

INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT DOCUMENT

TITLE	PROMOTING SUSTAINABLE UTILIZATION OF BAMBOO THROUGH COMMUNITY PARTICIPATION IN SUSTAINABLE FOREST MANAGEMENT
SERIAL NUMBER	PD 146/02 Rev.1 (I)
PERMANENT COMMITTEE	FOREST INDUSTRY
SUBMITTED BY	GOVERNMENT OF MYANMAR
ORIGINAL LANGUAGE	ENGLISH

SUMMARY

The aim of this project is to develop the potential of bamboo for poverty alleviation in the rural communities associated bamboo in Myanmar, where bamboo resources are abundant (963,000 ha) but their utilization is limited due to the outdated processing techniques and lack of quality products. The project will establish two demonstration plots in the Mandalay and Bago Divisions for intensive bamboo management and for processing and utilization. In the demonstration plots, selected bamboo species will be planted within the degraded forestlands, which have been impacted by over-harvesting, excessive grazing and other intensive disturbance on alternative land uses with delayed forest re-growth after abandonment. The selection criteria for the two demonstration plots will include the potentials to enhance sustainable forest management, in particular for the sustainable management of teak-bearing and mixed-deciduous forests, which are dominant forest types at the project sites. Research efforts will be made to realize the production of improved and diversified bamboo products with high quality and added value from sustainable sources. Based on the research results, technical guidelines for sustainable management and improved utilization of bamboo will be published and disseminated to interested parties, including farmers, through a series of training courses. Two bamboo cooperatives will be established and produce quality bamboo products for domestic and international markets. It is expected that after completion of the project, the bamboo sector in Myanmar contributes to alleviating rural poverty and to reducing pressure to the natural forests, which will strengthen sustainable forest management in the country.

EXECUTING AGENCY : FOREST DEPARTMENT, MINISTRY OF FORESTRY

DURATION : 48 MONTHS

APPROXIMATE :

STARTING DATE : UPON APPROVAL

BUDGET AND PROPOSED :

SOURCE OF FINANCE	Source	Contribution in (US\$)	(Kyats)
	ITTO	453,256	
	Gov't of Myanmar		1,309,620 (in kind)
	TOTAL	453,256	1,309,620

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PART I. CONTEXT

1. Origin

Today, billions of people, especially in poorer rural areas, depend on forest products including bamboo for their existence. According to Liese, a German professor, one billion people live in bamboo houses. In Myanmar, the contribution of bamboo to the rural population, which consists of 75% of the total population or 38 million people of Myanmar, is quite large and varied from food, shelter and energy to their income.

Because of the diverse topographical and climatic conditions in Myanmar, a great variety of vegetation exists; the country has more than 90 species of bamboo. According to the forestry statistics, on average annual production of bamboo in Myanmar for the last decade (1990-2000) was 0.85 billion pieces. This figure actually does not include bamboo extracted by rural people who mostly use bamboo at their wish from nearby forests. The figure covers only for commercial scale production done by trade purpose. Rural communities' annual bamboo utilization is estimated to be 912 million pieces as the Forest Department estimates that each family with 5 family members uses 120 pieces of bamboo annually (Planning and Statistics Division, Forest Department). Thus at a very conservative estimate, annual bamboo production in Myanmar is about 2 billions pieces covering all sorts of production.

On the contrary to her abundant supply of bamboo and other NWFPs, Myanmar's export earning from NWFPs is low compared to its neighboring countries. For example, China's exports earning from NWFPs was 25% of total forestry exports while that of India was 70%. The contribution of NWFPs earning to total forestry earning is 2% on average for the period between 1997 and 2000 in Myanmar. The main problem for this issue for Myanmar is lack of technical know-how on the use of bamboo.

Utility of a bamboo species depends on its properties. For example *Wabo* is used for housing-posts because of its large diameter with considerable thickness. Bamboo in some forests, which are in good accessibility with high population density, however, (have been) is being over exploited. Thus promotion of research and development on bamboo forest management is needed to help conserve the forests and to upgrade the life of rural community.

Provided that a variety of techniques on value-added or semi-finished bamboo products production are promoted, this will create large job opportunities for rural people thereby alleviating their poverty.

The Forest Department of Myanmar thus solicits ITTO's support particularly to alleviate the poverty of rural people in Myanmar by promoting appropriate technologies for bamboo utilization and management. The government of Myanmar is also trying its best to improve the life of the rural communities. Thus the project is totally in line with the government's policy to alleviate its rural poverty.

2. Sectoral Policies

Myanmar agenda 21 underscores the strategic course that the country can follow to promote and sustain the overall development in the country. The agenda recognizes the importance of human resource development for real development, "In formulating policies and strategies for sustainable development, the focus should be on human development and conservation and protection of resources and special account must be taken of those who depend on the resources for their livelihoods". The agenda identifies the forestry sector as "very important one to economic development in Myanmar". In regards with the sector, it identified five program areas to be addressed.

They are;

- ✓ Accelerate sustainable development of forest resources
- ✓ Develop the forestry sector to meet basic needs

- ✓ Promote efficiency in the production of forestry goods and services
- ✓ Strengthen forestry policies legislation and institutions, and
- ✓ Enhance people's participation in forestry development and management

Besides, it, in its forestry activities, states to establish demonstration projects and centers to serve as learning centers for upgrading community capabilities in tree planting and to demonstrate the economic benefits of community forestry programs. Thus this project is quite consistent with Myanmar Agenda 21.

Myanmar Forest Policy (1995) recognizes the sustainability of forest resources and, in its policy statements the followings are related to the present proposed project. They are;

- Sustainability of forest resources to ensure perpetual supply of both tangible and intangible benefits accrued from the forests for the present and future generations.
- Basic needs of the people for fuel, shelter, food and recreation
- Participation of the people in the conservation and utilization of the forests, and
- Public awareness about the vital role of forests for the well being and socio-economic development of the nation

Besides, objectives defined in "Forest Industry, Marketing and Trade (Para 3-4 of the Myanmar Policy)" of the Myanmar Forest Policy (1995) states;

- To develop and exploit the potential of non-wood forest products for meeting local needs and supporting small-scale rural forest-based industries for providing employment and off-farm income to the rural population.

Thus, the proposed project is also in line with the policy statements of Myanmar Forest Policy (1995).

This bamboo project is also consistent with the basic principles of Myanmar Forest Law (1992). There, in its eight principles, the law states to develop the economy of the State, and to meet the basic needs of the public through the conservation and protection of forests. And the principles included also emphasize on establishment of forest plantations and to meet the country's fuelwood requirement. The present proposed project will cover not only for establishment of bamboo forest plantations, but also provision of basic needs and thus the project is in line with the Myanmar Forest Law, 1992.

This project, which aims at regenerating the rural income by introducing upgraded use of bamboos, enabling sustainable forest management in the country is thus in line with Myanmar forest policies.

4. Programs and Operational Activities

The Community Forestry Instructions (CFI), issued in 1995, emphasizes the welfare of the rural communities. Based on these instructions, design of projects is made to take more into account the needs of local people. The salient points of the CFI are:

- *Land is given freely to the users' group for the establishment of community forest for an initial period of 30 years*
- *Users' group can exploit the forest products of the community forest in accordance with the prescriptions of the management plan*
- *No tax shall be levied on the users' group or members of the users' group concerning the forest products exploited from the community forest*
- *Surplus forest products can be sold to non-members of the village at reasonable prices. Taxation shall be exempted from the sale of these products.*
- *The users' group can market the surplus forest products to areas outside the village.*
- *The users' group can utilize forest products of the community forest and surplus cash to develop business enterprises that produce high quality products.*

The Myanmar forest sector has received the following pre-project and projects from ITTO after joining ITTO in 1993:

PPD 7/96 Rev. 1(I): Upgrading production efficiency in furniture manufacturing

PD 31/96 Rev.2 (M,F,I): Introducing Myanmar's lesser-used species to the world market

PD 3/98 (F): Teak-based multistoried agroforestry system: an integrate approach towards sustainable development of forests

A small project aiming at ex-situ conservation of bamboo species sponsored by IPGRI is currently being conducted in a buffer zone for the natural teak-bearing forests (MOSWE Branch Station of the Forest Research Institute in Pyinmana). Some reliable information in regards with bamboo forest management can get from this research.

In the past, Non-Wood Forest Products (NWFPs) was paid little attention by the authority concerned (foresters). It is, however, noted that NWFPs play a very important role for the livelihood of rural poor. Of many NWFPs, bamboo is the most important one as it is teak's best company as well as major income generator for the rural poor. The sustainable use of bamboo thus is not only important for the Forest Department but also the people living within or around the forests.

PART II. THE PROJECT

1. Project Objectives

1-1 Development Objective

The overall objective of this project is to enhance the socio-economic benefits of bamboo to 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.

1-2 Specific Objectives

Specific Objective 1. To develop and disseminate technical guidelines for sustainable management of bamboo forests and quality production of bamboo products.

Specific Objective 2. To increase income of rural communities in Mandalay and Bago divisions through the establishment of bamboo production cooperatives based on improved processing technologies and marketing.

2. Justification

2.1 Problems to be addressed

Myanmar is one of the developing countries and it is predominantly rural, a substantial portion of which depends on forests for subsistence and/or additional cash income. And 75% of the country's population lives in rural area. Poverty is one of the causes of environmental degradation. In situations of poverty, man's encroachment into the environment is exacerbated by the need to survive. The causes for poverty are varied; inadequate education, ill health, low income, high dependency ratio and etc.. In regards with health, the infant mortality rate at 1000 live-birth was at 50 and that of maternal mortality rate was 2 in 1996. According to statistics, about 30.6 per cent of the country's children under 3-years old are

either moderately or severely malnourished while 3 out of 5 persons have access to a full array of primary health service. Malaria is top public health problem in Myanmar.

Regarding rural income, daily income for an agricultural worker at the time of rice growing and harvesting is at about Kyat 200 for man and 150 for woman. But the workers have to work in other jobs, usually minor forest products exploitation, during the agricultural slack time as an occupation for cash income. For a bamboo worker, a daily income in Bago region ranges from Kyat 200-300. This is larger than that of an agricultural worker. But, the latter is more vulnerable to disease, especially malaria, than the former. Their income very rarely covers their living costs. Far worse than is the fact that their children rarely attend schools as they live in forests.

Those who live in or nearby forests usually live by shifting cultivation and/or live on minor forest products in one form or other as an occupation. In regards with the shifting cultivation, the annual rate of deforestation was changed from 220,000 ha in the decade between 1980-89. Shifting cultivation is one of the underlying causes for the loss of the forest. The FD stated the shifting cultivation affected area in the country at about 22.8% of the total land area (Forestry Fact Sheet, FD.1996). This figure gives the fact that there are at least 5 million people involved in shifting cultivation if 15-year fallow period and each family with five family members conducts one hectare of shifting cultivation annually are taken into consideration (The country's area is 676,553 km² and 50 million individuals in population.)

The population thus involved in shifting cultivation is one-tenth of the country's total population. This project will help reduce the rural population pressure to the remaining natural forest thereby ensuring Sustainable Forest Management in the country.

To portray the utilization of bamboo, it is still in ordinary use with old traditional style of bamboo products. No advanced use of bamboo has been existed in the country.

As shown in the Origin of PART I, earning from NWFP's of Myanmar contributed only 2% of total domestic forestry exports. The bulk of the forestry exports comes from teak-timber. Non-wood forest products, especially bamboo and rattan, play a significant role in daily life of the people, particularly for those who live nearby forests. And they, bamboo and rattan, have great potential to upgrade the living standard of the rural poor.

To address these problems or to alleviate the poverty of rural people, technical know-how on sustainable bamboo forest management and quality production of various bamboo products are needed. There are two main resources that enable us to alleviate rural poverty through bamboo product; they are land resource and abundant bamboo forest. The cultivable wasteland is identified at (79,711 km²) in land use figure. One unfortunate thing, however, is that there is no bamboo planting habit in Myanmar rural area. Because of improved technological introduction on bamboo products, as shown in INBAR News letter, poor farmers with small holdings of neighboring countries were able to at least double their income from bamboo manufacturing and thereby upraise themselves out of extreme poverty.

Similarly, promoting such an improved technologies and adoption of bamboo planting with intensive management practice will surely lift the Myanmar rural poor out of their poverty.

2.2 Intended situation after project completion

This proposed project could introduce advanced technologies on sustainable management of bamboo forests and its utilization to those involved in bamboo sector development. The intended situations after the project completion are as follows;

- (1) Rural people will gain technique on bamboo growing, tending and harvesting in a sustainable means, and be involved in the works of bamboo products manufacturing activities thereby increasing their cash income.

- (II) Those who are living by bamboo industry; bamboo shoots, handicraft, chopstick, furniture, etc., will gain advanced technologies to improve their products; from low to high quality products.
- (III) Both of bamboo grower and manufacture's incomes will increase because of government encouragement, and available opportunities for raw bamboo and value-added production.
- (IV) Because of regular supply of raw bamboo with improved qualities and diversified bamboo products, the bamboo industry in Myanmar will become stronger and enter in international market.

2.3 Project strategy

The following approaches will be employed to meet the objectives set.

Co-operation with relevant organization: The project executing agency will work with some relevant agencies, for example Central Research Organization of Yangon IPGRI and INBAR, and this will make efficient use of time and material to meet the objectives.

Establishment of demonstration plots: Two demonstration plots on bamboo growing will be made. The experiment data and technical knowledge gathered from the demonstration plots will be useful for farmers and potential investor to establish large tracts of bamboo forests for regular and sustained bamboo supply in the future.

Socio-economic survey: Understanding of population involved in bamboo industry and their socioeconomic situation is an integral part, and thus a socio-economic survey team will be formed and collect necessary data. It will identify working situation, income, health, educational matters and requirements of the rural poor. This survey will also estimate bamboo demand in the country. It will provide useful information for planners in implementing the project.

Training and workshop: Training on bamboo planting will be conducted for farmers and investor. This will support them technical and management skills on cultivating bamboo. Trainings for bamboo processing, making furniture, parquet, canning bamboo shoots, will be conducted for investors, businessmen and farmers. National workshop on bamboo project will be held to disseminate its finding for the awareness of the people inside and outside of the country.

Literature and material collection: Literature and materials in regards with bamboo, though not in large amount, have been published. These materials will contribute as an important references in implementing bamboo project to meet its objectives.

Bamboo forest survey: A survey team in order to know the growing stock of bamboo, especially in the project areas, will be formed. The team in collaboration with GIS section of planning and statistics division of the FD will give a reliable bamboo stocks.

2.4 Target beneficiaries

The direct beneficiaries will go to the rural poor first. Bamboo dwellers will gain a better farm-gate price for the bamboo they produce because of greater demand to the quality products. This will in turn also stimulate the growers to produce a better quality raw material for processing.

Bamboo traders will also achieve indirect benefit because of stable supply of raw material from the rural people. The technological innovation on processing resulted from the project will help the bamboo industries to improve their product qualities and strengthen their competitiveness at international market. These situations will create more investment on bamboo industries and provide employment opportunities for the rural poor. The project during and after implementing period will create job opportunities and thus rural people,

especially women, will be benefited. Reliable data on bamboo stocks found out by the survey team will be useful for government and institutions for their reference. The socio-economic information will also be useful for the said parties. The project has high replicability in other bamboo growing areas in Myanmar. With a successful ground-breaking project, the sustainable utilization of bamboo will be able to increase the number of beneficiaries from the project sites to the other bamboo growing areas.

Last, but not least, the project will alleviate the poverty of the rural people, there by reducing their pressure to remaining natural forests.

2.5 Technical and scientific aspects

Pyinmana and Pauk Kaung, the two project sites, are located in central Myanmar. The former is located at 400 Km north of Yangon and the latter at 330 northwest of Yangon, the capital of Myanmar. Nearly two-third of the project sites are dominated by hill and ranges, which, in high areas, ranges 500 and 600 m in elevation, and 100 and 200 m in elevation in undulating areas with gentle slopes. Sandy to clayey soils is common with alluvial soils in valleys. The average temperature for Pyinmana is 36 degree Celsius and 38 degree Celsius for Pauk Kaung respectively. The average annual rain fall during the past 11 years (1989-1999) for MOSWE station of FRI in Pyinmana was at 1,348 mm and that of Pauk Kaung was at 925 mm. The rainy season for the areas usually starts in mid-May and ends in October.

*Bamboos grow abundantly throughout the country either mixed with tree species or in pur stands. Bamboos around the project sites grow with tree species. Mixed deciduous forests are dominated in both sites and teak grows well in these areas. Common non-teak hardwood species in the areas are Pyinkado (*Xylia Kerri*), Padauk (*Petrocarpus macroarpus*), Yemane (*Gmelina arborea*), Thinwin(*Milletia pendula*), Binga (*Mitragyna rotundifolia*), Nabe (*Lansea grandis*) and Yon (*Anogeissas acuminata*). They grow in the forests along with the bamboo species of Kyathaung (*Bambusa polymorpha*), Thaikwa (*Bambusa tulda*), Tin-Wa (*Cephalostachyum pergracile*), Wabo (*Dendrocalamus brandisii*), Wabo-myet-san-gye (*Dendrocalamus hamiltonii*).*

For the efficient utilization of promising bamboos, the project will identify promising bamboo species for quality bamboo products by analyzing the physical and chemical properties of the fibers of the following 15 bamboo species

Table 1. Main bamboo species in Myanmar

No .	Scientific name	Local name
1	<i>Bambusa longispiculata</i>	Tabindaing-wa
2	<i>Bambusa polymorpha</i>	Kyathaung
3	<i>Bambusa tulda</i>	Thaikwa
4	<i>Cephalostachyum pergracile</i>	Tin-Wa
5	<i>Dendrocalamus brandisii</i>	Wabo
6	<i>Dendrocalamus calostachya</i>	Wagyi
7	<i>Dendrocalamus giganteus</i>	Wabo-gyi
8	<i>Dendrocalamus hamiltonii</i>	Wabo-myet-san-gye
9	<i>Dendrocalamus longispathus</i>	Wanet
10	<i>Dendrocalamus strictus</i>	Hmyin
11	<i>Dinochloa m'clellandi</i>	Wanwe
12	<i>Melocanna bambusoides</i>	Kayin-wa
13	<i>Oxytenanthera nigrociliata</i>	Waya
14	<i>Thyrsostachys oliveri</i>	Thanawa
15	<i>Thyrsostachys siamensis</i>	Htiyo-wa

Based on the results of the bamboo properties, practical guidelines on silviculture and harvesting of those promising or commercially important bamboo species for sustainable production will be developed. The silvicultural techniques will cover identification of site-

species-match and the most suited spacing to get the highest yield per unit area within the frame of sustainable production. Similarly research on harvesting will be made and it will cover on sustainable focus on suitable ratio of shoot and culms cutting to gain the most possible yield in a sustainable manner. Selective cutting will be employed as clear-felling conducted in Rakhine area of Myanmar proved yield decrease in later.

The research will, therefore, include the development of an age-limit harvesting system which bamboo clumps of three-years and over in age will be harvested. Emphasis will also be given to the production of sweet edible bamboo shoots for food through wider use of bio-fertilizers to increase shoot production, shoot diameter and per-unit-area yield.

The experiences gained in other areas, of course, are references for this project (e.g. case studies and experiences written in INBAR NEWSLETTER).

2.6 Economic aspects

According to an estimate of bamboo forests areas by the Forest Department, there were around 15,000 Km² in three major bamboo-growing areas such as Bago, Rakhine and Taninthayi. Taking into account the potential bamboo resources of Myanmar, it is obvious that the major economic benefits could be derived through appropriate management and utilization of this resource. The experience and development of the bamboo sectors in China provides a good opportunity for Myanmar. For example, in 1994 an area of 60,000 ha of bamboo forests located in the Anji county of China generated a total production of about US\$ 110 million from around 1,200 bamboo culms and shoot processing factories. In 1998 the Chinese exports of bamboo products were estimated at US\$ 200 million. Bamboo has played an important role in improving socio-economic situations in China as a source of employment as well as an earner of foreign currency. It is also important to note that there appears to be a steady export flow of bamboo products such as furniture and shoots from many of the bamboo producer countries in Asia. It is envisaged that bamboo products- possibly as a material combined with tropical wood- will become a significant export earner in the future.

By developing appropriate technologies for bamboo management and processing, and products development, Myanmar, which has extensive areas of bamboo and is currently working for poverty alleviation, could satisfy the national demand for bamboo products and the surplus production could be sold in the regional market. National production of bamboo products is currently limited and based on rudimentary techniques and their supply is decreasing due to irrational resource utilization. In the proposed project activities, the establishment of two demonstration plants for the production of edible shoots and for the production of bamboo products will lead to the processing of various bamboo products. It is also envisaged to carry out, among other things, national market surveys for bamboo shoots and products, and to propose appropriate marketing strategies. At the same time, it is important to understand the characteristics of bamboo as a raw material to produce goods required by the market.

2.7 Environmental aspects

Deforestation is a serious problem in Myanmar because it involves degradation of fragile forest ecosystems, conversion of forest lands to other uses with deterioration of quantity and productivity of remaining tropical forests, and depletion of biological diversity. In response to this changing environment, an expansion of bamboo cultivation in Myanmar can provide various environmental/ecological benefits such as rehabilitation of eroded agricultural and forest lands and carbon sequestration. Especially on the exposed degraded slopes can help prevent many potential disasters in mountainous areas. As evergreen plants, bamboo sprouts new culms every year, and are harvested in selective thinning pattern. So bamboo stands are relatively stable population. Its fine mat of fibrous root system is efficient in binding soil particles together, especially in tropics where the soil is most easily lost when exposed to heavy rainfalls. The results of various studies showed that bamboo ecosystems have better water and soil conservation function than other plantations.

Bamboo is also foremost in producing biomass up to 30 percent of their biomass each year. The carbon sequestration ability of such a species is likely to be very high among tropical timber species. According to an estimate, one-quarter of the biomass in tropical regions and one-fifth in subtropical regions comes from bamboo. If one considers the fact that the great majority of bamboos occurs in the tropics within the broad band circumscribed by the Tropics of Cancer and Capricorn, and that about 80 percent of the area containing bamboo is in the South and Southeast Asian tropical regions, the likely contribution to the national accounting of carbon sequestration by bamboo could be significant.

One of the most important aspects of the project is to contribute to the sustainable forest management of tropical resources by providing income generation activities for the forest dwellers from bamboo. The project will help reduce the pressure to the tropical forests. Developed technical guidelines for sustainable management of bamboo by the project will also contribute to the conservation of bamboo forest ecosystems. The project implementation will be beneficial for the protection of tropical forest resources and the conservation of environment.

2.8 Social aspects

Addressing socio-economic needs of local communities is a major aim through sustainable management and utilization of bamboo. Building a relationship between local communities and the project, allowing their meaningful input into the project will be an important process. High priority will be given early in the inception of the project to designing ways to ensure this. Impacts of the project on communities will be assessed in an ongoing participatory fashion throughout the project and specifically at an ex-post evaluation of the project.

Without having people participation, and addressing their needs, conservation as well as rehabilitation on degraded forests is impossible in the future. *As the project takes into account the community participation, the project should provide positive impacts especially to the local communities living within and around the project areas. First and most important positive impact of the proposed project to the local rural people is that the project inception, through extension means, will inform the newly enacted forestry legislations to the rural people who very rarely know the legislations because of limited forestry extension and poor access to news papers and periodical journals. For example, few farmers know the fact that they have the right to apply even for forestlands to grow trees and agri-crops for 30 years that is shown in the Community Forestry Instruction (CFI), 1995.*

Secondly, additional employment opportunities will be created for rural people to participate in the project's field and processing works such as site preparation, planting bamboos and follow up tending operations. This is also very positive impact as most of the population in two project sites is involved in casual works.

Thirdly, as the project is to be implemented with the community participation, the interested local people, community leaders and some private owners of the project areas will be skillful in bamboo growing and processing as they are to be trained in different training courses through out the project period..

Finally, the project intervention will improve the living standard of the local people of the two project sites and the areas are anticipated to be famous for raw and finished bamboo products producing areas.

Two project sites are identified based on rich experiences in the cultivation and use of bamboo and low economic situations of local ethnic groups. The demographic and social data of the two selected project areas are as follows:

Table 2. Demographic and social data for project areas

No	Description	Pyinmana	Pauk Kaung
1.	Rural population	78 % (309,417)	86% (119,384)
2.	Total Land area	(225,886) ha	(161,857) ha

3.	Total reserved forest area	(71,978) ha	(73551) ha
4.	Protected forests area	(48,724) ha	(8,477)
5.	Main Incomes	Agriculture & Forests	Agriculture & Forests
6.	Total Cultivating area	(31,998) ha	(24,586) ha
7.	Education Schools (in order of high, middle, primary level) Students (in order of high, middle and primary level) School Teachers (in order of high, middle and primary level)	(5), (11), (196) = 212 (5506), (12922), (28761)= 4,7189 (99), (655), (492)= 1,246	(5), (11), (151) = 167 45,662 n.a
8.	Bamboo demonstration plot	50 ha	50 ha

In the rural area of Pyinmana, land-owned farmers constitute at about 40 % and the remaining people are almost casual workers who work in agricultural occupations during the growing and harvesting time, but they, in agricultural slack time, engage in other jobs, usually to forest-based works.

The estimation of villagers working in bamboo industry in the villages along the Pyinmana and Taungnyo road was made conducting a simple survey. From the beginning of November to end of May, an opening season, the number of villagers is larger than the period from June to October, raining season in Myanmar. This is because some villagers work in rice growing activities. In the former period, daily bamboo extraction is at 20,000 pieces while in the raining season; it becomes lower; less than 10000. In natural forest, a worker can extract 30-35 pieces of bamboo per day. If this capacity is taken into consideration, the number of workers in the former period is at about 600 and 300 per-day for the latter. This also give the number of population lives by bamboo extraction is at 3000 in opening season and 1500 in raining season if 5 members per family is taken into account.

The implementation of this project will involve and accommodate active participation of the rural communities as well as private bamboo industries. The management model on bamboo intensive plantation trials will provide the opportunities of the local communities and private industries to work together in mutual benefits condition.

2.9 Risks

Bamboo is an essential part for daily livelihood of the forest dwellers as food, shelter, utility and a trade commodity although it is sometimes regarded as weed in the forests. This will be the first externally assisted project to manage and utilize bamboo through community participation. A major risk that is likely to hinder the achievement of the project objectives is the lack of the community participation in the proposed project activities. However, since the local generation of income through sustainable use of bamboo is a more viable option at the two project sites, the community participation will be facilitated by providing appropriate training programmes for the production of various bamboo products. The strong national commitment to progress is also likely to enhance the community participation.

Another risk for project implementation is the lack of appropriate processing technology for bamboo products development. This risk will be solved by developing the ability of project staff members in efficient utilization of bamboo through the key project staff's attendance at an International Training Workshop on Bamboo Handcraft Techniques and Its Tools and Small Machines being regularly organized by INBAR. The engagement of qualified international consultants in bamboo processing and product market development would also minimize the risks.

3. Outputs

3.1 Specific Objective 1

To develop and disseminate technical guidelines for sustainable management of bamboo forests and quality production of bamboo products.

- Output 1.1 : Two demonstration plots in two townships covering 10 commercial bamboo species in total 100 ha established.
- Output 1.2 : Technical manuals for plantation, management, harvesting and processing of bamboo published.
- Output 1.3 : Technology transfer on bamboo plantation, management and utilization

3.2 Specific Objective 2

To increase income of rural communities in Mandalay and Bago divisions through the establishment of bamboo production cooperatives based on improved processing technologies and marketing.

- Output 2.1 : Economic and socio-cultural characteristics of Pyinmana, Mandalay division and those of Pauk Kaung, Bago division and their potentials for bamboo development assessed.
- Output 2.2 : Two bamboo production cooperatives to produce edible bamboo shoots and bamboo products established and operated.
- Output 2.3 : Two national workshops covering cultivation, harvesting, processing, socio-economy, marketing and policies for the production of bamboo products organized and convened.

4. Activities

Output 1.1 Two demonstration plots covering 10 commercial bamboo species in 100 ha established.

The project will establish two demonstration plots to compile, analyze, and disseminate information required for sustainable management of promising bamboo species. Two plots will be established in Pyinmana, Mandalay division and Pauk Kaung, Bago division. Specifically, the demonstration plots, *keeping in mind the most highest yield within framework of sustainable production*, will enable plantation and management practices, assess effects of research activities in improving the production of edible shoots and quality bamboos, and provide a facility for the training of farmers and forest officers in bamboo plantation and management

Activity 1.1.1 Gathering information and establishment of research strategy.

It needs to formulate the research plan on the plantation and management of promising bamboo species. As a basic work, the information on bamboo cultivation and genetic improvement will be collected from relevant institutes, including FAO, INBAR and IPGRI. This activity will minimize duplicated research work. The research strategy will focus on sustainable management of intended products (shoot, culms production, charcoal, etc.,).

Activity 1.1.2 Establishment of two demonstration plots in Pyinmana and Pauk Kaung townships.

Two sites with a focus to improve the livelihoods of poor rural communities and to protect the environment in ecologically sensitive areas will be selected at Pyinmana, Mandalay division and Pauk Kaung, Bago division. 100 hectares of demonstration plots will be established and through site demonstration, the technology will be demonstrated and disseminated to outsiders in the future. About 10 bamboo species will be selected by surveying of markets to find out local and the national demand. The selection of bamboo species will be divided into three categories such as bamboos for edible shoots production for food, bamboos for stem (culm) production for construction and supporting poles, and bamboos for stem production for furniture and handicrafts.

Two demonstration plots will be established within the degraded forest lands, which has been impacted by over-harvesting, excessive grazing and other intensive disturbance on alternative land uses with delayed forest re-growth after abandonment. The selection criteria for the two demonstration plots will include the potentials to enhance sustainable forest management, in particular for the sustainable management of teak-bearing and mixed-deciduous forests, which are dominated forest types at the project sites. In addition to two project sites, a small-scale bamboo plantation, in exercising participatory approach, will be established in fringe areas of the natural teak bearing forests. The plantations thus established with the participation of local community leaders, traders and some interested private individuals will act as a buffer zone for the natural forests enabling sustainable forest management in the region. This sort of idea will be employed in site selection for future bamboo plantations.

Activity 1.1.3 Implementation of research work focused on bamboo plantation management and the production of edible bamboo shoots.

Research will include various aspects of bamboo management from the preparation of bamboo seedlings, appropriate management and harvesting systems. Bamboos are being harvested from one-year old, two-year old, and three-year old and over. One and two-year old culms are soft in fiber and not durable during the stages of extraction. Some clear-felling experiments had been done in the Rakhine State and the results indicated a tendency to decreased yields. The research will, therefore, include the development of an age-limit harvesting system which bamboo culms of three-years and over in age will be harvested. Emphasis will also be given to the production of sweet edible bamboo shoots for food.

Output 1.2 Technical manuals for plantation, management, harvesting and processing of bamboo published.

Many reports (pamphlets) to cover the different topics on plantation, management and harvesting of bamboo will be prepared and disseminated to interested parties in the country. These technical manuals will be served as a guide in the course of the training programmes.

Activity 1.2.1 Overseas training of the key project staff members and leaders of the local communities to study sustainable management and utilization of bamboo in neighboring countries

During years one and two, it will organize two study groups, each for five people including one from the local communities of the project sites, who will attend the International Training Workshop on Bamboo Handcraft Techniques and Its Tools and Small Machines being organized annually in China for a 20-day by INBAR or who will participate in a study tour in China (or Malaysia, Thailand) on sustainable bamboo management and utilization research, and practices in tropical environments. The experience and quality in bamboo management and utilization in other bamboo growing neighboring countries will be carefully evaluated for planning the increased utilization of bamboo in Myanmar.

Activity 1.2.2 Implementation of research on management, processing and utilization of selected bamboo species.

Research on bamboo management will be carried out at the project sites and the Forest Research Institute located in Yezin. Research programmes for the various areas in bamboo utilization to be investigated will be conducted at the Forest Research Institute and include testing of physical, mechanical, and chemical properties of selected bamboo species. It will also conduct research on bamboo protection by various methods since many bamboo products has low durability in natural environment due to lack of appropriate treatment, degradation of bamboo depots at pulp mills. The aim of this research is to investigate possibilities for bamboo protection in rural areas by simple methods. Research results will be used for the preparation of technical manuals for bamboo management and utilization. Scientific information will be published in research papers by the Forest Research Institute.

Activity 1.2.3 Select four key project staff to attend international seminars or workshops concerning sustainable management and utilization of bamboo.

Selected key project staff members will attend selected international seminars or workshops relating to bamboo development to collect updated knowledge and skills of bamboo management and utilization as well as to share the results of the project activities.

Activity 1.2.4 Preparation of technical manuals for plantation, management, harvesting, processing and utilization of bamboo.

Technical manuals will be prepared on various aspects of bamboo management and utilization based on research results by the project and other existing information. The technical manuals will be disseminated to interested parties in bamboo management and utilization and will be used as teaching materials for the proposed training courses on bamboo management and utilization. Details on the proposed training programmes are set out in Activity 2.1.1.

Output 1.3 Technology transferred on bamboo plantation, management and utilization

Activity 1.3.1 Organize and conduct six training courses on bamboo plantation, management and utilization.

It will be composed of three - five days for each training course, which includes lecture, demonstration and "hand on" exercises on plantation, management and utilization of bamboo. The main target groups for the training courses are mainly members of tribal groups. Bamboo manufactures and traders are also main target groups for the training courses. It will be conducted in the important sites for bamboo development in Myanmar in addition to the two project sites. The selection of four training sites except the two project sites will be decided based on the needs and willingness of local communities to promote bamboo plantation on degraded land and bamboo products development.

In addition to the planned training courses, additional demonstration and dissemination of the technology will be organized and operated based on the request of local communities. In order to enhance sustainable forest management in the project sites and in the country, the topics of the proposed training courses will include sustainable forest management practices.

Activity 1.3.2 Prepare a report on each in-country training course within one month of the completion of each training course.

An evaluation report on each training course will be prepared to provide recommendations for the organization of future research and training programmes.

Specific objective 2: To increase income of rural communities in Mandalay and Bago divisions through efficient and diversified utilization of bamboo based on improved processing technologies and marketing.

Output 2.1 Economic and socio-cultural characteristics of Pyinmana, Mandalay division and Pauk Kaung, Bago division and their potentials of bamboo development assessed.

The project will document the economic and socio-cultural characteristics of the rural communities of the project sites as well as of their needs and aspirations in bamboo development.

Activity 2.1.1 Organize and conduct of socio-economic surveys of the project sites as a basis for the preparation of demonstration plots and bamboo cottage industries.

Socio-economic surveys will be carried out to find out the detailed economic and socio-cultural characteristics of the two project sites such as Pyinmana, Mandalay division and Pauk Kaung, Bago division. The ITTO Guidelines for Ensuring Local Community Participation in the Project Cycle, which is attached to the ITTO Manual for Project Formulation (1999) as Annex B, will be applied in the proposed surveys. In addition, these surveys will also include bamboo resources and production of bamboo products at the project sites. A particular attention will also be given to the roles of and needs of women.

Activity 2.1.2 Analysis of the data and information collected.

It will identify all the users of the bamboo and forest resources, the nature of their claims upon them, and who makes the decisions over the use of the resources. Traditional ways of bamboo uses will be described. It will also provide information to understand which bamboo resources are most avidly sought in the project sites and which are most important to the communities.

Activity 2.1.3 Publication of a technical report on assessment of the economic and socio-cultural characteristics of the project sites and their potential of bamboo development.

The results of the surveys and their assessment will be compiled in the report to disseminate to relevant parties in forest policy formulation and to provide the necessary guidance in project implementation.

Output 2.2 Two bamboo production cooperatives to produce edible bamboo shoots and bamboo products established and operated.

It will be important for the project to provide a primary or secondary source of cash and emergency income for many forest-dwelling people throughout the project sites from the production of quality bamboo products.

Activity 2.2.1 Establishment of two bamboo production cooperatives.

Farmers and bamboo collectors in the project sites expressed interest in establishing a more organized bamboo production cooperatives which will plant and manage bamboo and will produce quality bamboo products. Attention will be given to the active participation of women in the project sites to the cooperatives. Members of the cooperatives will receive technical assistance in managing and processing bamboo throughout the participation of a series of training courses to be organized under Activity 2.1.1. Their engagement in the project activities will also be kept closely during project implementation.

Activity 2.2.2 Market survey and marketing strategies

The project will carry out a market survey on the current status and potential demand for quality bamboo products in domestic markets so as to propose relevant marketing strategies.

Activity 2.2.3. 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.

The project will identify appropriate technologies with consideration of raw material characteristics, social and environment aspects, available energy sources and others. Two pilot production plants with improved technology for the production of edible bamboo shoots and bamboo products such as furniture parts and handicrafts will be established in at Pyinmana, Mandalay division and Pauk Kaung, Bago division of the central part of Myanmar. The technology will be demonstrated and disseminated to other bamboo growing regions in the country.

Activity 2.2.4. Quality bamboo products produced.

The production testing will be carried out to find the best way to produce selected bamboo products. Bamboo has always been an indispensable material for the rural community, for house constructions, fences, poles, rafting, tools, baskets, fishing and charcoal. The identified bamboo products to be produced by the project include:

- Edible shoots, for local and regional market, as well as export.
- Poles for local uses and export. Europe imports annually 40 mill. poles. Significant amount of bamboo are used in Myanmar annually for pulping, with decreasing tendency. One ton of bamboo pulp saves 5 cm³ timber.
- Handicrafts in countless forms.
- Furniture, with improved design.
- Mats with simple and refined processing technology.
- Charcoal for local uses.

Output 2.3 Two national workshops covering cultivation, harvesting, processing, socio-economy, marketing and policies for the production of bamboo products organized and convened.

Activity 2.3.1 Conduct a project implementation strategy seminar to ensuring the participation of key project personnel from all involved offices and the local communities in the project sites.

Within six months of project commencement it will organize a seminar to prepare a project implementation strategy with the participation of about 40 key project staff and main stakeholders in project implementation.

Activity 2.3.2 Conduct two national workshops on the development of the bamboo sector.

In years two and four, organize and convene two, 3-day workshops, one in Yangon and the other one in Mandalay, for 40 forest officers, members of the bamboo production cooperatives, farmers, bamboo collectors and traders in each workshop. The participation of key policy-makers from the Ministry of Forestry will be ensured at each workshop. The main topics of the workshops will include:

- Awareness raising on the importance of the bamboo sector to decision-makers at all levels.
- Institutional strengthening and coordination regarding bamboo conservation, management and processing issues, including the promotion of more private sector cooperation to enhance the contribution of bamboo for poverty alleviation and economic prosperity.
- Strengthening of extension support to bamboo farmers, collectors, processors and traders for improved technologies for bamboo management and utilization.

- *Sharing information concerning the contributions of bamboo to sustainable forest management in the project sites.*
- Dissemination of project results to the target groups to promote the development of the bamboo sector.

Activity 2.3.3 Prepare and distribute workshop proceedings.

Within two months of the completion of each workshop, the project will prepare workshop proceedings to disseminate to relevant parties relating to the development of the bamboo sector.

5. Logical Framework Matrix

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Development Objectives: The overall objective of this project is to enhance socioeconomic benefits of bamboo to rural communities through their active participation in sustainable management and utilization of bamboo forests.</p>	<p>Increased contribution of bamboo sector to socio-economic conditions of the rural communities associated with bamboo</p> <p>Economic contribution to the two project sites is increased to 200% at the end of year 4.</p> <p>Export earning from bamboo products is increased from 2% to 5% of total export of forest products at the end of year 4</p> <p>A national strategy for long-term bamboo developments is formulated in the middle of year 4.</p>	<p>Statistical Yearbook Myanmar</p> <p>Annual reports of the Ministry of Forestry</p> <p>Technical reports and papers by project team and consultants</p> <p>Project progress reports</p>	<p>Government' continued support on bamboo sector development to alleviate poverty of rural communities.</p> <p>On-ground application of Community Forest Instructions</p> <p>Active participation of rural communities in sustainable management of bamboo forests and use of bamboo</p>
<p>Specific Objective 1. To develop and disseminate technical guidelines for sustainable management of bamboo forests and quality production of bamboo products</p>	<p>Publication of technical guidelines for bamboo plantation, management, harvesting and bamboo processing and utilization is available in the middle of year 3.</p> <p>Improved technologies on bamboo management and utilization are developed and disseminated to key target groups during project implementation</p>	<p>Forest Department Statistics</p> <p>Technical reports and papers by project team and consultants</p> <p>Project progress reports</p>	<p>Timely and adequate inputs by the parties concerned</p> <p>Easy adoption of improved technology</p>

<p>Output 1.1: Two demonstration plots covering 10 commercial bamboo species in 100 ha established.</p>	<p>At the end of year 1 two demonstration plots are established and managed for technology transfer to farmers.</p>	<p>Technical reports and papers by project team and consultants Project progress reports Evaluation reports</p>	<p>Selection of the most promising bamboo species Timely and adequate inputs by the parties concerned</p>
<p>Output 1.2: Technical manuals for plantation, management, harvesting and processing of bamboo published.</p>	<p>At the middle of year 1 the FRI is implementing bamboo research programmes for the development of technical guidelines</p> <p>At the middle of year 3 technical guidelines for bamboo plantation, management and processing are published.</p>	<p>Technical manuals Progress reports and Technical reports</p>	<p>Technical information fully discovered</p>
<p>Output 1.3: Technological transfer on bamboo plantation, management and utilization</p>	<p>At the middle of year 2 ten-project team members, including leaders from the communities attend an international training course on bamboo</p> <p>Between year 3 and 4 at least six training courses are conducted with the participation of key target groups, including tribal groups</p>	<p>Training materials Progress reports on training Project progress reports</p>	<p>Public awareness is fully raised on bamboo utilization</p> <p>Active participation of the key target groups in the training courses</p> <p>Availability of qualified teachers</p>
<p>Specific Objective 2 To increase income of rural communities in Mandalay and Bago divisions through the establishment of bamboo production cooperatives based on improved processing technologies and marketing.</p>	<p>Contribution from bamboo to the rural communities is increased</p> <p>At the end of the project contribution to the two project site is increased by two fold in terms of quantity or income by the farmers</p>	<p>Reports of Forest Department and local governments Progressive mid-term or project completion report</p>	<p>Bamboo is a feasible land use in rural communities and profitable commodity.</p>

<p>Output 2.1: Economic and socio-cultural characteristics of Pyinmana, Mandalay division and Pauk Kaung, Bago division and their potentials of bamboo development assessed.</p>	<p>A socio-economic survey of the project sites is carried out at the first half of years 2 and 4</p> <p>Survey results are disseminated to interested parties, including international seminars/workshops during project period</p>	<p>Report of International consultant on sociology</p> <p>Project progress reports</p>	<p>Timely availability of competent sociologist</p> <p>Cooperation of farmers in the survey</p> <p>Selection of representative areas for bamboo development</p>
<p>Output 2.2: Two bamboo production cooperatives to produce edible bamboo shoots and bamboo products established and operated.</p>	<p>In the middle of year 3 two-bamboo production cooperatives are established</p> <p>The two cooperatives are running with a sound business plan in year 4</p>	<p>Technical reports by project team and consultants</p> <p>Reports by the two cooperatives</p>	<p>Development of mutual understanding and confidence between the project members and the farmers</p> <p>Provision of low-cost processing equipment</p>
<p>Output 2.3: Two national workshops covering cultivation, harvesting, processing, socio-economy, marketing and policies for the production of bamboo products.</p>	<p>The first national workshop for bamboo development is convened in the middle of year 2</p> <p>The second workshop is convened before project completion</p> <p>Strategies for bamboo development are identified in each workshop</p>	<p>Workshop proceedings, mid-term report and project completion report</p> <p>Technical papers by the project team and consultants</p>	<p>Resource persons are timely available</p>

6. Work Plan																	
Output/Activity	Responsible Party	Year 1 by quarters				Year 2 by quarters				Year 3 by quarters				Year 4 by quarters			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Output 1.1																	
Activity 1.1.1: Gathering information and establishment of research strategy	Forest Research Institute (FRI)	█	█	█													
Activity 1.1.2: Establishment of two demonstration plots	Forest Research Institute (FRI)		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Activity 1.1.3: Implementation of research work focused on bamboo plantation management and the production of edible bamboo shoots	Forest Research Institute (FRI) National and international consultants			█	█	█	█	█	█	█	█	█	█	█	█	█	█
Output 1.2																	
Activity 1.2.1: Overseas training for bamboo management and utilization	Forest Department Myanma Timber Enterprise (MTE)				█	█											
Activity 1.2.2: Implementation of research on management, processing and utilization of selected bamboo species	FRI				█	█	█	█	█	█	█	█	█	█	█	█	█
Activity 1.2.3: Select four key project staff to attend international seminars or work-shops concerning sustainable management and utilization of bamboo	Forest Department									█	█	█	█	█	█	█	█

6. Work Plan (Continued)																	
Output/Activity	Responsible Party	Year 1 by quarters				Year 2 by quarters				Year 3 by quarters				Year 4 by quarters			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Activity 1.2.4: Preparation of technical manuals for plantation, management, harvesting, processing and utilization of bamboo.	FRI National and international consultants																
Output 1.3																	
Activity 1.3.1: Organize and conduct six training courses on bamboo plantation, management and utilization.	Forest Department MTE																
Activity 1.3.2: Prepare a report on each in-country training course	FRI																
Output 2.1																	
Activity 2.1.1: Organize and conduct of socio-economic surveys of the project sites	FRI National and international consultants																
Activity 2.1.2: Analysis of the data and information collected	FRI Consultants																
Activity 2.1.3 Publication of technical reports on assessment of the economic and sociological characteristics of the project sites and bamboo development	FRI																

6. Work Plan (Continued)																	
Output/Activity	Responsible Party	Year 1 by quarters				Year 2 by quarters				Year 3 by quarters				Year 4 by quarters			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Output 2.2																	
Activity 2.2.1: Establishment of two bamboo production cooperatives	Forest Department																
Activity 2.2.2: Market survey and marketing strategies	FRI National and international consultants																
Activity 2.2.3: Identification and installation of appropriate processing technologies and equipment for the production of quality bamboo products	FRI National and international consultants																
Activity 2.2.4: Quality bamboo products produced	FRI Two bamboo cooperatives MTE																
Output 2.3																	
Activity 2.3.1: Conduct a project implementation strategy seminar to ensuring the participation of key project personnel and the local communities	Forest Department MTE																
Activity 2.3.2: Conduct two national workshops on the development of the bamboo sector	Forest Department MTE																
Activity 2.3.2: Prepare and distribute workshop proceedings	Forest Department FRI																

7. Budget

7.1 OVERALL PROJECT BUDGET BY ACTIVITY

OUTPUTS/ACTIVITIES Non-Activity Based Expenses	BUDGET COMPONENTS							
	10 Project Personnel	20 Sub Contracts	30 Duty Travel	40 Capital Items	50 Consum able Items	60 Miscella neous	Quarter Year	GRAND TOTAL
ACTIVITIES								
<u>Output 1.1</u>								
A1.1.1: Gathering information and establishment of research strategy	6,000				4,000		Q1-3, Y1	10,000
A1.1.2: Establishment of two demonstration plots in Pyinmana and Pauk Kaung townships	16,800		8,000	25,000	2,000		Y1-4	51,800
A1.1.3: Implementation of research work focused on bamboo plantation management and the production of edible bamboo shoots	6,000		1,000	2,000	4,000	2,000	Y1-4	15,000
Subtotal 1	28,800	0	9,000	27,000	10,000	2,000		76,800
<u>Output 1.2:</u>								
A1.2.1: Overseas training of the key project staff members and leaders of the local communities in management and utilization of bamboo	20,000						Q4, Y1 Q1, Y2	20,000
A1.2.2: Implementation of research on management, processing and utilization of selected bamboo species	6,000		1,000	14,000	5,700		Y2-4	26,700
A1.2.3: Select four key project staff to attend international seminars or workshops concerning sustainable management and utilization of bamboo	0		6,000				Q2-3, Y4	6,000
A1.2.4: Preparation of technical manuals for plantation, management, harvesting, processing and utilization of bamboo	3,000	10,000	1,500	2,000	6,000	2,000	Q2-4, Y1 Y2, Y3	24,500
Subtotal 2	29,000	10,000	8,500	16,000	11,700	2,000		77,200
<u>Output 1.3:</u>								
A1.3.1: Organize and conduct six training courses on bamboo plantation, management and utilization.	15,000		16,000	15,000	6,000	2,000	Q1-4, Y3 Q1-3, Y4	54,000
A1.3.2: Prepare a report on each in-country training course within one month of the completion of each training course	3,000				2,000		Q2-4, Y3 Q1-4, Y4	5,000
Subtotal 3	18,000		16,000	15,000	8,000	2,000		59,000

Output 2.1:								
A2.1.1: Organize and conduct of socio-economic surveys of the project sites as a basis for the preparation of demonstration plots and bamboo cottage industries.	6,000		6,000		1,000	1,000	Q1-2, Y3 Q2-3, Y4	14,000
A2.1.2: Analysis of the data and information collected	4,200				1,000		Q3, Y3-4	5,200
A2.1.3: Publication of a technical report on assessment of the economic and socio-cultural characteristics of the project sites and their potential of bamboo development	4,200	2,000			2,000		Q4, Y4	8,200
Subtotal 4	14,400	2,000	6,000		4,000	1,000		27,400
Output 2.2:								
A2.2.1: Establishment of two bamboo production cooperatives	13,000	6,000	11,000	29,000	4,000	8,000	Q1-3, Y3 Y1	71,000
A2.2.2: Market survey and marketing strategies	10,000		2,000		2,000		Q2-3, Y3 Q1, Y4	14,000
A2.2.3: 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	7,100		1,000		2,500	1,000	Q1-4, Y4	11,600
A2.2.4: Quality bamboo products produced	13,500		1,000		1,500	2,000	Q2, Y1	18,000
Subtotal 5	43,600	6,000	15,000	29,000	10,000	11,000		114,600
Output 2.3:								
A2.3.1: Conduct a project implementation strategy seminar to ensuring the participation of key project personnel from all involved offices and the local communities in the project sites.	8,000		1,500		1,100		Q1-2, Y2	10,600
A2.3.2: Conduct two national workshops on the development of the bamboo sector	8,000		8,000		3,000	2,000	Q1-2, Y2	21,000
A2.3.3: Prepare and distribute workshop proceedings	4,000	8,000		9,500	2,000		Q2-3, Y4	23,500
Subtotal 6	20,000	8,000	9,500	9,500	5,100	2,000		55,100
Component total	153,800	26,000	64,000	87,000	48,800	20,000		
ITTO Monitoring and evaluation								28,000
ITTO Programme support costs								25,656
GRAND TOTAL	153,800	26,000	64,000	87,000	48,800	20,000		453,256

7.2 Project Budget by Financing Source (in USD) for ITTO and Kyats for Myanmar

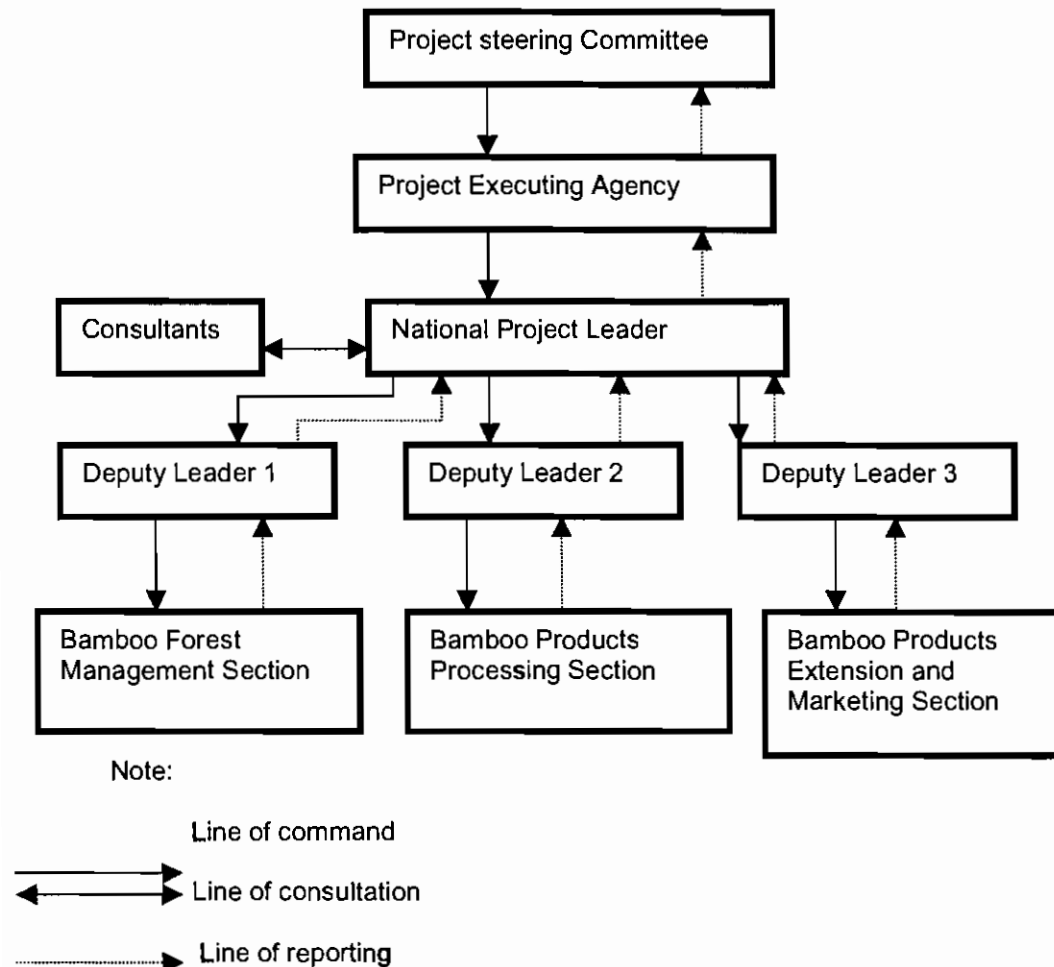
Items	ITTO (USD)	National (Kyats)
10. Project Personnel		
11. National experts (48 months) 1 Project coordinator - US\$700/month 3 Forest management specialists - US\$200/month 3 Wood processing specialists - US\$200/month		201,600 172,800 172,800
12. National Consultants 1 Bamboo management consultant - US\$500/month (36 months) 1 Bamboo processing consultant - US\$500/month (40 months) 1 Bamboo shoots consultant - US\$800/month (8 months) 1 Bamboo products marketing consultant - US\$700/month (12 months)	18,000 20,000 6,400 8,400	
13. Other labor (48 months) 10 Clerical assistants - US\$50/month 2 Administrators - US\$100/month 2 Secretaries - US\$200/month 7 Hired unskilled labor - US\$50/month	19,200 16,800	144,000 57,600
15. Fellowship and training 2 Overseas training groups (each 5 people) to China US\$2,000/person	20,000	
16. International consultants 1 Forest sociology consultant - US\$10,000 (1 month) 1 Bamboo management consultant - US\$10,000 (1 month) 1 Bamboo processing consultant - US\$10,000 (1 month) 1 Bamboo products business consultant - US\$10,000 (1.5 month)	10,000 10,000 10,000 15,000	
19. Component	153,800	748,800
20. Sub-contracts		
21. Sub-contract-publishing technical manuals and workshop Proceedings	20,000	
22. Sub-contract-establishing two bamboo products processing Plants	6,000	
29. Component	26,000	
30. Duty Travel		
31. Daily Subsistence Allowance Domestic-US\$20/day, 7 days/time, 20times/person, 10 persons International-US\$100/person, 20days, 6 persons (4 int'l consultants, 2 project staff)	28,000 12,000	
32. Transport costs Domestic-US\$100/time, 20times/person, 6 persons International-US\$2,000/person, 6 person	12,000 12,000	
39. Component Total	64,000	
40. Capital Items		
41. Premises		120,000
42. Land		60,000

44. Capital equipment		
1 Vehicle (4x4 Jeep)-US\$25,000	25,000	
1 Set of training equipment-US\$15,000	15,000	
3 Computer sets-US\$2,000	6,000	
4 Measurement equipment-US\$500	2,000	
1 Set of wood properties testing equipment-US\$10,000	10,000	
2 Sets of bamboo products processing equipment-US\$14,500 (Bamboo strip splitter, cutting machine, slicing, surface grinding, stick maker, dryer, finishing planer)	29,000	60,000
49. Component Total	87,000	240,000
50. Consumable Items		
51. Raw materials	8,500	60,000
52. Spares	9,600	30,000
53. Fuel and Utilities	18,700	
54. Office supplies	12,000	60,000
59. Component Total	48,800	150,000
60. Miscellaneous		
61. Sundry	14,000	
62. Auditing	6,000	
69. Component Total	20,000	
70. Executing Agency Management Cost		170,820
79. Component Total		170,820
80. ITTO Monitoring, Evaluation & Administration		
81. Monitoring & Review Costs	18,000	
82. Evaluation Costs	10,000	
83. Programme Support Costs (6%)	25,656	
89. Component Total	53,656	
90. Refund of Pre-project Costs	0	
100. GRAND TOTAL	453,256	1,309,620

PART III. OPERATIONAL ARRANGEMENT

1. Management structure

The project will be implemented under the overall supervision of the Ministry of Forestry. The executing agency will be the Forest Department (FD), Ministry of Forestry under which the Forest Research Institute (FRI) will undertake the role of project implementation. A schematic project management structure is shown as below.



The Project Steering Committee (PSC) will consist of Minister of the Ministry of Forestry or somebody authorized by the Minister as a chairman, Representative of ITTO, the Director-General of the Planning and Statistics Department of the Ministry of Forestry, the Director-General of the Forest Department, the Managing-Director of Myanmar Timber Enterprise, the Managing-Director of the Forest Products Joint Venture Cooperation, Chairman of the Myanmar Timber Merchants Association, Consultants, Directors of the Forest Department Headquarters, as members and the Director of the Forest Research Institute as the Secretary.

Implementation of the project will be closely collaborated by the members of the PSC under the authorization given by the Chairman.

The implementing Agency, the FD, will coordinate all relevant agency to accomplish the objectives of the project. As a head of FD, the Director-General will supervise and give continuous guidance to the project leader. The Forest Research Institute (FRI) will undertake responsibility of implementation of the project. The Project Leader will be assigned by the Executing Agency.

2. Monitoring, Reporting and Evaluation.

(a) Periodic project progress reports

Periodic progress reports of the project will be made available to ITTO twice a year, 4 weeks before the intended date of monitoring visits, which will coincide with 2 months prior to the usual bi-annual ITTO Council Sessions. Assuming the project starts at 1st April in Year 1, tentative month of submission of progress reports to ITTO will be as follows.

1 st Project Progress Report	March, Year 1
2 nd Project Progress Report	September, Year 2
3 rd Project Progress Report	March, Year 2
4 th Project Progress Report	September, Year 3
5 th Project Progress Report	March, Year 3
6 th Project Progress Report	September, Year 4
7 th Project Progress Report	March Year 4

The reports will conform to the standard format established in the *ITTO Manual for Project Formulation (1999)*. These reports will contain information on project performance for each activity and, if possible, completed outputs.

(b) Project Completion Reports

The project completion report will be submitted to ITTO as soon as possible after the completion of and in any case within three months.

The Project Leader will undertake this responsibility in compliance with the Project Agreement and *ITTO Manual for Project formulation (1999)*

(c) Project Technical Reports

Project technical report will be submitted to ITTO within three months of Project Completion. Mid-term technical reports will be submitted to ITTO when any assigned outputs have been achieved according to the work plan. The reports will be made in conformity with the *ITTO Manual for Project Monitoring Review and Evaluation*.

(d) Monitoring, Review and Steering Committee's Visits

The project will be subject to monitoring by ITTO representatives according to the ITTO guidelines. Monitoring visits by ITTO representation(s) may be fixed by the ITTO or consulted with the Executing Agency. Appropriate time of monitoring visits should be made in March every year open season for field visits during the PSC meetings.

(e) Evaluation

The project will formally be subjected to participatory evaluation with ITTO guidelines.

3. Future operation and maintenance

There are two main portions in this project; 1. Establishment of the bamboo plantation and 2. Enhancement of the rural community participation in sustainable utilization of bamboo through improved and diversified processing technology. Both will contribute the alleviation of rural people's poverty and experimental results of this project will be useful as valuable sources for other institutions and agencies. The FRI will maintain the project results and apply in its future social forestry projects, especially in future community forests. The 100-ha-wide bamboo experimental plots will be maintained by the FRI for a model plots for rural communities as a profitable business and research plots for scientists.

PART IV. TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTO objectives

This project is in full compliance with the following Articles of the ITTA 1994:

- (c) *to contribute to the process of sustainable development.*
- (f) *to promote and support research and development with a view to improving forest management and efficiency of wood utilization as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests.*
- (i) *to promote increased and further processing of tropical timber from sustainable sources in producing member countries with a view to promoting their industrialization and thereby increasing their employment opportunities and export earnings.*

In Myanmar, the bulk of people live in rural areas and their livelihood mainly depends on agriculture and forests. Their reliance to forests is very large and as a result some early accessible forests have been wiped out. This will jeopardize the existence of natural forests in the long-term, let alone to have SFM in those forests. Since the proposed project is based on working with local communities to ensure their participation in the sustainable use of bamboo resources, it will contribute to the achievement of sustainable development of local communities through increasing forest values in timber producing forests and providing income generation opportunities.

2. Relationship to ITTO Yokohama Action Plan and priorities

This project is also in full compliance with the following goals established by the Committee on Reforestation and Forest Management and the Committee on Forest Industry.

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

- (5) *Access opportunities for, and promote development of non-timber forests products and forest services, which can improve the economic attractiveness of maintaining the forest resource base.*
- (7) *Encourage and assist members as appropriate to:
develop innovative mechanism and relevant legislative frameworks, including incentives and market-based instruments to secure and expand, where appropriate, which address.*

Goal 2: Promote sustainable management of tropical forest resources

- (5) *Monitor and assess the environmental, social, and economic costs and benefits of forest plantation development and utilize the information to promote, where appropriate, new plantations within the ITTO Guidelines for the Establishment and Sustainable Management of Planted Tropical Forests.*
- (10) *Encourage and assist Members, as appropriate, to:*
 - *improve the productive capacity of natural forest, where appropriate, through intensified silvicultural practices, better utilization of lesser-used species, promotion of non-timber forest products, guided natural regeneration, enrichment planting and reforestation.*
 - *Implement research and development activities in the management of secondary tropical forests, restoration of degraded tropical forests and rehabilitation of degraded forest land, taking into consideration ITTO guidelines;*
 - *Establish and manage forests for multi-use in close co-operation with local forest owners and communities living in the forest areas.*

The project is also in line with the priorities established by the Committee on Forest Industry particularly in the following:

Goal 2. Improve Industry's Efficiency of Processing and Utilization of Tropical Timber from Sustainable Sources

- (5) To the extent possible, given the Organization's primary focus on timber, develop, publish and disseminate techniques and technologies on product development and on utilization efficiency of non-timber forest products*

- (8) Encourage Members and assist, where appropriate, to;*
 - formulate research and development of proposals that assist with the piloting and commercialization of improved and/or innovative utilization methodologies, including reduction of losses and increased use of residues and recycling;*
 - participate in international standards activities related to forest products; and undertake research into wood properties and end use requirements, with particular attention to the properties and availability of lesser-used species and timber plantation species and the potential markets for them.*

The present proposed project aims at to check the population pressure by employing sustainable utilization of bamboo with community participation. Bamboo, as a rule, is teak's best company and unless sustainable utilization of bamboo is in existence, the teak bearing forests will be disappeared. Bamboo produces 30% of biomass annually and their litter fall provides nutrient to the teak, a timber species with rapid growth. Thus over harvesting of bamboo will check the growth of Myanmar tropical species, teak, Pyinkado and etc. Adoption of bamboo growing habit, managing it in a sustainable manner will enable the outcome of SFM, the ITTO objectives; while improving the living standard of local community fulfilling their requirements of food, shelter through bamboo industry.

In particular, the project will provide comprehensive information to access opportunities for, and promote development of non-timber forests products and forest services, which can improve the economic attractiveness of maintaining the forest resource base through the assessment of the opportunities of bamboo development at the project sites closely linked with the local communities in sustainable management of teak and other hardwood forests. Further, the project will contribute to the development, publication and dissemination of techniques and technologies on various bamboo product developments through conduct of bamboo products research and development and a series of training courses on bamboo management and utilization with the participation of key stakeholders in bamboo development, including women and local community leaders.

Appendix 1. Terms of Reference for National and International Consultants

The project team will include eight professionals; each 4 national and International consultants. The four national consultants will be assigned for bamboo management, processing, bamboo shoots making and bamboo products marketing. Similarly, 4 short-term international consultants for this project are; one sociologist, and 3 experts for management, processing and product business.

The minimum qualifications and obligations required for the key staff are shown below.

Forest Management Expert

National Forest Management Expert must be a forester with rich experience in forest management, holding at least a Master degree in management field and having knowledge on bamboo growing and management, being proficient in English.

The main responsibilities of the management experts will include;

- ▶ Gathering information for bamboo planting and management
- ▶ Identification and demarcation of the demonstration plots
- ▶ Formulating and implementing work plan
- ▶ Regular inspection of bamboo plantations
- ▶ Participating in project's extension activities
- ▶ Conducting training on bamboo planting and management
- ▶ Preparation of reports and manuals

Bamboo Processing Expert

National Bamboo Processing Experts must be a forester/forest engineer holding university degree in the field of wood science or forestry with extensive experience in promoting timber and non-timber products; being proficient in English both in speaking and writing.

His duties will include;

- ▶ Gathering information on bamboo properties and processing activities
- ▶ Identifying, appropriate bamboo harvesting way, and of bamboo species for bamboo products.
- ▶ Preparing design for bamboo products
- ▶ Site selection for bamboo processing plant
- ▶ Acquisition of processing mechanics and installation
- ▶ Production tests and adjustment
- ▶ Conducting training on bamboo processing to the staff and communities
- ▶ Participation in extension activities and
- ▶ Preparation of reports and manuals

Bamboo Product Marketing Consultant

National Bamboo Product Marketing Consultant must be a person holding at least an university degree in business management and marketing or relevant fields with 5 years experience in forest product marketing and proficient in English.

His/ her duties will include;

- ▶ Gathering information market situation of bamboo products
- ▶ Identification of market demand (high demand bamboo products and their price) and recommendations on the establishment of two bamboo cooperatives
- ▶ Market survey of bamboo products
- ▶ Communicating with international bamboo product associations
- ▶ Preparation of manuals and reports

International Forest Management Consultant

International Forest Management Consultant must be a forester with at least university degree in the field of forest management and having at least 10 years experience in tropical forest management, being proficient in English language.

His/ her duties will include:

- Provision of technical assistance to the national forest management consultant in order to achieve the expected objectives and outputs 1.1 and 1.2
- Training national staff (foresters)
- Giving advice to research works in bamboo plantation and management.
- Analysis of the contribution of bamboo to sustainable forest management
- Evaluation of the project activities in bamboo management

International Bamboo Processing Consultant

International Bamboo Processing Consultant must be a forester or forest engineer with an university degree in the field of forest product utilization and having more than 10 years in processing of timber and bamboo products, and being proficient in English language.

His/ her duties will include

- Gathering internationally high demand bamboo products
- Making product design
- To give advice in constructions and operation of bamboo product producing plants
- Assisting national experts in identifying technologies and selecting equipment
- Participation in training of processing plant staff
- Assisting project evaluation

International Sociology Consultant

International Sociology Consultant must be a sociologist in the field of Social science or forest science and having more than 10 years in experience in community forestry programmes in tropical countries and being fluent in English Language.

- Making rural socio-economic survey
- Assessing the attitude of rural communities to the project
- Developing social means to organize the rural communities to be involved in bamboo project
- Preparation of manuals and reports
- Giving necessary social advice to project leader and guidelines in project extension activities

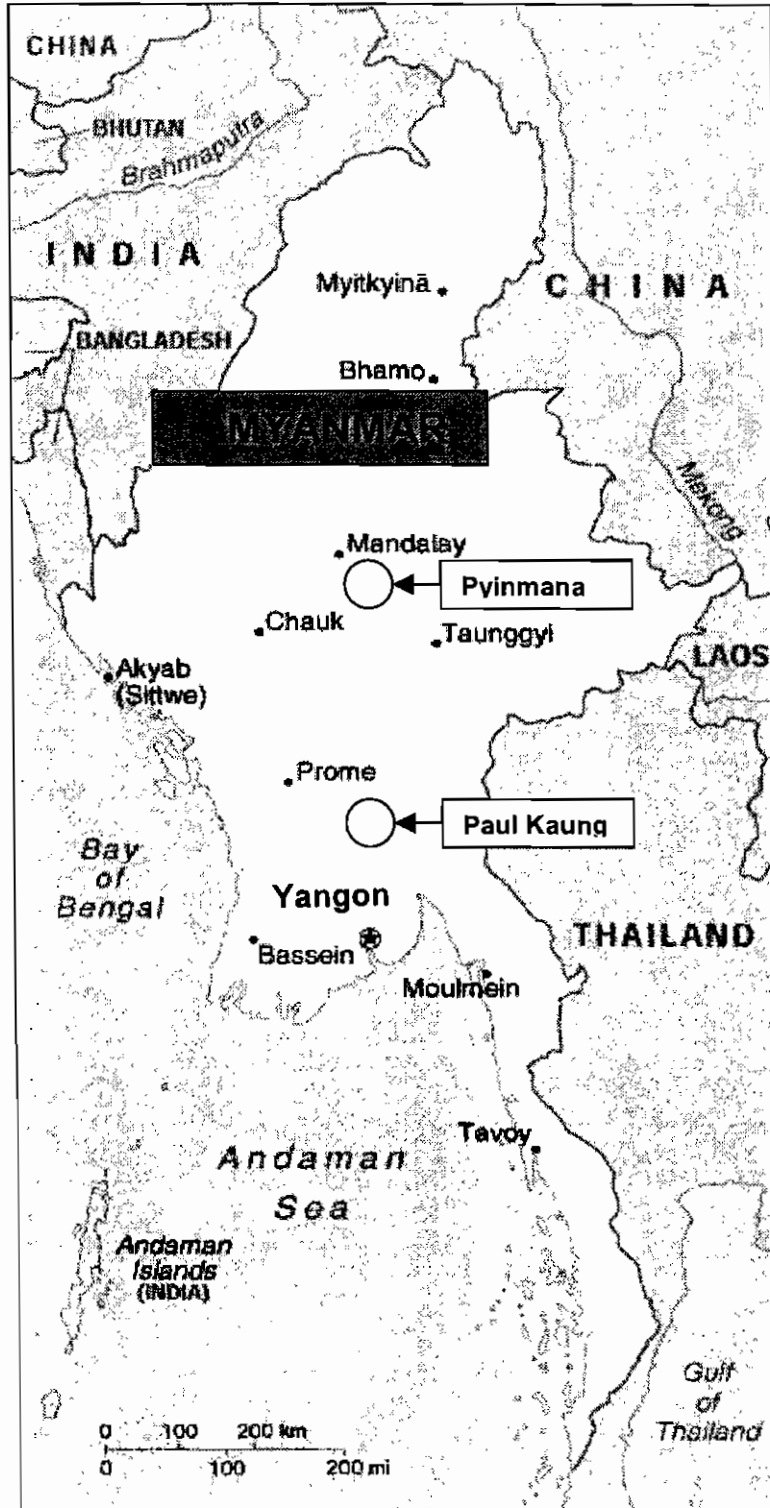
International Bamboo Business Consultant

International Bamboo Products Business Consultant must be a forester holding an university degree, preferable Ph.D, with intensive experiences in promoting tropical Non Wood Forest Products (NWFPs) business and being fluent in English.

His/ her duties will include;

- Assisting in gathering information on the existing bamboo products in bamboo products producing countries and identification of potential bamboo products to be promoted by the project
- Economic analysis of bamboo products manufacturing
- Prediction of bamboo products demand in domestic and international markets
- Giving advice on bamboo products distribution channel and pricing
- Preparation of marketing manuals and reports on bamboo products

Appendix 2. Map showing two project sites



Appendix 3 Summary of modifications of the revised proposal PD 146/02 Rev.1 (I)

Recommendations of the 23 rd Expert Panel	Modifications made in PD146/02 Rev.1 (I)
1. Rework Section 3 "Programmes and Operational Activities"	This Section provides information on the national forest policy regarding the Community Forestry Instruction (1995) and on completed and on-going ITTO pre-project and projects oriented to the development of the country's forestry sector.
2. Elaborate further the technical and social aspects of the project and provide more information on the project sites.	<p>The technical aspects of the project include that based on the results of the bamboo properties, practical guidelines on silviculture and harvesting of those promising or commercially important bamboo species for sustainable production will be developed (see page 7-8).</p> <p>Measures to improve the participation of local communities in the proposed project activities is introduced in Section 2.8 Social Aspects (see page 10-11)</p> <p>Section 2.5 Technical and Scientific Aspects includes information on the location, environment and forest types of the project sites (see pages 7-8).</p>
3. Clarify the relation between the expected project achievements and the relevant ITTO Objective(s) and how the Project work would make a significant contribution to the advancement of the ITTO Yokohama Action Plan.	Part IV Tropical Timber Framework provides details on the expected contribution of the project in response to Articles (c), (f) and (i) of the ITTA, 1994 and to selected goals of the ITTO Yokohama Action Plan, including the assessment of opportunities for, and promotion of the development of non-timber forests products and forest services, which can improve the economic attractiveness of maintaining the forest resource base (see pages 30-31).
4. Strengthen the project activities to contribute to sustainable forest management.	<p>The project Activity1.1.2 provides selection criteria for the establishment of demonstration plots. They will be established within the degraded forest lands, where have the potentials to enhance SFM (see page 12).</p> <p>The project Activity 2.3.2 provides agenda for the proposed workshop. One subject is to present a study report concerning the contributions of bamboo in SFM (see page 16)</p>
5. Rework the project title to reflect the core of the project activities.	The project title was changed to "Promoting Sustainable Utilization of Bamboo through Community Participation in Sustainable Forest Management"