



**MINISTRY OF FORESTRY  
FOREST DEPARTMENT, MYANMAR**



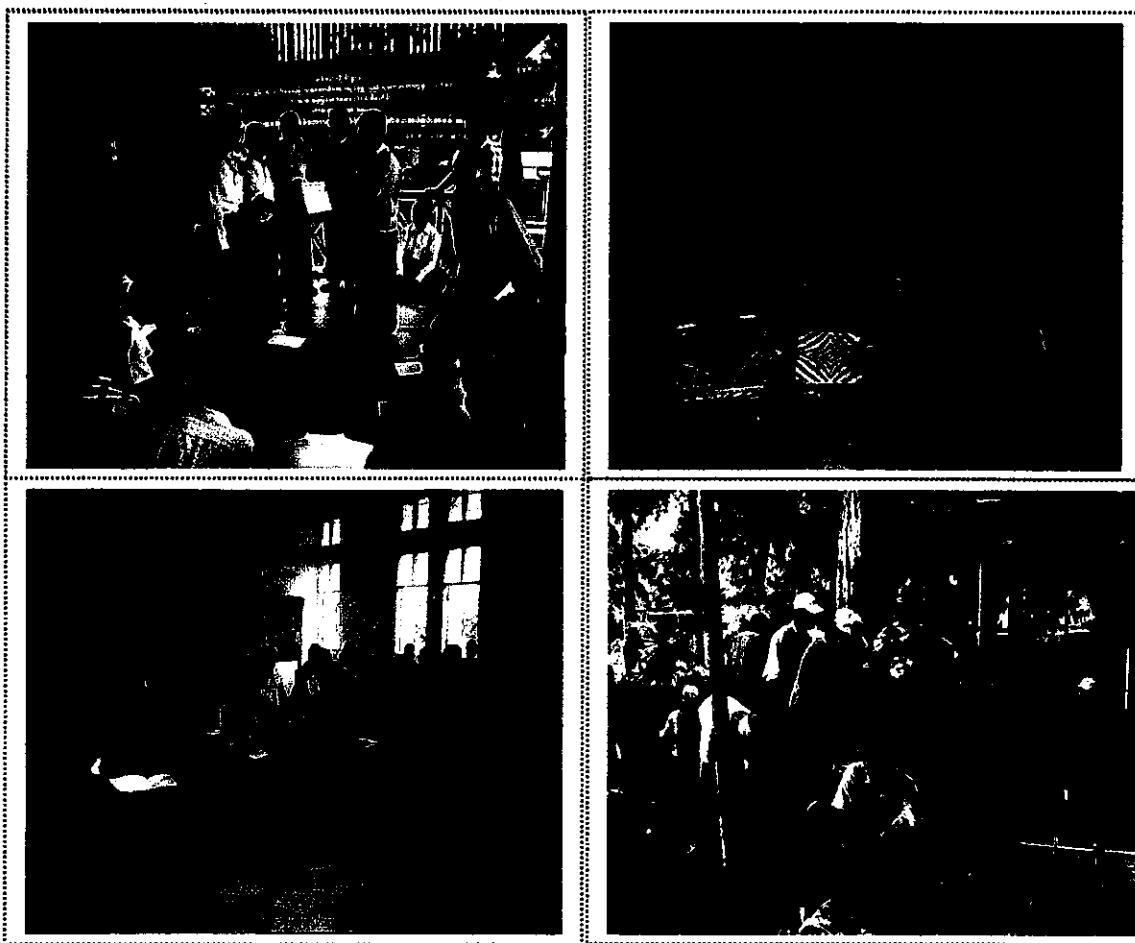
**AND**

**INTERNATIONAL TROPICAL TIMBER ORGANIZATION**

ITTO Project PD 146/02 Rev.1(I)

**"Promoting Sustainable Utilization of Bamboo through Community Participation in  
Sustainable Forest Management"**

**Completion Report**



SUBMITTED TO

**International Tropical Timber Organization**

**Yokohama JAPAN**

**May 2007, Yangon Myanmar**

(3 July '07  
No. 957 (B) ✓

## PREFACE

There is an urgent need to enhance and improve the socio-economic benefits from the utilization bamboo in Myanmar as pertaining to its various products for the rural communities which constitute the major population of the country through their active participation in sustainable management and utilization of bamboo forests including bamboo plantation establishment and the production of various quality bamboo products through developing and dissemination of technical guidelines or manuals for the above stated activities for them. Concurrently bamboo production cooperatives can and should also be established based on improved processing technologies and marketing, making use of the Manuals and Technological papers produced by this Project including the willing participation of the rural population and also making use of the various bamboo products and handicraft production, thereby generating increased income for the rural population who participated in the implementation programme of the project.

May 2007 Yezin  
Project Manager

**A. Project Identification**

- (a) Title - Promoting Sustainable Utilization of Bamboo through Community Participation to Enhance Sustainable Forest Management”
- (b) Serial Number - ITTO Project PD 146/02 Rev.1 (I)
- (c) Implementing Agency - Forest Department, Ministry of Forestry
- (d) Host Government - Union of Myanmar
- (e) Starting Date - 1<sup>st</sup> January 2003
- (f) Duration - 48 Months
- (g) Project Cost - Myanmar Government’s Contribution: 1,309,620 Kyats  
ITTO Contribution : 453,256 US\$
- (i) Project Sites - For bamboo forest management; South Nawin reserved forest in Paukhaung Township of Pyay District, Bago Division, Ngalaik reserved forest of Pyinmana Township, Yamethin District, Mandalay Division and Kawhmu reserved forest of Kawhmu Township, Yangon Division.
- For bamboo products processing, marketing and extension; Le Lu Aing Village of Pyinmana, Ledi Village of Paukhaung and Yedashe Village of Kawhmu Townships.
- (j) Project Area - 50 ha of bamboo plantation; 25 ha each in Paukhaung Township of Pyay District, Bago Division, and Pyinmana Township of Yamethin District, Mandalay Division have been formed in the year 2003.
- 50 ha bamboo plantation in Kawhmu reserved forest; 10-ha for research plot and 40-ha for community owned plantation have been established in the year 2004.
- 10 ha of natural bamboo forests in Ngalaik reserved forest, Pyinmana Township for natural bamboo forest management activities.

- 10 ha of natural Hmyin (*Dendrocalamus strictus*) forests in Paukkaung Township for natural bamboo forest management activities.
- (k) Development Objective - The overall objective of this project is to enhance the socio-economic benefits of bamboo for the rural communities through their active participation in sustainable management and utilization of bamboo forests. This project will also contribute to sustainable forest management in Myanmar.
  - (l) Specific objectives -
    - (1) To develop and disseminate technical guidelines for sustainable management of bamboo forests and quality production of bamboo products.
    - (2) To increase income of rural communities in Mandalay, Bago and Yangon Divisions through the establishment of bamboo production cooperatives based on improved processing technologies and marketing.

## PART I. Executive Summary

### 1. Background Information of the Project.

#### 1.1 Key problems to be addressed.

The Project sites in which the ITTO Project PD 146/ 02 Rev.1 (I) are located in (a) the eastern middle region the Bago Yoma about 20 miles from the Nay Pyi Taw, (b) the western middle region of the Bago Yoma about 25 miles from Pyay and (c) Yedashe village, Kawhmu village, Kawhmu Township where private owned bamboo plantations have been established for the production and marketing of bamboo poles, culms and their traditional bamboo products including handicrafts. However with the increase in the rural population and declining bamboo resources due to many constraints, major problems which need to be addressed are listed as follows:

- (1) economic stress or less income generation arising from the declining bamboo resource due to the increasing rural population who are dependent on bamboo resource wholly or partly for their subsistence;
- (2) illicit felling and marketing of bamboo by bamboo traders who employ the innocent rural population in their enterprise leading to further decline in the bamboo resources.
- (3) exploitation of the rural population by the affluent bamboo plantation owners in the production of traditional as well as other form of bamboo products produced or implemented by the rural population under contract which is paid in advance and favoring the bamboo plantation owners in monetary terms and thereby being exploited.
- (4) lack of awareness and having very little knowledge on sustainable forest (bamboo) silviculture and management by the majority of the rural population with a meagre income and lacking input and the ability for establishing bamboo plantation of their own or for establishing a co-operative for the production and marketing of the traditional and other popular bamboo products in their village or villages.
- (5) absence of cooperation, partnership and management responsibility sharing between the local rural communities, forest department in bamboo plantation establishment and ownership, bamboo products production and marketing.

As the growing stock of bamboo is gradually declining especially in areas in the vicinity of the rural population adversely affecting their income generation, the project aims to increase and improve the socio-economic conditions of the rural population in the project areas in Mandalay, Bago and Yangon Divisions by their participation in the establishment of bamboo plantations of their own in some limited measure and the establishment of bamboo products production groups, based on improved processing technology, marketing and extension by developing, disseminating and publishing guidelines and manuals for sustainable management of bamboo forests and quality production of value added bamboo products including canned bamboo shoots which can increase their income quite substantially.

The rural population will be given the opportunity to actively participate in natural forest bamboo management in regions adjoining their villages so that having acquired the technology of successful natural bamboo forest management, a greater proportion of them

can join in the natural forest bamboo management thereby increasing the bamboo resources for their own welfare and the welfare of the State Government.

The aim and object of the project is also to encourage the rural villagers to establish bamboo plantations of their own and subsequently forming their own cooperatives for the production and marketing of the traditional and other popular bamboo products with the aid and guidance of the Forest Department including donors and NGOs which specialize in looking after the welfare of the rural poor and improving their socio-economic status.

#### 1.2. Development objective and outputs

For the Development objective, the following outputs are achieved.

- 50 ha of bamboo plantations, 25 ha in Paukkaung Township, Pyay District, Bago Division and 25 ha in Pyinmana Township, Nay Pyi Taw established for respective rural villagers.
- 50 ha bamboo plantation in Yedashe village, Kawhmu Township, Yangon Division established for the Yedashe villagers in which 10 ha Research Plot being managed by FRI and 40 ha community plantation managed by the villagers under the Community Forestry Instruction Programme.
- 10 ha trial planting of bamboo species at Tatkone Township of Nay Pyi Taw.
- 10 ha natural bamboo forest in Ngalaik Reserve, Pyinmana Township, Pyinmana District, Nay Pyi Taw is being managed by the FRI.
- 30 ha of natural Hmyin (*Dendrocalamus Strictus*) bamboo forest in Pyay Township, Pyay District, Bago Division handed over to the rural villagers under the Community Forestry Instruction Programme.

#### Specific objective and their outputs

##### Outputs

- Research work focused on bamboo plantation management and production of edible bamboo shoots and that of management, processing and utilization of selected bamboo species carried out.
- Technical manuals of plantation management, harvesting, processing and utilization of bamboo published.

- Six training courses on bamboo plantation management and utilization implemented and report on each in-training course published.
- Publication of a technical report on the assessment of the economic and socio-cultural characteristics of the villagers in the project sites and their potential of bamboo development implemented.
- Establishment of two bamboo products production groups completed.
- Identification and installation of appropriate processing technologies equipments for the production of quality bamboo products at two pilot production plants in the project sites completed.
- Project implementation strategy seminar to ensure the participation of the key project personnel and the local communities conducted.
- Conducted two national workshop / seminar/ forum with papers presented by national and international bamboo experts, on the development of the bamboo sector and the proceedings of both seminars were conducted and published.

### 1.3 Strategy adopted on carrying out the project

The strategy adopted in carrying out the project is essentially composed of three main sections namely;

- (a) Bamboo Forest Management Section
- (b) Bamboo Products Development and Processing Section
- (c) Bamboo Products Extension and Marketing Section

#### (a) Bamboo Forest Management Section

Bamboo Forest Management is mainly concerned with selection, propagation and management of important commercial bamboo species as pertaining to their silviculture, growth habits or characteristics by conducting experiments on species trials.

Bamboo propagation by offset and nodal cuttings in cleared and uncleared trial plots, study on agroforestry designs with waya and wabo-gyi mixed with tapioca and banana in agroforestry designed plots and comparison of survival rates in weeding were conducted and trials, involving spot weeding, slash weeding and control including line weeding were carried out. The experimented bamboo species (hymen, wabo, tin.wa and wanet) at Paukkaung bamboo plantation were found to be not very successful and was therefore

replaced with hymin alone in accordance with the 5<sup>th</sup> PSC meeting decision and was found to be quite successful.

At the Pyinmana bamboo plantation site, 10 commercial species were planted and the average survival rate was quite good. (78.95%)

In the trial planting in the dry zones trial planting with hymin, tin, kyathaung and thaik by offset and seedlings were carried out. The best results were obtained by seedling method while the offset method gave very poor survival percentage.

Comparison of shoot production of hymin wa between treated clumps and control were also carried out at Paukkaung natural bamboo forest. All these research experiments are implemented with the object of the publishing manuals on the management and propagation of bamboo in natural forest.

(b) Bamboo Products Processing Section

The strategy followed in this section during the project period are as follows:

- Bamboo properties test involving 15 commercially important bamboo species from which a manual was published for the 15 important bamboo species.
- Bamboo preservation research was carried out with kyathaung, thaik, hymin, kyalo and wanet with four treatments namely, watersoaking, boiling in neem seed solution, boric acid soaking and treatment with hydrogen peroxide were conducted. According to the research results, water-soaking treatment and boric acid soaking treatment were found to be more suitable than other treatments.
- value added bamboo products research involving the production of
  - Bamboo curtain
  - Woven handicraft and
  - Bamboo furniture are produced through the participation of the trainees of the bamboo producer groups from Ledi and Le Lu Aing villages, private entrepreneurs and NGO groups, so as to generate income for them particularly the trainees from Ledi and Le Lu Aing



Two bamboo products producer groups were also organized at Ledi village and Le Lu Aing Village for their income generation. The groups were provided with various machinery, articles and accessories needed to produce various bamboo products.

The strategy for bamboo products processing section is publication of a "Manual for Bamboo Shoot Production" and a "Manual for Charcoal and Vinegar Production" which includes bamboo species most suitable for making bamboo shoot, management of bamboo shoots plantation, nutrient contents of various species of bamboo shoots and bamboo shoot processing technologies which in some way will generate income to the rural population and to any entrepreneur who makes use of these Manuals. Different methods of charcoal burning and 8 species of bamboo used for bamboo charcoal burning were also included in the "Charcoal and Vinegar Production Manual".

(c) Marketing and Extension Section

The strategy involved in this processing and furniture making training course No.6 on bamboo products section includes processing and furniture making training. The trainees include villagers from the project site personnel from Metta Foundation and also from FRI (Yezin) totalling 21. The training was on bamboo weaving, slicing and making of bamboo hats and bamboo furniture making, including bamboo beds. Lectures were also given to trainees by International Consultant Ms. Carmelita Bersalona, National Consultants, U Mehm Ko Ko Gyi, U Sein Thet and U Moe Aung on global trend of bamboo industry, bamboo forest management, bamboo products processing, bamboo products marketing in Myanmar and the basic principles of marketing respectively from 14<sup>th</sup> to 18<sup>th</sup> August 2006 at FRI, Yezin.

A Seminar entitled "Bamboo in Myanmar" was presented by Ms. Carmelita Bersalona on 21<sup>st</sup> August 2006 at the Forest Research Institute, Yezin. The extension and marketing section also arranged a discussion forum on Bamboo Market in Myanmar on the 29<sup>th</sup> of August of the same year in Yangon, attended by project staffs, national consultants, bamboo expert from the Phillipines Ms. Carmelita Bersalona including bamboo products manufacturers and exporters.

Bamboo market survey involving collection of information on current situation of bamboo products in Myanmar and exploring market extension potential particularly export market was jointly undertaken by the extension and marketing section and the Myanmar Survey Research involving in-depth interviews were conducted in all bamboo producing as well as marketing villages, towns, and cities all over Myanmar including big cities such as Yangon, Mandalay, Patheingyi etc. The findings on this survey were presented at the Second National Forum on Sustainable Bamboo Development in Myanmar. Eight other resource persons, including Dr. K. K. Seethalakshmi from Kerala Forest Research Institute, India and Mr. Chuchawan Sutthirilapa from Thailand, both being bamboo experts, also participated and presented papers at the Forum.

Two bamboo production groups on the project sites, one at Le Lu Aing village of Pyinmana Township and the other at Ledi village of Paukkaung Township were organized, including the election of new executive members and both groups had been running their business in line with the guidance given by the project.

A certificate for the establishment of 50 acre community forest was granted to the community forestry users' group at Ledi village, Paukkaung Township.

The socio-economic and educational status of the rural villagers at Yedashe and Tauggyaung villages in Kawhmu Township, Ledi and Nyaung-Won villages in Paukkaung Township were investigated through structured questionnaires and personal interviews of villagers in the 5 villages of the project sites so as to find out the outcome and impact of the project towards the rural community.

#### 1.4 Project's planned duration and planned overall costs

Duration 1<sup>st</sup> January 2003 to 31<sup>st</sup> December 2006 plus 3 months extension to 31<sup>st</sup> March 2007

Myanmar Government Contribution 1,309,620 Kyats

ITTO Contribution 453,256 US\$

### 1.5 Specific sector at country or regional level to which the project relates

The forest department and Myanmar Timber Enterprise under the Ministry of Forestry are responsible for the planning, conservation, management, harvesting, processing and marketing of forest produce and products including bamboo and other non-wood forest products. NGO such as Myanmar Forest Products and Timber Merchant Association (MFPTMA) and some other NGOs may play some parts in the future implementation on the follow up project activities.

Implementation of the project was guided by the Project Steering Committee (PSC), chaired by the Deputy Minister, Ministry of Forestry under the supervision of the PSC. The Forest Department and MTE carried out the task of the project. Therefore, cooperation of FD and MTE are essential for the successful implementation of the project.

## 2. Project Achievement

### 2.1 Outputs achieved

The outputs mentioned in the work plan have been accomplished during the time-frame of the project with the extension of the 3 month from 1<sup>st</sup> January to 31<sup>st</sup> March, 2007. These outputs actually were the basis for further achievement to fulfill the requirements of the specific objectives outlined in the project document. Under the guidance of the ITTO, these outputs, in general terms have been materialized and thus the following concrete outcomes have been obtained at the end of the project.

1.	Proceedings of Project Implementing Strategy Seminar (in Myanmar)
2.	Report on International Training Workshop on Small Bamboo Daily Product Processing Technologies and Machines (in English)
3.	Report on Training on Bamboo Products Processing and Bamboo Forest Management at Hainan, Sichuan and Zhejiang Provinces (in English)
4.	Bamboo Charcoal and Vinegar Making Technique & Utilization (in Myanmar)
5.	Manual for Bamboo Forest Management (in Myanmar)
6.	Notes on Market Information, Channel Intelligence and Network Development (in Myanmar)
7.	Guidelines on Formation of Bamboo Products Producer Groups and Bamboo Products Co-operatives (in Myanmar)
8.	Bamboo Plantation and Bamboo Products, Training Course No .1 (in English)
9.	Bamboo Plantation Establishment, Bamboo Forest Management and Bamboo Products Production, Training Course No.2 (in English)
10.	Bamboo Products, Training Course No.3 (in English)
11.	Training Workshop on Natural Bamboo Forest Management, Training Course No .4 (in English)
12.	Bamboo Plantation Techniques and Bamboo Forest Management, Training Course No .5 (in English)
13.	Bamboo Products Processing and Furniture Making, Training Course No .6 (in English)
14.	Investigation on Chemical, Physical and Mechanical Properties of Some Myanmar Bamboo Species (in English)
15.	Study on Socio-economic Characteristics of Rural People in Paukkaung and Kawhmu Townships (in English)
16.	Current Market Situation of Bamboo Shoot in Myanmar and Market Expansion Potential (in English)
17.	Bamboo Products Market Survey in Myanmar (in English)
18.	A report on "Workshop-cum-Seminar on Poverty Alleviation through Bamboo-based Development: Policies, Strategies and Stakeholders" (in English)
19.	A report on " International Training Workshop on Bamboo Handicraft, Bamboo Weaving and Furniture Processing Technologies" (in English)
20.	National Forum on Sustainable Teak and Bamboo Development in Myanmar (in English)
21.	Report on International Training Workshop on Bamboo and Rattan Sustainable Management in Developing Countries (in English)
22.	Report on International Training Workshop on Bamboo Propagation, Management and Harvesting: Methods, Policy issues and Strategies (in English)
23.	Report on Training on Bamboo Cultivation and Bamboo Shoot Processing in Thailand (in English)
24.	National Consultant(Bamboo Management) Termination Report (in English)

25.	National Consultant(Bamboo Processing) Termination Report (in English)
26.	National Consultant(Bamboo Products Marketing) Termination Report (in English)
27.	Second National Forum on Sustainable Bamboo Development in Myanmar (in English)
28.	Handbook on Bamboo Properties in Myanmar (in English)
29.	Bamboo Shoot Products in Processing Manual (in Myanmar)

## 2.2 Specific objectives achieved

The following specific objectives were achieved in promoting sustainable utilization of bamboo through community participation in sustainable forest management which would include Teak and other valuable commercial hard wood species. [2004 ITTO National Forum on Sustainable Teak and bamboo Development in Myanmar, 2007 ITTO. The Silvicultural Management of Forests in Myanmar.]

- 50 ha of bamboo plantation have been established for the rural population, 25 ha in the Paukanug Township and 25 ha in Pyinmana Township with their participation.
- 40 ha of bamboo plantation at Yedashe village, Kawhmu Township had been established for bamboo products production and create income generation of the Yedashe villagers.
- For the purpose of promoting income generation and development of tradition bamboo handicrafts, the Bamboo Products Extension and Marketing Section had established an Income Generation Groups at Le Lu Aing, Pyinmana Township and Ledi at Paukaung Township. To fulfill the aforesaid purpose, a revolving fund system was developed for the groups with the project assistance.
- A total of 75 ha community natural bamboo forest was established in Paukaung.

## 2.3 Contribution to the achievement of the development objective

Contribution to the achievement of the development objectives includes establishment of bamboo plantations by the rural villagers themselves and owned and managed by them.

Apart from these initiatives, further activities towards the achievement of the development objective were capacity building through trainings, study tours and long term assurance of the rural villagers involvement through the establishment of bamboo plantation owned by them and for their own use in its management including production of various bamboo

products and marketing them for their own income generation including the formation of users' groups and income generation groups.

#### 2.4 Situation prevailing after project completion as compared to the project situation

After the completion of the project, the rural villagers in the project sites had come to realize the techniques of bamboo plantation establishment. They have also acquired new technologies and methods of producing quality bamboo products through the facilities provided by the project for creating more income for themselves through marketing these quality products through groups created by or between themselves.

Some other villagers which are not included in the project sites, will become motivated to take part in the bamboo plantation establishment of their own initiative for their own welfare. In a sense, they will come to participate in the development objective by readily making use of the various manuals and guidelines in Myanmar provided by the project.

#### 3. Target beneficiaries involvement

Target beneficiaries of the project were local villagers who were involved in the project and the Forest Department itself. For the successful implementation of the project, all of the interested and concerned parties gave high consideration and willingly participate on the project activities for which the Forest Department, the executing agency was directly responsible. Technical assistance was not expected from the rural villagers communities but some of their traditional know-how and expertise on bamboo plantation establishment and production of various bamboo products were worth mentioning here. After the project period, the villagers from other local communities would become more involved in the bamboo business in consultation with the Forest Department and in cooperation with the Department for their own socio-economic welfare as, the growing stock of bamboo is declining and the price of bamboo and its products are increasing two or three folds of their former prices.

#### 4. Lessons learned

##### 4.1 Development lessons

###### 4.1.1 Aspects of the project designs which most contributed to its success or failure in achieving the Development Objective.

The design or set-up of the project was generally found to be quite appropriate with sufficient field operating efficient forces, the activities prescribed under the specific objectives were well accomplished in time with the exception of a slight delay where the chosen specified species for plantation and experimentation were not very suitably fitted to the site, involving replacing some bamboo species, which had not given good results. However the replacement was carried out in quick time and this did not affect the development objective.

All the activities were completed in time at the end of the project except that there is added time needed for follow up operation and for publication of the various Manuals Handbook, etc and the project period was conveniently extended to 3 more months approved by the ITTO, resulting in the successful completion of the project. The prominent feature of the project was the formation of the Project Steering Committee and Project Advisory Committee with senior officials from the forestry sector as members.

###### 4.1.2 Changes in intersectoral links which affected the project's success

Pertaining to the implementation of the project, relevant sectors under the Ministry of forestry and interested parties were coordinated from the beginning and through out the project period. No changes had been made between the linkages among them. Consequently, no adverse effect had been experienced due to strong intersectoral linkage.

###### 4.1.3 Additional arrangements that could improve cooperation between the relevant parties interested in the project

Frequent fraternization between the project staff and the relevant parties interested in the project at the start of the project and on and off meeting and discussion with refreshments so as to come to know them personally and intimately, including their

family members may ensure success for the project including sincerity showing good will and cooperation to them.

#### 4.1.4 Factors which will most likely affect project sustainability after completion

If the project staff had won confidence, intimacy and cooperation of the relevant parties, these factors will positively affect the sustainability after completion of the project. The Forest Department will have to give guidance and support and solve any problem or difficulty encountered by them after completion of the project.

## 4.2 Operational lessons

### 4.2.1 Project organization and management

Forest Department, the executing agency was responsible for the overall implementation of the project. Under the guidance of the Director General of the Planning and Statistics Department of the Ministry of Forestry who is also Chairman of the PSC, the Project Manager took charge of the planning, executing, reporting and general management of the project team. Field activities were carried out by the respective field operating bodies in which their respective activities had been delegated to them in their respective project sites. Execution and progress of activities of the whole project were guided and monitored by the Project Steering Committee including one representative from ITTO and two representatives from two donor countries.

### 4.2.2 Project documentation

Responsibility of all the project documentation was vested on the Project Manager and Project Coordinator. According to the Project Document, progress reports, technical reports and publications were regularly sent to the PSC and to ITTO.

### 4.2.3 Monitoring and evaluation

Besides monitoring and evaluation by ITTO, the Project Steering Committee monitored and evaluated the progress report at 6 months intervals.



#### 4.2.4 Quality of project planning

Generally, the quality of project planning was satisfactory.

#### 4.2.5 Definition of the roles and responsibilities of the institutions involved in the project implementation

The Forest Department took the role of the overall implementation of the project under the guidance of the Chairman of the PSC. The Project Manager submitted the progress reports to the Chairman of the PSC and followed the instructions laid down by him.

#### 4.2.6 Actions to be taken to avoid variations between planned and actual implementation

Great care were taken at the planning phase so as to avoid any variation between planned and in the actual implementation of the plan. All relevant parties were actively involved in the planning.

#### 4.2.7 External factors that influenced the project implementation and that could have been foreseen

There are no external factors that could have been foreseen which can influence the project implementation.

#### 4.2.8 External factors that influenced the project implementation and that could not have been foreseen

There are no external factors that could have been foreseen which can influence the project implementation except some inconveniences such as the tele-communication between head office of the project and office of field operating body. Some part of the roads leading to the project sites were earth roads and it was a little difficult to reach the project sites in quick time during the raining season.

### 5. Recommendations

The Project Planning Phase is of utmost importance for the successful implementation of the project and all relevant parties were involved in the project planning. The project key persons

and field staff were assigned exclusively to their specific project works and not encumbered by other works.

Adequate time was given in the preparation stage well ahead of the starting date of the work schedule. It is specially important to place emphasis on international consultants and project staff to complete their assigned activities or duties according to the workplan or schedule.

Secretarial work is an important component for the successful implementation of the project. Qualified secretary and adequate facilities determine the quality of the project implementation. Adequacy of qualified staff, facilities and adequate fund should be considered before the actual implementation of the project.

Access to concerned parties and related parts of the project through telephone fax, e-mail and express mail can contribute to the successful implementation of the project. There is a very strong and urgent need to implement another similar bamboo project in Myanmar as the country's bamboo growing stocks have become very low when compared with that of 40 or 50 years ago, adversely affecting the socio-economic conditions of the rural population, the majority of whom are dependent on bamboo for their subsistence. Moreover, the taxonomy of bamboo in Myanmar still needs to be cleared. The situation is further aggravated by the increase in the rural population, further accentuating their adverse socio-economic conditions. Consequently, there is an urgent necessity for enhancement of the bamboo resources through the many ways, means and methods as demonstrated by this project with the willing participation of the rural population which constitute the major proportion of Myanmar's total population.

## PART II. MAIN TEXT

### 1. Project Content

#### 1.1 Background introduction

The project was designed to promote sustainable utilization of bamboo through community participation in sustainable forest management. However, sustainable utilization of bamboo through community participation cannot be readily accomplished without adequate growing stock of bamboo which had declined due to growing population, heavy dependence of the major rural population on the forest, including bamboo for their subsistence, recurrent bamboo flowerings, annual repeated forest fires, practice of shifting cultivation, lack of inadequate system of bamboo management etc.

Consequently, there is an urgent need to restock the declining bamboo resources through the active participation of rural population who resides proximal to the forest areas in which bamboo had become scarce in accessible areas. The Forest Department and ITTO had appropriately initiated this project for a 4-year period in which the rural population participate in bamboo plantation establishment, management, including the processing production of various bamboo products and marketing them through trainings and seminars and publication of manuals, handbooks, guidelines, pamphlets through which they can implement the differing technologies relating to bamboo and bamboo products production and thereby increase the income of the rural communities.

#### 1.2 Development and specific objectives

The primary aim of the project is to enhance the declining bamboo resources all over the country through the participation of the major rural communities in the enhancing programs which will also enhance their socio-economic benefits through their participation in the sustainable management of bamboo plantations and natural bamboo forests, including the processing, production, utilization and marketing of various bamboo products such as bamboo shoots and bamboo charcoal for export.

The project also aims to develop and disseminate various technical manuals and guidelines for sustainable management of bamboo forests and bamboo plantations and quality production of various bamboo products.

It also aims to increase the income of the rural communities in the project sites through the establishment of bamboo products production groups based on improved processing technologies and marketing.

### 1.3 Outputs

- 10 ha research plot in the Kawhmu project site for experimental trials established.
- 100 ha of bamboo plantation in the project sites established out of which 40 ha are included in the community Bamboo Forest.
- 2 Users' Group organized.
- 70 ha of Community Bamboo Forest established.
- Bamboo Products Producer Group of two Groups organized.
- Production of new value added bamboo products such as bamboo curtains, woven, mat-ply bamboo board, and bamboo handicraft and bamboo furniture implemented.
- A hand weaving loom at Forest Research Institute including a bamboo stick making machine and its accessories installed.
- Training courses, field level workshops and national level workshops conducted.

### 1.4 Strategy

At one time in the past, the bamboo resource in the natural forest of the Bago Yoma was described as a sea of bamboo. The picture has completely changed now.

A socio-economic survey of the villages in the Paukkaung Township (2 in Paukkaung) and Kawhmu Townships (4 in Kawhmu) were made. In the Kawhmu Township, most of the villagers earned their living through the production of bamboo products; the bamboo resource is scarce now and the price is high with the result that their income is not very remunerative. The strategy is therefore to produce their own bamboo resource through the establishment of bamboo plantations by themselves with help from the project so that their bamboo products can generate more income for themselves and establishing their own bamboo products producing cooperatives.

In Paukkaung Township, majority of the villagers were dependent on the bamboo resources which are still abundant for their subsistent livelihood by selling bamboo culms and pickled bamboo shoots while at the same time cultivating paddy during the rains in the land available

for paddy cultivation. The strategy is therefore for them to participate in the management of the natural bamboo forest to maintain the bamboo resources and some new income strategies should be provided to the villagers through the transfer of technologies for making value-added-products from raw bamboo such as mats, sieves, walls or fences etc, and facilitating the market that is necessary to sell these bamboo related products to the main market directly.

So the strategy is that natural bamboo management systems should be practiced in areas where bamboo resources are still available and bamboo plantations should be established in areas where bamboo resources are scarce. In both areas, promoting technologies for value added products and market facilities are essential for increasing income generation of the rural people.

#### 1.5 Execution of work plan

The 4 years work plan of the project had been approved since the beginning of the project. Further more a 3 month extension had also been approved. All the activities in the workplan had been achieved within the time frame of the workplan and the outputs achieved during the project periods are as follows:

1.5.1. Outputs achieved

<b>Activity</b>	<b>Percentage executed</b>	<b>Estimated completion date</b>
Gathering information and establishment of research activity.	100	Completed in June 2004.
Establishment of four demonstration plots.	100	Completed in July 2006. Follow up operations are to be carried out
Implementation of research work focused on bamboo plantation management and production of edible bamboo shoots.	100	Completed in July 2006
Oversea trainings for bamboo management and utilization.	140	End of November 2006.
Implementation of research on management, processing and utilization of selected bamboo species.	100	Completed in February 2007
Select four key project staff to attend international seminars or workshops concerning sustainable management and utilization of bamboo.	100	Completed in March 2007
Preparation of technical manuals for plantation, management harvesting, processing and utilization of bamboo.	100	Completed and printed at the end of March 2007
Six training courses on bamboo plantation, management and utilization organized and conducted.	100	Completed in August 2006
Preparation of a report on each in-country training course.	100	Completed in December 2006
Completion of the Organization on socio-economic surveys of the project sites as a basis for the preparation of demonstration plots and bamboo cottage industries.	100	Socio-economic surveys at 7 villages of 3 project areas have been completed.
Analysis of the data and information completed.	100	Data analysis was completed in the first week of April 2006

Publication of a technical report on assessment of the economic and socio-cultural characteristic of the project sites and their potential of bamboo development.	100	Completed in April 2006
Establishment of two bamboo products production groups.	100	Completed in December 2006
Market survey and marketing strategies.	100	Bamboo shoot market survey was conducted in 2005 and the report completed for publication. Bamboo products market survey was also conducted and completed in December 2006.
Identification and installation of appropriate processing technologies and equipment for the production of quality bamboo products at two pilot production plants in the project sites.	100	All processing technologies and handing over of all equipments necessary to produce bamboo products have been facilitated by the EA and completed before the end of March 2007.
Quality bamboo products produced.	100	Bamboo hat, bag, curtain, table mat, sofa, dinning table & chairs, room divider and side table, have been produced. Bamboo woven mat ply-board were also produced.
Conduction of a project implementation strategy seminar to ensure the participation of key project personal and the local communities.	100	Project Implementing Strategy Seminar was held at Forest Research Institute, Yezin from 27-28 June 2003.
Two national workshops on the development of the bamboo sector were conducted and successfully completed.	100	The first national forum was held on 30 March 2004. The second national forum was held from November 21 <sup>st</sup> -22 <sup>nd</sup> 2006.
Publication and distribution on of the workshop proceedings completed.	100	Proceedings of the first National Forum has been prepared and distributed since 2004. The Proceedings of the second National Forum has been prepared and printed and distributed at the end of March 2007.

## 1.6 Inputs applied

From the start of the project from 1<sup>st</sup> January 2003 to the end of March 2007 the following inputs have been made for the project.

### 1.6.1 Man Power

#### (a) International Consultant

- 1) Dr. Fu Maoyi as an International Consultant for Bamboo Forest Management was assigned for 3 weeks from 11<sup>th</sup> February to 3<sup>rd</sup> March, 2004.
- 2) Mr. Sukiman, as an International Consultant for Bamboo Marketing was assigned for 2 weeks from 21 March to 4 April, 2004.
- 3) Ms. Carmelita B. Bersalona, International Consultant for Bamboo Processing was assigned for one month from the 1<sup>st</sup> August, 2006 to 31<sup>st</sup> August, 2006.
- 4) Dr. Kolankara Kodikunnath Seethalakshmi, International Expert for the second national forum on sustainable bamboo development in Myanmar was invited from the 19<sup>th</sup> – 23<sup>rd</sup> November, 2006.
- 5) Mr. Chudchawn Sutthisrisilapa, International Expert for the second national forum on sustainable bamboo development in Myanmar was invited from the 19<sup>th</sup> – 23<sup>rd</sup> November, 2006.

#### (b) National Consultant

- 1) National Consultant for Bamboo Forest Management was assigned for altogether 36 months from 16<sup>th</sup> September, 2003 to 15<sup>th</sup> June 2004 (9 months) and from 1<sup>st</sup> October 2004 to 31<sup>st</sup> December, 2006 (27 months) totalling (9+27 = 36 months).
- 2) Two National Consultants for Bamboo Processing were assigned for altogether 30½ months one from 16<sup>th</sup> September, 2003 to 15<sup>th</sup> June 2004 (9 months) and the other from 16<sup>th</sup> March 2005 to 31<sup>st</sup> December, 2006 (21½ months) totalling (9+21½=30½ months).
- 3) National Consultant for Bamboo Products Marketing for 9 months from 1<sup>st</sup> April 2006 to 31<sup>st</sup> December, 2006

#### (c) Administration

2 Officials (one each from Forest Department Head Quarter and Forest Research Institute, Yezin)



(d) Implementation and Research

12 Personnel (11 from FRI and 1 from FD HQ), 2 representative from MTE was assigned from 1<sup>st</sup> February, 2005

(e) Other labours - General 10 daily workers

1.6.2 Capital Inputs

Camera	1
Video camera	1
Computer + Accessories	4
Digital camera	2
Vehicle	1
Copier	1
LCD Projector	1

1.6 Project rationale

Myanmar had rich bamboo resources in the past and due to various constraints such as population increase, increase in the practice of taungya cultivation, dependence of the rural population on bamboo for their daily household uses and for their subsistence etc and because of its vast resources and its seemingly inexhaustible nature, the department inadvertently failed to take notice of its declining stock. Bamboo forest management should have been started some years ago and most appropriately, this bamboo project had been started over 4 years ago by the Forest Department, Ministry of Forestry and the ITTO which will be of the greatest benefit to the department through enhancing the bamboo growing stock as well as the participation of the rural population in the management and establishment of bamboo plantations including the production of bamboo products and marketing them by themselves thereby increasing their income generation.

1.8 Relevance to ITTO

- to contribute to the process of sustainable development.
- to enhance the capacity of ITTO members to implement a strategy for achieving exports of bamboo and bamboo finished product, enhanced production of dried bamboo shoots from sustainably managed bamboo resources.

- it yields benefits to the economy of the country as a whole and it is relevant to both producing and consuming countries.
- it relates to becoming competitive in tropical bamboo and bamboo products trade.
- it offers reasonable prospect for positive economic returns in relation to costs.

## 2. Project content

The project takes full cognizance of the strategic objectives of Myanmar Forest Policy which among others are;

- to accelerate regeneration and appreciation and rehabilitate the degraded forest lands through extensive establishment of bamboo plantations.
- to raise people's participation and public awareness for people based forestry development.

These are the stated aims of the Ministry of Forestry to conserve and rehabilitate the forest resources in which bamboo has become a major component in the socio-economic development of the country and to enhance peoples' participation.

## 3. Project Design and Organization

### 3.1 Adequacy of the results of the identification phase

Restocking the depleting bamboo areas in the establishment of bamboo plantations which have started with the implementation of this project and follow up of the objectives of the project by forest department NGOs and private entrepreneurs.

### 3.2 Sound conceptual foundation of the project

Development of the declining bamboo resources is one of the key factors underlying the sustainable management of forests as extensive bamboo had thrived mixed together with trees, both commercial and lesser used species. Since bamboo had now become a very important resource of the forests due to its being characterized as green gold because of it becoming competitive with tropical timber international trade in terms of export foreign exchange earning and at the same being an environmentally friendly plants conducive to erosion control. The project aimed to develop an approach to restock the declining bamboo resources on the development of community forest based on peoples' participation with the added objective of generating and increase in their income through marketing the various

quality products of bamboo by the rural population. A follow up program is an important issue to accomplish the goal of the development objective.

### 3.3 Adequacy of time and other resources for project formulation

The provision of budget and the allocation of the project period of 4 years including the project staff and national and international consultants can be deemed to be quite adequate and most useful for the implementation of the project. However the need arises to extend the project period to 3 more months and the necessity of some financial realignment for the publication of the second national forum, manuals, handbooks, guidelines training reports etc which were therefore accomplished during the extended period.

### 3.4 Understanding and appropriateness of the roles and responsibilities of the institutions involved with the project implementation

Under the guidance of the Project Steering Committee the implementing agency, the Forest Department was responsible for organizing, executing and reporting all the activities of the project. The project cooperating office was responsible for documentation, organizing meetings and communication to ITTO and also concerned with the national and international agencies.

The Director of the Forest Research Institute, Yezin as Project Manager was responsible for the overall management and supervision for field activities. Research and development activities were carried out in consultation with the Director of the Forest Research Institute, who at the same time is the Project Manager.

### 3.5 Beneficiary involvement with the project's efforts and actions

Local communities especially those residing proximal to the forest and the Forest Department were the major beneficiaries of the project. Local community involvement in the project activities includes bamboo plantation establishment, formation of User's Groups and community forestry development in the project areas and participation in meetings, trainings and workshops.

#### 4. Project Implementation

##### 4.1 The most critical difference between planned and actual project implementation

There was no difference between planned and actual implementation in the project except that an extension period of 3 months was needed to implement follow up operations. The budget was also adequate for the whole project period, including the 3 month extension period.

##### 4.2 Measures and actions which could have been avoided these variations

Great care have been taken in the planning and financial components and the need to monitoring of the progress of the implementation to see whether it complied with the work plan. The consideration of man power input, hiring of consultants in relevant fields and allotment of adequate time frame for the activities should have thoroughly been considered in planning.

##### 4.3 Appropriateness of the assumptions made and correct identification of the risks involved

Assumptions made in the project document were based on actual field observations over a period of time and were found to be appropriate and consequently there was no risk of failure during the project.

##### 4.4 Project sustainability after project completion as a result of project implementation conditions

There was no delay in the activities of the project and its implementation follow the work schedule in the workplan implementation of the project was satisfactory and the involvement of the local communities as pertaining to the formation of two producers' groups including the establishment of bamboo plantation would be directly linked to the long term sustainability of the project areas.

##### 4.5 Appropriateness of project inputs

All the consultants as approved in the project were appointed according to the time frame except the international consultant on socio-economic development for the rural community.

Adoption of designs was done under the guidance of the Project Steering Committee. The contribution from ITTO was sufficient for the implementation of the project.

## 5. Project Results

### 5.1 Situation existing at project completion as compared to the pre-project situation

After the project implementation, two Bamboo Products Production Groups were established in Le Lu Aing village of Pyinmana Township and in Ledi village of Paukkaung Township. Community forestry was established through the formation of 2 Users' Group, one in Ledi village of Paukkaung Township with 14 members of the Users' Group managing a 30 ha natural bamboo forest established by the ITTO Project and the other at Yedashe village at Kawhmu Township with 50 members of the Users' Group managing a 40 ha bamboo plantations established by the ITTO project.

A 10 ha research plot was also established at Kawhmu Township which was later turned into a bambusetum under the directive of the Project Steering Committee. Various manuals, handbooks, guidelines, training reports etc as pertaining to Bamboo Forest Management, Bamboo Plantation Establishment, Bamboo Products Training Course, Investigation on Chemical, Physical and Mechanical Properties of Some Myanmar Bamboo Species etc are as shown in section 2.1, outputs achieved in tabulated form.

The rural population are now exposed to the means, methods, management, establishment of bamboo plantation and natural bamboo forests including producing bamboo products and they therefore have ample opportunities to increase their income through making use of any guideline or directive as given in the various publications. These opportunities were not available for them in the pre-project situation.

### 5.2 Extent to which the project specific objective was achieved

The specific objectives of developing and dissemination technical manuals, handbook, guidelines for sustainable management of bamboo forests had been achieved quite extensively and quality production of bamboo products and that of increasing the income of rural communities in the project sites in Mandalay, Bago and Yangon Division through the establishment of bamboo products production groups based on improved processing technologies and marketing had also been achieved in the respective project sites.

5.3 Impact of the project results on the sectoral programmes on the physical environment, on the social environment and on the target beneficiaries

Impact of the project results on the physical environment of the project sites is very positive in that bamboo plantations had been successfully established with the rural people participation including that of management of the natural bamboo forest. The socio-economic status of the rural population on the project sites had also improved through increased income generation and the rural populations as target beneficiaries are now very much motivated to continue in implementation of the project objectives.

5.4 Project sustainability after project completion as a result of project implementation condition

As the rural participants in the project sites as users' groups and bamboo products production groups had been established and having become very well motivated in their attitude towards the works which had been accomplished by themselves, the project sustainability after the project completion as result of the implementation is very positive.

6. Synthesis of the analysis

- |     |                                |  |
|-----|--------------------------------|--|
| (a) | Specific Objective Achievement | <input checked="" type="checkbox"/> Realised         |
|     |                                | <input type="checkbox"/> Partly Realised             |
|     |                                | <input type="checkbox"/> Unrealised                  |
| (b) | Outputs                        | <input checked="" type="checkbox"/> Realised         |
|     |                                | <input type="checkbox"/> Partly Realised             |
|     |                                | <input type="checkbox"/> Unrealised                  |
| (c) | Schedule                       | <input checked="" type="checkbox"/> On time          |
|     |                                | <input type="checkbox"/> Delayed but not seriously   |
|     |                                | <input type="checkbox"/> Seriously delayed           |
| (d) | Actual Expenditures            | <input checked="" type="checkbox"/> As planed        |
|     |                                | <input type="checkbox"/> More than 10% above planned |
|     |                                | <input type="checkbox"/> More than 20% above planned |

### PART III. CONCLUSIONS AND RECOMMENDATIONS

#### 1. Development Lessons

- (1) Information on constraints and varying conditions relevant to project should be collected and recorded for reference before the planning commences. Organization of the local communities in the project sites as pertaining to the mechanism and procedure of the project should be disseminated to them so that they know before hand what to do when they become involved in the project period.
- (2) The various relevant sections should be established so as to attain a smooth cooperation with them throughout the project implementation.
- (3) The project covered only a limited project site when compared to the whole bamboo forest areas of the whole country and consequently, there is urgent need to further enhance development of bamboo resources in the vast declining bamboo areas in the country.
- (4) Only those rural populations who are keen and willing to participate in the bamboo project should be allowed to participate because, without the willing participation of the major rural population, sustainable forest bamboo management cannot be accomplished.
- (5) Constant awareness should be inculcated into the mind and thought of the rural population that enhancing the bamboo growing stock is for the good of their social and economic betterment.
- (6) They should have this acute awareness of the fact that they must willingly participate in the bamboo enhancing project.
- (7) Without their acute awareness and willing participation, their future social and economic conditions will be very bleak.

#### 2. Operational lessons

- (1) The organization and structure of the project was appropriate with various levels of commands. Good results from the project was achieved by the intensive guidance of the Project Steering Committee and the close supervision of the Project Manager and the responsible project staffs including the advice suggested by the national and international consultants.
- (2) The bamboo species chosen for establishing bamboo plantation should be planted on sites and climate well suited to them.

(3) The time and season on which days of the lunar month the planting should be carried out is also an important factor for successful establishment of bamboo plantation.

### 3. Recommendations for future projects

#### 3.1 Identification

(1) This bamboo project initiated the urgent basic and the technical know-how for further enhancing the growing stock of the bamboo in the country which had gone through various stages of which had been overlooked in the past through a much more vigorous and an all-out participation of the rural population who are dependent on the bamboo for their general utility and also as a source of income for their livelihood.

(2) The present project had paved the way for further concerted future action in bamboo development in Myanmar. There is an urgent need also to generate the rural people income who are undergoing socio-economic stress through their active and willing participation in an extensive bamboo development not only by the rural population alone but also by the urban population as presented by the international consultant from KFRI, India in which the urban population is willingly growing bamboo in their homesteads, compounds, back gardens, thereby greatly enhancing the country bamboo growing stock.

(3) Bamboo resource enhancement should also be taken up by entrepreneurs who are in a position to establish large extent of bamboo plantations by themselves. Some of the NGOs and participants had shown their willingness to establish bamboo plantations at the second national forum on sustainable bamboo development in Myanmar in November 2006.

#### 3.2 Design

The design of the future project on bamboo resource enhancement should be based on the results and experiences obtained from this project. In the preparation of a project, specific objectives, outputs and activities should be very clearly defined so as to secure the right and effective results in quantity as well as in quality.

The present situation of bamboo in Myanmar indicates that bamboo plantation establishment should possibly be given the first priority and also at an extensive scale with the participation of the whole population.



### 3.3 Implementation

Implementation of future bamboo project and other bamboo resource enhancement operations should primarily be carried out by the Forest Department with the willing participation of the rural population. As and when necessary, able entrepreneurs who are well conversant with the art of bamboo plantation establishment should be given the opportunity to do so including the urban and rural population who wish to establish bamboo clumps in their homesteads, backyards and compounds for their own use or earning some side income for their livelihood.

The production of the planting stock should be provided and made available to the interested stateholders if possible through establishment of seedling nurseries including multiplication nurseries by the respective Township or District forest offices. Consequently, the forest staff in the Township offices should take the opportunity to collect bamboo seeds during bamboo flowering, particularly during the sporadic bamboo flowering as gregarious flowering does not occur very often due to the scarcity of bamboo clumps in extensive gregarious groups.

Information on suitable species fitted to the sites and climate as pertaining to the procedure of planting, production of planting stock and planting methods suitable to each particular bamboo species should be provided to the interested groups.

Promotion bamboo industry should be carried out by the Forest Department in coordination with private enterprises and cottage industries.

"Bamboo shoots canning" industries should be developed including bamboo products marketing and provided with modern processing technologies. If feasible, plantation of commercially important bamboo species should be established and at the same time land should be made available to the communities both urban and rural who take a keen interest and willingness to establish bamboo plantations.

Research on bamboo growing with tree species should be conducted especially with soil improving nitrogen fixing commercial species as both will have a stabilizing effect on the soils.

Extensive awareness programmes should be organized for popularization of bamboo cultivation by the forestry extension department and the Forest Research Institute through repeated radio and television talks and inviting the public, both urban and rural to observe the Demonstration Plots so that their interest in bamboo cultivation is generated to the extent of becoming personally involved in bamboo cultivation.

Bambuseta should be established in suitable regions of the country according to the condition of sites and their climatic conditions taking care that only species well-suited to sites and climate conditions be planted in each Bambusetum.

#### 3.4. Organization

Structure of organization in future project should be as was organized in this project. As much as is feasible, participation of professional staff who are expert in their respective fields from abroad should also be made possible as they will have a very important role to play in the successful implementation of future project.

### 3.5 Management

Key persons of the project such as project leader/manager and field manager for future project should be independent from responsibilities other than that at the project itself so that they can handle their work or duty competently and responsibly without any encumbrance. For organizing the rural/ local people, extension services and incentives are highly needed for the successful implementation of any project.

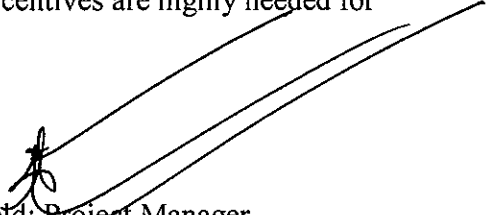
#### Responsible for the Report

Name: U Ohn Winn

Director

Forest Research Institute, Yezin

Forest Department



Position held: Project Manager

ITTO Bamboo Project