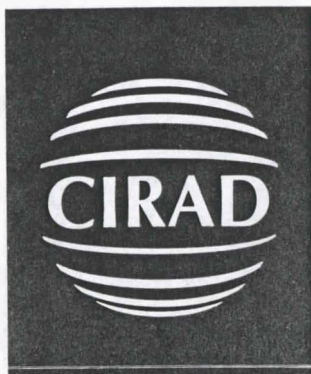


Department of Forestry  
Lao PDR

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Centre  
de coopération  
internationale  
en recherche  
agronomique  
pour le  
développement

FIFTH  
6 MONTHLY PROGRESS REPORT  
JULY - DECEMBER 1997

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**CIRAD-Forêt - MIDAS - Burapha**

Lao ADB Plantation Forestry Project - Loan No, 1295 (SF)

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January 1998

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## LIST OF ABBREVIATIONS & ACRONYMS

ADB	Asian Development Bank
APB	Agricultural Promotion Bank
AV	Audio visual
BOL	Bank of Lao
BME	Benefit Monitoring and Evaluation
DAFI	Development Agriculture & Forest Industry (Govt. enterprise)
DAFO	District Agriculture & Forestry Office
DOF	Department of Forestry
EMR	Environmental Monitoring Report
EBS	Environmental Baseline Survey
EMS	Environmental Monitoring System
GIS	Geographic Information System
GOL	Government of Lao
MAF	Ministry of Agriculture and Forestry
MCTPC	Ministry of Communication, Transport, Post and Construction
PAM	Project Administration Memorandum
PAFO	Province Agriculture & Forestry Office
PBP	Pilot Block Plantation
PCU	Project Co-ordination Unit
PFP	Pilot Farm Plantation
PPCU	Provincial Project Co-ordination Unit
PSP	Permanent Sample Plot
R&D	Research and Development
STP	Socio Technical Profile
TA	Technical Assistance consultancy for institutional strengthening

## PHOTOGRAPHS



**Photo 1.** Farmers and individuals using the APB credit line of Part A planted a total of 870 ha in 1997. In this photo an individual planted a mixture of short, medium and long term crops which were: hill rice, Bananas and *Eucalyptus* respectively. The plantation is in the Vientiane Prefecture.



**Photo 2.** This farmer in who planted in Savannakhet Province has followed extension advice from the PPCU by making his fence from natural materials and then planting other useful species along it to provide a "live fence" when the original fence rots away.





Photo 3. PCU and PPCU conducted an Investment Seminar at Saravan Province to introduce the Project to interested farmers and investors.



Photo 4. This 2 day introductory Investment Seminar was held at Champasak Province by PCU and PPCU, it was attended by 70 participants





**Photo 5.** This year 264.6 ha of PFPs were planted by farmers. This part of the Project is now completed with a total of 401.8 ha established in Vientiane Prefecture and the Provinces of Vientiane, Bolikhamsay, and Savannakhet during 1996 and 1997.



**Photo 6.** Innovative agro-forestry combinations were demonstrated in the PFPs. This one in Vientiane Prefecture shows a combination of trees, Bananas and corn. In the background is another agro-forestry demonstration featuring trees, hill rice and corn.





**Photo 7.** In 1997 three PBPs of 61.6 ha were established. The total of 228.6 ha has been established by the Project from 1995 to 1997. These are now completed. The 1997 PBPs received maintenance weeding and fertilising. This photo of Phon Si PBP after fertilisation of trees shows the green strips of rice surrounding the young trees.



**Photo 8.** The 1997 PBPs featured many agro-forestry demonstrations. In this photo the newly planted trees are marked by the stakes and surrounded by the agro-forestry crop which is a Peanut cash crop.





**Photo 9.** The Project established "Seed Production Areas" for future seed supply of *Acacia mangium* and *Acacia auriculiformis* seed in 2 of the 1997 PBPs. This photo shows the *Acacia auriculiformis* "Seed Production Area" at Non Savang PBP.



**Photo 10.** The Project established demonstration stands using 3 species of "Fodder Trees" in 2 of the 1997 PBPs. These trees can be used for supplementing cattle feed in the dry season. This photo shows the "Fodder Trees" stand in Song Khon Keo PBP.





**Photo 11.** Three new road construction contracts were signed in this reporting period and two contractors have already mobilised and started the road works. This photo shows the start of works on the Pakngan Road in Vientiane Prefecture.



**Photo 12.** The PCU, district authorities, village leaders and contractors meet to discuss the road construction works of the Nongkhait Road in Vientiane Prefecture.





**Photo 13.** Participating nurseries have delivered a total of 2,566,955 seedlings to PFPs, PBPs and credit line clients from 1995 to 1997. In 1997 there were 688,482 seedlings delivered to PBPs and PFPs while 1,321,608 were delivered to credit line clients. This photo shows seedling delivery to Vientiane Province credit line clients.



**Photo 14.** The Environmental Monitoring System is operating over the 12 PBPs established from 1995 to 1997. No adverse effects have been discovered. This photo of Na Kha PBP in a 12 month old stand shows the fast return of healthy ground cover.





**Photo 15.** In this 6 month reporting period there were 14 training courses, seminars and public awareness displays with an involvement of 559 man days organised and held by the Project, or other institutions, to support Project activities. This photo shows the Nursery Training Course in Saravan Province.

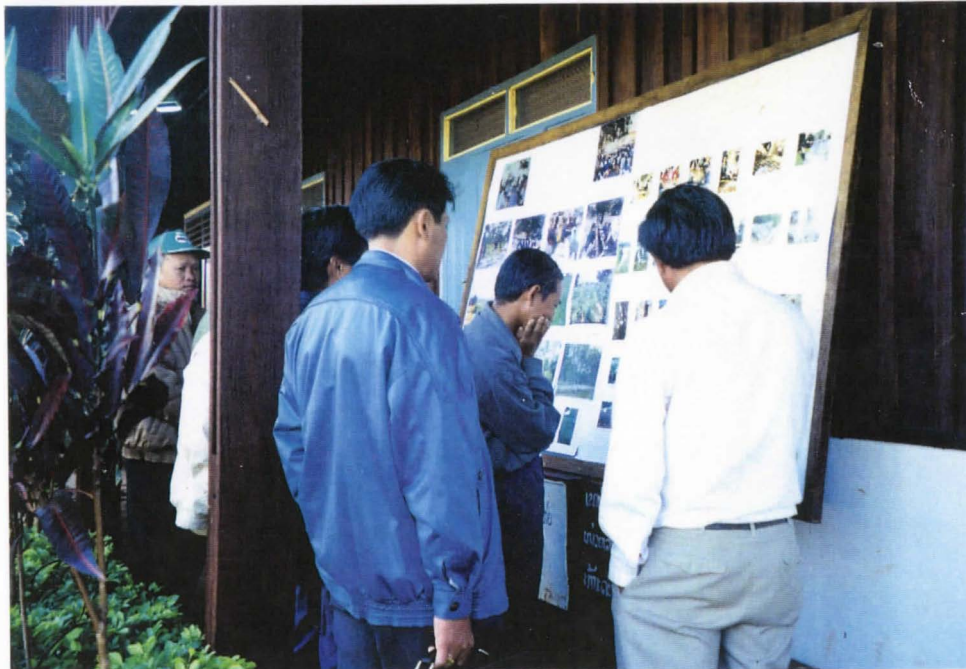


**Photo 16.** Two new PPCUs were formed in Saravan and Champasak Provinces to oversee and co-ordinate the expansion of the Project there. They are receiving training and support from PCU. This photo shows a training course at Champasak.





**Photo 17.** The 48.6 ha of 1995 and 118.4 ha of 1996 planted PBPs were maintained by fertilising and vegetation cutting as was required in each case. This photo is of one and a half year old stand at Phon Sim PBP.



**Photo 18.** A number of public awareness programs about tree plantations and environmental protection were carried out by PCU /PPCUs. This photo is of the display at Lao Ngam District of Saravane Province held during the Investment Seminar.

## 1. EXECUTIVE SUMMARY

This fifth 6 monthly progress report is a summary of the implementation activity and progress of the LAO-ADB Industrial Tree Plantation Project. The consultant, CIRAD-Forêt in association with MIDAS Agronomics and Burapha Development Consultants are assisting the Department of Forestry of the Lao PDR in the implementation of this project.

This fifth report covers the period of 6 months from 1 July to 31 December 1997 and will be the final "6 Monthly Progress Report" of the long term phase for the Implementation Consultants. The Team leader will finish the long term phase on 31 March 1998 and the Road Construction Engineer and will finish exactly one month later. The short term phase will then continue with one month long visit per year till 2000

This document reports on;

- Progress, problems and status of the project implementation over the last 6 months.
- Strength of PCU, PPCU, specialists and local support staff.
- Specialists activities, inputs and time provided over the last 6 months.
- Consultant's expenditure over the last 6 months and since start of project.
- Implementation input work plan of each specialist for the next 12 months.

A brief overview of the Project achievements during this fifth 6 month reporting period are:

### Part A

- Monitored quality of nursery seedling supply and co-ordinated the transport and delivery of 1,321,608 seedlings in the 4 provinces for credit clients.
- Conducted investment seminars in 2 provinces to promote the credit line and inform the prospective clients about various aspects of planting trees and environmental protection
- Revised extension booklets to present a focused and up to date message reflecting experiences gained during the last two planting seasons.
- Started extension activities and co-ordinated with the APB recruitment of clients for the 1998 credit line. This was seriously delayed 4 months while waiting for APB.

### Part B

- Monitored quality of nursery seedling supply and co-ordinated the transport and delivery of 688,482 seedlings in the 4 provinces for PBPs and PFPs.
- Completed the establishment of 4 new PBPs totalling 61.6 ha. Establishment of PBPs during 1995-1997 reached a total of 228.6 ha which is 95% of total project target. Extra compensatory areas of PFPs and privately owned demonstration plantations were established to off set the shortfall on area. This project activity is now completed
- Monitored 1997 PFP's establishment activities of seedling transport, planting, weeding and fertilising. Farmers planted 264.6 ha in 1997 and during 1996-1997



completed at total of 401.8 ha of PFPs during the project. This is 124% of total project target and this project activity is now completed.

#### Part C

- The total civil works completed to date by the project is 15.7 km of road construction and one bridge. To this have been added plans for a further 39.5 km of road construction, the 6 roads will be contracted in 5 packages. During this 6 month period the remaining balance of 2 road survey and design works for these packages were fully completed and have been approved by MCTPC.
- Full tender documents, drawings and contracts have been completed for all the 5 contract packages.
- Tenders were advertised and contract administration committees were formed in the provinces, they scored the tenders and allocated the 5 contract packages to winning contractors. 3 of the 6 contracts have been signed and approved by ADB.
- Two contractors have mobilised for their road construction works

#### Part D

- The Project Mid Term Review was conducted by GOL and ADB during 6-16 August. As a result the following actions have been approved by GOL and ADB:
  - Addition of new 2 provinces (Champasak, Saravan) to the 4 existing sub-project areas.
  - Purchase of additional vehicles and equipment.
  - Extension of Team Leader's long term work phase from 31 October 1997 till 31 March 1998.
  - Allocation of remaining 3.97 man months of Plantation Operation Specialists work time to Road Engineer.
  - Establishment of foreign currency revolving seed fund.
  - Reallocation of loan proceeds.
  - Building new PPCU offices in 5 provinces.
- Two new PPCUs in the newly approved sub-project areas of Champasak and Saravan Provinces have been established and training /supporting activities by PCU are in progress
- There have been 14 training courses, seminars and public awareness displays with a total involvement of 559 man days have been organised and held by the Project or other institutions for project activities.
- The Environmental specialist spent 2 periods of two weeks each with PCU, their activities were on the following activities: preparation of plantation monitoring reports, preparation of training handbook, preparation of mini EBS system and forms for areas smaller than 5 ha and training of PCU.

## 2. INTRODUCTION

### 2.1 Project

The Industrial Tree Plantation Project known in Lao PDR as the Lao-ADB Plantation Forestry Project is located in twelve districts of Vientiane Prefecture, and the provinces of Vientiane, Bolikhamsay, Savannakhet and since October 1997 Champasak and Saravan. The project is comprised of four parts ;

- Part A : Provision of a credit facility for smallholder farmers and private enterprises to finance the establishment of industrial tree plantations on about 9,000 ha of unstocked and degraded forest land;
- Part B : Establishment of pilot block and pilot farmer plantations on 560 ha;
- Part C : Improvement of plantation access roads; and
- Part D : Project management support including nursery improvement, public awareness programs, incremental staffing and logistical support.

The project implementation started in late 1995 and is scheduled to finish in early 2001.

DOF and BOL Credit Department are the executing agencies of this project.

- APB is implementing Part A .
- DOF is implementing Parts B, C and D also co-ordinating and managing the project through the PCU and six PPCUs.

### 2.2 Background

This fifth 6 Month Report of the project implementation covers the period from 1 July 1997 until 31 December 1997. It has been prepared by CIRAD-Forêt, the implementation consultant. This report contains information on the;

- Progress and status of the project implementation to 31 December 1997.
- Specialists activities and inputs provided over the fifth reporting period.
- Issues and recommendations arising from the project.
- Consultants expenditure for the period to 31 December 1997.
- Specialists activities planned for the following 12 months as this is the last report of the long term implementation phase.

### 3. PROJECT IMPLEMENTATION RECORD BY PERIOD

#### 3.1 Achievements: up to 31 December 1995 ( 1st period )

##### Part B

- PBP sites were selected and plantings established in 1995 on 5 of these averaging 8 to 10 ha each with a combined area of 49 ha planted.
- Surveyed, demarcated and mapped planting areas for the 1996 planting season.
- Analysed PBP and PFP sites and then put to immediate use the appropriate species and silviculture practices that have proven effective locally and in other regions similar to the Lao site types and formulated plantation concept and design.
- Provided appropriate silviculture schedules for the requirements of the PBP and PFP planting plans.
- Reviewed and redrafted nursery and plantation prescriptions and contracts as required.
- Planned production of 1996 trees and selected nurseries for this.
- Seedlings were produced for the 1995 PBPs including tree production training.
- Weeded and fertilised existing PBPs and protected them from cattle and fire
- Searched for and confirmed 4 required new PBP and 90 PFP sites with local people by STP process for rational land use.
- Obtained approval from district and provincial authorities as required for above.

##### Part C

- Implemented access roading survey and design for PBP access roads.

##### Part D

- Strengthened and developed the extension ability of PPCU to recruit and service farmers and rural community.
- Establishment of PCU and PPCU including staffing arrangements and training program for operational staff.
- Provided training on economic principles for commercial plantations. Training courses for plantation establishment methods.
- Provided training in appropriate management methods used in the commercial plantation sector. Particularly in the area of contract formulation, management, payments and control.
- Planning of the first annual Environmental Baseline Survey.

#### 3.2 Achievements: 1 January - 30 June 1996 ( 2nd period )

##### Part B

- Provided training in nursery techniques for the production of seedlings in the four provinces
- Recruited contractors, negotiated and signed contracts and produced a total of 441,000 seedlings in the 4 provinces.



- Recruited contractors, negotiated and signed contracts for land preparation and establishment of 6 new PBP areas in the 4 provinces.
- Land preparation, environmental protection areas surveyed and marked, fence building, and cultivation on all 6 1996 PBP sites was finished ready for planting on schedule
- Weeding, maintenance and protection of the 1995 PFPs.
- Planting and fertilising on 4 1996 PBPs is completed, and on the other 2 1996 PBPs planting is in progress and will soon be completed.

#### Part C

- Completed survey and design for all PBPs access roads.
- Bid documents and contracts completed for road access works in Vientiane Prefecture, Vientiane Province and Bolikhamsay Province. Savannakhet Province is now in progress
- Setting up of contract evaluation committee, selection of contractors and the start of construction works for the Phon Thong access road, Vientiane Province and the Nam Souang bridge rehabilitation, Vientiane Prefecture

#### Part D

- Extension activities resulting in selection, training, provision of seedlings and assistance to farmers resulting in planting of 137 ha of PFPs.
- Environmental Baseline Survey devised, tested and field data collection completed for 7 of the 8 1995 and 1996 PBPs.
- Plantation Management Plans for all 1995 and 1996 PBPs have been completed

### **3.3 Achievements: 1 July - 31 December 1996 (3rd period )**

#### Part B

- Planting, weeding and fertilising of 118.4 ha in six new PBP located in 6 districts of the 4 provinces.
- Planting and weeding of 137.2 ha of PFPs by 108 families and 11 institutions in 43 villages in the 4 provinces.
- Location and approval of more than 73 ha of new PBPs in 3 provinces for planting in 1997.
- Location and approval of 108 ha of PFPs in 4 Provinces for planting in 1997. The balance of 183 ha to be finalised in January.

#### Part C

- Completion of tender documents and contracts for Phon Sim access road.
- Started road access construction civil works in Na Kha, Song Khon Mai and Phon Sim. At end of period these were completed; 60%, 80% and 60 % respectively.
- Completed the on-going construction civil works at the Nam Souang bridge and Phon Tong Access road.

Part D

- Secured two wood purchase agreements for Vientiane Province and two wood purchase agreements for Vientiane Prefecture for the participants of the credit scheme.
- Intensive extension and plantation promotion programme activities for Part A.
- Environmental Baseline Surveys prepared and completed for all existing PBPs. PCU and PPCU trained in; environmental protection, environmental monitoring methods, and analysis of environmental data.
- Preparation of draft reports on; Environmental Monitoring System, Environmental Baseline Survey and 1996 Annual Environmental Monitoring Report.
- BME activities continued and were carried out with all PBP locations being visited and evaluated
- Conducted plantation investment seminars in each of the 4 provinces with the participation of PAFO, APB, Provincial authorities and DOF
- Provided training on a country wide basis with courses in; plantation techniques, STP, environmental protection and plantation economics to PAFO in a series of 3 courses held in the North, Centre and South Lao PDR.
- Provided training courses in environmental protection to PCU and the PPCUs in the 4 provinces.
- Training and strengthening of PPCU, PAFO and APB staff to provide support for the APB credit plantation part of the project.
- Provided support to APB for Part A by doing STP, evaluating applicants' plantation management plans and evaluation of problems and progress.
- Preparation of Permanent Sample Plot Establishment and Measurement Manual in English and translated into Lao

**3.4 Achievements: 1 January - 30 June 1997 ( 4th period )**Part A

- Arranged for the APB clients in the 4 provinces and assisted them to make contracts with 12 nurseries to provide 1,321,608 seedlings for credit plantation establishment. Imported high quality seed for clients' nurseries.
- 1997 was the first year of APB credit and credit was issued for 875 ha and 785 ha were actually established by clients

Part B

- Recruited nursery contractors, negotiated and signed contracts and produced a total of 688,482 seedlings in the 4 provinces for PBPs and PFPs.
- Recruited contractors, negotiated and signed contracts for land preparation and establishment of 4 new PBPs in the 4 provinces totalling 61.6 ha. Planting is in progress and is 85% completed. Establishment to date of PBPs is 95% of total project target and is considered completed.
- PFP activities resulting in farmer selection, training, provision of seedlings and assistance to farmers resulting in planting of 264.6 ha of PFPs. Establishment to date of PFPs is 124% of total project target and is considered completed.



- Weeding, maintenance and protection of 167 ha of 1995 and 1996 planted PFPs.

#### Part C

- The three roading construction works, 13.7 km, started in late 1996 have been completed and accepted. This brings the total civil works completed by the project to 15.7 km of road construction and one bridge
- PCU submitted plans for a further 39 km of road construction works. Bid documents and contracts completed for the five road survey and design works in Vientiane Prefecture and the provinces of Vientiane, Savannakhet and Bolikhamsay. Three surveys are completed and two are 60% completed.

#### Part D

- Provided training in nursery techniques for the production of project seedling requirements in the four provinces for the staff of 15 nurseries and PPCUs.
- Environmental Baseline Survey field data collection was completed for 1997 PFPs.
- Two further PFP trials were established; cattle fodder tree trial and Boron deficiency trials.
- The permanent sample plot system for tree growth monitoring was established in 1995 plantations.
- Six training courses with a total of 363 training man days have been organised and held.
- Extension activities resulting in farmer selection and assistance resulted in planting of 264.6 ha of PFPs.

### **3.5 Achievements: 1 July - 31 December 1997 ( 5th period )**

#### Part A

- Monitored quality of nursery seedling supply and co-ordinated the transport and delivery of 1,321,608 seedlings in the 4 provinces for credit clients.
- Conducted investment seminars in 2 provinces to promote the credit line and inform the prospective clients about various aspects of planting trees and environmental protection.
- Revised extension booklets to present a focused and up to date message reflecting experiences gained during the last two planting seasons.
- Started extension activities and co-ordinated with the APB recruitment of clients for the 1998 credit line. This was seriously delayed 4 months while waiting for APB

#### Part B

- Monitored quality of nursery seedling supply and co-ordinated the transport and delivery of 688,482 seedlings in the 4 provinces for PFPs and PFPs.
- Completed the establishment of 4 new PFPs totalling 61.6 ha. Establishment of PFPs during 1995-1997 reached a total of 228.6 ha which is 95% of total project target. Extra compensatory areas of PFPs and privately owned demonstration plantations were established to off set the shortfall on area. This project activity is now completed.

- Monitored 1997 PFP's establishment activities of seedling transport, planting, weeding and fertilising. Farmers planted 264.6 ha in 1997 and during 1996-1997 completed at total of 401.8 ha of PFPs during the project. This is 124% of total project target and this project activity is now completed.

#### Part C

- The total civil works completed to date by the project is 15.7 km of road construction and one bridge. To this have been added plans for a further 39.5 km of road construction, the 6 roads will be contracted in 5 packages. During this 6 month period the remaining balance of 2 road survey and design works for these packages were fully completed and have been approved by MCTPC.
- Full tender documents, drawings and contracts have been completed for all the 5 contract packages.
- Tenders were advertised and contract administration committees were formed in the provinces, they scored the tenders and allocated the 5 contract packages to winning contractors. 3 of the 6 contracts have been signed and approved by ADB.
- Two contractors have mobilised for their road construction works.

#### Part D

- The Project Mid Term Review was conducted by GOL and ADB during 6-16 August. As a result the following actions have been approved by GOL and ADB:
  - Addition of new 2 provinces (Champasak, Saravan) to the 4 existing sub-project areas.
  - Purchase of additional vehicles and equipment.
  - Extension of Team Leader's long term work phase from 31 October 1997 till 31 March 1998.
  - Allocation of remaining 3.97 man months of Plantation Operation Specialists work time to Road Engineer.
  - Establishment of foreign currency revolving seed fund.
  - Reallocation of loan proceeds.
- Two new PPCUs in the newly approved sub-project areas of Champasak and Saravan Provinces have been established and training /supporting activities by PCU are in progress.
- There have been 14 training courses, seminars and public awareness displays with a total involvement of 559 man days have been organised and held by the Project or other institutions for project activities.
- The Environmental specialist spent 2 periods of two weeks each with PCU, their activities were on the following activities: preparation of plantation monitoring reports, preparation of training handbook, preparation of mini EBS system and forms for areas smaller than 5 ha and training of PCU.



#### 4. PROJECT STAFFING

##### 4.1 PCU

During this reporting period there have been changes to the numbers of the PCU staff. Two staff member have been granted 2 year scholarships to further their study overseas. Two other staff have been granted 6 month leave from the project. The lower staff strength is considered sufficient to continue the remaining Project work load which now mainly consists of servicing and supporting Part A of the project. As at 31 December 1997 the PCU staff positions were as follows;

##### PCU Staff Strength as at 31 December 1997

Section	Staff Nos. and Position
Directors	1 Project Director 1 Deputy Project Director
Monitoring & Evaluation Section:	1 Section Head 3 Section staff
Training & Extension Section:	1 Section Head / Training 1 Extension
Plantation Development Section:	1 Section Head
Administration Section:	1 Section Head 1 Accountant 1 Cashier
A total strength of 12 persons.	

##### 4.2 PPCU

During this reporting period there have been no changes at the PPCUs of Vientiane Prefecture and the Provinces of Vientiane, Bolikhamsay and Savannakhet. But there has been the addition of new PPCUs at Saravan and Champasak Provinces. They are each staffed by 5 members of PAFO or DAFO. As at 31 December 1997 the PPCU staff numbers and positions were;

##### PPCU Staff Strengths as at 31 December 1997

Position	Nos. in each PPCU					
	Pref.	Vient.	Bolik.	Savan.	Sarav.	Champ.
Head	1	1	1	1	1	1
Admin	1	1	1	2	1	1
Extension	2	2	4	3	3	3
Technical	4	3	2	3	0	0
	8	7	8	9	5	5
New staff	0	0	0	0	5	5
Staff leaving	0	0	0	0	0	0

### 4.3 Implementation Specialists

There are five specialists in the project implementation team fielded by the CIRAD-Forêt consultant in association with MIDAS Agronomics and Burapha Development Consultants.

The combined consultancy is allocated a total of 83 man months from May 1995 to December 2000. The specialists work times for the project during this reporting period were:

#### Specialists Work Time During Reporting Period

Specialist	( Work Time in Man Months )		
	1st - 4th period	This period	Remaining
• Thomas Brummer ( 36 mths.) Plantation Management Specialist / Team Leader	24.17	6.00	5.83
• Anthony Zola ( 7 mths.) Environmental Specialist	2.33	0.80	3.87
• Khamsay Hongsouvanh ( 12 mths.)	12.00	0	0
• Bounsamay Inthavong ( 4 mths. )	4.00	0	0
• Korakhanh Voravong ( 3.97 mths ) Road Specialiists	0	0	3.97
• Keu Moua ( 14 mths.) Plantation Operation Specialist	10.03	0	0
• Keo Nanthasack ( 10 mths.) Nursery Operation Specialist	10.00	0	0
<b>TOTAL INPUT</b>	<b>62.53</b>	<b>6.80</b>	<b>13.67</b>

### 4.4 Local Support Staff

Three local support staff are employed with the implementation consultancy to assist the project. There have been no changes of this staff during this reporting period;

#### Local Support Staff Employed During Reporting Period

Position	No. persons	Employment commenced
Secretary	1	1 July 1996
Accountant	1	1 November 1995
Driver	1	1 June 1995

### 4.5 Team Leaders Work Schedule

- Under the existing project implementation Schedule the Team Leader / Plantation Management Specialist will have an initial long term assignment of 28 months and then a further 8 months of time divided into short term visits of about 2 months each year. The long term assignment was originally scheduled to finish at the end of October 1997



The DOF has proposed and ADB approved that 5 months of the Team Leader's short term assignment be transferred to the long term so it will now finish 31 March 1998. The short term is a balance of 2.83 months. It is proposed that this remaining time is allocated as follows; 1998 for 1 month, 1999 for 1 month and 2000 for 0.83 month.

## 5. PRINCIPAL WORK ACCOMPLISHED

### 5.1 Plantation Management

#### 5.1.1 1997 PBP Establishment

In 1997 there were 4 new PBPs established with a total area of 61.6 ha. To date a total of 12 PBPs have been established in the four provinces. The target was 240 ha. A total of 228.6 ha was established which is 95% of target. These have been accepted as completed by GOL and ADB.

The three 1997 PBPs established in Bolikhamsay Province were planted late because the land preparation contractors were not available to start at the time required and no replacements were available. Mechanical ploughing work was frequently interrupted by heavy rains and then required waiting for the soil to dry out enough to continue work. Because local labour was already committed to nearby PFPs and to credit plantations it was possible to substitute manual hole digging for ploughing only to a very limited extent. The trees were well planted but the raining season finished earlier than usual while the trees were still small. This will mean that the growth rate will be less than which would otherwise be expected, apart from the late planting the PBP establishment was very well done. A wide range of new agroforestry demonstrations were incorporated.

In Savannakhet 1997 PBP establishment was on schedule with very good results.

Agroforestry demonstrations were carried out in all PBPs

The privately owned demonstration area in Xaithany District, Vientiane Prefecture established with PCU co-operation and advice was also well established and incorporated a variety of interesting and innovative agro-forestry options.

Weeding and fertilising operations were completed according to schedule in all PBPs.

In the Bolikhamsay and Savannakhet 1997 PBPs there were planted stands of a good performing *Acacia mangium* provenance and also a seed orchard derived *A. auriculariformis* of excellent form. In each province there is one stand of each of these species. These stands have been designed to be thinned three times and will be used as "Seed Production Areas". In five years they will provide a cheap, reliable seed supply of higher quality than is now imported from Australia for plantation establishment.

Stands of *Cassia fistula*, *Relomix regia* and *Anthocephalus indicus* were planted in the various 1997 PBPs to demonstrate local species.

Another feature of the 1997 PBPs is the planting of three species of trees specially for cattle forage, they are *Calliandra calothyrsus*, *Leucaena sp.* and *Gliricidia sepium*. If these prove successful they will be promoted next year through the extension system.

All PBP planting is summarised in the table on the following page

**PBP Establishment Summary**

Province	1995	1996	1997	Total ha
Vientiane Prefecture				
Na Kha	14.9	14.7	-	29.6
Vientiane Province				
Phon Tong	8.5	41.6	-	50.1
Phon Kham	8.2	-	-	8.2
Bolikhamsay Province				
Song Khon Mai	-	17.7	-	17.7
Pha Baht	-	10.5	-	10.5
Phon Savan	6.9	-	-	6.9
Phon Si	-	-	<b>10.5</b>	10.5
Som Sa Art	-	-	<b>9.8</b>	9.8
Song Khon Kao	-	-	<b>9.3</b>	9.3
Savannakhet Province				
Phon Sim	10.1	20.6	-	30.7
B. Bouthong	-	13.3	-	13.3
Non Savang	-	-	<b>32.0</b>	<u>32.0</u>
	48.6	118.4	<b>61.6</b>	228.6

**5.1.2 1997 PFP Establishment**

Establishment of PFPs in 1997 was 264.6 ha. There is now a total of 401.6 ha planted in the four provinces. This part of the Project has now been very successfully completed.

This year PFP establishment was much easier than last year even though a much larger area was planted. Farmers copied their neighbours who planted last year or went to see the PFP demonstration areas after hearing about them. Such was the interest among the farmers that much more PFP area could have been planted additional to the Project's quota.

Farmers continued to experiment with new variations of agro-forestry and their maintenance work of weeding and fertiliser was very satisfactory. Planting of seedlings by farmers this year was well planned and executed, there were few examples of delay while trees waited at the planting sites.

The total PFP plantings are summarised in the table below.

**PFP Establishment Summary**

Province	1995	1996	1997	Total ha
Vientiane Prefecture	-	20.0	<b>95.5</b>	115.5
Vientiane Province	-	17.5	<b>52.9</b>	70.4
Bolikhamsay Province	-	42.2	<b>23.0</b>	65.2
Savannakhet Province	-	57.5	<b>93.2</b>	150.7
		<u>137.2</u>	<u><b>264.6</b></u>	<u>401.8</u>

**5.1.3 1995 and 1996 PBP Maintenance**

During this reporting period the 48.6 ha of 1995 and 118.4 ha of 1996 planted PBPs have been patrolled to check for cattle invasion.

Maintenance works carried out in this period were fertilising and weeding to accelerate the slower growth which had resulted from rice agro-crops which were planted too close



to the trees giving them very strong competition or from late weeding. These were in Phon Tong 41.6 ha and in Beung Bouthong 13.3 ha.

#### 5.1.4 Training and Extension

During this period 559 training man days were conducted in 14 separate courses. They were:

**Training Program Summary for Period**

Training topic	No. trainees	No. days	Man days	Location
Investment seminar (PPCU, clients)	60 70	2 2	120 140	Saravan Champasak
PSP Data Calculation (PCU)	10	1	10	Vientiane
Environment Data collection (PCU)	5	1	5	Vientiane
Plantation & Nursery (PPCU, APB, PAFO)	5	13	65	Saravan
STP (PPCU, APB, PAFO)	5	13	65	Saravan
ADB Project Finance (PCU)	2	3	6	Vientiane
Management Information (PCU)	1	20	20	France, CIRAD
National Forest Policy (PCU)	1	39	39	Sweden, Sida
Forest Management (PCU)	1	21	21	Sweden, Sida
Environmental Mitigation (PCU)	7	1	7	Vientiane
Environmental Analysis (PCU)	5	1	5	Vientiane
World Food Day Display (PCU, PPCU)	14	1	14	Bolikhamsay
English (PCU)	1	47	<u>47</u>	Hoei Ngang
			<b>559</b>	

Two PPCU staff have received scholarships to further their professional qualifications. These are both for 2 years. One is for M.Sc at AIT in Thailand and the other for Dip.For. at Cypress Forestry College

Extension work among PFPs and credit line clients has continued concentrating on plantation maintenance and judging by the results was most successful. However the start of client recruitment for the 1998 credit line was delayed for 4 months, till December, waiting for APB to begin operations.

The extension message has been reassessed and reformulated to follow Project developments and experience. A number of booklets were produced or updated including a set of photographs designed to assist the extension officers' message to their clients in the field and a booklet for credit clients describing what land to plant, procedure to get credit, plantation techniques and environmental protection requirements

The procurement of ten 125 cc cross country motorcycles have been approved by GOL and ADB for the PPCU officers working far from towns having more difficult access during the raining season. Procurement procedures for these has began

#### **5.1.5 BME**

During this period there have been no field activities scheduled for BME. But there have been training activities in which MES has participated 6 of which are directly designed to strengthen BME work. Some staff have also participated in an investigation of client profile, and study and verification of land use progression in Bolikhamsay i.e. logging followed by gradual inflow of shifting agriculture along the logging access roads, then later development of irrigated paddy fields using the accumulated capital from shifting agriculture and now development of forestry plantations on the surplus and unused shifting agriculture land. Further work is continuing on this in conduction with the Team Leader of TA2028.

#### **5.1.6 Technical Aspects**

Technical reports were produced by the Team Leader on the following topics:

- Extension Procedures for Credit
- Photographs for Extension Officers
- Calculation of Plantation IRR

#### **5.1.7 Markets**

DAFI has been approached to provide a purchase agreement for the Project clients and it is now considering the matter.

#### **5.1.8 Mid Term Review**

The Project Mid Term Review was conducted by GOL and ADB during 6-16 August. After the Review the following actions have been approved by GOL and ADB:

- Addition of new 2 provinces (Champasak, Saravan) to the 4 existing sub-project areas.
- Purchase of additional vehicles and equipment.
- Extension of Team Leader's long term work phase from 31 October 1997 till 31 March 1998.
- Allocation of remaining 3.97 man months of Plantation Operation Specialist's work time to the Roding Engineer.
- Establishment of a foreign currency revolving seed fund.
- Reallocation of funds.

#### **5.1.9 Project Contacts**

There have been meetings and working sessions with other projects, businesses and organisations in Lao PDR who are doing work that connects with this project. These project contacts have been with;

- STENO to gather information and costs on tissue culture laboratory.
- Forestry Research Centre to discuss objectives and functions of tissue culture laboratory.
- CIRAD and Caisse Francaise de Developpment for an assistance contribution to the Project of training and equipment.
- Lao Swedish Forestry Program to discuss values of plantation wood products

- Stabilisation of Shifting Agriculture Project to share experience and ideas on project development.
- Fortech Co. to discuss possibilities for private plantation development in Lao.
- JICA to obtain information on Bolivan Plateau area.
- IFC to suggest possibilities for plantation wood utilisation investment in Lao.
- GFA Consultants to discuss plantation development potential and experiences.
- Millsearch Pty. Ltd. gave information on unexploded ordinance.
- Wildlife and Protected Areas Conservation component of the FOMACOP Project on aspects of biodiversity monitoring.

## **5.2 Environmental Monitoring**

### **5.2.1 Reports**

The Environmental Report No. 1 was produced. The report compared data collected on the EBS and the follow-up Environmental Monitoring Survey. It summarises the impacts of the 1995 and 1996 PBPs on the local environment. The results of the analysis shows that the PBPs are having no negative impact on the environment.

### **5.2.2 Environmental Guidelines**

Previously there had been issued "Preliminary Environmental Guidelines for Plantation Establishment" in March 1996. As a result of the intervening 2 planting seasons of experience in establishing and maintaining plantations there has been issued a revised "Environmental Guidelines for Plantation Establishment" that is presented in Appendix 1 of this report.

These guidelines are seen as appropriate for the various conditions in the 4 areas that the Project has been implemented to date. The guidelines are derived from:

- the results of environmental monitoring on PBPs and PFPs since 1995,
- application of the "Preliminary Environmental Guidelines for Plantation Establishment" originally issued in March 1996 and updated in early 1997, and
- observations and recommendations made by Project staff and consultants since 1994.

### **5.2.3 Surveys**

An Environmental Monitoring Survey was made at the Na Kha PBP in Vientiane Prefecture. No negative impacts were found, natural vegetative cover had returned to the site preventing any soil erosion.

Environmental Monitoring Survey (EMS) responsibilities are in the process of being passed on to PPCUs using the PCU to do quality control of the monitoring. It was found that PPCU will require further strengthening for their input to the EMS. Further training and PCU /specialist's work is now being directed to improve this aspect.

A mini Environmental Monitoring System has been developed for use with the mini STP for plantations of less than 20 ha to allow rapid assessment by PPCU.

### **5.2.4 Training**

A "Training Handbook for Environmental Monitoring of Forest Tree Plantations in Lao PDR" was produced as a guide for PCU trainers providing training to new PPCU and DOF /PAFO personnel responsible for environmental monitoring. The handbook covers 3 types of training:



- orientation training to trees and the environment,
- operating the Environmental Monitoring System,
- field training in data collection.

Training sessions by the environmental specialist has been provided to PCU staff on the following topics:

- environmental data analysis,
- compliance monitoring,
- environmental mitigation measures.

### 5.3 Nursery Operations

#### 5.3.1 Nursery Seedling Distribution

The nursery production required for the project has increased in large steps in each year of the Project. In 1995 a total of 122,505 seedlings were distributed from 2 nurseries; in 1996 a total of 429,184 seedlings were distributed from 4 nurseries and in this 1997 reporting period a total of 2,010,090 seedlings were distributed from the 14 nurseries producing seedlings for the Project.

In this reporting period seedlings were successfully distributed on schedule to the required planting sites for PBPs, PFPs and to Part A clients. The following tables show all seedlings distributed for the project Part A and Part B;

**Part A Seedlings Distributed in 1997**

Province & Nursery	Species	Provenance	No. Seedlings
<b>Credit Plantations (Part A)</b>			
Vientiane Pref. (Soukprasuth Nsy.) (Khanthaly Nsy.)	E. camaldulensis	Laura River	223,244
			<u>70,000</u>
			293,244
Vientiane Prov. (Keo Udom Nsy.) (Army Nsy.)	E. camaldulensis	Laura River	50,000
			<u>161,636</u>
			211,636
Bolikhamsay (Enterprise #3 Nsy.) (Muang Mai Nsy.) (Hua Hee Nsy.) (Kamphoun Nsy.) (Sai Samon Nsy.)	E. tereticornis	Mitchell River	42,750
			89,725
			13,600
			159,471
	A. mangium	Upper Aramea	<u>24,050</u>
			329,596
Savannakhet (Km 4 Nsy) (Sod Nsy) (BAF Co. Nsy.)	E. camaldulensis	Laura River	50,000
			200,000
			<u>237,132</u>
			487,132
<b>Subtotal - Part A</b>			<b>1,321,608</b>

<b>PBPs &amp; PFPs (Part B)</b>			
Vientiane Prov (Ban Bua Nsy)	E. tereticornis	Laura River	98,050
	Cassia fistula	Lao	500
	Relomix regia	Lao	<u>500</u>
			99,050
Vientiane Pref. (Ban Bua Nsy)	E. tereticornis	Laura River	216,450
	A. mangium	Upper Aramea	5,550
	Cassia fistula	Lao	500
	Relomix regia	Lao	<u>500</u>
			223,000
Bolikhamsay (Enterprise #3 Nsy)	E. tereticornis	Mitchell River	61,050
	E. tereticornis	Kennedy River	48,606
	A. mangium	Upper Aramia	9,350
	A. auriculiformis	PNG	9,250
	Cassia fistula	Lao	300
	Relomix regia	Lao	100
	Calliandra calothyrsus	Retalhuleu ex Bali }	
	Gliricidia sepium	115690 }	<u>6,666</u>
			135,322
Savannakhet (BAF Co )	E. tereticornis	Kennedy River	204,722
	A. mangium	Kapal Village	11,472
	A. auriculiformis	PNG	9,250
	Calliandra calothyrsus	Retalhuleu ex Bali	1,481
	Leucaena sp.	Australia	1,481
	Gliricidia sepium	115690	1,482
	Anthocephalus indicus	Lao	<u>1,222</u>
<b>Subtotal - Part B</b>			<b>688,482</b>
<b>Total all seedlings for Part A &amp; Part B in 1997</b>			<b>2,010,090</b>

## 5.4 Roading

### 5.4.1 Works Completed

Four roads with a total length of 15.7 km plus one bridge have so far been completed during the 1996 and 1997 dry seasons during previous reporting periods. A summary of those completed works appears the table below;

#### Access Roads Works Completed in 1996 & 1997

No.	Works Name	Province	Km	Contract Value \$
RC-01	Phon Sim Road	Savannakhet	7.9	118,307
RC-02	Song Khon Mai Road	Bolikhamsay	2.4	37,925
RC-03	Na Kha Road	Vientiane Pref.	3.4	67,278
RC-04	Phon Tong Road	Vientiane Prov.	2.0	42,650
BC-03	Nam Souang Bridge	Vientiane Pref.		28,400
Above	survey & design	All		10,584
	GOL contribution			<u>10,787</u>
			<b>15.7</b>	<b>\$ 315,931</b>

### 5.4.2 Additional Works

A further 39.5 km of access roads will be constructed in the 1998 dry season. The 6 works will be administered in 5 contract packages. During this 6 month reporting period the remaining 2 survey and design contracts for the additional roads were completed and approved by MCTPC. Comprehensive tender documents were then prepared complete with specifications, drawings and contract documents. Tender selection committees were formed and tenders advertised, tenders scored and 5 contracts were allocated to winning tenders. Approvals for 3 of the 5 contracts have been given by MCTPC, MAF, MOF and ADB, the 2 contracts remaining are in process.

Start of contract works was originally scheduled for November 1997, two of these started in late December 1997 and the others will now begin in January 1998 and will continue for 4 months till end April. Some delays were experienced due to difficulties in getting prompt approvals during the tender allocation process from each province as approval staff in MAF, MCTPC and MOF were not always available. Further and more serious delays were encountered during the negotiations with the winning tenders because during this time the Asian currency crisis hit and contractors would not proceed with contract signing without escalation clauses for spare parts, materials and fuel costs which comprise about 80% of the contract price. As these are short term contracts of 4 months or less no price escalation was allowed for in the contract documents. The PCU was then faced with changing contracts that had been already approved by MCTPC, MAF and MOF. This process took some time to resolve but a formula has now been established and approved by all parties.

A summary of the additional access roads appears below. Please note that the contract numbers have been changed from those which appeared in the "Midterm Project Review Report".

**Additional Access Roads**

No.	Road Name	Province	Km	Approx. Value \$
RC-05A	Pakngan	Vientiane Pref.	11.6	204,000
RC-05B	Nongkhiat	Vientiane Pref.	4.8	204,000
RC-06	Muk-Koua	Vientiane Prov.	11.7	220,000
RC-07	Savang-Xong	Savannakhet	5.4	132,000
RC-08A	Si-Savat	Bolikhamsay	3.0	66,000
RC-08B	Song Khon Kao	Bolikhamsay	3.0	81,000
All	survey & design	All		<u>25,000</u>
			<b>39.5</b>	<b>\$ 728,000</b>

### 5.4.3 Road Engineer for Construction

The Road Engineer's time allocation for the project was finished in February 1997, the Plantation Operations Specialist has a balance of 3.97 months left. It has been approved by GOL and ADB that the balance of the Plantation Operations Specialist's time be allocated to the Road Engineer. The existing fee rate for the Plantation Operations Specialist will be used for the Road Engineer so that there are no budget changes. A Contract Variation has been issued by GOL and forwarded to ADB.

- The original Engineer is now committed with a new long term project so a replacement Engineer Mr Korakhanh Voravong has been proposed by the Consultant to supervise the construction of these additional roads. The Engineer's CV has been approved by GOL and ADB and he is scheduled to take up his duties on 2 January 1998 as contract works start. His work time will end on 30 April 1998.



## 6. EXPENDITURE

### 6.1 Local Expenses

The report for international and local expenditure by the consultancy specialists of the project is in the two tables below. These expenditure reports cover the implementation specialists expenditure only and does not include expenditure made by the consultant's home office. The expenditure summary to the end of the fifth reporting period ending on 31 December 1997 follows:

<b>Local out of Pocket Expenses (US\$)</b>			
Item	Total Budget	Total Spent	Budget balance
Per Diem (field)	39,801	23,976.59	15,824.41
Per Diem (Vientiane)	10,968	4,740.00	6,228.00
DSA	13,306	5,083.00	8,223.00
Domestic air Travel	7,910	594.43	7,315.57
Transport	17,643	7,689.82	9,953.18
Communication	9,898	6,350.58	3,547.42
Housing	38,989	30,222.52	8,766.48
Local support staff	27,852	18,058.99	9,793.01
Office supply	<u>5,946</u>	<u>1,395.63</u>	<u>4,550.37</u>
	<b>172,313</b>	<b>98,111.56</b>	<b>74,201.44</b>

### 6.2 International Expenses

<b>International out of Pocket Expenses (US\$)</b>			
Item	Total Budget	Total Spent	Budget balance
International Travel	38,825	18,507.65	20,317.35
Miscellaneous Travel Exp.	3,909	4,287.77	(378.77)
Per Diem out of Lao	2,798	2,200.00	598.00
Communications	5,108	531.93	4,576.07
Reproduction reports	9,835	2,823.96	7,011.04
Miscellaneous	<u>1,095</u>	<u>92.38</u>	<u>1,002.62</u>
	<b>61,570</b>	<b>28,443.69</b>	<b>33,126.31</b>

## 7. IMPLEMENTATION PLANS FOR NEXT PERIOD

As this will be the last 6 Month Progress Report the proposed work plans for the next 12 months from 1 January 1997 to 31 December 1998 are reported for each implementation specialist is as follows;

### 7.1 Team Leader / Plantation Management Specialist

Jan. Prepare fifth 6 month report. Assist with organisation of seedling supply. Assist with recruitment of Part A clients. Assist with extension advisory service of PPCUs. Assist new PPCUs in Saravan and Champasak.

Feb. Assist with recruitment of Part A clients and extension advisory service of PPCUs. Prepare the Draft Final Report and submit for comments.

March Amend the Draft Final Report incorporating comments. Finalise Consultant's administration and finance matters in preparation for end of the long term phase of the Consultancy. Preparations for short term Consultancy. Departure formalities.

End of Long Term phase and of Consultancy.

Start of Short Term phase of Consultancy.

Aug. Check quality of establishment operations of 1998 plantations with PPCUs. Assist PCU /APB with the implementation of 1999 Part A clients recruitment. Initiate planning and qualification checks of participating nurseries for 1999 clients' seedling production.

### 7.2 Environmental Specialist

Feb. EBS report for 1997 PBPs. Training for PPCU, PAFO, DAFO and preliminary environmental assessment of Saravan and Champasak.

Oct. Preparation of manual on mitigation of environmental impacts from tree plantations.

### 7.3 Road Construction and Maintenance Engineer

Jan. Supervision and quality testing of roading civil works contracts.

Feb. Supervision and quality testing of roading civil works contracts.

March Supervision and quality testing of roading civil works contracts.

April Supervision and quality testing of roading civil works contracts.

End of Road Engineer's consultancy.

## Environmental Guidelines for Plantation Establishment

### Introduction

The Environmental Guidelines for Plantation Establishment have been prepared based upon experiences of the Lao-ADB Plantation Forestry Project since 1994. The Guidelines are seen as appropriate for the topographic, agro-ecological, and socio-economic conditions prevailing in the four provinces of Lao PDR in which the Project has been implemented to date, namely: Vientiane Prefecture and the Provinces of Vientiane, Bolikhamsay, and Savannakhet.

Among the conditions that predominate in these provinces include :

- mostly flat alluvial lowland plains (the Vientiane plain of Vientiane Province and Vientiane Prefecture), Savannakhet Plain, and the Paksan Plain (of Bolikhamsay Province) along the Mekong River and its tributaries;
- high (for Lao PDR) population density (among the highest in Lao PDR, approximately 100 persons per square kilometer) and several population centers (Vientiane, Paksan, Thakhek, Savannakhet);
- most intensive agricultural land use in Lao PDR (particularly in Vientiane Prefecture), with 80 percent of the population engaged in agricultural activities;
- mostly sandy loam or sandy clay loam, with some areas in Vientiane Province and Vientiane Prefecture having alluvial complex with shallow thick loose layer of round gravel; and,
- competition for forest land from agriculture, urban expansion, industrial development, and installation of communications, transportation, and energy infrastructure units.

The Environmental Guidelines recommended here also have been derived from:

- the results of environmental monitoring at pilot block plantations operated by the Project since 1995;
- modifications of preliminary "Environmental Guidelines for Plantation Establishment" issued by the Project in mid 1996; and,
- observations and recommendations made by Project staff and consultants since 1994.

These Environmental Guidelines are expected to be modified periodically, as forest plantations are established in other regions of Lao PDR, where different agro-ecological conditions (for example, steep slopes and loose soils) predominate, and the need for other locally appropriate guidelines may be required.

The purpose of the Environmental Guidelines for Plantation Establishment is to provide Project staff and Department of Forestry personnel with guidelines to control plantation establishment in an effort to minimize negative impacts on the environment. In this way, they can make best of the types of degraded forest lands usually available.



**Environmental Guidelines for Plantation Establishment**

1. Flat to gently sloping land, 0 to 15 degrees can be burned and prepared by bulldozer and ploughing prior to planting.
2. Moderately sloping land, 16 to 30 degrees, can be burned and planted using holes, but cannot be prepared by bulldozer or ploughing, Weeding must be only by hand methods.
3. Steep land, more than 30 degrees, should not be cleared; if already cleared, it should be left unplanted and not be weeded.
4. The bottom and banks of wet season drainage channels (dry watercourses) should not be planted nor weeded. For drainage channels with abrupt slopes, natural vegetation also should be preserved for a distance of 5 to 10 meters along the edge of the drainage channels, For drainage channels with gradual slopes, a two meter wide protection strip of natural growth also should be retained on either side of the mid-point of the bottom of the channel: or a protection strip of natural growth that is as wide as the water is known to flow during wet season rains should be retained at the bottom of the channel.
5. Bulldozers should not travel on tracks and roads inside plantations, nor should these roads be ploughed.
6. A protection strip 40 meters wide (measuring from the wet season water level) must be retained in place around lakes, ponds, and other standing water bodies located inside or adjacent to plantations. If the area around the standing water body is already cleared, the 40 meter strip should remain unplanted to allow for regeneration of a natural growth protection strip. No bulldozer work or ploughing should take place in the strip, nor should it be weeded.
7. A protection strip 20 meters wide must be retained in place on the bank of streams, rivers, and other flowing water courses. If the area around the flowing water course is already cleared, the 20 meter strip should remain unplanted to allow for regeneration of a protection strip of natural growth. No bulldozer work or ploughing should take place in the trip, nor should it be weeded.
8. A protection strip not less than 15 meters wide must be retained around rice paddy fields. If the area around the paddy field is already cleared, the 15 meter strip should remain unplanted to allow for regeneration of a protection strip of natural growth. No bulldozer work or ploughing should take place in the strip, nor should it be weeded.
9. The boundaries of block (closed spacing) forest tree plantations must be a minimum of 40 meters from a village, but must be subject to STP approval to leave enough land for villagers needs in the foreseeable future.
10. Existing scattered indigenous trees more than 15 centimeters in diameter, and bamboo species that provide non-wood forest products will be left in the plantation during land clearing.