INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT DOCUMENT

TITLE:	PRODUCTION SYSTEMS AND INTEGRATED MANAGEMENT OF SHOOT-BORERS FOR THE SUCCESSFUL ESTABLISHMENT OF MELIACEAE PLANTATIONS IN THE YUCATAN PENINSULA AND VERACRUZ, MEXICO
SERIAL NUMBER:	PD 350/05 Rev.3 (F)
COMMITTEE:	REFORESTATION AND FOREST MANAGEMENT
SUBMITTED BY:	GOVERNMENT OF MEXICO
ORIGINAL LANGUAGE:	SPANISH

SUMMARY

This project proposal stems from the phyto-sanitary diagnosis carried out in 2002-2003 by INIFAP in the plantations of the Yucatan Peninsula as well as from the National Meeting on Meliaceae Shoot-Borers, held in Mexico, where it was recognised that these insects currently represent the greatest threat for the 300,000 ha of cedar and mahogany plantations established in the south-southeast region of Mexico. The forest pest detection and assessment work carried out by INIFAP in 153 plantations, covering an area of 1,901 ha, revealed that the incidence of *Hypsipyla grandella* ranged from 4.8% to 100%, while the incidence of *Chrysobothris yucatanensis* ranged from 0.3% to 43% (Diaz et al. 2004). Out of the total area of plantations sampled, only 16% was under some kind of pest management system. **A number of technologies have been developed over the years in relation to various aspects of Meliaceae plantations, including planting methods, plantation management and pest control. This project seeks to streamline and validate the generated technologies in the study area, develop technologies to strengthen shoot-borer control through a holistic approach, and scientifically address and validate these technologies with producers in an orderly and systematic manner. The project will include a number of basic research activities on biological aspects of shoot-borers and genetic aspects of Meliaceae species.** The aim of this project (development objective) is **to achieve the sustainable production of tropical timber in Mexico through the development and implementation of an integrated system for the management of pests that are currently limiting the establishment of cedar and mahogany plantations in the Mexican tropics.** The project is focused on the south-southeast region of Mexico, where the country's largest area of tropical forests is found. The specific objective of the project is **to develop an integrated shoot-borer management system for young Meliaceae plantations to enable forest producers in the Yucatan Peninsula and Veracruz to successfully establish plantations for the sustainable production of tropical timber.** It is envisaged that after project completion, producers will have acquired scientific knowledge to understand their Meliaceae plantation systems and deal with phyto-sanitary problems, which will ensure their success throughout the process – from the establishment of the plantation to the harvesting of products – thus achieving sustainable production. This will contribute to the rehabilitation of forest areas and to the conservation of natural tropical forests.

EXECUTING AGENCY:	NATIONAL INSTITUTE FOR FORESTRY, AGRICULTURAL AND ANIMAL RESEARCH (INIFAP)
COOPERATING GOVERNMENTS:	--
DURATION:	36 MONTHS
APPROXIMATE STARTING DATE:	UPON APPROVAL

BUDGET AND PROPOSED SOURCES OF FINANCE:	**Source**	**Contribution in US$**
	ITTO	**362,672.00**
	INIFAP	209,600.00
	TOTAL	**572,272.00**

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PART I. CONTEXT

1. Origin

After a remarkable increase in tropical forest plantations in the south-southeast region of Mexico since 1997, a number of plantation management deficiencies have become evident and serious pest infestations of Meliaceae shoot-borers (*Hypsipyla grandella* and *Chrysobothris yucatanensis*) have taken place (Diaz 2004; Equihua 2004), jeopardising the investment made by producers as well as the objectives of reforestation programs (National Reforestation Program – PRONARE) and plantation programs (National Program for Commercial Forest Plantations – PRODEPLAN) of the National Forest Commission (CONAFOR). So serious is the threat posed by the shoot-borers *Hypsipyla grandella* and *Chrysobothris* that on 7-8 October 2004, the Forest Health Management Unit of CONAFOR organised and coordinated the first National Meeting on Meliaceae Shoot-Borers in Mexico, which brought together producers, researchers, academics and the civil society in general, all of whom discussed their problems, knowledge, experiences and needs with a view to finding solutions in the short, medium and long terms (CONAFOR 2004).

The forest pest detection and assessment work carried out by INIFAP in 153 plantations, covering an area of 1,901 ha, revealed that the incidence of *Hypsipyla grandella* ranged from 4.8 to 100%, while the incidence of *Chrysobothris yucatanensis* ranged from 0.3 to 43% (Diaz et al. 2004). Out of the total area of plantations sampled, only 16% was under some kind of pest management.

Since the 1960's, INIFAP has worked on cedar and mahogany species in the following areas: germination, growth, plant production, rooting of juvenile cuttings, plantation establishment, plantation management, pest management, biological management, integrated management, environmental impact of forest plantations and genetic improvement, among others.

This project proposal stems from the phyto-sanitary diagnosis carried out in 2002-2003 by INIFAP in the plantations of the Yucatan Peninsula as well as from the National Meeting on Meliaceae Shoot-Borers, held in Mexico, where it was recognised that these insects currently represent the greatest threat for the more than 300,000 ha of cedar and mahogany plantations established in the south-southeast region of Mexico **and that producers in the area lack the technical skills required to manage these plantations.**

2. Sectoral policies

The accelerated deforestation process that has been taking place in the Mexican tropics has prompted forest sector authorities to promote reforestation and commercial plantation programs as a way of reverting the degradation of tropical forestlands. CONAFOR's Strategic Forest Program 2025 promotes the development of commercial plantations, as there are 11 million hectares in the country that are suitable for that purpose. This measure is aimed at reducing the pressure exerted on natural vegetation areas while at the same time ensuring a supply of raw materials for the forest industry. However, the success of these plantations is jeopardised by the attacks of Meliaceae shoot-borers (*Hypsipyla grandella* and *Chrysobothris yucatanensis*) and the producers' lack of knowledge on pest management alternatives. Unless appropriate technological packages are made available, both PRONARE and PRODEPLAN run the risk of not fulfilling their objectives due to producers' disappointment at the impact of these pests on their plantations. Furthermore, it is generally recognised that in other countries, such as Ghana, Indonesia, Malaysia, Bangladesh, Australia, Brazil and Costa Rica, borers represent the main limiting factor in the establishment of Meliaceae plantations.

The objectives of this project are consistent with the general goals of the Strategic Forest Program 2025 for Mexico, as well as with the specific objectives of the PRONARE and PRODEPLAN programs of the National Forest Commission.

PRONARE's objective is to ensure the establishment of a new forest cover in forests, rainforests and semi-desert areas, on the basis of the natural land use capacity of each ecosystem and community needs. The main species produced to achieve the objectives of this Program in the south-southeast region of Mexico are red cedar (*Cedrela odorata*) and mahogany (*Swietenia macrophylla*).

PRODEPLAN was developed by the Government of Mexico in 1997. Its objectives include promoting the establishment of commercial forest plantations on forestry-apt agricultural or abandoned lands with a view

to reducing the pressure exerted on natural forests and rainforests. Thus, PRODEPLAN seeks to ensure the sustainable production and conservation of forests and rainforests. During 1997 - 2000, this Program provided support for the planting of 60,000 hectares. In addition, further support was provided for the planting of another 160,000 ha between 2001 and 2004 (CONAFOR). Undoubtedly, Meliaceae species play a significant role within PRODEPLAN as out of the total 78,000 ha planted to date (2004), 10,000 ha have been planted with red cedar and 2,000 ha with a combination of red cedar and mahogany (CONAFOR 2004). CONAFOR estimates that out of the target 220,000 ha to be planted, about 39% will comprise Meliaceae species. If PRONARE's reforestation activities are added to the above statistics, the total area of plantations established in the country increases significantly, a conservative estimate being 300,000 ha for the south-southeast region of the country.

In view of the above, this project proposal is in consonance with the conservation and sustainable forest development policies stated in the Strategic Forest Program for Mexico 2025.

3. Programmes and operational activities

CONAFOR, through its conservation and sustainable forest development policies for Mexico, generates operational programmes establishing targets and operational strategies. The Strategic Forest Program 2025 and the National Forest Program 2001-2005 envisage the development of a National Forestry Fund for the provision of training and the distribution of national and international resources for the funding of forest activities.

PART II: THE PROJECT

1. Project objectives

1.1 Development objective:

Achieve the sustainable production of tropical timber in Mexico through the development and implementation of an integrated system for the management of pests that are currently limiting the establishment of cedar and mahogany plantations in the Mexican tropics.

1.2 Specific objective:

1.2.1 Develop an integrated shoot-borer management system for young Meliaceae plantations to enable forest producers in the Yucatan Peninsula and Veracruz to successfully establish plantations for the sustainable production of tropical timber

2. Justification

2.1 Problem to be addressed

Forest activities in the tropical forests of Mexico have been based on the selective logging of a reduced number of species, particularly cedar and mahogany, as these species have been the backbone of forest activities in the Mexican tropics. As a result of this, it was estimated that in the 1980's, in areas with these species the average density of harvestable individuals was 0.5 individuals per hectare, but by the end of the decade this density had decreased to 0.25 commercial individuals per hectare of both cedar and mahogany species. This reduction in harvestable volumes resulted in the deforestation of large areas of medium and high forests, as given that there were very few high commercial value species left in these forests, they lost their importance as sources of economic resources for the owners and consequently, land use practices changed to agriculture and cattle raising.

The accelerated deforestation process in the Mexican tropics has prompted forest sector authorities to promote reforestation and commercial plantation programs as a way of reverting the degradation of tropical forest areas. CONAFOR's Strategic Program Forest 2025 provides for the promotion of commercial forest plantations, as there are 11 million hectares of forestry apt lands in the country. This measure is aimed at reducing the pressure on natural forest areas while at the same time ensuring the supply of the forest industry. However, the success of these plantations is jeopardised by the attacks of Meliaceae shoot-borers (*Hypsipyla grandella* and *Chrysobothris yucatanensis*) and the producers' lack of knowledge on pest management alternatives. If adequate technological packages are not made available,

both PRONARE and PRODEPLAN run the risk of not achieving their objectives because of the negative effect that these pests are having on producers in view of the devastating impacts on their plantations. It is generally recognised that in other countries such as Ghana, Indonesia, Malaysia, Bangladesh, Australia, Brazil and Costa Rica, borers constitute the main limiting factor for the establishment of Meliaceae plantations.

The forest pest detection and evaluation studies carried out in 2002 - 2003 in the Yucatan Peninsula, where samples were taken from 153 plantations over an area of 1,901 hectares, revealed that the incidence of *Hypsipyla grandellaI* ranged from 4.8 to 100% and that of *Chrysobothris yucatanensis* from 0.3 to 43% (Diaz, et al. 2004). Out of all the plantations sampled, only 35 (16%) had applied some sort of chemical pest control procedure.

Meliaceae shoot-borers (*Hypsipyla grandella* and *Chrysobothris yucatanensis*) are the main pests attacking red cedar (*Cedrela odorata*) and mahogany (*Swietenia macrophylla*) plantations in Mexico. The high incidence and severity commonly seen in the field have limited the success of these plantations, which has led to the failure of national programmes aimed at the establishment of Meliaceae forest plantations. Research efforts to find ways of combating these pests (genetic improvement, silvicultural treatments, biological control, chemical procedures) have all had limited success. There is still a lack of cost-effective methods to revert this process and address the frustration of community producers in the Yucatan Peninsula and Veracruz. In this context, no efforts have been tried to date in this region with the use of clones from selected borer-resistant trees.

In a world of globalized economies, where it is important to be competitive on the one hand and on the other to ensure the preservation of natural resources, the country that finds the most effective method for the protection of forest plantations against *Hypsipyla grandella* and *Chrysobothris yucatanensis* will have undoubtedly contributed to sustainable forest management in other producer countries with Meliaceae species. Hence the significance of this project.

Both Veracruz and the Yucatan Peninsula are considered to be ideal regions for the development of the project as they have the greatest number of plantations from the PRONARE and PRODELAN programs as well as the most significant projects in terms of area covered.

PROBLEM-TREE

CONSEQUENCES

Extensive borer infestations (*Hypsipyla grandella* y *Chrysobothris yucatanensis*) endangering *Cedrela odorata* and *Swietenia macrophylla* plantations developed in the south-southeast region of Mexico

Lack of producers' motivation to establish Meliaceae forest plantations

National programs' failure to establish Meliaceae forest plantations

Producers are not aware of silvicultural and pest (*Hypsipyla grandella* y *Chrysobothris yucatanensis)* management requirements to establish successful *Cedrela odorata* and *Swietenia macrophylla* plantations in the Yucatan Peninsula and Veracruz, Mexico

CAUSES

Producers believe that commercial cedar and mahogany plantations only provide forest products in the long term and require limited tending

No technological packages available for the integrated management of Meliaceae borers in the south-southeast region of Mexico

Most Mexican producers are from a social sector traditionally devoted to agricultural and cattle-raising activities and only now are beginning to embark on forest plantations

Lack of technical assistance to ensure the success of forest plantations

Limited knowledge on parasitic and predatory agents and natural entomopathogenic organisms that could be used for the biological control of Meliaceae shoot-borers.

Limited scientific information on insect biology

Limited research at the local level available to producers on the impact of silvicultural and agroforestry techniques to prevent borer attacks and/or stimulate fast plantation growth. There is also a lack of Meliaceae shoot-borer resistant genotype development programs

Figure 1. Forestry map of the Republic of Mexico showing project study areas

2.2 Intended situation after project completion

The following situation is expected at the end of the 3-year project implementation period:

Scientific knowledge will have been acquired contributing to the management of *H. grandella* and *C. yucatanensis*, while the effectiveness of *Hypsipyla grandella* and *Chrysobothris yucatanensis* direct control methods will have been assessed.

Information will have been generated on *Hypsipyla grandella* and *Chrysobothris yucatanensis* population fluctuations and environmental factors regulating these pests' life cycles throughout the year in the study area, thus facilitating the structuring of a Meliaceae borer control program.

Techniques will be available to prevent and reduce the impacts of shoot-borer attacks.

Meliaceae shoot-borer resistant genotypes will be available for the establishment of community forest plantations.

The damage caused by *Hypsipyla grandella* and *Chrysobothris yucatanensis* to cedar and mahogany plantations will have been reduced by at least 40% and the use of appropriate products for the control of pathogens will be more efficient.

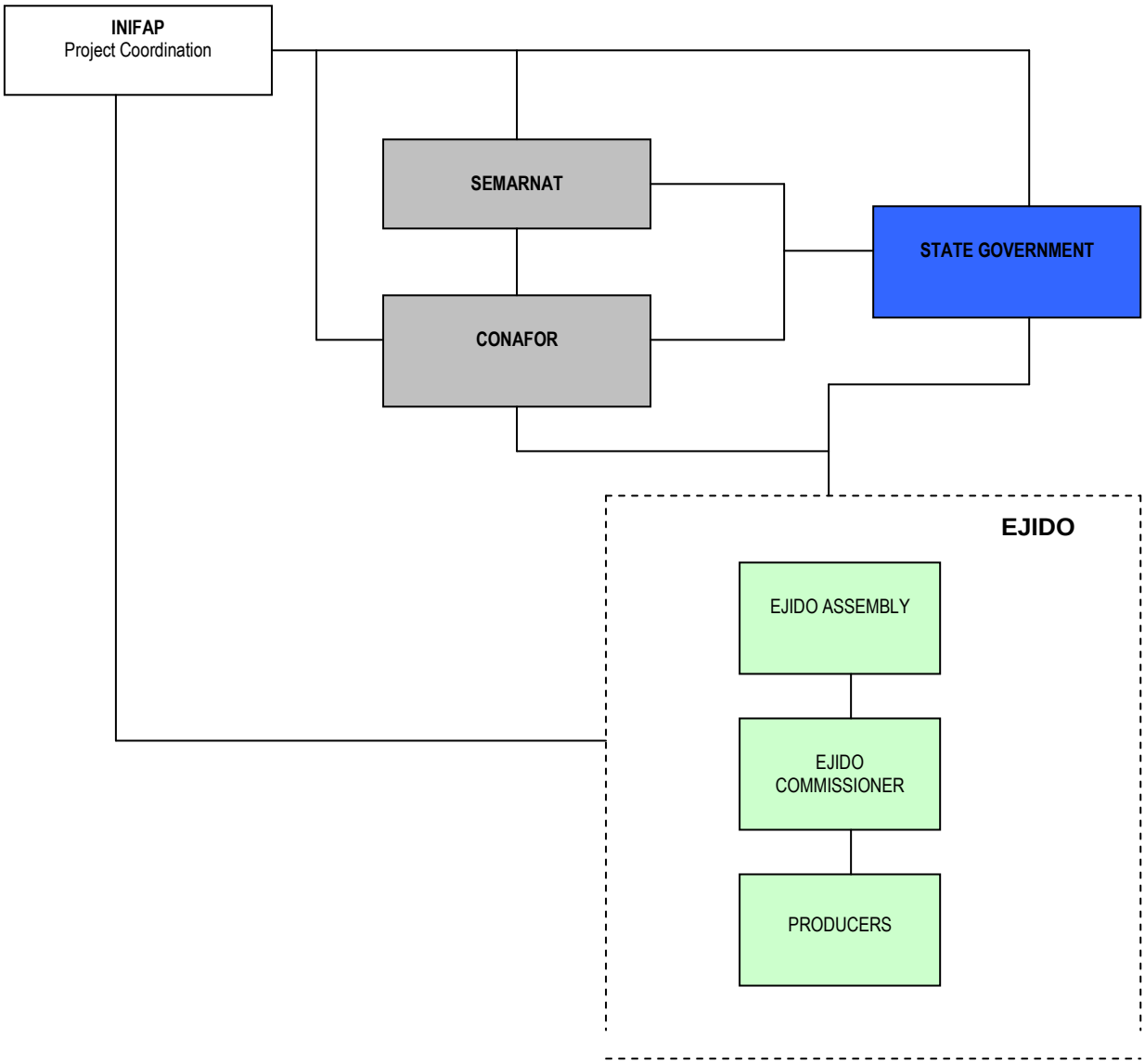
2.3 Project strategy

The project is aimed at promoting and stimulating the establishment, management and harvesting of forest plantations in the Mexican tropical region, as well as contributing to the technological and environmental development of the country through training and scientific knowledge-building activities which will allow producers to successfully manage their forest plantations.

The project plans to establish experimental tests on producers' lands so that they can participate in the development of technology from the onset. This will facilitate the assimilation of the findings of these tests as producers will have first-hand knowledge about the origins of the technology. The tests that the project plans to implement are: a). Evaluation of direct control methods for *H. grandella* and *C. yucatanensis*; b) Monitoring of damages and pests in order to acquire further baseline information about the biology of Meliaceae shoot-borers; c) Establishment of clone banks of borer-resistant cedar and mahogany genotypes and establishment of pilot plantations to evaluate genotypes that are resistant to Meliaceae shoot-borers.

The implementation of this project will involve the participation of federal, state and ejido authorities. At different levels, the relevant authorities will accredit communities, ejidos and producers as appropriate, and will facilitate the provision of government support as required. INIFAP will be responsible for the implementation of technical-scientific project activities.

PROJECT IMPLEMENTATION FLOW CHART



2.4 Target beneficiaries

Project results and outputs will be used by:

- First and foremost, the producers of the south-southeast region of Mexico who have agreed to reconvert their farmlands or unused lands into forest plantations; in particular, ejido members and small landholders.
- Technical staff and service providers.
- Education institutions.
- Research institutions.
- CONAFOR.

2.5 Technical and scientific aspects

INIFAP has previously coordinated projects with CIID Canada (Model Forest 1989-1993) and ICRAF (1993-2000). Through the implementation of agroforestry projects, both international centres have sought to generate knowledge and technologies through participatory research methods. These experiences have facilitated the transfer of the technology generated by INIFAP to producers in the Yucatan Peninsula, thus initiating their technological development. However, no research work has been done on the

establishment of forest plantations as a production activity and as a vehicle for sustainable forest utilization, and given that the current forest sector policies are promoting the development of forest plantations, this research could be the driving force required to promote forest activities in the Mexican tropics.

In addition, in order to provide producers with information about generated technologies, INIFAP published two books on Forest Technologies ("*Tecnologías llave en mano*") in 1998 and 1999 where more than 201 technologies were described. Approximately 30% of these were related to tropical forest regions and one third of this total to the management and establishment of plantations and to the control of pests affecting cedar and mahogany species.

Since the 1960's, INIFAP has worked on cedar and mahogany species in areas such as: germ-plasm collection and management, germination, growth, plant production, rooting of juvenile cuttings, plantation establishment, plantation density, plantation management, pruning, thinning, pest management, biological management, integrated management, environmental impact of forest plantations and genetic improvement, among others.

Furthermore, the outputs of the research work carried out will immediately be made available to producers, as the experiments will be implemented on their lands and communities with the direct participation of producers. With regard to finding a solution to the pest control problem, existing experimental technology has managed to control shoot-borers with a 40 to 60% success rate. It is expected that this technology together with the research outputs from project activities and the training to be provided to producers, will facilitate the control of shoot-borers at economically acceptable and viable percentage levels.

Community participation in the project – Meliaceae plantation owners in the project study area will participate during two vital stages of the project: during the initial stage of the project they will be provided with a simplified version of the project and interviews will be held to evaluate their interest in developing and implementing pest control methodologies. Based on the results of the interviews, suitable producers will be selected to participate as volunteers in the project. During a subsequent project stage, these volunteer producers will directly participate in the project by facilitating the establishment of experimental or demonstration plots on their lands and also allowing other producers interested in obtaining information about the technology to visit these plots. Volunteer producers will also participate by carrying out maintenance activities in the experimental plots (clearing, irrigation, pruning, thinning and pest control) and by applying experimental treatments under the supervision of project staff. The experimental plots of these volunteer producers will become teaching and learning centres for Meliaceae plantation owners and the community in general. The project executing agency (INIFAP) already has experience in working with communities in the study area and currently has a list of potential participating producers.

From 1993 to 2002, more than 30,000 hectares have been planted mainly with cedar and mahogany species in the Yucatan Peninsula (SEMARNAP, 2002). These plantations have faced several problems, including a lack of technical assistance, meteorological phenomena and pests. The latter are a serious limiting factor and have been identified as a serious problem.

The work carried out in 2002 - 2003 in the Yucatan Peninsula on the detection and evaluation of forest pests identified *Hypsipyla grandella* and *Chrysobothris yucatanensis* as the two main pests affecting cedar and mahogany plantations, with *H. grandella* having an incidence rate of 4.8 to 100% and *C. yucatanensis* from 0.3 to 43% (Diaz, et al. 2004). Out of all the plantations sampled, only 35 (16%) were under some sort of chemical pest control treatment. Another important result was the obvious lack of technical assistance, a situation that does not facilitate the development of efficient silvicultural management and pest control systems.

The submission of this project proposal was motivated by the above factors together with the results of the National Meeting on Meliaceae Shoot-Borers held in Catemaco, Veracruz, on 7-8 October 2004, where it was agreed that the problem of Meliaceae shoot-borers is a priority issue that needs to be addressed for the development of cedar and mahogany plantations in the Mexican tropics.

2.6 Economic aspects

From 1997 to 2004, more than 300,000 hectares of forest plantations have been established in the Mexican tropics (mainly with Meliaceae species). It is estimated that an average of 1,000 plants per hectare have been produced, accounting for more than 300 million plants, which at a cost of US$0.2 per plant, represents an investment of approximately US$60 million. However, it is estimated that during the first year, 60 to 70% of these plants die, which represents a loss of more than US$42 million. With the use of appropriate technologies and adequate training for the successful management of these plantations, it is estimated that these losses could be reduced by more than US$30 million.

Extrapolating these figures to the 11 million hectares in the country that are suitable for forest plantations, 39% of which could be established with Meliaceae species, the benefits of this project would significantly increase.

2.7 Environmental aspects

The project will directly contribute to ensure that the forest plantations established in the Yucatan Peninsula and Veracruz (30,000 and 20,000 hectares respectively) will achieve their objective of reducing the pressure exerted on natural forests. Furthermore, the project seeks to ensure sustainable forest production and forest conservation through the development of an operational model for the generation and adoption of technologies for the management of Meliaceae plantations. This will involve the direct participation of producers and technicians through the establishment of 12 demonstration plantations and will thus lead to the technological development of 12 communities through the silvicultural management of plantations and integrated management of Meliaceae shoot-borers so as to enable producers to be successful throughout the entire process – from the establishment of their plantations to the sustainable production of forest products.

Moreover, the project will contribute to the rehabilitation of more than 500,000 hectares of tropical forests which are lost every year in the Mexican tropics as a result of slash-and-burn practices, as the establishment of cedar and mahogany plantations will provide a real alternative both for the rehabilitation of these areas and for the sustainable production of timber resources.

2.8 Social aspects

The project will contribute to the successful establishment of plantations by forest owners and to the sustainable production of tropical timber by providing information and knowledge about plantation establishment and optimising technological processes and pest control activities through an integrated management approach. This will guarantee the phytosanitary health of plantations, which will in turn provide for the production of intermediary products from thinning and/or clearing operations at the end of the rotation cycle. All of this will promote the establishment of Meliaceae forest plantations and will generate employment in rural areas, thus contributing to the improvement of the standard of living of forest communities.

2.9 Risks

The project envisages the establishment of trials on experimental sites and on producers' lands. There is a risk involved in ensuring the appropriate selection of these communities and cooperating producers, as the lack of real interest on the part of participating communities or producers could lead to project failure. In order to minimise this risk, the project team will ensure the participation of state authorities and communities in the selection process and will require cooperating producers to have experience in the establishment of forest plantations. Furthermore, the participation of CONAFOR and State Government authorities will guarantee the support required to ensure the success of the project.

Another potential risk is the magnitude of the task to be undertaken (technological development and research). In order to minimise this risk, the project team will be made up of 12 researchers with extensive experience in research activities and technology validation, as well as knowledge about the project area, as they have all worked for more than 20 years in the region.

3. Outputs

Upon project completion, producers will have a better understanding of environmental factors affecting the presence of Meliaceae shoot-borers, more efficient control methods and pest-resistant materials, which will significantly contribute to the management of shoot-borers in Meliaceae plantations to ensure their success throughout the process – from the establishment of the plantation to the harvesting of products – thus achieving sustainable production. This will in turn contribute to the rehabilitation of forest areas and to the conservation of natural tropical forests.

3.1 Specific objective 1

Output 1.1: Validation of direct control methods for *H. grandella* and *C. yucatanensis,* assessing their cost-effectiveness.

Output 1.2: Monitoring of damage and pests to collect information on the biology of Meliaceae shoot-borers in the study area (population fluctuations and environmental factors regulating *Hypsipyla grandella* and *Chrysobothris yucatanensis* life cycles).

Output 1.3: Identification and propagation of Mealiacea borer-resistant genotypes.

4. Activities

4.1 Output 1.1:

Activity 1.1.1: Identification of pest affected areas.

Activity 1.1.2: Definition and implementation of treatments.

Activity 1.1.3: Monitoring and evaluation.

4.2 Output 1.2:

Activity 1.2.1: Identification of areas for monitoring.

Activity 1.2.2: Basic studies on shoot-borer biology.

4.3 Output 1.3:

Activity 1.3.1: Inspection tours for the identification of resistant genotypes and selection of individuals.

Activity 1.3.2: Establishment of clone banks and reproduction of materials.

Activity 1.3.3: Identification of areas for the establishment of trials.

Activity 1.3.4: Preparation and establishment of pilot plantations:

Activity 1.3.5: Monitoring and evaluation.

5. Logical framework worksheets

PROJECT ELEMENTS	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Development objective Achieve the sustainable production of tropical timber in Mexico through the development, implementation of an integrated system for the management of pests that are currently limiting the establishment of cedar and mahogany plantations in the Mexican tropics.	The area of successful forest plantations is increased by 50% together with forest production	Statistics from the states	Forest promotion and development policies remain unchanged. No natural disasters take place in the south-southeast region of Mexico
Specific objective 1 Develop an integrated shoot-borer management system for young Meliaceae plantations to enable forest producers in the Yucatan Peninsula and Veracruz to successfully establish plantations for the sustainable production of tropical timber	After 3 years, a forest plantation management program will be established to ensure the successful development of plantations, and a seminar/workshop will be held for the analysis and discussion of project results with the participation of producers, technicians and sectoral authorities.	Manual on Meliaceae plantation management. Document describing experiences and achievements made as well as the analysis and discussion of project results with producers, technicians and sectoral authorities.	Producers and authorities maintain their interest in the promotion and development of cedar and mahogany forest plantations.
Output 1.1 Evaluation of direct control methods for *H. grandella* and *C. yucatanensis,* assessing their cost-effectiveness and performance.	Two trials for the validation of direct control methods for Meliaceae shoot-borers in Campeche and Quintana Roo.	Experimental plots established. Geographic location map of trials and general data (communities, owners and area). Annual report. Brochure for producers.	The producers actively participate in the activities and provide their lands for the establishment and development of trials.
Activity 1.1.1: Identification of pest affected areas.			
Activity 1.1.2: Definition and implementation of treatments.			
Activity 1.1.3: Monitoring and evaluation.			
Output 1.2 Monitoring of damage and pests to collect information on the biology of Meliaceae shoot-borers in the study area (population fluctuations and environmental factors regulating *Hypsipyla grandella* and *Chrysobothris yucatanensis* life cycles).	12 sites for damage and pest monitoring over a period of 4 years in the states of Yucatan, Campeche, Quintana Roo and Veracruz.	Geo-referenced location map of monitoring sites and general data (communities, owners and area). Annual report. Brochure for producers.	The producers are interested and provide their lands for the establishment of monitoring sites.
Activity 1.2.1: Identification of areas for monitoring.			
Activity 1.2.2: Basic studies on shoot-borer biology.			

PROJECT ELEMENTS	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Output 1.3 Identification and propagation of Mealiacea borer-resistant genotypes.	Three trials for the assessment of Meliaceae borer-resistant genotypes established in INIFAP's experimental field stations during the first year.	Geo-referenced location map of trials and general data. Annual report. Brochure for producers.	Existing material is not lost due to meteorological phenomena, fires or illegal logging.
Activity 1.3.1: Inspection tours for the identification of resistant genotypes and selection of individuals.			
Activity 1.3.2: Establishment of clone banks and reproduction of materials.			
Activity 1.3.3: Identification and selection of genotypes.			
Activity 1.3.4: Reproduction of materials.			
Activity 1.3.5: Establishment and evaluation.			

A preliminary analysis of the study area was carried out and based on the experience of participating researchers, the following 12 communities are recommended for the establishment of plots and trials. However, the final selection of communities will depend on the results of the participatory analysis to be carried out jointly with producers, authorities and researchers.

LOCALITY AND/OR COMMUNITY	**MUNICIPALITY**	**STATE**
Echeverría Castellot	Calakmul	Campeche
Tikimul	Campeche	Campeche
Rancho Santa Fé	Champotón	Campeche
Unión de Plantadores Forestales del Municipio José María Morelos	José María Morelos	Quintana, Roo
Ejido Laguna Guerrero	Otón P. Blanco	Quintana, Roo
Unión de Plantadores Forestales, Municipio de Carrillo Puerto	Carrillo Puerto	Quintana, Roo
Catmis	Tzucacab	Yucatán
Temozón Norte	Mérida	Yucatán
Distás	Distás	Yucatán
Unión de Productores Forestales del Municipio de Tezonapa	Tezonapa	Veracruz
Unión Ganadera del Norte de Veracruz	Tuxpan	Veracruz
Ejido Salto de Eyipantla	San Andrés Tuxtla	Veracruz

6. Work plan

OUTPUTS /ACTIVITIES	RESPONSIBLE PARTY	YEAR											
		1				2				3			
		Quarter				Quarter				Quarter			
		1	2	3	4	1	2	3	4	1	2	3	4
Output 1.1 Two trials established for the validation of direct control methods for *H. grandella* and *C. yucatanensis*	**INIFAP**												
Activities													
1.1.1: Identification of pest affected areas													
1.1.2: Definition and implementation of treatments													
1.1.3: Monitoring and evaluation													
Output 1.2 Sites established for the monitoring of damages and pests so as to collect further baseline information on the biology of Meliaceae shoot-borers in the study area	**INIFAP**												
Activities													
1.2.1 Identification of areas for monitoring													
1.2.2 Basic studies on shoot-borer biology													
Output 1.3 Three genetic trials established for the assessment of Meliaceae borer-resistant genotypes	**INIFAP**												
Activities													
1.3.1: Inspection tours for the identification of resistant genotypes and selection of individuals													
1.3.2: Establishment of clone banks and reproduction of materials													
1.3.3 Identification and selection of genotypes													
1.3.4 Reproduction of materials													
1.3.5 Monitoring and evaluation													

7. BUDGET

7.1 Project budget by component

CALCULATION WORKSHEETS

Output 1.1 Two trials established for the evaluation of direct control methods for *H. grandella* and *C. yucatanensis*						
Activity 1.1.1 Identification of pest affected areas	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	1	1,800	1,800	(E)	Q2,Q3 year 1
	12. Collaborating Researchers (12)	0.75	1,800	16,200	(E)	Q2,Q3 year 1
	19. Component Total			**18,000**		
30. Duty travel	31. DSA (26)	1	100	2,600	(I)	Q2,Q3 year 1
	39. Component Total			**2,600**		
40. Capital items	43. Vehicles (3)	2	750	4,500	(E)	Q2,Q3 year 1
	44. Capital equipment (GPS)	2	500	1,000	(I)	Q2,Q3 year 1
	49. Component Total			**5,500**		
50. Consumable items	53. Fuel/utilities (4)	2	500	4,000	(I)	Q2,Q3 year 1
	59. Component Total			**4,000**		
60. Miscellaneous	61. Sundry (4)	1	250	1,000	(I)	Q2,Q3 year 1
	62. Auditing (4)	0.03	3,000	360	(I)	Q2,Q3 year 1
	69. Component Total			**1,360**		
70. Executing agency management costs	71. Management cost(4)	0.2	1,000	800	(E)	Q2,Q3 year 1
	79. Component Total			**800**		
SUBTOTAL				**32,260**		
Activity 1.1.2: Definition and implementation of treatments	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	1	1,800	1,800	(E)	Q3,Q4 year 1
	12. Collaborating Researchers (12)	0.75	1,800	16,200	(E)	Q3,Q4 year 1
	13. Field technicians (2 months)	2	400	1,600	(I)	Q3,Q4 year 1
	19. Component Total			**19,600**		
20. Sub-Contracts	21. Subcontract (Wages 40)	2	15	1,200	(I)	Q3,Q4 year 1
	29. **Component Total**			**1,200**		

30. Duty travel	31. DSA (26)	1	100	2,600	(I)	Q3,Q4 year 1
	32. International travel (2)	0.5	1,500	1,500	(I)	Q3,Q4 year 1
	33. Transport costs (2)	1	600	1,200	(I)	Q3,Q4 year 1
	39. Component Total			**5,300**		
40. Capital items	43. Vehicles (3)	2	750	4,500	(E)	Q3,Q4 year 1
	49. Component Total			**4,500**		
50. Consumable items	51. Raw materials(2)	3	400	2,400	(I)	Q3,Q4 year 1
	53. Fuel/utilities (4)	2	500	4,000	(I)	Q3,Q4 year 1
	54. Office supplies (2)	1	300	600	(I)	Q3,Q4 year 1
	59. Component Total			**7,000**		
60. Miscellaneous	62. Auditing (4)	0.03	3,000	360	(I)	Q3,Q4 year 1
	69. Component Total			**360**		
70. Executing agency management costs	71. Management cost(4)	0.2	1,000	800	(E)	Q3,Q4 year 1
	79. Component Total			**800**		
SUBTOTAL				**38,760**		
Activity 1.1.3: Monitoring and evaluation	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	1.5	1,800	2,700	(E)	Q4 year 1 to Q4 year 3
	12. Collaborating Researchers (4)	3	1,800	21,600	(E)	Q4 year 1 to Q4 year 3
	13. Field technicians (2)	3	400	2,400	(I)	Q4 year 1 to Q4 year 3
	19. Component Total			**26,700**		
20. Sub-Contracts	21. Subcontract (Wages 60)	2	15	1,800	(I)	Q4 year 1 to Q4 year 3
	29. Component Total			**1,800**		
30. Duty travel	31. DSA (40)	4	100	16,000	(I)	Q4 year 1 to Q4 year 3
	32. International travel (1)	1	3,000	3,000	(I)	Q4 year 1 to Q4 year 3
	39. Component Total			**19,000**		
40. Capital items	43. Vehicles (4)	3	750	9,000	(E)	Q4 year 1 to Q4 year 3
	44. Capital equipment (Laptop)	2	2,500	5,000	(I)	Q4 year 1 to Q4 year 3
	49. Component Total			**9,900**		
50. Consumable items	51. Raw materials(2)	27	400	21,600	(I)	Q4 year 1 to Q4 year 3
	53. Fuel/utilities (2)	27	100	5,400	(I)	Q4 year 1 to Q4 year 3
	54. Office supplies (2)	3	300	1,800	(I)	Q4 year 1 to Q4 year 3
	59. Component Total			**28,800**		

60. Miscellaneous	61. Sundry (2)	1	500	1,000	(I)	Q4 year 1 to Q4 year 3
	62. Auditing (4)	0.03	3,000	360	(I)	Q4 year 1 to Q4 year 3
	69. Component Total			**1,360**		
70. Executing agency management costs	71. Management cost(4)	0.2	1,000	800	(E)	Q4 year 1 to Q4 year 3
	79. Component Total			**800**		
SUBTOTAL				**92,460**		
Output 1.2 Sites established for the monitoring of damages and pests so as to collect further baseline information on the biology of Meliaceae shoot-borers in the study area						
Activity 1.2.1 Identification of areas for monitoring	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	0.5	1,800	900	(E)	Q2, Q3, Q4 year 1
	12. Collaborating Researchers (4)	0.5	1,800	3,600	(E)	Q2, Q3, Q4 year 1
	19. Component Total			**4,500**		
30. Duty travel	31. DSA (5)	4	100	2,000	(I)	Q2, Q3, Q4 year 1
	39. Component Total			**2,000**		
40. Capital items	43. Vehicles (4)	1.5	750	4,500	(E)	Q2, Q3, Q4 year 1
	43. Vehicles (1)	1	15,000	15,000	(I)	Q2, Q3, Q4 year 1
	44. Capital equipment (Data logger)	12	550	6,600	(I)	Q2, Q3, Q4 year 1
	44. Capital equipment (GPS)	2	500	1,000	(I)	Q2, Q3, Q4 year 1
	49. Component Total			**27,100**		
50. Consumable items	53. Fuel/utilities (4)	2	500	4,000	(I)	Q2, Q3, Q4 year 1
	54. Office supplies (4)	1	300	1,200	(I)	Q2, Q3, Q4 year 1
	59. Component Total			**5,200**		
60. Miscellaneous	61. Sundry (4)	1	250	1,000	(I)	Q2, Q3, Q4 year 1
	62. Auditing (4)	0.03	3,000	360	(I)	Q2, Q3, Q4 year 1
	69. Component Total			**1,360**		
70. Executing agency management costs	71. Management cost(4)	0.2	1,000	800	(E)	Q2, Q3, Q4 year 1
	79. Component Total			**800**		
SUBTOTAL				**40,960**		
Activity 1.2.2 Basic studies on shoot-borer biology	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	0.5	1,800	900	(E)	Q1 year2 to Q4 year 3
	12. Collaborating Researchers (4)	0.5	1,800	3,600	(E)	Q1 year2 to Q4 year 3
	13. Field technicians (4)	6	400	9,600	(I)	Q1 year2 to Q4 year 3
	14. Fellowships and training (1)	12	350	4,200	(I)	Q1 year2 to Q4 year 3
	19. Component Total			**18,300**		

20. Sub-Contracts	21. Subcontract (Wages 80)	4	15	4,800	(I)	Q1 year2 to Q4 year 3
	29. Component Total			**4,800**		
30. Duty travel	31. DSA (40)	4	100	16,000	(I)	Q1 year2 to Q4 year 3
	32. International travel (2)	0.5	1,500	1,500	(I)	Q1 year2 to Q4 year 3
	33. Transport costs (2)	1	600	1,200	(I)	Q1 year2 to Q4 year 3
	39. Component Total			**18,700**		
40. Capital items	43. Vehicles (4)	6	750	18,000	(E)	Q1 year2 to Q4 year 3
	44. Capital equipment (projector)	2	3,500	7,000	(I)	Q1 year2 to Q4 year 3
	44. Capital equipment (Cop Port)	1	3,500	3,500	(I)	Q1 year2 to Q4 year 3
	49. Component Total			**28,500**		
50. Consumable items	51. Raw materials(4)	24	100	9,600	(I)	Q1 year2 to Q4 year 3
	53. Fuel/utilities (4)	2	500	4,000	(I)	Q1 year2 to Q4 year 3
	54. Office supplies (4)	1	300	1,200	(I)	Q1 year2 to Q4 year 3
	59. Component Total			**14,800**		
60. Miscellaneous	61. Sundry (4)	1	250	1,000	(I)	Q1 year2 to Q4 year 3
	62. Auditing (4)	0.03	3,000	360	(I)	Q1 year2 to Q4 year 3
	69. Component Total			**1,360**		
70. Executing agency management costs	71. Management costs (4)	0.2	1,000	800	(E)	Q1 year2 to Q4 year 3
	79. Component Total			**800**		
SUBTOTAL				**87,260**		
Output 1.3 Three genetic trials established for the assessment of Meliaceae borer-resistant genotypes						
Activity 1.3.1: Inspection tours for the identification of resistant genotypes and selection of individuals	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	1	1,800	1,800	(E)	Q2, Q3 year 1
	12. Collaborating Researchers (12)	0.75	1,800	16,200	(E)	Q2, Q3 year 1
	19. Component Total			**18,000**		
30. Duty travel	31. DSA (26)	1	100	2,600	(I)	Q2, Q3 year 1
	39. Component Total			**2,600**		
40. Capital items	43. Vehicles (3)	2	750	4,500	(E)	Q2, Q3 year 1
	43. Vehicles (1)	1	15,000	15,000	(I)	Q2, Q3 year 1
	44. Capital equipment (GPS)	2	500	1,000	(I)	Q2, Q3 year 1
	49. Component Total			**20,500**		
50. Consumable items	53. Fuel/utilities (4)	2	500	4,000	(I)	Q2, Q3 year 1
	59. Component Total			**4,000**		

60. Miscellaneous	61. Sundry (4)	1	250	1,000	(I)	Q2, Q3 year 1
	62. Auditing (4)	0.03	3,000	360	(I)	Q2, Q3 year 1
	69. Component Total			**1,360**		
70. Executing agency management costs	71. Management costs (4)	0.2	1,000	800	(E)	Q2, Q3 year 1
	79. Component Total			**800**		
SUBTOTAL				**47,260**		
Activity 1.3.2: Establishment of clone banks and reproduction of materials	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	1	1,800	1,800	(E)	Q2, Q3, Q4 year 1
	12. Collaborating Researchers (12)	0.75	1,800	16,200	(E)	Q2, Q3, Q4 year 1
	19. Component Total			**18,000**		
30. Duty travel	31. DSA (26)	1	100	2,600	(I)	Q2, Q3, Q4 year 1
	39. Component Total			**2,600**		
40. Capital items	43. Vehicles (3)	2	750	4,500		Q2, Q3, Q4 year 1
	44. Capital equipment	2	500	1,000	(I)	Q2, Q3, Q4 year 1
	49. Component Total			**5,500**		
50. Consumable items	53. Fuel/utilities (4)	2	500	4,000	(I)	Q2, Q3, Q4 year 1
	59. Component Total			**4,000**		
60. Miscellaneous	61. Sundry (4)	1	250	1,000	(I)	Q2, Q3, Q4 year 1
	62. Auditing (4)	0.03	3,000	360	(I)	Q2, Q3, Q4 year 1
	69. Component Total			**1,360**		
70. Executing agency management costs	71. Management costs (4)	0.2	1,000	800	(E)	Q2, Q3, Q4 year 1
	79. Component Total			**800**		
SUBTOTAL				**32,260**		
Activity 1.3.3 Identification and selection of genotypes	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	0.5	1,800	900	(E)	Q2, Q3, Q4 year 1
	12. Collaborating Researchers (4)	0.5	1,800	3,600	(E)	Q2, Q3, Q4 year 1
	13. Field technicians (2)	3	400	2,400	(I)	Q2, Q3, Q4 year 1
	19. Component Total			**6,900**		
20. Sub-Contracts	21. Subcontract (Wages 60)	2	15	1,800	(I)	Q2, Q3, Q4 year 1
	29. Component Total			**1,800**		
30. Duty travel	31. DSA (10)	2	100	2,000	(I)	Q2, Q3, Q4 year 1
	39. Component Total			**2,000**		

40. Capital items	43. Vehicles (4)	1.5	750	4,500	(E)	Q2, Q3, Q4 year 1
	44. Capital equipment	2	3,500	7,000	(I)	Q2, Q3, Q4 year 1
	49. Component Total			**11,500**		
50. Consumable items	53. Fuel/utilities (4)	2	500	4,000	(I)	Q2, Q3, Q4 year 1
	54. Office supplies (4)	3	150	1,800	(I)	Q2, Q3, Q4 year 1
	59. Component Total			**5,800**		
60. Miscellaneous	61. Sundry (4)	1	250	1,000	(I)	Q2, Q3, Q4 year 1
	62. Auditing (4)	0.03	3,000	360	(I)	Q2, Q3, Q4 year 1
	63. Contingencies	1	1,000	1,000	(I)	Q2, Q3, Q4 year 1
	69. Component Total			**2,360**		
70. Executing agency management costs	71. Management costs (4)	0.2	1,000	800	(E)	Q2, Q3, Q4 year 1
	79. Component Total			**800**		
SUBTOTAL				**31,160**		
Activity 1.3.4 Reproduction of materials	**Units and Quantity**	**No.**	**Unit cost /month**	**Total (US $)**	**Source**	**Quarter /Year**
10. Project personnel	11. Senior Researcher	0.5	1,800	900	(E)	Q4 year 1
	12. Collaborating Researchers (4)	0.5	1,800	3,600	(E)	Q4 year 1
	19. Component Total			**4,500**		
20. Sub-Contracts	21. Subcontract (Wages 80)	3	15	3,600	(I)	Q4 year 1
	29. Component Total			**3,600**		
30. Duty travel	31. DSA (20)	4	100	8,000	(I)	Q4 year 1
	39. Component Total			**8,000**		
40. Capital items	44. Capital equipment (Video camera)	1	1,200	1,200	(I)	Q4 year 1
	49. Component Total			**1,200**		
50. Consumable items	51. Raw materials(3)	3	500	4,500	(I)	Q4 year 1
	53. Fuel/utilities (4)	2	500	4,000	(I)	Q4 year 1
	54. Office supplies (2)	3	300	1,800	(I)	Q4 year 1
	59. Component Total			**10,300**		
60. Miscellaneous	61. Sundry (4)	1	250	1,000	(I)	Q4 year 1
	62. Auditing (4)	0.03	3,000	360	(I)	Q4 year 1
	69. Component Total			**1,360**		
70. Executing agency management costs	71. Management costs (4)	0.2	1,000	800	(E)	Q4 year 1
	79. Component Total			**800**		
SUBTOTAL				**29,760**		

Activity 1.3.5 Monitoring and evaluation	Units and Quantity	No.	Unit cost /month	Total (US $)	Source	Quarter /Year
10. Project personnel	11. Senior Researcher	1.5	1,800	2,700	(E)	Q1 year 2 to Q4 year 3
	12. Collaborating Researchers (4)	3	1,800	21,600	(E)	Q1 year 2 to Q4 year 3
	13. Field technicians (2)	3	400	2,400	(I)	Q1 year 2 to Q4 year 3
	14. Fellowships and training (1)	12	350	4,200	(I)	Q1 year 2 to Q4 year 3
	19. Component Total			**30,900**		
20. Sub-Contracts	21. Subcontract (Wages 60)	2	15	1,800	(I)	Q1 year 2 to Q4 year 3
	29. Component Total			**1,800**		
30. Duty travel	31. DSA (20)	4	100	8,000	(I)	Q1 year 2 to Q4 year 3
	32. International travel (2)	2	3,000	6,000	(I)	Q1 year 2 to Q4 year 3
	39. Component Total			**14,000**		
40. Capital items	43. Vehicles (4)	3	750	9,000	(E)	Q1 year 2 to Q4 year 3
	49. Component Total			**9,000**		
50. Consumable items	51. Raw materials(3)	3	500	4,500	(I)	Q1 year 2 to Q4 year 3
	53. Fuel/utilities (8)	4	100	3,200	(I)	Q1 year 2 to Q4 year 3
	54. Office supplies (2)	3	300	1,800	(I)	Q1 year 2 to Q4 year 3
	59. Component Total			**9,500**		
60. Miscellaneous	61. Sundry (4)	1	500	2,000	(I)	Q1 year 2 to Q4 year 3
	62. Auditing (4)	0.03	3,000	360	(I)	Q1 year 2 to Q4 year 3
	63. Contingencies	2	1,000	2,000	(I)	Q1 year 2 to Q4 year 3
	69. Component Total			**4,360**		
70. Executing agency management costs	71. Management costs (4)	0.2	1,000	800	(E)	Q1 year 2 to Q4 year 3
	79. Component Total			**800**		
SUBTOTAL				**70,360**		

7. CONSOLIDATED YEARLY PROJECT BUDGET BY SOURCE – ITTO (in US$)

Budget components		TOTAL	YEAR 1	YEAR 2	YEAR 3
10	**Project personnel**				
	11. Senior researcher				
	12. Collaborating researchers				
	13. Field technicians	16,600.00	2,600.00	7,000.00	7,000.00
	14. Fellowships and training	8,400.00		4,200.00	4,200.00
	19. **Component total**	**25,000.00**	**2,600.00**	**11,200.00**	**11,200.00**
20.	**Sub-contracts**				
	21. Sub-contract (with A)	15,000.00	7,000.00	4,000.00	4,000.00
	29. **Component total**	**15,000.00**	**7,000.00**	**4,000.00**	**4,000.00**
30.	**Duty travel**				
	31. DSA	62,400.00	26,400.00	18,000.00	18,000.00
	32. International travel	12,000.00	2,300.00	4,850.00	4,850.00
	33. Transport costs	2,400.00	1,200.00	600.00	600.00
		76,800			
	39. **Component total**	**76,800.00**	**29,900.00**	**23,450.00**	**23,450.00**
40.	**Capital items**				
	41. Premises				
	42. Land				
	43. Vehicles	30,000.00	30,000.00		
	44. Capital equipment	34,300.00	23,800.00	10,500.00	
	49. **Component total**	**64,300.00**	**53,800.00**	**10,500.00**	
50.	**Consumable items**				
	51. Raw materials	42,600.00	12,500.00	15,050.00	15,050.00
	52. Spares				
	53. Fuel and services	40,600.00	29,400.00	5,600.00	5,600.00
	54. Office supplies	10,000.00	5,800.00	2,100.00	2,100.00
	59. **Component total**	**93,200.00**	**47,700.00**	**22,750.00**	**22,750.00**
60.	**Miscellaneous**				
	61. Sundry	10,000.00	6,300.00	1,850.00	1,850.00
	62. Auditing	6,840.00	5,880.00	480.00	480.00
	63. Contingencies	3,000.00	1,000.00	1,000.00	1,000.00
	69. **Component total**	**19,840.00**	**13,180.00**	**3,330.00**	**3,330.00**
70.	**Executing agency management costs**				
	79. **Component total**				
	SUB-TOTAL	**294,140.00**	**154,180.00**	**75,230.00**	**64,730.00**
80.	**ITTO Monitoring, evaluation and administration**				
	81. Monitoring and review costs				
	82. Evaluation costs	**30,000.00**			
	83. Programme support costs 8%	**23,532.00**			
	84. Ex-post evaluation	**15,000.00**			
	89. **Component total**	***68,532.00**			
90.	Refund of pre-project costs				
100	**GRAND TOTAL**	**362,672.00**			

***Total evaluation costs (10,000.00/year and ex-post evaluation (15,000.00).**

CONSOLIDATED YEARLY PROJECT BUDGET BY SOURCE – INIFAP (in US$)

Budget components		TOTAL	YEAR 1	YEAR 2	YEAR 3
10	**Project personnel**				
	11. Senior researcher	**16,200.00**	10,600.00	2,800.00	2,800.00
	12. Collaborating researchers (12)	**122,400.00**	82,800.00	19,800.00	19,800.00
	13. Field technicians				
	14. Fellowships and training				
	19. **Component total**	**138,600.00**	**93,400.00**	**22,600.00**	**22,600.00**
20.	**Sub-contracts**				
	21. Sub-contract (with A)				
	29. **Component total**				
30.	**Duty travel**				
	31. DSA				
	32. International travel				
	33. Transport costs				
	39. **Component total**				
40.	**Capital items**				
	41. Premises				
	42. Land				
	43. Vehicles	**63,000.00**	29,000.00	17,000.00	17,000.00
	44. Capital equipment				
	49. **Component total**	**63,000.00**	**29,000.00**	**17,000.00**	**17,000.00**
50.	**Consumable items**				
	51. Raw materials				
	52. Spares				
	53. Fuel and services				
	54. Office supplies				
	59. **Component total**				
60.	**Miscellaneous**				
	61. Sundry				
	62. Auditing				
	63. Contingencies				
	69. **Component total**				
70.	**Executing agency management costs**				
	71. Management costs	**8,000.00**	5,800.00	1,100	1,100.00
	79. **Component total**	**8,000.00**	**5,800.00**	**1,100**	**1,100.00**
	SUB-TOTAL				
80.	**ITTO Monitoring, evaluation and administration**				
	81. Monitoring and review costs				
	82. Evaluation costs				
	83. Programme support costs				
	84. Ex-post evaluation				
	89. **Component total**				
90.	Refund of pre-project costs				
100	**GRAND TOTAL**	**209,600.00**			

OVERALL PROJECT BUDGET BY ACTIVITY (IN US$)

BUDGET COMPONENTS									
OUTPUT/ACTIVITY	**10. Project Personnel**	**20. Sub-Contracts**	**30. Duty Travel**	**40. Capital Items**	**50. Consumable Items**	**60. Miscel-laneous**	**70. Ex. Ag. Manag. Cost**	**Quarter Year**	**GRAND TOTAL**
Output 1.1 Two trials established for the evaluation of direct control methods for *H. grandella* and *C. yucatanensis*									
Activities									
1.1.1: Identification of pest affected areas	18,000.00(E)		2,600.00(I)	4,500.00(E) 1,000.00(I)	4,000.00(I)	1,360.00(I)	800.00(E)	Q2, Q3 Y1	**32,260.00**
1.1.2: Definition and implementation of treatments	18,000.00(E) 1,600.00 (I)	1,200.00(I)	5,300.00(I)	4,500.00(E)	7,000.00(I)	360,.00(I)	800.00(E)	Q3, Q4 Y1	**38,760.00**
1.1.3: Monitoring and evaluation	24,300.00(E) 2,400.00 (I)	1,800.00(I)	19,000.00(I)	9,000.00(E) 5,000.00 (I)	28,800.00(I)	1,360.00(I)	800.00(E)	4Q Y1 to 4Q Y3	**92,460.00**
	64,300.00(I)(E)	**3,000.00**(I)	**26,900.00(I)**	**24,000(I)(E)**	**39,800.00(I)**	**3,080.00(I)**	**2,400.00(E)**		**163,480.00**
Output 1.2 Sites established for the monitoring of damages and pests so as to collect further baseline information on the biology of Meliaceae shoot-borers in the study area									
Activities									
1.2.1 Identification of areas for monitoring	4,500.00(E)		2,000.00(I)	4,500.00(E) 22,600.00(I)	5,200.00(I)	1,360.00(I)	800.00(E)	Q2,Q3,Q4 Y1	**40,960.00**
1.2.2 Basic studies on shoot-borer biology	4,500.00(E) 13,800.00(I)	4,800.00(I)	18,700.00(I)	18,000.00(E) 10,500.00(I)	14,800.00(I)	1,360.00(I)	800.00(E)	Q1 Y2 to Q4 Y3	**87,260.00**
	22,800.00(I) (E)	**4,800.00(I)**	**20,700.00(I)**	**55,600.00(I) (E)**	**20,000.00(I)**	**2,720.00(I)**	**1,600.00(E)**		**128,220.00**
Output 1.3 Three genetic trials established for the assessment of Meliaceae borer-resistant genotypes									
Activities									
Activity 1.3.1: Inspection tours for the identification of resistant genotypes and selection of individuals	18,000.00(E)		2,600.00(I)	4,500.00(E) 16,000.00(I)	4,000.00(I)	1,360.00(I)	800.00(E)	Q2, Q3, Y1	**47,260.00**
Activity 1.3.2: Establishment of clone banks and reproduction of materials	18,000.00(E)		2,600.00(I)	4,500.00(E) 1,000.00(I)	4,000.00(I)	1,360.00(I)	800.00(E)	Q2,Q3,Q4 Y1	**32,260.00**
1.4.1 Identification and selection of genotypes	4,500.00(E) 2,400.00(I)	1,800.00(I)	2,000.00(I)	4,500.00(E) 7,000.00(i)	5,800.00(I)	2,360.00(I)	800.00(E)	Q2,Q3,Q4 Y1	**31,160.00**
1.4.2 Reproduction of materials	4,500.00(E)	3,600.00(I)	8,000.00(I)	1,200.00(I)	10,300.00(I)	1,360.00(I)	800.00(E)	Q4 Y1	**29,760.00**
1.4.3 Monitoring and evaluation	24,300.00(E) 6,600.00(I)	1,800.00(I)	14,000.00(I)	9,000.00(E)	9,500.00(I)	4,360.00(I)	800.00(E)	Q1 Y2 to Q4 Y3	**70,360.00**
	78,300.00(I) (E)	**7,200.00(I)**	**29,200.00(I)**	**47,700.00(E)(I)**	**33,600.00(I)**	**10,800.00(I)**	**4,000.00(E)**		**210,800.00**

(I) ITTO Contribution (E) INIFAP Contribution

CONSOLIDATED YEARLY PROJECT BUDGET BY SOURCE – ITTO (in US$)

Budget components / Annual disbursements		TOTAL	YEAR 1	YEAR 2	YEAR 3
10	Project Personnel	25,000.00	2,600.00	11,200.00	11,200.00
20.	Sub-contracts	15,000.00	7,000.00	4,000.00	4,000.00
30.	Duty travel	76,800.00	29,900.00	23,450.00	23,450.00
40.	Capital items	64,300.00	53,800.00	10,500.00	
50.	Consumable items	93,200.00	47,700.00	22,750.00	22,750.00
60.	Miscellaneous	19,840.00	13,180.00	3,330.00	3,330.00
70.	Executing agency management cost				
	79. Component Total				
	SUB-TOTAL	294,140.00	154,180.00	75,230.00	64,730.00
80.	ITTO Monit., eval. and administration				
	89. Component total	*68,532.00			
90.	Refund of pre-project costs				
100	GRAND TOTAL	362,672.00			

*Total evaluation costs (10,000.00/year and ex-post evaluation (15,000.00).

CONSOLIDATED YEARLY PROJECT BUDGET BY SOURCE – INIFAP (in US$)

Budget components / Annual disbursements		TOTAL	YEAR 1	YEAR 2	YEAR 3
10	Project Personnel	138,600.00	93,400.00	22,600.00	22,600.00
20.	Sub-contracts				
40.	Capital items	63,000.00	29,000.00	17,000.00	17,000.00
50.	Consumable items				
60.	Miscellaneous				
70.	Executing agency management costs	8,000.00	5,800.00	1,100	1,100.00
	SUB-TOTAL	209,600.00			
80.	ITTO Monit., eval. and administration				
90.	Refund of pre-project costs				
100	GRAND TOTAL				

PART III. OPERATIONAL ARRANGEMENTS

1. Monitoring, reporting and evaluation

ITTO, **CONAFOR** and **INIFAP** will be jointly responsible for project monitoring and evaluation. INIFAP has internal control bodies such as the Research Directorate, which is in charge of the technical follow-up and evaluation of projects, the Management Directorate, responsible for monitoring the proper administration of resources based on the financial schedules authorised for the project, and finally the Experimental Field Stations have Field Planning and Evaluation Units (UPECs), a collegial agency responsible for monitoring the implementation of projects.

Both **ITTO** and **CONAFOR** have established mechanisms for project follow-up and will be able to carry out the necessary technical and administrative reviews to monitor the smooth implementation of the project.

Finally, the Senior Researcher will be responsible for providing information on project progress on a six-monthly basis as well as preparing a final report describing project achievements.

2. Future operation and maintenance

As mentioned earlier, the involvement of the authorities and institutions responsible for forest development in the country will be ensured so that they can provide the necessary support to continue project activities using the transfer model and the technologies developed as tools for forest development. In addition, both technicians and producers trained by the Project will be able to ensure its continuity. If the continued existence of the project's team of researchers is considered to be necessary, additional resources will be sought for that purpose through various development programs and mechanisms available in the country. The research team will act as advisers to technicians and producers so as to develop the necessary skills to meet the requirements for the success of the plantations.

PART IV. THE TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTA 1994 objectives

This project is consistent with at least 6 of the 14 ITTO objectives as described below:

Objective c. The project seeks to facilitate the success of producers in the establishment of forest plantations on forestry-apt lands which are currently used as low-productive agricultural lands or which have been abandoned due to their low agricultural production capacity. Furthermore, the project seeks to restore forest areas to reduce the pressure exerted on natural areas. Thus, the project will contribute to the process of sustainable development of forest-dependent communities in the south-southeast region of Mexico.

Objective f. Forest plantations in Mexico started to gain importance in 1997. Therefore, producers have limited experience and have not yet accessed the scientific knowledge developed on plantation establishment and management. The project seeks to generate scientific information through the establishment of trial plantations as well as transferring already existing knowledge. Thus, this proposal is a research and development project aimed at promoting increased efficiency in tropical forest production and conservation in Mexico.

Objective j. Mexico has two programmes to promote reforestation in degraded areas (PRONARE) and the establishment of commercial plantations (PRODEPLAN). In order to achieve their objectives, these two programmes provide support to the communities that depend on forest resources for their livelihood. This project will generate and transfer technologies to maintain the interest of those producers that have already established plantations and to encourage undecided producers to establish new plantations. The funding of this project will motivate both institutions and local communities to rehabilitate degraded areas.

Objective l. The project envisages the implementation of trials with red cedar and mahogany genotypes to assess their tolerance to Meliaceae shoot-borers. These trials will help demonstrate the value of the conservation of wild tree species germ-plasm.

Objective m. The project will include specific activities for the transfer of technology to producers and technical personnel through demonstration plantations and training courses and workshops. Furthermore, the project will facilitate technical cooperation with a number of countries, including the United States of America and Ghana. To this end, the project will secure the participation of a co-senior researcher from the University of Northern Arizona with experience in development projects in the tropical areas of Ghana, Africa.

Objective n. To contribute to this objective, project researchers have decided to disseminate the generated information through national and international fora, technical publications and articles in scientific journals. This will enable other ITTO members to access the information, which can be useful in other countries.

2. Compliance with ITTO Action Plan

The project is consistent with the two ITTO goals in the field of reforestation and forest management. Research and technology transfer activities will contribute to support actions aimed at the conservation of the timber resource base in the tropical region of Mexico. Promoting reforestation and commercial forest plantations on the basis of scientifically sound technological packages will contribute to the sustainable management of these forests.

A major challenge faced by Mexico is the rehabilitation of forest areas that were previously cleared for agricultural and cattle-raising uses. Most of these lands belong to *Ejidos* (communally held land) and small landowners. As a recent member of ITTO, Mexico needs the support of the Organization in various aspects. The ITTO Action Plan seeks to encourage members to carry out reforestation and rehabilitation activities in degraded forest areas taking into consideration producers' interests; thus, this project is consistent with ITTO objectives and mission.

Project participants are aware of the importance of technical cooperation between countries. Therefore, the project envisages the exchange of experiences with other countries of the Americas and Africa. The Senior Researcher (SR), Eric R.A. Diaz Maldonado MSc., was educated at CATIE, Costa Rica, and will seek the technical cooperation of Dr. Carlos Navarro, a scientist from Costa Rica, as well as sharing experiences with Caribbean countries. Furthermore, the Project has secured the participation of a researcher (Dr. Michael R. Wagner) from the Northern Arizona University (NAU) with experience in research and development projects in Ghana, Africa, and will ensure academic exchange between INIFAP research personnel and research personnel from the Forest Research Institute of Ghana (FORIG). Another participating researcher (Dr. Guillermo Sanchez Martinez) has worked with Dr. Michael R. Wagner (NAU), Dr. Joseph Cobbinah (FORIG) and Paul P. Bosu (FORIG) and will also seek to establish technical links between INIFAP, the Northern Arizona University and FORIG.

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ANNEX A. PROFILE OF THE EXECUTING AGENCY

Expertise of the executing agency

The National Institute for Forestry, Agricultural and Animal Research (Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias – INIFAP) is a **decentralised public agency and public research centre** with the following mandate: *"Contribute, through the development of scientific knowledge and innovative agricultural and forestry technologies, and in response to the demands and needs of agro-industrial chains and different types of producers, to sustainable rural development by improving competitiveness and securing the natural resource base, through participatory work in cooperation with other public and private institutions and organisations associated with the Mexican rural sector".* INIFAP disseminates the information developed through courses, demonstration activities, workshops and various publications for producers and technical and scientific personnel.

Over the last three years, the Institute has implemented a number of forest research projects in the south-southeast region of Mexico, including the following:

1. Diagnosis on phytosanitary conditions of forest plantations in the Yucatan Peninsula (financed by CONAFOR).
2. Study on the genetic diversity of mahogany and cedar populations for conservation and genetic improvement purposes (financed by Fundación Produce Yucatan).
3. Study on agroforestry systems in the Yucatan Peninsula (CONAFOR – Fundación Produce Yucatan).
4. Evaluation and management of tropical timber species plantations in Quintana Roo (Fundación Produce Quintana Roo).
5. Monitoring of damages caused by *Hypsipyla grandella* and *Chrysobothris yucatanensis* in Meliaceae plantations in the Yucatan Peninsula (financed by CONAFOR).
6. Integrated management of *Hypsipyla grandella* and *Chrysobothris yucatanensis* in cedar and mahogany plantations (financed with INIFAP's own resources).
7. Domestication of Meliaceae species in the Yucatan Peninsula (financed by CATIE).
8. Use of geographic information systems to assess the production potential of species for reforestation in Yucatan (financed by CONAFOR).
9. Management of forest resources to increase their productivity through the liberation of commercial species (financed by Fundación Produce Campeche).
10. Localisation, identification and establishment of wild orchids in the state of Campeche (Fundación Produce Campeche).

Since Mexico has only recently become a member of the International Tropical Timber Organization, INIFAP has not yet received any funding from ITTO. This should be one of the first proposals submitted by Mexico to the Organization.

Infrastructure of the executing agency

INIFAP has several experimental field stations in the south-southeast region of Mexico and owns an area of over 10,000 hectares, where it has conducted research work since 1961 on tropical forest management and conservation. INIFAP's experimental field stations include the following:

Campo Experimental Mocochá, Yucatán
Campo Experimental Tizimín, Yucatán
Campo Experimental Uxmal, Yucatán
Campo Experimental Chetumal, Quintana Roo
Campo Experimental San Felipe Bacalar, Quintana Roo
Campo Experimental El Palmar, Veracruz
Campo Experimental Etzna, Campeche
Campo Experimental Chiná, Campeche
Campo Experimental "El Tormento", Campeche

All the experimental field stations have laboratories and plant production areas, including:

A forest seed laboratory with infrastructure for the storage and conservation of tropical germ plasm (Exp. Fields Chiná, El Tormento and San Felipe Bacalar)
Biotechnology Laboratory (Exp. Field Mocohá)
Water-soil-plant laboratory (Exp. Fields Chiná, Mocochá, Chetumal)
Beneficial organisms laboratory (Exp. Field Chiná)

Three Experimental Field Stations in the Yucatan Peninsula have also dormitory facilities for technical and scientific personnel from other institutions.

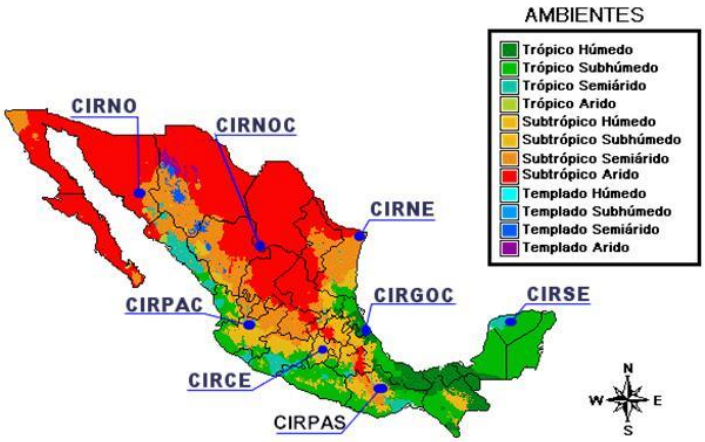
Budget

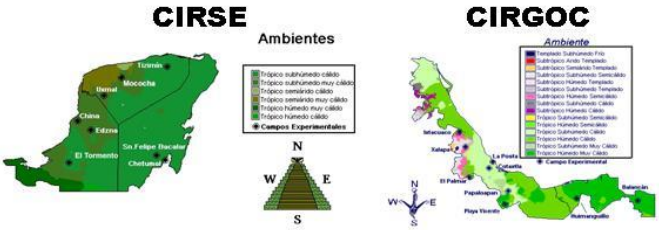
In January – August 2004, INIFAP's budget was 592.5 million pesos for operational costs and 25.8 million pesos for investment costs.

Personnel

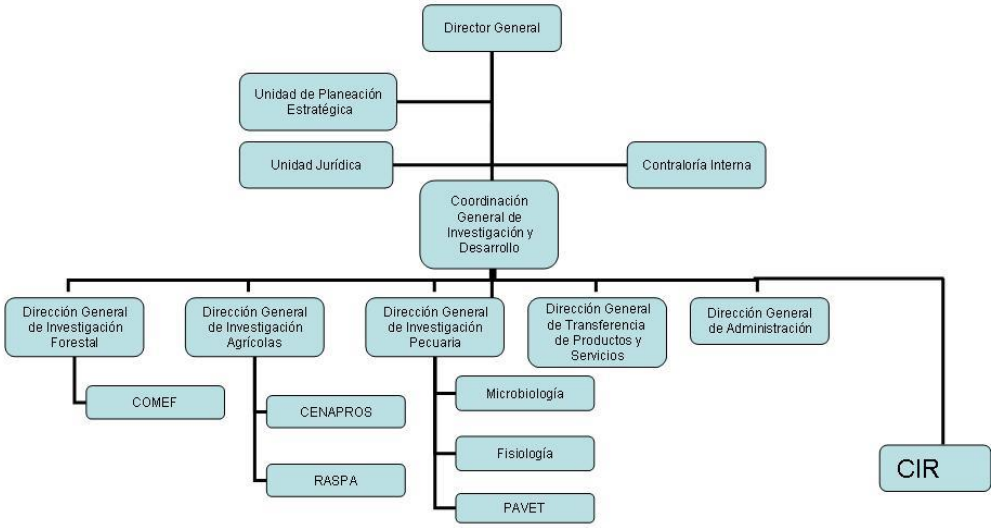
INIFAP has a total of 1029 researchers, comprising 183 professionals with a bachelor's degree, 590 with a master's degree and 256 with a PhD. Out of the total 1029 researchers, 117 are exclusively devoted to forestry, although there is interaction between the forestry and agricultural areas. About 25 researchers in southeast Mexico work in relation to tropical forest issues.

REGIONES INIFAP





ORGANIGRAMA DEL INIFAP



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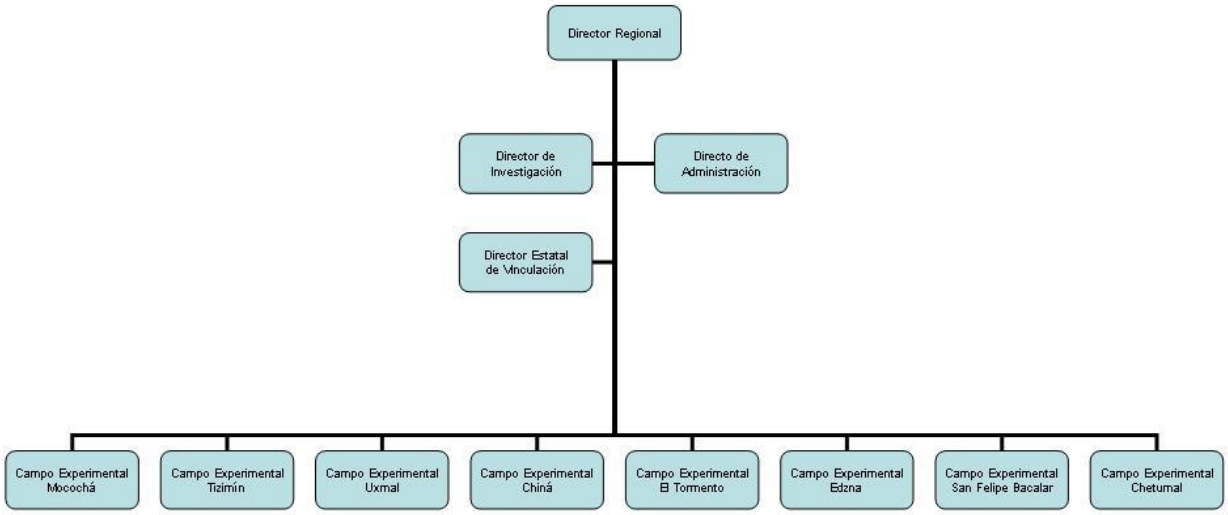
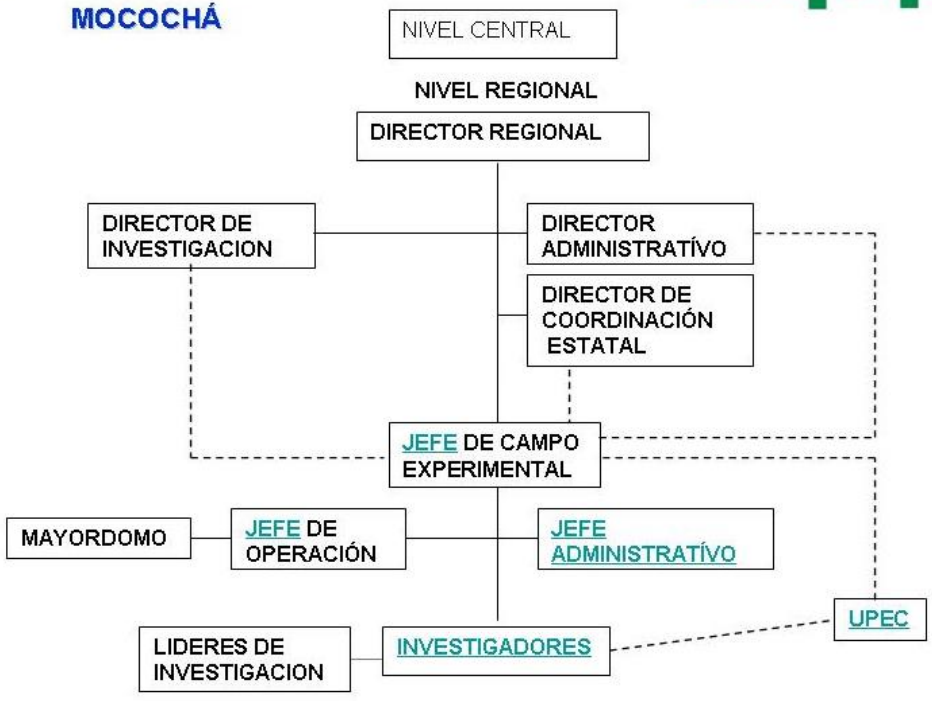
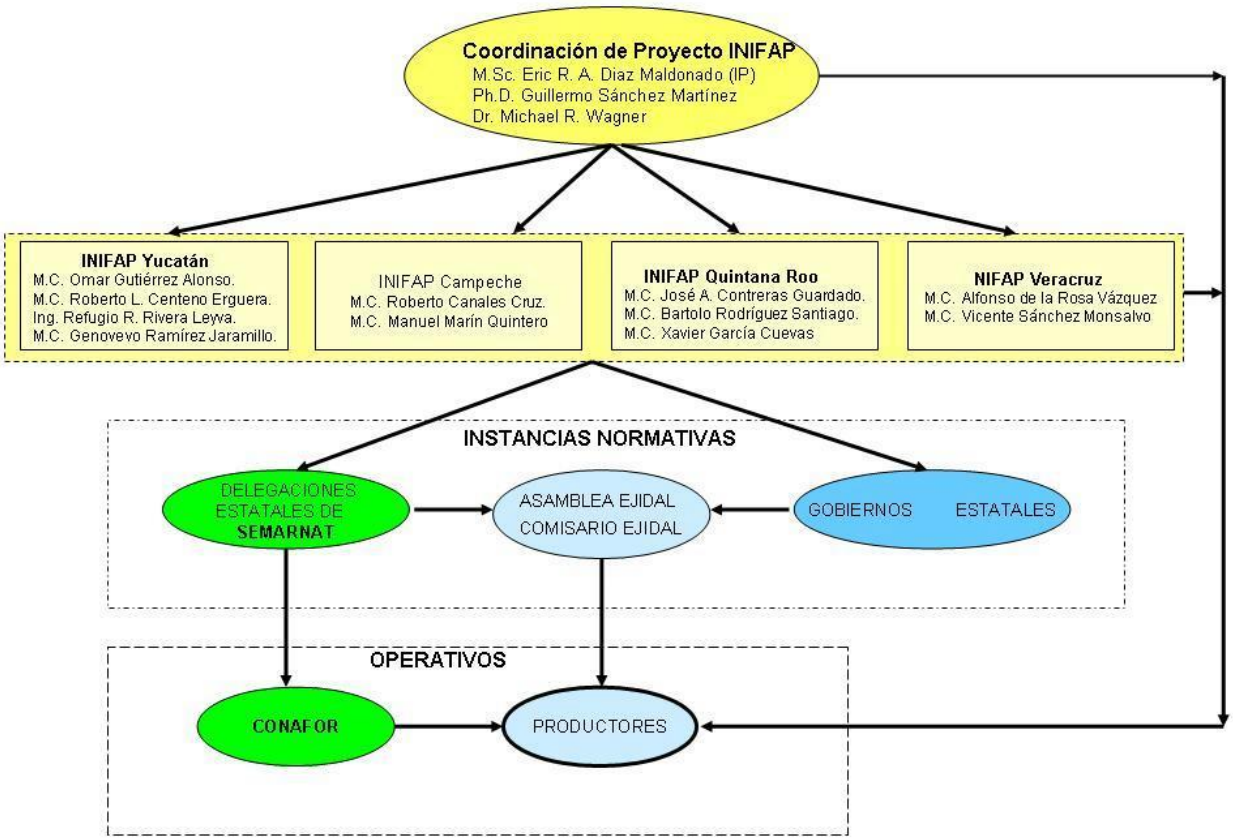


CAMPO EXPERIMENTAL MOCOCHÁ



PROJECT ORGANIZATIONAL CHART



ANNEX B. CURRICULA VITAE OF THE KEY STAFF

M.Sc. ERIC R. A. DIAZ MALDONADO
Senior Researcher (SR)

• Date and place of birth and nationality: 20 May 1959, Durango, Durango, Mexico. Mexican.

• University Degree: Agricultural Engineer specialised in Forestry. Graduated from the School of Agriculture of the University of Guadalajara. 1983.

• Post-graduate degree: MSc in Silviculture and Agroforestry. CATIE. 1991.

• Relevant work:

Díaz, M. E. 1991. Enraizamiento de estacas juveniles de *Gmelina arborea* Linn. In Núm. 49 Revista científica de difusión internacional con Comité Editorial (Silvoenergía). INIFAP. Mexico, D.F.

Díaz, M. E. 1992. Enraizamiento de estacas juveniles de *Cedrela odorata* L. In Núm. 51 Revista científica de difusión internacional con Comité Editorial (Silvoenergía). INIFAP. Mexico, D.F.

Díaz, M. E. 1993. Impacto de las plantaciones forestales en el medio ambiente. In Memoria del Foro Internacional sobre los aprovechamientos forestales en selvas y su relación con el ambiente. México, D.F. 224p.

Díaz, M. E. 1993. Germinación y crecimiento de tres especies forestales tropicales. In Folleto de investigación del INIFAP. Mexico, D.F.

Díaz, M. E. 1993. Libro "Melina". INIFAP. Mexico, D.F.

Díaz, M. E. 1997. Establecimiento de plantaciones de cedro rojo en el trópico de Mexico. In Tecnologías Llave en Mano. INIFAP-SAGAR. Mexico, D.F. 151-152 p.

Díaz, M. E. 1999. Control de *Hypsipyla grandella* en plantaciones de meliáceas (Cedro y caoba). In 500 Tecnologías Llave en Mano. SAGAR-INIFAP. Mexico, D.F. 77-78p.

Díaz, M. E., Rodríguez, P. A. 1999. Manejo de plantaciones de cedro rojo *(Cederla odorata)*. In 500 Tecnologías Llave en Mano. SAGAR-INIFAP. Mexico, D.F. 79-80p.

Díaz, M. E., Rodríguez, P. A. 1999. Producción de planta de cedro *(Cederla odorata)* a raíz desnuda. In 500 Tecnologías Llave en Mano. SAGAR-INIFAP. Mexico, D.F. 89-90p.

Díaz Maldonado E. R. A., 2004. Diagnostico de las condiciones fitosanitarias de las plantaciones forestales en la Península de Yucatán **in** ·3er Congreso forestal de cuba y III Simposio internacional de técnicas agroforestales. Instituto de Investigaciones Forestales. Cuba. 24 p.

Gutiérrez-Alonso, O., Rivera, L .R. R., Díaz, M. E. R. A., López, T. J. L., Marín, Q. M., Gómez, D. A., Rodríguez, S. B. 2004. Principales Plagas Forestales en Plantaciones de Meliáceas de la Península de Yucatán, Mexico. **in** ·3er Congreso forestal de cuba y III Simposio internacional de técnicas agroforestales. Instituto de Investigaciones Forestales. Cuba. 24 p.

Rivera-Leyva, R. R., Gutiérrez-Alonso, O., Díaz, M. E. R. A., López, T. J. L., Marín, Q. M., Gómez, D. A., Rodríguez, S. B., Ramírez, J. G. 2004. Caracterización de las plantaciones forestales en la Península de Yucatán, Mexico. in ·3er Congreso forestal de cuba y III Simposio internacional de técnicas agroforestales. Instituto de Investigaciones Forestales. Cuba. 24 p.

Ph.D. GUILLERMO SÁNCHEZ MARTÍNEZ
(Co-Senior Researcher)
Date of birth: 3 November 1961
Nationality: Mexican

Address: Instituto Nacional de Investigaciones Forestales, Campo Experimental Pabellón, Km. 32.5 Carretera Aguascalientes-Zacatecas, Pabellón de Arteaga, Aguascalientes C.P. 20660.

Education: Ph.D. Forest Science. Northern Arizona University (2000)
M.Sc. Forestry. Northern Arizona Unviversity. School of Forestry (1993)
Licenciatura en Agronomía. Universidad Autónoma Metropolitana (1986)

Recent work:

2001- to date: Principal Researcher. Instituto Nacional de Investigaciones Forestales y Agropecuarias. Program Leader – Forest Conservation, Protection and Restoration Research Program.
1997-2000: CONACYT fellow for PhD studies at the Northern Arizona University.
Research Assistant. School of Forestry. Northern Arizona University.

Relevant work undertaken in the last few years:

Technical officer in charge of CONAFOR-CONACYT-2002-C01-6118 research project
Technical officer in charge of CONAFOR-CONACYT-2002-C01-5631 research project
Guest professor (Forest Ecosystem Management): Universidad Autónoma de Aguascalientes.

Recent publications:

Sánchez Martínez, G., E. González Gaona y M.L. Sandoval Cruz. 2004. Control biológico del psílido del eucalipto *Glycaspis brimblecombei* Moore con la avispita parasitoide *Psyllaephagus bliteus* Riek. INIFAP. Campo Experimental Pabellón. Desplegable Técnica Núm. 2.

Sánchez Martínez, G. E. González Gaona y J. Villa Castillo. 2003. El psílido del eucalipto rojo *Glycaspis brimblecombei* Moore: Guía para su identificación en campo. INIFAP. Campo Experimental Pabellón. Desplegable Técnica Núm. 1.

Sánchez-Martínez, G. and M.R. Wagner. 2002. Bark beetle community structure under four ponderosa pine forest stand conditions in northern Arizona. Forest Ecology and Management 170: 145-160.

Sánchez-Martínez, G. and M.R. Wagner. 1999. Short-term effects of defoliation by sawflies (Hymenoptera: Diprionidae) on above- and below-ground growth of three ponderosa pine genotypes. Environmental Entomology 28: 38-43.

Dr. MICHAEL R. WAGNER
(Co-Senior Researcher)
School of Forestry, Northern Arizona University,
P.O. Box 15018, Flagstaff, AZ 86011

Education:

Ph.D. Entomology	University of Wisconsin-Madison 1980 Minor: Plant Pathology
M. Sc. Entomology	University of Wisconsin-Madison 1977
B. Sc. Forest Science	University of Wisconsin-Madison 1972

Relevant research and teaching activities:

- 1999- present: Regents' Professor , School of Forestry, Northern Arizona University

- 2000- present: Director, Centennial Forest, Northern Arizona University

- Co-Senior Researcher, ITTO PD 3/95: Conservation, provenance plantings, and integrated pest management to sustain Iroko production in West Africa.

- Co-Senior Researcher, ITTO PD 75/90: Development of genetic resistance in Iroko to a damaging pests.

- Co-Senior Researcher, ITTO PD 256/03: Alternative mixed plantation systems and restoration strategies for conservation and sustainable production of native timber species in Ghana.

Selected publications:

Cobbinah J. R. and Wagner M. R. (ed) 2000. Research advances in restoration of iroko as a commercial species in West Africa, Proceedings of International Tropical Timber Organization Odum (Iroko) Workshop. Kumasi, Ghana, Nov. 2000. 134 p.

Nichols, J. D., V.K. Agyeman, F.B. Aguro, M. R. Wagner, and J. R. Cobbinah. 1999. Patterns of seedling survival in the tropical African tree, Milicia excelsa. Forest Ecology and Management, 110, 353-362.

Cobbinah, J. R. and Wagner, M. R. (1995) Phenotypic variation in Milicia excelsa to attack by Phytolyma lata. Forest Ecology and Management 75: 147-153.

Nichols, J.D., Ofori. D.A., Wagner, M.R., Bosu, O. and Cobbinah, J. R. 1999. Survival, growth and gall formation by Phytolyma lata on Milicia excelsa established in mixed-species tropical plantations in Ghana. Agricultural and Forest Entomology 1, 137-141.

Wagner, M.R., S.K.N. Atuahene, J.R. Cobbinah. 1991. Forest Entomology in West Tropical Africa: Forest Insects of Ghana. Kluwer Academic Publishing. The Netherlands. 210pp.

COLLABORATORS

NAME: VICENTE SANCHEZ MONSALVO
R.F.C.: SAMV580505

UNDERGRADUATE DEGREE: DEPARTMENT OF FORESTRY, AUTONOMOUS UNIVERSITY OF CHAPINGO
PERIOD: 1977 - 1982
MASTER'S DEGREE: FORESTRY DIVISION, AUTONOMOUS UNIVERSITY OF CHAPINGO
PERIOD: 1989 - 1991

PUBLICATIONS AND OTHER RECENT ACADEMIC ACTIVITIES:

SANCHEZ M.V., C. VELASQUEZ E. AND G. LOPEZ S. 1995. CONTROL BIOLOGICO DEL BARRENADOR DE BROTES DEL CEDRO ROJO. OCTAVA REUNION CIENTIFICO- TECNOLOGICA FORESTAL Y AGROPECUARIA, VERACRUZ 95.

SANCHEZ M.V., G. BORJA L. AND M. RODRIGUEZ P. 1995. ESTABLECIMIENTO DE UN ENSAYO DE PROCEDENCIAS Y FAMILIAS DE CEDRO ROJO EN EL CAMPO EXPERIMENTAL EL PALMAR OCTAVA REUNION CIENTIFICO-TECNOLOGICA FORESTAL Y AGROPECUARIA, VERACRUZ 95.

SANCHEZ, M.V. AND C. VELAZQUEZ E. 1996. Control biológico de Hypsipyla grandella (Zeller), barrenador de cedro rojo y caoba en el Campo Experimental El Palmar. Novena Reunión Científico-Tecnológica Forestal y Agropecuaria, Veracruz 96 p. 172- 178.

ALTAMIRANO, R.B., V. SANCHEZ, M. AND C.H. AVILA B. 1996. Crecimiento inicial e importancia económica de 10 especies forestales tropicales. Novena Reunión Científico- Tecnológica y forestal y Agropecuaria, Veracruz 96. p. 1 -7.

SANCHEZ, M.V. AND C. VELAZQUEZ E. 1998. Microorganismos para controlar el barrenador de brotes de cedro rojo y caoba. INIFAP. CIRGOC. Campo Experimental El Palmar. Folleto Técnico Núm. 25 Veracruz, Mexico. 14p.

SANCHEZ, M.V. 1998. El control biológico de Hypsipyla grandella Zeller (LEPIDOPTERA: PYRALIDAE), barrenador de brotes del cedro rojo. p 264 -266. Río Bravo, Tamps. Mexico

SANCHEZ, M.V. 1999. Evaluación de la efectividad biológica del insecticida Decistab para el control del barrenador de brotes, Hypsipyla grandella Zeller, del cedro rojo. X Simposio Nacional sobre Parasitología Forestal. p 22. Campeche, Camp.

SANCHEZ, M.V. 1999. Manejo integrado del barrenador de brotes del cedro rojo y caoba en el Campo Experimental El Palmar, Tezonapa, Ver. Informe Final de Investigación. Inédito. 27 p. CIRGOC. INIFAP.

SANCHEZ, M.V. AND J.G. SALAZAR G. 1999. Parámetros genéticos en un ensayo de progenies de cedro rojo, Cedrela odorata L. en el Campo Experimental El Palmar. XII Reunión científica - tecnológica Veracruz 1999. p 287 - 293.

SANCHEZ, M.V. 2000. Propuesta para el manejo integrado del barrenador de brotes en plantaciones comerciales de cedro rojo y caoba. XIII Reunión científica y tecnológica forestal y agropecuaria Veracruz 2000.

SANCHEZ, M.V. 2000. El manejo integrado del barrenador de brotes Hypsipyla grandela Zeller (Lepidoptera: Pyralidae) en cedro rojo: Una propuesta. XXIII Congreso Nacional de Control Biológico. P200 - 2002. Guanajuato, Gto. Mexico

SANCHEZ, M.V. AND C. MONROY R. 2001. Evaluación de crecimiento de cinco especies tropicales forestales. XIV Reunión científica - tecnológica forestal y agropecuaria Veracruz 2001.

SANCHEZ, M.V. 2001. Criterios para el manejo integrado del barrenador de brotes (Hypsipyla grandella Zeller) en plantaciones de cedro rojo. En: Taller: Avances recientes en la domesticación de caoba y cedro con énfasis a colección de germoplasma, mejoramiento genético y silvicultura de plantaciones. San Felipe Bacalar, noviembre de 2001. CATIE, INIFAP, USDA.

OTHER COLLABORATORS

MSc Roberto Canales Cruz.
MSc Omar Gutiérrez Alonso.
MSc Antonio Sánchez Martínez.
MSc Roberto L. Centeno Erguera.
MSc Manuel Marín Quintero
MSc José A. Contreras Guardado.
MSc Bartolo Rodríguez Santiago.
MSc Xavier García Cuevas
MSc Arquímedes Gómez Domínguez
Eng. Refugio R. Rivera Leyva.
MSc Genovevo Ramírez Jaramillo.

ANNEX C: REPONSE TO THE 31ST EXPERT PANEL'S RECOMMENDATIONS

EXPERT PANEL RECOMMENDATION	MODIFICATION	PAGES
1. Clearly mention if the focus of the proposal is geared towards the development of scientifically approached shoot-borer control techniques.	Project summary. Items 2.2 – Intended situation after project completion and 2.3 Project strategy were modified.	1,7
2. Focus solely on outputs 1.2, 1.4 and 2.1. Postpone the other outputs to a later stage, at least until achieving the abovementioned outputs, so as to incorporate the results of these into a follow-up project. Resize this proposal accordingly.	Specific objective 2 was deleted. Items 2.2 – Intended situation after project completion, 2.3 – Project Strategy and 2.7 – Environmental Aspects were modified.	1,4,7,9,10,11 & 12
3. Under Output 2.1, rather than establishing demonstration plantations, establish properly designed research plots	Item 2.5 – Technical and Scientific Aspects was modified. Items 2.9 – Risks and 3 – Outputs were modified.	8,10,11,12
4. Under Output 2.2, rather than initiating premature training programs, due to the fact that the results of the research will probably merit some time, consider organizing one seminar/workshop once all other outputs have been achieved and are ready to be openly discussed and disseminated	Items 2.5 – Technical and Scientific Aspects, 3 – Outputs and 3.1 – Specific objective 1 were modified.	8,10 & 11
5. Provide an organizational chart of the project, which should also include the links with the other collaborating institutions and stakeholders, as well as the project steering committee	See project organisational chart and project implementation flow chart	8 & 36
6. Consider transferring the cost of the independent annual and final audits to the counterpart budget, and provide for itemized and/or unit costs under the budget lines for sub-contracts, capital equipment, raw materials, fuel and services, office supplies and sundry. Readjust the budget in line with the abovementioned recommendations	Item 7 – BUDGET was modified	16 - 26

EXPERT PANEL RECOMMENDATION	MODIFICATION	PAGES
7. Under no circumstances can executing agency management costs be covered with ITTO funds. Transfer this cost amounting to US$ 71,451 from the ITTO budget to the counterpart budget, so as to conform to the 15% of total costs allowed to the Executing Agency for overhead costs and under other budget headings, if applicable, as per ITTO Project Formulation Manual	Item 7 – BUDGET was modified	16 - 26
8. Include an Annex which shows the recommendations of the 31st Panel and the respective modifications in tabular form	Included in this table	