
<b>Activity 2.2.2:</b> Select forest species for reforestation and agroforestry and for the production of 700,000 seedlings	Forest species selected for agroforestry and reforestation activities.	Monitoring visits and project progress reports.	No relevant assumptions.
<b>Activity 2.2.3:</b> Conduct workshops and field days on reforestation and agroforestry techniques	Community groups trained in agroforestry and reforestation.	Project progress reports.	Active community participation.
<b>Activity 2.2.4:</b> Implement, with the participation of the local communities, agroforestry and reforestation programs with multiple-use forest species for 650 hectares over a period of 4 years	Agroforestry and reforestation activities implemented in at least 160 hectares per year.	Monitoring visits and project progress reports.	Active community participation.
<b>Activity 2.2.5:</b> Monitor and record the behaviour of the forest plantations and agroforestry plots established	Annual records on the behaviour of established plantations.	Project annual reports and monitoring visits.	No relevant assumptions.
<b>Activity 2.2.6:</b> Establish a monitoring, control, maintenance and management strategy for the 650 hectares of agroforestry and reforestation areas with multiple-use species	Monitoring strategy designed for agroforestry and reforestation areas.	Monitoring strategy document. Project final report.	No relevant assumptions.

## 6. WORK PLAN

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	SCHEDULE (in quarters)																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17-20
<b>OUTPUT 1.</b> 4,000 hectares of mangrove forests in the region of Azuero and Western Panama suitable for the implementation of sustainable management and harvesting techniques have been selected and corresponding management plans have been developed																		
<b>Activities</b>																		
1.1.1: Collect cartographic information and review previous studies on mangrove forests in Panama	Project staff /Subcontractor																	
1.1.2: Hold 2 meetings with ANAM's Regional Administrations, municipal and provincial authorities, and other institutions relevant to the project	Project staff and communities																	
1.1.3: Organise and hold meetings with the communities to brief them on the project	Project staff																	
1.1.4: Carry out 4 reconnaissance visits to mangrove forest areas in Azuero and Western Panama	Project staff																	
1.1.5: Hold 10 workshops/meetings with the local communities to pre-select priority mangrove areas for the implementation of management plans and the establishment of groups (committees) for mangrove management and rehabilitation	Project staff and communities																	
1.1.6: Carry out a preliminary reconnaissance inventory over mangrove areas with greatest potential for sustainable management	Project staff																	
1.1.7: In coordination with the local communities, select and demarcate areas for the implementation of a sustainable mangrove forest management programme (4,000 hectares divided into 10 areas).	Project staff																	
1.1.8: Carry out a mapping survey and prepare maps of the areas selected for management	Project staff																	

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	SCHEDULE (in quarters)																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17-20
<b>1.1.9:</b> Hold 2 annual coordination and information meetings with other related institutions and organisations	Project staff																	
<b>OUTPUT 1.2</b> 4,000 hectares of mangrove forests under a sustainable management and harvesting system																		
<b>Activities</b>																		
<b>1.2.1:</b> With the participation of the local communities, carry out detailed forest inventories and update existing forest inventories over selected areas for the implementation of sustainable forest management activities	Project staff /communities																	
<b>1.2.2:</b> Develop management plans for 4,000 hectares of mangrove forests with the participation of the communities	Project staff /Mangrove forest management expert																	
<b>1.2.3:</b> Hold 10 annual workshops with the participation of communities using mangrove forests to train them in the implementation of management plans	Project staff/ communities																	
<b>1.2.4:</b> Implement 10 training workshops on sustainable harvesting for the communities	Project staff /communities																	
<b>1.2.5:</b> Carry out 10 annual field days with the participation of the communities to demonstrate the application of sustainable harvesting and management techniques	Project staff/ communities																	
<b>1.2.6:</b> Design and apply indicators to verify the effectiveness of management plans	Mangrove forest management expert																	
<b>1.2.7:</b> Design a strategy to support the continuity of management after project completion	Project staff /ANAM																	
<b>OUTPUT 2.1</b> 600 hectares of mangrove forests rehabilitated through enrichment practices and reforestation with mangrove species																		
<b>Activities</b>																		
<b>Activity 2.1.1:</b> Hold 10 workshops/meetings with the local communities to pre-select priority mangrove areas enrichment and reforestation with mangrove species	Project staff and Communities																	

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	SCHEDULE (in quarters)																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17-20
<b>Activity 2.1.2:</b> Identify criteria to select suitable areas for enrichment and for the implementation of reforestation programmes using mangrove species	Project staff /Mangrove forest management expert																	
<b>Activity 2.1.3:</b> Select, with the participation of the communities, areas for the implementation of mangrove forest enrichment and reforestation activities using mangrove species	Project staff /Communities																	
<b>Activity 2.1.4:</b> Mapping of selected areas	Subcontractor																	
<b>Activity 2.1.5:</b> Select, in conjunction with the communities, 10 areas for the establishment of nurseries to produce mangrove seedlings	Project staff /Communities																	
<b>Activity 2.1.6:</b> Select suitable mangrove species for enrichment and reforestation programs	Project staff/ communities																	
<b>Activity 2.1.7:</b> Conduct workshops and field days with the participation of local communities on production of mangrove seedlings for reforestation	Project staff /Communities																	
<b>Activity 2.1.8:</b> Produce 650,000 seedlings from various mangrove species over a period of 4 years	Project staff /Communities /Subcontractor																	
<b>Activity 2.1.9:</b> Establish an internship in Colombia or Ecuador for project technicians and community members to observe the progress made in those countries in the area of mangrove reforestation																		
<b>Activity 2.1.10:</b> Define technical criteria and strategies to be used in the implementation of mangrove forest enrichment and reforestation programs																		
<b>Activity 2.1.11:</b> Conduct 10 workshops and 10 field days with the participation of local communities to provide training on mangrove forest enrichment and reforestation	Project staff /Communities																	
<b>Activity 2.1.12:</b> Carry out, with the participation of local communities, actual enrichment and reforestation activities on 600 hectares over a period of 4 years	Project staff																	
<b>Activity 2.1.13:</b> Establish a monitoring, control, maintenance and management strategy for the rehabilitated 600 hectares of mangrove forests over a period of 4 years	Project staff and communities																	
OUTPUT 2.2 650 hectares allocated to agroforestry and reforestation with multiple-use forest species																		

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	SCHEDULE (in quarters)																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17-20	
Activities																			
<b>Activity 2.2.1:</b> Hold 10 workshops/meetings with the local communities to pre-select priority areas for agroforestry and reforestation using multiple-use forest species																			
<b>Activity 2.2.2:</b> Select forest species for reforestation and agroforestry and for the production of 700,000 seedlings																			
<b>Activity 2.2.3:</b> Conduct workshops and field days on reforestation and agroforestry techniques																			
<b>Activity 2.2.4:</b> Implement, with the participation of the local communities, agroforestry and reforestation programs with multiple-use forest species for 650 hectares over a period of 4 years	Project staff																		
<b>Activity 2.2.5:</b> Monitor and record the behaviour of the forest plantations and agroforestry plots established	Project staff																		
<b>Activity 2.2.6:</b> Establish a monitoring, control, maintenance and management strategy for the 650 hectares of agroforestry and reforestation areas with multiple-use species	Project staff																		

## 7. BUDGET

### 7.1 CONSOLIDATED YEARLY PROJECT BUDGET

PROJECT COMPONENTS		UNIT COST	YEARS				TOTAL
			YEAR 1	YEAR 2	YEAR 3	YEAR 4	
		US\$					
<b>10</b>	<b>Project personnel</b>						
	11. National experts						
	Project coordinator 1/48 months	2,000 / month	24,000	24,000	24,000	24,000	96,000
	Forest engineer 1/48 months	1,000 / month	12,000	12,000	12,000	12,000	48,000
	Agricultural engineer 1/36 months	1,000 / month	12,000	12,000	12,000		36,000
	12. National consultants						
	Expert in mangrove forest management 1/18 months	1,500 / month	9,000	9,000	9,000		27,000
	Expert in agroforestry and reforestation 1/24 months	1,500 / month	9,000	9,000	9,000	9,000	36,000
	Expert in community development 1/24 months	1,500 / month	18,000	18,000			36,000
	13. Other labour						
	Boat driver 1/48 months	350 / month	4,200	4,200	4,200	4,200	16,800
	Manual labour 2/48 months	600 / month	7,800	7,800	7,800	7,800	31,200
	Secretary 1/48 months	450 / month	5,400	5,400	5,400	5,400	21,600
	14. Fellowships and training						
	Internships 3/1 week in Colombia	1,500 / persona	4,500			3,000	7,500
	15. International experts						
	Expert in mangrove forest management 1/4 weeks	1,375 / week	5,500			5,500	11,000
	16. International consultants						
	Expert in criteria and indicators 1/2 weeks	3,125 / week	6,250			6,250	12,500
	<b>Component Total</b>		<b>117,650</b>	<b>101,400</b>	<b>83,400</b>	<b>77,150</b>	<b>379,600</b>
<b>20</b>	<b>Subcontracts</b>	<b>Subcontracts</b>					
	21. Subcontracts						
	Demarcation of areas and forest inventories		25,000	20,000			45,000
	Production of seedlings	0.011/seedling	7,000	8,000			15,000
	<b>Component Total</b>		<b>32,000</b>	<b>28,000</b>			<b>60,000</b>

<b>30</b>	<b>Duty Travel</b>						
	31. DSA	1,600/month	20,000	20,000	20,000	20,000	80,000
	32. International travel			1,000		1,000	2,000
	33. Service costs		15,000	10,000	10,000	10,000	45,000
	<b>Component Total</b>		<b>35,000</b>	<b>31,000</b>	<b>30,000</b>	<b>31,000</b>	<b>127,000</b>
<b>40</b>	<b>Capital items</b>						
	41. Premises (2 offices)	20,000 /office	40,000				40,000
	42. Land (2 areas of 500 m <sup>2</sup> )	2 /m <sup>2</sup>	2,000				2,000
	43. Vehicles (2)	23,000/unit	46,000				46,000
	44. Capital equipment		20,000	10,000	10,000	10,000	50,000
	<b>Component Total</b>		<b>108,000</b>	<b>10,000</b>	<b>10,000</b>	<b>10,000</b>	<b>138,000</b>
<b>50</b>	<b>Consumable items</b>						
	51. Raw materials	1,250 / month	15,000	15,000	15,000	15,000	60,000
	52. Spares	292 / month	3,500	3,500	3,500	3,500	14,000
	53. Utilities/fuel	1,667 / month	20,000	20,000	20,000	20,000	80,000
	54. Office supplies	1,500 / month	18,000	18,000	18,000	18,000	72,000
	<b>Component Total</b>		<b>56,500</b>	<b>56,500</b>	<b>56,500</b>	<b>56,500</b>	<b>226,000</b>
<b>60</b>	<b>Miscellaneous</b>						
	61. Sundry	875 / month	10,500	10,500	10,500	10,500	42,000
	62. Auditing	1,000 / year	1,000	1,000	1,000	1,000	4,000
	63. Contingencies	833 / month	10,000	10,000	10,000	10,000	40,000
	64. Publications	417 / month	5,000	5,000	5,000	5,000	20,000
	<b>Component Total</b>		<b>26,500</b>	<b>26,500</b>	<b>26,500</b>	<b>26,500</b>	<b>106,000</b>
<b>70</b>	<b>Executive agency management costs</b>						
	71. Monitoring and evaluation						
	<b>Component Total</b>		12,345	12,345	12,345	12,345	49,380
	<b>SUBTOTAL</b>		<b>387,995</b>	<b>265,745</b>	<b>218,745</b>	<b>213,495</b>	<b>1,085,980</b>
<b>80</b>	<b>ITTO Administration, monitoring and evaluation</b>						
	81. Monitoring and review costs		10,000	10,000	10,000	10,000	40,000
	82. Evaluation costs					15,000	15,000
	83. Programme support costs		16,300	11,496	8,676	9,261	45,733
	<b>Component Total</b>		<b>26,311</b>	<b>21,496</b>	<b>18,676</b>	<b>34,261</b>	<b>100,744</b>
<b>100</b>	<b>GRAND TOTAL</b>		<b>414,306</b>	<b>287,241</b>	<b>237,421</b>	<b>247,756</b>	<b>1,186,724</b>



## 7.2 OVERALL PROJECT BUDGET BY ACTIVITY

OUTPUT/ACTIVITIES	10. Project Personnel	20. Sub-contracts	30. Duty travel	40. Capital Items	50. Consumable Items	Miscellaneous	Quarter Year	GRAND TOTAL
<b>OUTPUT 1.1</b> 4,000 hectares of mangrove forests in the region of Azuero and Western Panama suitable for the implementation of sustainable management and harvesting techniques have been selected and corresponding management plans have been developed								
<b>Activity 1.1.1:</b> Collect cartographic information and review previous studies on mangrove forests in Panama	2,500 (I) 2,000 (E)		2,750 (I) 1,400 (E)	4,500 (I) 1,700 (E)	3,200 (I) 1,000 (E)	1,200 (I) 1,000 (E)	Q1	<b>22,250</b>
<b>Activity 1.1.2:</b> Hold 2 meetings with ANAM's Regional Administrations, municipal and provincial authorities, and other institutions relevant to the project	2,000 (I) 2,500 (E)		1,000 (I) 500 (E)	300 (I) 200 (E)	2,500 (I) 600 (E)	900 (I) 600 (E)	Q1	<b>11,100</b>
<b>Activity 1.1.3:</b> Organise and hold meetings with the communities to brief them on the project	6,500 (I) 4,500 (E)		2,000 (I) 1,000 (E)	1,700 (I) 1,000 (E)	4,000 (I) 1,500 (E)	1,700 (I) 1,500 (E)	Q1 to Q2	<b>25,400</b>
<b>Activity 1.1.4:</b> Carry out 4 reconnaissance visits to mangrove forest areas in Azuero and Western Panama	2,800 (I) 2,500 (E)		1,000 (I) 500 (E)	1,500 (I) 500 (E)	4,500 (I) 1,500 (E)	1,800 (I) 1,500 (E)	Q2 to Q3	<b>18,100</b>
<b>Activity 1.1.5:</b> Hold 10 workshops/meetings with the local communities to pre-select priority mangrove areas for the implementation of management plans and the establishment of groups (committees) for mangrove management and rehabilitation	8,100 (I) 5,500 (E)		2,500 (I) 1,200 (E)	3,200 (I) 2,100 (E)	5,500 (I) 2,500 (E)	2,000 (I) 1,900 (E)	Q2 to Q3	<b>34,500</b>
<b>Activity 1.1.6:</b> Carry out a preliminary reconnaissance inventory over mangrove areas with greatest potential for sustainable management	10,000 (I) 5,000 (E)	10,000 (I)	4,500 (I) 2,500 (E)	4,800 (I) 1,000 (E)	5,000 (I) 1,500 (E)	1,900 (I) 1,500 (E)	Q2 to Q4	<b>47,700</b>
<b>Activity 1.1.7:</b> In coordination with the local communities, select and demarcate areas for the implementation of a sustainable mangrove forest management programme (4,000 hectares divided into 10 areas).	6,500 (I) 4,300 (E)		2,400 (I) 1,200 (E)	2,900 (I) 1,700 (E)	3,800 (I) 1,200 (E)	1,600 (I) 1,200 (E)	Q3 to Q5	<b>26,800</b>
<b>Activity 1.1.8:</b> Carry out a mapping survey and prepare maps of the areas selected for management	11,500 (I) 7,500 (E)	10,000 (I)	2,600 (I) 800 (E)	3,600 (I) 1,800 (E)	3,600 (I) 1,500 (E)	1,900 (I) 1,500 (E)	Q4 to Q6	<b>46,300</b>
<b>Activity 1.1.9:</b> Hold 2 annual coordination and information meetings with other related institutions and organisations	2,500 (I) 2,500 (E)		650 (I) 500 (E)	3,800 (I) 1,300 (E)	7,200 (I) 2,500 (E)	1,800 (I) 1,500 (E)	Q1, Q5, Q9, Q13	<b>24,250</b>
<b>OUTPUT 1.2</b> 4,000 hectares of mangrove forests under a sustainable management and harvesting system								

OUTPUT/ACTIVITIES	10. Project Personnel	20. Sub-contracts	30. Duty travel	40. Capital Items	50. Consumable Items	Miscellaneous	Quarter Year	GRAND TOTAL
<b>Activity 1.2.1:</b> With the participation of the local communities, carry out detailed forest inventories and update existing forest inventories over selected areas for the implementation of sustainable forest management activities	8,000 (I) 6,000 (E)	15,000 (I)	2,500 (I) 1,700 (E)	2,500 (I) 1,200 (E)	7,200 (I) 2,600(E)	1,900 (I) 1,600 (E)	Q5 to Q8	<b>50,200</b>
<b>Activity 1.2.2:</b> Develop management plans for 4,000 hectares of mangrove forests with the participation of the communities	5,500 (I) 2,800 (E)		1,500 (I) 800 (E)	2,700 (I) 1,200 (E)	6,900 (I) 1,000 (E)	2,500 (I) 2,000 (E)	Q6 to Q9	<b>26,900</b>
<b>Activity 1.2.3:</b> Hold 10 annual workshops with the participation of communities using mangrove forests to train them in the implementation of management plans	11,000 (I) 6,700 (E)		2,500 (I) 1,100(E)	3,200 (I) 2,100 (E)	6,500 (I) 1,500 (E)	1,800 (I) 1,500(E)	Q3, Q7, Q11, Q15	<b>37,900</b>
<b>Activity 1.2.4:</b> Implement 10 training workshops on sustainable harvesting for the communities	10,000 (I) 6,700(E)		2,500 (I) 1,200 (E)	3,200 (I) 2,100 (E)	6,500 (I) 1,500 (E)	2,000 (I) 1,600 (E)	Q4 to Q10	<b>37,300</b>
<b>Activity 1.2.5:</b> Carry out 10 annual field days with the participation of the communities to demonstrate the application of sustainable harvesting and management techniques	5,200 (I) 3,600 (E)		3,800 (I) 1,500 (E)	3,800 (I) 1,400 (E)	6,800 (I) 1,200 (E)	1,700 (I) 1,200(E)	Q4, Q8, Q12	<b>30,200</b>
<b>Activity 1.2.6:</b> Design and apply indicators to verify the effectiveness of management plans	3,800 (I) 2,000 (E)		3,200 (I) 1,300 (E)	3,600 (I) 1,500 (E)	4,500 (I) 1,400 (E)	1,600 (I) 1,300 (E)	Q14	<b>24,200</b>
<b>Activity 1.2.7:</b> Design a strategy to support the continuity of management after project completion	6,200 (I) 4,500 (E)		2,800 (I) 1,700 (E)	3,900 (I) 1,700 (E)	4,200 (I) 1,350 (E)	1,500 (I) 1,200 (E)	Q15	<b>29,050</b>
<b>OUTPUT 2.1</b> 600 hectares of mangrove forests rehabilitated through enrichment practices and reforestation with mangrove species								
<b>Activity 2.1.1:</b> Hold 10 workshops/meetings with the local communities to pre-select priority mangrove areas enrichment and reforestation with mangrove species	10,000 (I) 6,700 (E)		2,500 (I) 1,200 (E)	4,200 (I) 2,100 (E)	6,200 (I) 1,600 (E)	2,100 (I) 1,700 (E)	Q2 to Q5	<b>38,300</b>
<b>Activity 2.1.2:</b> Identify criteria to select suitable areas for enrichment and for the implementation of reforestation programmes using mangrove species	2,800 (I) 2,500 (E)		2,800 (I) 900 (E)	1,500 (I) 600 (E)	4,500 (I) 1,450(E)	1,900 (I) 1,500 (E)	Q1 to Q2	<b>20,450</b>
<b>Activity 2.1.3:</b> Select, with the participation of the communities, areas for the implementation of mangrove forest enrichment and reforestation activities using mangrove species	3,600 (I) 2,000 (E)		2,300 (I) 1,200 (E)	1,500 (I) 700 (E)	3,900 (I) 1,200 (E)	1,500 (I) 1,100 (E)	Q4,Q8,Q12	<b>19,000</b>
<b>Activity 2.1.4:</b> Mapping of selected areas	4,200 (I) 3,500 (E)	10,000 (I)	5,800 (I) 2,200 (E)	5,500 (I) 2,100 (E)	8,200 (I) 1,800 (E)	2,000 (I) 1,700 (E)	Q4,Q8,Q12	<b>47,000</b>

OUTPUT/ACTIVITIES	10. Project Personnel	20. Sub-contracts	30. Duty travel	40. Capital Items	50. Consumable Items	Miscellaneous	Quarter Year	GRAND TOTAL
<b>Activity 2.1.5:</b> Select, in conjunction with the communities, 10 areas for the establishment of nurseries to produce mangrove seedlings	2,100 (I) 1,500 (E)		1,200 (I) 800 (E)	1,200 (I) 500 (E)	3,700 (I) 1,200 (E)	1,700 (I) 1,300 (E)	Q3, Q4, Q7	<b>15,200</b>
<b>Activity 2.1.6:</b> Select suitable mangrove species for enrichment and reforestation programs	2,000 (I) 1,000 (E)		800 (I) 500 (E)	1,300 (I) 700 (E)	3,300 (I) 1,350 (E)	1,800 (I) 1,400 (E)	Q4 to Q5	<b>14,150</b>
<b>Activity 2.1.7:</b> Conduct workshops and field days with the participation of local communities on production of mangrove seedlings for reforestation	5,200 (I) 3,500 (E)		1,300 (I) 700 (E)	2,500 (I) 1,200 (E)	5,600 (I) 1,000 (E)	1,500 (I) 800 (E)	Q3 to Q15	<b>23,300</b>
<b>Activity 2.1.8:</b> Produce 650,000 seedlings from various mangrove species over a period of 4 years	13,600 (I) 10,000 (E)	8,000 (I)	6,400 (I) 2,000 (E)	5,200 (I) 1,400 (E)	6,400 (I) 1,250 (E)	1,600 (I) 1,100 (E)	Q4 to Q15	<b>56,950</b>
<b>Activity 2.1.9:</b> Establish an internship in Colombia or Ecuador for project technicians and community members to observe the progress made in those countries in the area of mangrove reforestation	4,500 (I) 2,000 (E)						Q6	<b>6,500</b>
<b>Activity 2.1.10:</b> Define technical criteria and strategies to be used in the implementation of mangrove forest enrichment and reforestation programs	2,600 (I) 1,700 (E)		1,800 (I) 500 (E)	1,200 (I) 500 (E)	2,000 (I) 900 (E)	1,400 (I) 1,000 (E)	Q2 to Q4	<b>13,600</b>
<b>Activity 2.1.11:</b> Conduct 10 workshops and 10 field days with the participation of local communities to provide training on mangrove forest enrichment and reforestation	11,200 (I) 7,500 (E)		2,500 (I) 1,200 (E)	3,300 (I) 2,100 (E)	6,500 (I) 1,400 (E)	1,700 (I) 1,200 (E)	Q1 to Q16	<b>38,400</b>
<b>Activity 2.1.12:</b> Carry out, with the participation of local communities, actual enrichment and reforestation activities on 600 hectares over a period of 4 years	17,800 (I) 11,800 (E)		2,800 (I) 1,100 (E)	2,200 (I) 1,100 (E)	6,800 (I) 1,700 (E)	1,800 (I) 1,500 (E)	Q5, Q6, Q9, Q10, Q13, Q14	<b>48,600</b>
<b>Activity 2.1.13:</b> Establish a monitoring, control, maintenance and management strategy for the rehabilitated 600 hectares of mangrove forests over a period of 4 years	3,100 (I) 1,300 (E)		2,800 (I) 1,100 (E)	2,500 (I) 1,000 (E)	5,100 (I) 1,000 (E)	1,200 (I) 1,000 (E)	Q16 to end of project	<b>20,000</b>
OUTPUT 2.2 650 hectares allocated to agroforestry and reforestation with multiple-use forest species								
<b>Activity 2.2.1:</b> Hold 10 workshops/meetings with the local communities to pre-select priority areas for agroforestry and reforestation using multiple-use forest species	11,200 (I) 8,500 (E)		3,100 (I) 1,200 (E)	4,300 (I) 2,100 (E)	6,800 (I) 1,700 (E)	1,500 (I) 1,200 (E)	Q4 to Q5	<b>41,600</b>
<b>Activity 2.2.2:</b> Select forest species for reforestation and agroforestry and for the production of 700,000 seedlings	1,100 (I) 1,800 (E)	7,000 (I)	1,000 (I) 800 (E)	1,500 (I) 800 (E)	2,500 (I) 1,200 (E)	1,900 (I) 1,200 (E)	Q5 to Q6	<b>20,800</b>

OUTPUT/ACTIVITIES	10. Project Personnel	20. Sub-contracts	30. Duty travel	40. Capital Items	50. Consumable Items	Miscellaneous	Quarter Year	GRAND TOTAL
<b>Activity 2.2.3:</b> Conduct workshops and field days on reforestation and agroforestry techniques	4,2500 (I) 2,500 (E)		3,700 (I) 2,000 (E)	2,600 (I) 1,100 (E)	6,500 (I) 1,700 (E)	1,900 (I) 1,700 (E)	Q7, Q11, Q15	<b>27,900</b>
<b>Activity 2.2.4:</b> Implement, with the participation of the local communities, agroforestry and reforestation programs with multiple-use forest species for 650 hectares over a period of 4 years	17,800 (I) 11,800 (E)		3,000 (I) 1,700 (E)	2,500 (I) 1,100 (E)	8,200 (I) 2,900 (E)	2,500 (I) 1,900 (E)	Q6, Q7, Q10, Q11, Q14, Q15	<b>53,400</b>
<b>Activity 2.2.5:</b> Monitor and record the behaviour of the forest plantations and agroforestry plots established	1,100 (I) 1,500 (E)		2,500 (I) 800 (E)	1,300 (I) 600 (E)	3,500 (I) 1,100 (E)	1,500 (I) 1,100 (E)	Q8 to end of project	<b>15,000</b>
<b>Activity 2.2.6:</b> Establish a monitoring, control, maintenance and management strategy for the 650 hectares of agroforestry and reforestation areas with multiple-use species	2,800 (I) 1,500 (E)		2,500 (I) 1,300 (E)	1,500 (I) 800 (E)	4,400 (I) 1,200 (E)	1,900 (I) 1,000 (E)	Q16 to end of project	<b>18,900</b>
<b>TOTAL</b>								<b>1,031,200</b>

(I) = ITTO  
(E) = ANAM

Q = quarters

**7.3 PHASED PROJECT BUDGET BY SOURCE – ITTO**

BUDGET COMPONENTS / ANNUAL DISBURSEMENTS	YEAR				TOTAL
	PHASE I		PHASE II		
	Year 1	Year 2	Year 3	Year 4	
10. Project personnel	79,850	63,600	45,600	39,350	228,400
20. Subcontracts	32,000	28,000			60,000
30. Duty travel	25,000	21,000	20,000	21,000	87,000
40. Capital items	66,000	10,000	10,000	10,000	96,000
50. Consumable items	44,000	44,000	44,000	44,000	176,000
60. Miscellaneous	15,000	15,000	15,000	15,000	60,000
<b>Subtotal 1</b>	<b>261,850</b>	<b>181,600</b>	<b>134,600</b>	<b>129,350</b>	<b>707,400</b>
80. ITTO Administration, monitoring and evaluation					
81. Monitoring and Review Costs	10,000	10,000	10,000	10,000	40,000
82. Ex-post Evaluation Cost				15,000	15,000
83. Program Support Costs	16,311	11,496	8,676	9,261	45,744
<b>Subtotal 2</b>	<b>26,311</b>	<b>21,496</b>	<b>18,676</b>	<b>34,261</b>	<b>100,744</b>
<b>ITTO TOTAL</b>	<b>288,161</b>	<b>203,096</b>	<b>153,276</b>	<b>163,611</b>	<b>808,144</b>
	<b>491,257</b>		<b>316,887</b>		

**7.4 PHASED PROJECT BUDGET BY SOURCE – ANAM**

BUDGET COMPONENTS / ANNUAL DISBURSEMENTS	YEAR				TOTAL
	PHASE I		PHASE II		
	Year 1	Year 2	Year 3	Year 4	
10. Project personnel	37,800	37,800	37,800	37,800	151,200
20. Subcontracts	---	---	---	---	---
30. Duty travel	10,000	10,000	10,000	10,000	40,000
40. Capital items	42,000				42,000
50. Consumable items	12,500	12,500	12,500	12,500	50,000
60. Miscellaneous	11,500	11,500	11,500	11,500	46,000
70. ANAM administrative costs	12,345	12,345	12,345	12,345	49,380
<b>ANAM TOTAL</b>	<b>126,145</b>	<b>84,145</b>	<b>84,145</b>	<b>84,145</b>	<b>378,580</b>
	<b>210,290</b>		<b>168,290</b>		<b>378,580</b>

<b>GRAND TOTAL</b>	<b>414,306</b>	<b>287,241</b>	<b>237,421</b>	<b>247,756</b>	<b>1,186,724</b>
	<b>701,547</b>		<b>485,177</b>		

**7.5 CONSOLIDATED YEARLY PROJECT BUDGET BY COMPONENT AND BY SOURCE**

/ ANNUAL DISBURSEMENTS BUDGET COMPONENTS	YEAR								TOTAL
	Year 1		Year 2		Year 3		Year 4		
	ITTO	ANAM	ITTO	ANAM	ITTO	ANAM	ITTO	ANAM	
10. Project personnel	79,850	37,800	63,600	37,800	45,600	37,800	39,350	37,800	379,600
20. Subcontracts	32,000		28,000						60,000
30. Duty Travel	25,000	10,000	21,000	10,000	20,000	10,000	21,000	10,000	127,000
40. Capital Items	66,000	42,000	10,000		10,000		10,000		138,000
50. Consumable Items	44,000	12,500	44,000	12,500	44,000	12,500	44,000	12,500	226,000
60. Miscellaneous	15,000	11,500	15,000	11,500	15,000	11,500	15,000	11,500	106,000
70. ANAM Management Costs		12,345		12,345		12,345		12,345	49,380
80. ITTO Administration, Monitoring & Evaluation	26,311		21,496		18,676		34,261		100,744
90. Refund of pre-project costs									
<b>TOTAL BY SOURCE</b>	288,161	126,145	203,096	84,145	153,276	84,145	163,611	84,145	
<b>GRAND TOTAL</b>	<b>414,306</b>		<b>287,241</b>		<b>237,421</b>		<b>247,756</b>		<b>1,186,724</b>







## **PART III: OPERATIONAL ARRANGEMENTS**

### **1. MANAGEMENT STRUCTURE**

This project will be under the responsibility of the National Environmental Authority, through the National Forest Directorate. An administrative and technical team will be hired to work under the leadership of a Project Coordinator.

Project administration will be the responsibility of the National Environmental Authority of the Republic of Panama, the agency in charge of environmental and natural resource policies.

The National Environmental Authority of the Republic of Panama has the capacity to house the Project and assist in the implementation of activities. However, for budgetary reasons, it is recommended that a work team be established to work for the project on a full-time basis.

### **2. MONITORING, REPORTING AND EVALUATION**

The Project Coordinator will be responsible for submitting comprehensive and detailed reports on project activities and expenditures on a six-monthly basis. These reports will be submitted to the National Environmental Authority and to ITTO. The reports will be prepared following the ITTO standard format, but this Organization may request additional information if and when required.

The project completion report will be submitted in accordance with ITTO rules, i.e. within a maximum of 3 months of project completion. The final report will include as annexes all publications and promotional materials generated by the project.

Both ITTO and the National Environmental Authority are expected to participate in the evaluation visits and meetings carried out by ITTO. Every effort will be made to ensure that all evaluation missions can have access to all project activities.

The project will invite the ITTO to visit project facilities at any time it may consider necessary. Upon completion of the first half of the project, a mid-term evaluation report will be submitted to ITTO and to the National Environmental Authority.

### **3. FUTURE OPERATION AND MAINTENANCE**

Upon completion of project activities, the criteria and indicators for the sustainable management of mangrove forests will have been established, including a strategy for future follow-up.

After project completion, the executing agency will be responsible for the monitoring and follow-up of project achievements; in particular, it will ensure the sustainability of the mangrove forest plots to be rehabilitated through enrichment and reforestation activities. Furthermore, ANAM will continue to promote agroforestry programmes in the project area so as to produce mangrove substitute products in forest plantations.

**Measures to guarantee the future sustainability of project activities:** The participation of other institutions and organisations operating in the area as well as local, municipal and provincial authorities in the implementation of project activities will be ensured so as to equip them with the necessary tools to contribute to ANAM during and after project implementation.

One of the key activities of this proposal (activity 1.1.5) is the establishment of local mangrove rehabilitation and management groups or committees. After project completion, these groups will be sufficiently consolidated to ensure the future sustainability and continuity of activities. However, ANAM will continue providing assistance to these groups as required and will promote the development of a mangrove management fund to also achieve financial sustainability; the resources of this fund will be the income generated through the actual implementation of activities, supplemented with donations from interested organisations.

## **PART IV: THE TROPICAL TIMBER FRAMEWORK**

### **1. COMPLIANCE WITH ITTA, 1994 OBJECTIVES**

This project proposal is consistent with ITTO objectives as established in Article 1 of the International Tropical Timber Agreement (ITTA), 1994.

*c. To contribute to the process of sustainable development; the local criteria and indicators to be established will serve as the basis for sustainable forest management, which in turn will contribute to sustainable development in the country.*

*f. To promote and support research and development with a view to improving forest management and efficiency of wood utilisation as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests; since sustainable forest resource management is a pre-requisite to forest certification, research will be promoted to improve forest management and the capacity to identify other forest values will be enhanced.*

*l. To encourage members to develop national policies aimed at sustainable utilisation and conservation of timber producing forests and their genetic resources and at maintaining the ecological balance in the regions concerned.*

### **2. COMPLIANCE WITH ITTO ACTION PLAN**

This project is consistent not only with ITTO priorities but also with the ITTO Yokohama Action Plan 2002-2006. It complies with the following goals and actions based on the provisions of the ITTA in the field of reforestation and forest management:

#### **Goal 1: Support activities to secure the tropical timber resource base**

Action 1: Support the effective enforcement of forest laws and regulations that ensure sustainable forest management and secure the production base.

Action 4: Promote the conservation, rehabilitation and sustainable management of threatened forest ecosystems, in collaboration with relevant organizations.

Action 7: Encourage members and assist them, where appropriate, to:

- Assess the current and potential productivity of major tropical forest types, taking into account the need to promote future growth and effective regeneration;
- Secure the forest resource base through the implementation of forest policy, legislation and associated strategies, revised and updated where appropriate;
- Identify and prevent irregular forestry activities.

#### **Goal 2: Promote sustainable management of tropical forest resources.**

Action 1: Promote the implementation of ITTO guidelines and C&I and review and improve these as necessary.

Action 2: Promote the implementation of sustainable forest harvesting, including reduced impact logging.

Action 3: Develop and promote the implementation of guidelines for the management of secondary tropical forests, the restoration of degraded tropical forests and the rehabilitation of degraded forest lands.

Action 10: Encourage members and assist them, where appropriate, to:

- Improve the formulation and implementation of plans for sustainable forest management, with particular emphasis on harvesting limits;
- Implement appropriate forest harvesting, including reduced impact logging, as a component of sustainable forest management;
- Improve the productive capacity of natural forests, where appropriate, through intensified silvicultural practices, better utilization of lesser-used species, the promotion of non-timber forest products, guided natural regeneration, enrichment planting and reforestation;
- Implement research and development activities in the management of secondary tropical forests, restoration of degraded tropical forests and rehabilitation of degraded forest land, taking into consideration ITTO guidelines;
- Test and enhance examples of collaborative forest management for tropical production forests;
- Establish and manage forests for multiple uses in close cooperation with local forest owners and communities living in forest areas;
- Strengthen training institutions and intensify training of forestry personnel and other stakeholders in silviculture, RIL and resource assessment, and in the management of both natural forests and timber plantations.

### **3. RELATIONSHIP TO ITTO MANGROVE WORK PLAN 2002-2006**

The project is consistent with the ITTO Mangrove Mission Statement, which reads: *“ITTO aims to promote the conservation, rehabilitation and sustainable management of mangroves to benefit the global community, particularly communities living in the mangroves and their surrounding areas, by engaging in activities within the scope of the ITTA. ITTO’s work on mangroves will be carried out in collaboration with relevant organizations and be based upon scientific research of the highest standards, as well as traditional knowledge and value systems”.*

In this context, the activities envisaged in this project are basically consistent with the following programme areas stipulated in the ITTO Mangrove Work Plan:

- Area 1: Conservation and sustainable management
- Area 2: Mangrove information and awareness
- Area 3: Socio-economic aspects
- Area 4: Mangrove ecosystem functions and health
- Area 5: Cooperation and capacity building

## **ANNEXES**

### **Annex A. 3.1 Profile of the Executing Agency**

The National Environmental Authority (ANAM) is a government agency with extensive experience in the implementation of projects with international organisations, including USAID, the World Bank, the Inter-American Development Bank, WWF, CITES, IUCN, GTZ and ITTO.

ANAM has extensive experience in thematic areas such as the implementation of forest policies, silvicultural principles for the management of natural and planted forests, environmental education, and management of protected wild areas.

ANAM has implemented or is implementing the following ITTO-supported projects:

Completed projects:

- ◆ Management, Conservation and Development of Mangrove Forests in Panama - PD 128/91 Rev.2 (F)
- ◆ Forestry Management, Community Development and Sustained Use of Forests in the Punta Patiño Forest Reserve, Darien Region, Panama - PD 35/93 Rev.4 (F), Phases I & II
- ◆ Technical Assistance to Develop a Mapping and Inventory Project Aimed at the Sustainable Management and Administration of Forest Resources - PPD 15/96 Rev.1 (F)
- ◆ Forest Development Plan for the Sustainable Management of Forests in the District of Donoso, Panama - PPD 6/95 Rev.1 (F)
- ◆ Master Plan for the Upgrading of the Forest Industrial Infrastructure in Panama - PD 15/97 Rev.2 (I)
- ◆ Management of Cativo Forests and Non-Timber Products with the Participation of Rural and Indigenous Communities, Darien, Panama - PD 37/95 Rev.2 (F)
- ◆ Establishment of Forest Statistics Information System - PD 44/96 Rev.2 (M)

The following ITTO-funded projects were under implementation as of 29/02/2000:

- ◆ Sustainable Forest Management in the Nargana District, Kuna Yala Indigenous Territory, Panama - PD 1/96 Rev.3 (F)
- ◆ Institutional Strengthening of the Geographic Information System (GIS) of the National Environmental Authority (ANAM) for the Monitoring and Evaluation of Panama's Forest Resources with a View to their Sustainable Management - PD 54/98 Rev.1 (F)

### **3.2 Infrastructure of the Executing Agency**

The National Environmental Authority is represented in each of the nine provinces of the Republic of Panama and in the district of San Blas. For administration purposes, the area is divided into twelve regions and ANAM has regional offices in each of these regions, which are in turn divided into Agencies. Similarly, the Authority has facilities suitable for the provision of training to its personnel and community members.

### 3.3 Budget

Budget of the National Environmental Authority  
for the period 1987-2001 (US\$)

Year	Budget (US\$)		
	Operational budget	Investments	Total
1987	2,074,344	9,807,400	11,881,744
1988	1,885,000	10,132,800	12,017,800
1989	2,018,000	4,420,751	6,438,751
1990	4,389,615	1,178,000	5,567,615
1991	4,781,000	2,460,900	7,241,900
1992	6,040,000	3,382,600	9,422,600
1993	6,542,000	9,466,000	16,008,000
1994	6,762,000	5,751,711	12,514,359
1995	6,888,400	8,209,000	15,097,400
1996	7,153,500	13,726,200	20,897,700
1997	7,368,400	10,090,700	17,459,100
1998	7,135,700	11,297,100	18,432,800
1999	7,623,200	12,422,700	20,045,900
2000	7,842,000	10,867,100	18,709,100
2001	8,234,700	16,456,700	24,691,400
2002	8,159,570	16,867,558	25,027,128
2003	7,766,200	12,005,800	19,772,000
<b>Total</b>	<b>102,664,277</b>	<b>158,542,980</b>	<b>261,207,257</b>

Source: Directorate for Environmental Policies and Planning, ANAM.

With reference to the above budget, it should be pointed out that according to Panamanian legislation:

- ◆ Personnel costs, operational costs, and acquisition of consumable items and capital equipment must be covered with funds from the operational budget.
- ◆ Personnel costs, operational costs, and acquisition of consumable items and capital equipment related to the implementation of projects must be covered with funds from the investments budget. In these contributions, the investment amount of cooperating agencies is estimated in terms of both goods and services.

### 3.4 Personnel

Personnel structure of the National Environmental Authority  
(as of November 1999)

Classification	Permanent	Temporary	TOTAL
Administrative	54	21	75
Technical	358	138	496
Logistic Support	409	191	600
Total	821	350	1,171

The technical staff category includes professionals, technicians and supervisory personnel.

## **Annex B. Curricula vitae of the key staff (to be identified)**

## **Annex C. Terms of reference for the key staff**

The National Environmental Authority will recruit a Project Coordinator and a number of experts in order to implement the project.

**PROJECT COORDINATOR:** The Project Coordinator should be a professional with experience in forest management, preferably with a knowledge of mangrove forest management and rehabilitation and development of forest management plans.

The candidate should have a minimum of five years experience in the above areas. Furthermore, he/she should hold a Master's Degree in an area related to this field of expertise.

### **Main duties:**

- Responsible for coordinating the project staff and providing technical and administrative guidance for the implementation of planned activities
- Developing annual work plans and related budgets
- Planning and coordinating project implementation in coordination with the relevant authorities of ANAM's National Natural Heritage Directorate
- Assisting in the selection of consultants and supervising their work
- Ensuring the timely achievement of project outputs and objectives
- Monitoring project expenditures
- Monitoring project activities and preparing progress reports, monthly reports and other technical and administrative reports on the project

### **Remuneration:**

The Project Coordinator will receive fortnightly payments, excluding social security benefits.

**MANGROVE FOREST MANAGEMENT EXPERT:** This consultant should have a minimum of five (5) years experience in mangrove forest management. In addition, he/she should hold at least a university degree in forest engineering.

### **Main duties:**

- Review and assess existing information on mangrove forests in Panama and advise the work team for the development of mangrove forest management plans
- In coordination with the rest of the project team, select mangrove areas to develop management plans and review the forest inventory results
- Develop, in conjunction with the project team, sustainable management indicators for mangrove forests
- Identify and propose development and harvesting activities consistent with the sustainable use of mangrove forests
- Develop, in conjunction with the project team, a mangrove reforestation program and a training program to train the communities in this field

### **Remuneration:**

The payment of fees will be made as established by the Project Coordinator on the basis of the time spent by this expert in the project area for the performance of his/her duties.

**AGROFORESTRY AND REFORESTATION EXPERT:** This consultant should have a minimum of five (5) years experience in agroforestry and reforestation. In addition, he/she should hold at least a university degree in forest engineering.

**Main duties:**

- Develop, in coordination with the project team, agroforestry and reforestation programs
- Assist in the selection of forest species and areas for the development of agroforestry and reforestation programs
- Advise the project team in regards to vegetative material for mangrove reforestation programs
- Advise the project team in regards to the establishment of forest nurseries and community training in this field

**Remuneration:**

The payment of fees will be made as established by the Project Coordinator on the basis of the time spent by this expert in the project area for the performance of his/her duties.

**COMMUNITY DEVELOPMENT EXPERT:** This consultant should have a minimum of five (5) years experience in rural development. In addition, he/she should hold at least a university degree in agricultural economics and/or sociology.

**Main duties:**

- Review and assess existing information on socioeconomic aspects in the project area and advise the work team in this field
- Collaborate with the project team in the development of community organisation and training strategies
- In conjunction with the project team, develop strategies aimed at promoting the adoption of sustainable development practices to be continued even after project completion

**Remuneration:**

The payment of fees will be made as established by the Project Coordinator on the basis of the time spent by this expert in the project area for the performance of his/her duties.

**INTERNATIONAL EXPERT IN MANGROVE FOREST MANAGEMENT:** This consultant should have a minimum of ten (10) years experience in mangrove forest management. In addition, he/she should hold at least a Master's degree in the field of mangrove forest management.

**Main duties:**

- Provide guidance to the national expert and the project team for the development of mangrove forest management and reforestation plans
- Provide guidance to the project team for the development of sustainable management indicators for mangrove forests
- Propose development and harvesting activities consistent with the sustainable use of mangrove forests
- Evaluate the implementation of mangrove forest management and reforestation activities

**Remuneration:**

The payment of fees will be made as established by the Project Coordinator on the basis of the time spent by this expert in the project area for the performance of his/her duties.

## **Annex D**

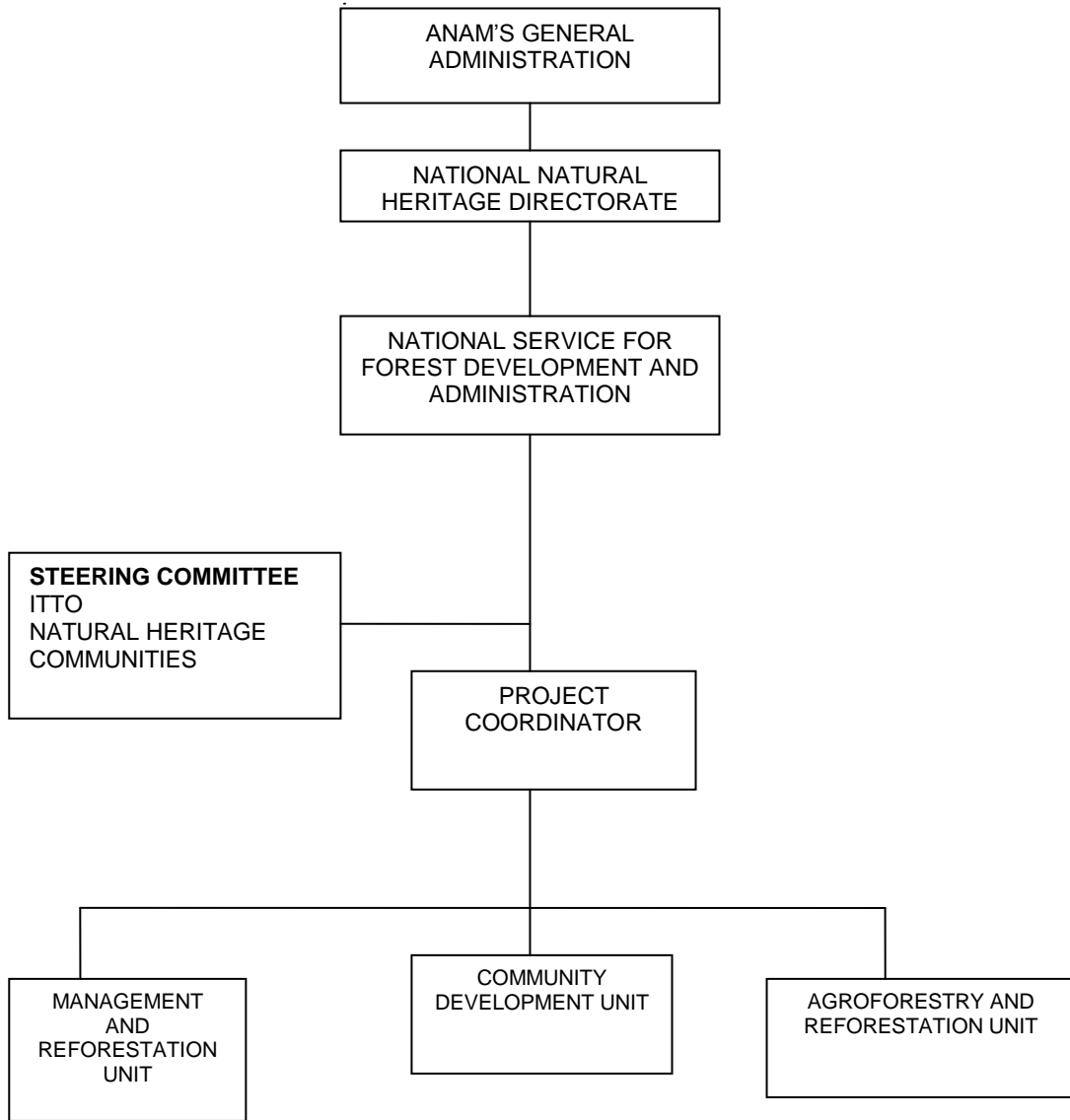
### **MEASURES FOR THE DISSEMINATION OF PROJECT RESULTS**

1. Project results will be posted in ANAM's Web Page as they are produced so that users and the general public can access them.
2. Project reports and results will be published and made available to the public.
3. Upon project completion, two (2) workshops will be organised to evaluate and disseminate project results.



**ANNEX E**

**PROJECT ORGANISATIONAL CHART**



## ANNEX F

### AGROFORESTRY SYSTEMS AND REFORESTATION

This annex contains a brief description of some agroforestry systems that have been successfully implemented in Panama and are proposed for this project. In addition, a list of the forest species most commonly used for agroforestry and reforestation is included.

1. ALLEY CROPPING SYSTEM: Management of rows of trees interspersed with agricultural crops. The aim of this system is to improve the soil with the cover between rows. The main forest species used in this system are:

*Gliricidia sepium* (Balo)  
*Leucaena leucocephala* (Leucaena)  
*Diphysa robinoides* (Macano)

2. FAMILY ORCHARDS: Farmers produce the crops they need for their subsistence around their homes (agricultural, fruit, forest and medicinal species).
3. SHADED CROPS: Planting of annual or semi-perennial agricultural crops under the shade of forest species. The forest species most commonly used in this system are:

*Gliricidia sepium* (Balo)  
*Eritrina poeppigiana* (Eritrina)  
*Cordia alliodora* (Laurel)  
*Inga spp* (Guaba)  
*Albizia falcataria* (Albizia)

4. HEDGING: Planting of shrubs and trees along plot boundaries so as to prevent the encroachment of animals and demarcate property areas. The species frequently used in this system is *Gliricida sepium*, although several other forest species are also used.
5. GRASSLAND PLANTATIONS: Combination of forest plantations with grasslands so as to simultaneously produce forest products and cattle feed.
6. PURE PLANTATIONS: Planting of trees to produce only forest products. The forest species most commonly used for this purpose in Panama are mostly *Tectona grandis* (Teak), *Pinus caribaea* (Pine) and *Bombacopsis quinatum* (Cedro espino).

**ANNEX G : COMPARATIVE TABLE OF REVISIONS MADE  
IN RESPONSE TO THE ITTO 25TH EXPERT PANEL RECOMMENDATIONS**

<b>Expert Panel Recommendations</b>	<b>Revisions made in response to ITTO recommendations</b>
1. Refer to the ITTO Mangrove Work Plan and the proposal's relevance to it in Part IV of the proposal	In Part IV: The Tropical Timber Framework, a description of the relationship of the project proposal to ITTO Mangrove Work Plan 2002-2006 has been included.
2. Clearly specify the problems, and their underlying causes, to be addressed by the proposal, and adjust the problem tree accordingly	The problem tree has been revised and adjusted according to the Expert Panel recommendations and following the provisions of the ITTO Manual on Project Formulation.
3. Strengthen the economic and social aspects (sections 2.6 & 2.8) of the proposal and the details on the mechanisms for involving the communities on a long-term sustainable basis	The sections on economic and social aspects have been revised and strengthened (sections 2.6 and 2.8).
4. Separate the work program for the agroforestry activities from that geared towards mangrove rehabilitation, and also consider the planting of some indigenous species, rather than focusing solely on exotics	The separation of agroforestry activities from mangrove rehabilitation activities had already been effected prior to the recommendations of the 25th Expert Panel as can be seen in the work plan. Similarly, native species had been included in the project as shown in Annex F on agroforestry and reforestation systems.
5. Include quantitative measures for the main indicators in the logical framework	Some indicators were included in the previous revision as recommended by the 24th Expert Panel. In this revision, new indicators have been added for each specific activity.
6. Clearly describe mechanisms to guarantee the future sustainability of the activities upon project completion and consider reinvesting part of the potential harvesting revenues to achieve this	Part III of the project document now includes a description of a number of measures aimed at guaranteeing the future sustainability of activities upon project completion.
7. Reduce the budget as recommended by the 24 <sup>th</sup> Expert Panel and provide detailed budgets by activities and by components and source, including unit costs. Clearly identify the annual and final audit costs	The previous revision included a 32% reduction in the budget for project personnel and project experts. A further reduction in the budget would lead to a reduction in activities. The annual and total auditing costs were also included in the previous revision as indicated in Table 7.1: Consolidated yearly and total project budget. This revision incorporates a new column in Table 7.1 for unit costs.

All modifications and changes have been marked in BLUE to facilitate their reading throughout the project document.