INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT PROPOSAL

TITLE	INTRODUCING MYANMAR'S LESSER-USED TIMBER SPECIES TO THE WORLD MARKET
SERIAL NUMBER	PD 31/96 Rev.2 (M,F,I)
PERMANENT COMMITTEE	FOREST INDUSTRY
SUBMITTED BY	GOVERNMENT OF MYANMAR
ORIGINAL LANGUAGE	ENGLISH

SUMMARY

Myanmar's forests contain much more commercially valuable timber than what is made available to the market today. The Forest Department in collaboration with the Forest Research Institute, will prepare the ground work for getting such timber ready for the market by doing a detailed inventory of selected forest areas of east Bago Yoma Region and by carrying out laboratory and field testing of these hitherto underutilized species.

EXECUTING AGENCY	FOREST DEPARTMENT, MYANMAR
COOPERATING GOVERNMENTS	
DURATION	36 MONTHS
APPROXIMATE STARTING DATE	UPON APPROVAL

BUDGET AND PROPOSED SOURCES OF FINANCE

Source	Contribution in US$	Local Currency Equivalent (Kyats)
ITTO	495,533.50	
Gov't of Myanmar	1,615,108.00	9,690,650
TOTAL	2,110,641.50	

PART I : CONTEXT

A. Relevance to ITTO

With a primary aim of increasing the value of the forest as a national asset through the introduction of new timber species on to the market this project is consistent with one of the objectives of ITTO, 1983 (Article 1) which is to promote and support research and development with a view to improving forest management and wood utilization . It is in compliance with all the criteria pertaining to R & D (Article 23). This project is also in line with one of ITTO's strategies of developing and promoting on optimal use of tropical forests (ITTO Action Plan see 4. " Strategies and Action Plans") and falls within one of the priority areas of the Committee on Forest Industry stated in ITTO Action Plan, pertaining for laboratory research on new species and products.

B. Relevance to National Policies

Myanma Selection System allows for an annual output of 630,000 m^3 of teak and 2.34 million m^3 of other hardwoods under sustainable management. Actually only 70% of its harvestable teak and 34% of the other hardwood species are being extracted annually.

There is a great deal of room for optimal utilization of its forest resource. The main reason for the short fall in teak extraction is the apparent lack of the milling capacity to process the teak locally whereas in the case of hardwoods it is mainly due to the knowledge-gap on the properties and usefulness of those timbers. This classifies the hardwood under the lesser-used (or underutilized) category. This project underlines the Myanmar Government's Policy of attaining additional benefits from its natural resources by promoting the "export of value added forest products and encourage the use of under utilized species" (Myanmar Forest policy, 1995 see 3.4 "Forest Industry, Marketing and Trade"). It is the stated aim of the Ministry of Forestry to encourage the production, processing and marketing of (non-teak) hardwoods and other forest produce in the form of finished goods and other products. The Forest Department which will spearhead the project assumes the responsibility of developing the forest sector in the area of environment and wildlife conservation, protection of catchment areas and provision of sufficient timber and other forest produce on a sustained basis.

PART II: THE PROJECT

1. Origin

There has been no previous ITTO activity related to this project in Myanmar.

2. Project Objectives

2.1 Development Objective

The primary aim of the project is to increase the economic contribution of Myanmar's forest resource by emphasizing the introduction of underutilized timber species.

2.2 Specific objectives

2.2.1 Specific Objective 1

To gather information on Lesser Used Species(LUS) for industrial planning purposes with particular reference to the stand class distribution and regeneration status.

2.2.2 Specific Objective 2

Experimental scale introduction of 100 LUS to the market through identification of wood properties and further processing.

3. Project Justification

3.1 Problems to be addressed

Myanmar's natural forests are known to contain at least seven hundred potential timber tree species. As of today teak constitutes eighty percent of the total volume of timber export. The forest is capable of contributing much more foreign exchange

earnings through efforts in promoting the lesser used timbers on to the market. But its acceptance is restricted by a lack of knowledge of its properties. In the mean time wasteful practices tend to continue with the use of teak for common utility purposes which could easily be replaced by the less valuable hardwoods. Increased utilization of these hardwoods would also mean better conservation of teak.

3.2 Characteristics of the region of area where the project will be located

The project site consists of selected forest areas of about 50,000 ha in Oktwin township in the East Bago Yoma region. In Oktwin township, landuse according to Agricultural Census 1990 includes 80,500 ha of forested land, 41,200 ha of land under villages and agriculture and waterbodies of 1,500 ha with a balance unalloted public land of 18,000 ha. Within the forest area, the reserved forests consist of 88% and the rest unclassed forests. The forest type in the study area mainly consists of Moist Upper Mixed Deciduous Forest, Dry Upper Mixed Deciduous Forest and in some low lying areas, Lower Mixed Deciduous Forest types. There are also patches of Evergreen Forest and Deciduous Dipterocarp Forests.

The population of Oktwin in 1995 is estimated to be 137,832, projected from 1983 population census with a population growth rate of 1.87 %.

The terrain is more or less undulating with high elevation regions not exceeding 650 m. Major soil groups are derived from Tertiary Sand Stone and Lime Stone, with Yellow Brown Forest Soils dominating the region. Soils are generally shallow, friable and well structured with a loamy texture.

Rainfall ranges between 1500 - 2000 mm, with rainy days of 115-132 days.

3.3 Other relevant aspects of "pre-project situation".

The Forest Department has been implementing a Continuous Forest Inventory (CFI) system since 1981. National Forest Survey and Inventory (BUR/79/011) and National Forest Management and Inventory Project (MYA/85/003) were the two UNDP/FAO aided projects which had been operational in carrying out the CFI system until,

December 1993. Under the CFI system pre-investment surveys on a systematic grid basis of 3 km x 3 km using overall sampling intensity of 0.1 %, management inventories in selected townships on a systematic basis of 1.5 km x 1.5 km, with an overall sampling intensity of 0.5% to provide necessary information for drawing up management plans had been carried out. In economically less important forested area, a reconnaissance forest inventory was also applied in which a stratified sampling design with a clustered-plot lay out was undertaken with a very low sampling intensity. After the termination of the project, forest inventory at pre investment level has been carried out annually with the financial support of the Forest Department.

The project site within the Bago Yoma region was inventoried in 1992-93 using the pre-investment survey design. In order to determine the potential of LUS for industrial planning purposes from the project site, it will be necessary to conduct forest inventory at the management level. Apart from that, in the current forest inventory designs, regeneration status of commercial species such as Teak and Pyinkado were included in the design. The intended management level forest inventory will survey the regeneration status of the LUS.

The Forest Research Institute (FRI)at Yezin is the only research institute for forestry under the Forest Department. An agreement was made to establish FRI with UNDP/FAO grant in 1974. Under this Agreement two phases covering the period 1978 to 1983 and 1983 to 1987 were formed to build up the infrastructure and strengthen FRI successively. Researchers were trained with the cooperation of the University of Syracuse under a UNDP grant during that period. The FRI has 6 technical divisions covering the fields of Forest Management, Botany and Tree Improvement, Natural Resources, Protection, Wood Properties and Forest Industries. The other two divisions namely, Research Planning and Extension and Financial and Administrative divisions support the activities of technical divisions.

FRI has formerly 36 researchers and senior staff out of 251 staff. However, due to retirement and inevitable transfer of researchers to other institutions and departments,

it has now only 18 senior staff, out of which 5 are engaged in wood properties and forest industries.

After the termination of the project, FRI has continued to carry out the research activities under the guidance and financial support of the Forest Department. During the project period FRI was well equipped with modern laboratory facilities and literature. However, some equipment and machinery become unserviceable due to wear and tear after a long period of handling. Availability of up-to-date literature is also lacking. Shortages of chemicals, spare parts and updated literature pose constraints to conduct research activities properly.

FRI, in collaboration with Myanmar Timber Enterprise, has published an illustrated book entitled "Some Commercial Timbers of Myanmar" which included 25 commercial species. No publication of that kind was made for LUS. However, some 25 to 30 species of LUS has been tested for physical and mechanical properties. Ten species have been tested for durability and treatability. Drying properties of some 15 to 20 LUS have been carried out while more than 50 species have been anatomically identified at FRI.

3.4 Intended situation after the project completion

The database provided from the management level inventory will give detailed information on the stock both in quantity and quality and regeneration status of LUS in the project area for industrial planning purposes for potential end-users.

At the termination of the project, wood properties of 100 LUS will be determined and expected end-use of these LUS will be propagated through extension services. Sample end-use products will be demonstrated to convince the public on the utility of LUS for domestic purposes as well as for the promotion of the private sector investment in small-scale wood industries, which will provide employment opportunities for the rural dwellers.

3.5 Target beneficiaries

The immediate beneficiaries of the project will be the local communities by way of increased income through the positive impact of new knowledge of the additional raw material which will present opportunities for creating rural based industries and thereby providing more employment to the people.

3.6 Project Strategy

3.6.1 Reasons for selection

The strategy to achieve the intended objectives identified by this proposal is to investigate the resource information on 100 LUS by conducting the management inventory; to harvest sample LUS for testing the required properties and to make presently and potentially marketable LUS products on an experimental scale.

In Myanmar, the main timber species used for construction, furniture, household commodity and decorative, etc. are still confined to only a limited number of species as has been mentioned in Section 3. of Project Justification. For the purpose of this project proposal, it is confident that management inventory with a sampling intensity of 1% would satisfy the needs of the project.

3.6.2 Lessons drawn from past evaluation

Previous forest inventories conducted in Myanmar provide information on LUS regarding species composition and per hectare volume and density only. The status of regeneration of LUS is still lacking. This type of information will provide baseline information for studying forest growth dynamics and regeneration potential for the sustainable utilization of the resource base in the forest management unit under study. The detailed management inventory using 1 % sampling intensity in which quantitative as well as qualitative information such as determining the net volume of standing timber by species

and log sizes in the area, will provide information base for rational utilization of forest resources. The potential of LUS with additional information on commercial uses through proper research activities will provide better opportunities for the promotion of private investments in small-scale wood industries using LUS.

Research scale exploitation of LUS, especially a few selected species indicated large-scale harvesting is necessary for commercial exploitation. Research activity in promoting the utilization of LUS should be extended from mere testing stage to demonstration of potential end-use commodities in order to obtain acceptance by consumers.

3.6.3 Technical and scientific aspects

Most of the facilities are already available within the Forest Department in terms of trained man-power to carry out inventory work and timber testing equipment (although most of it needs to be serviced) at the Forest Research Institute, though it still requires the provision of some additional equipment and machinery for processing timber into finished products.

Traditional acceptance of teak for its reputation and relative abundance of this species make it difficult for LUS to compete with it in both local and international markets. Some LUS might be well known for its quality but unavailability in quantity (as compared to teak) renders it unmarketable. If classification and grouping of those lesser available species according to their properties and end-uses be made after thorough testing and analysis, it would be of great help for strategic marketing planning.

Working properties of some timber made it difficult for small-scale industry to produce finished commodities commercially. Small-scale industries will have to be well equipped with timber processing facilities and technology. Although a considerable number of forestry personnel have been trained in the area of

forestry related fields, very few has been exposed in the area of timber technology and industries.

3.6.4 Economic aspects

Initiation of commercial exploitation of LUS could be expected to fulfill the acute shortage of domestic timber requirement and thereby relieving the over cutting of few exportable timber species for domestic use.

With the exploitation of LUS along with existing commercial species, per unit area logging costs could greatly be reduced and thus, will increase the efficiency of the logging industry.

3.6.5 Environmental aspects

With the increased harvest of LUS, the species composition of the residual forest becomes more balanced and thereby increasing the value of the forest. Research is also needed in this aspect.

Since the Myanmar Selection System (MSS) will be applied in which only trees of and above the specified girth limits will be extracted, it is expected that there will be no serious adverse impact on the environment.

3.6.6 Social aspects

The acceptance of LUS in the market through research activities would provide better employment opportunities for the rural dwellers in logging industries and other related activities. Moreover with the promotion of private investors in the development of cottage industries using LUS, additional incomes could be generated for the rural communities.

3.6.7 Managerial aspects

The sole implementing agency is the Forest Department (FD) in collaboration with ITTO. Inventory crews and FRI personnel are competent for carrying out tasks under the proper guidance and support of Project Steering Committee (PSC). PSC will mainly consist of representative members of Ministry of Forestry, Planning and Statistics Department, Forest Department and Myanma Timber Enterprise.

3.7 Reasons for ITTO support

ITTO support of the project is highly useful, further, the organization has had several experience in this kind of approach to resource enhancement work. Previous work on forest inventory was carried out under a UNDP assistance programme but such operations gave a broad indication of forest content by classification. This project will proceed from there into getting more detailed information of the forest content suited for industrial planning purposes.

3.7.1 ITTO aspects

The internationally agreed Year 2000 Objective of the ITTO was supported by the Government of Myanmar with a view to achieving the sustainable management of the country's forest resources.

ITTO support is requested to implement this project with a view to fulfilling the primary ITTO objective of helping member countries to implement programs and projects aimed at sustainable tropical timber production in consonance with forest resource and environmental conservation.

3.7.2 Relationship to relevant actions supported by other donors

At the moment there is no related activities with other donors.

3.8 Risks

The project is not expected to encounter risks of failure as the operations are basically standard to the Forest Department.

4. Outputs

4.1 Outputs for Specific Objective 1

Specific Objective 1

To gather information on LUS for industrial planning purposes with particular reference to the stand class distribution and regeneration status.

Output 1.1

About 50,000 ha of forest at management level inventoried.

Output 1.2

Data of LUS in inventoried area, processed using computer facilities (Volume table, stand table, stock table etc.,)

Output 1.3

Staff from forest inventory, computer /GIS sections trained overseas.

4.2 Outputs for Specific Objective 2

Specific Objective 2

Experimental scale introduction of 100 LUS to the market through identification of wood properties and further processing.

Output 2.1

Technical data of 100 LUS on wood properties and probable end-uses established .

Output 2.2

Sample finished products of LUS for public demonstration.

Output 2.3

Handbooks, pamphlets, video tapes etc., on improved utilization of LUS for peoples' awareness thorough extension services.

Output 2.4

One person each in the field of Wood Anatomy, Wood Mechanics, Wood Drying, and Wood Preservation trained overseas during the first year.

Output 2.5

Two persons each in area of saw-mill technology (especially sharpening band saw) handicraft manufacturing, turnery and finishing wood products trained locally during the first year. (One month course)

5. Activities and inputs

Output 1.1

About (50,000) ha of forest at management level inventoried.

	Activities		Input
1.	Planning and preparation of yearly work plans for forest	1.	1 National Consultant, 1 Staff Officer, 2 Forest Rangers,

inventory operations.

2. In-service training of forest inventory crews.
3. Actual field work.

maps, aerial photos and satellite images.

2. 10 Deputy Rangers and 26 Foresters, 10 field crews, with each crew consisting of 1 Deputy Ranger and 2 Foresters and 5 labourers. These inventory crews will carry out inventory works for 3-4 months each year. One truck and 1 inspection vehicle and 2 drivers for servicing inventory crews; field and camping equipment; transport and other field supporting expenses.

Output 1.2

Data of LUS in inventoried area, processed using computer facilities (Volume table, Stand table and Stock table etc.,)

Activities

1. Data processing and analysis of inventory data.
2. Volume table construction of selected LUS or species groups.
3. Preparation of reports on inventory results.

Inputs

1. 2 professional staff and 8 technical staff, 5 numbers of PC for data processing.
2. Laser Jet printer for report generation.

Output 1.3

Staff from forest inventory, computer /GIS sections trained overseas.

Activities	Input
1. Study overseas at appropriate institution.	1. Provision of funds for training

Output 2.1

Technical data of 100 LUS on wood properties and probable end-uses established.

Activities	Inputs
1. Draw executing plan for sampling, material collection and timber testing.	Consultancy 1 m/m
2. Collection of timber, 50 species each year during the 1st and 2nd years. About 10 m^3 per species.	1 Forest Ranger 4 Deputy Rangers 8 Foresters Logging and camping facilities 1 Saw-mill and accessories. (Repair existing facilities at FRI) Trained persons at FRI.
3. Preparation of timber specimens for various testings.	2 National consultants
4. Laboratory studies on anatomy, drying behaviour, durability, treatability, physical and mechanical properties.	
5. Prepare a technical report of properties and utilization of tested LUS.	

Output 2.2

Sample finished products of LUS for public demonstration processes.

Activities	Inputs
1. Recruitment of qualified personnel for handling timber products. 2. Preparation of timber collected for further processing. 3. Process finish-products according to the recommended end-use.	1. Consultancy 1 m/m 2. Cost of hiring professionals. 3. Timber 4. Drying kiln 5. Machineries for special purpose manufacturing.

Output 2.3

Handbooks, pamphlets, video tapes, etc. on improved utilization of LUS for peoples' awareness through extension services.

Activities	Inputs
1. Collection of data, photographs, videos throughout the process of harvesting to end-uses 2. Editing and processing. 3. Publishing 4. Study (Overseas).	1. Audio visual aids 2. Professionals. 3. Operating expenses. 4. Computers 5. Selected personnel from Extension Division, Forest Department.

Output 2.4

One person each in the fields of Wood Anatomy, Wood Mechanics, Wood Drying and Wood Preservation trained abroad during the first year.

Activities	Inputs
1. Selection of suitable candidates and give pre-requisite training (One month for each course) 2. Training overseas at appropriate institutions for relevant studies (3-6 month course)	1. Candidates 2. Training allowances 3. Host institutions for proper training.

Output 2.5

Two persons each in the areas of saw-mill technology (especially sharpening band saw) handicraft manufacturing, turnery and finishing wood products trained during the first year. (One month for each courses)

Activities	Inputs
1. Selection of suitable candidates	1. Consultancy 1 m/m
2. Procuring required machineries	2. Machineries for special purposes
3. Training	

6. LOGICAL FRAMEWORK WORKSHEETS

Project Title Introducing Myanmar's Lesser-used Timber Species to the World Market

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Development Objective : Increased number of non-teak hardwood species on the market to 100 species.	1. Increased scheme of domestic use of LUS. 2. Gradual replacement of domestic teak consumption by non-teak timbers. 3. Appropriate stand class distribution of non-teak species in properly managed forests.	1. Statistics on timber exported and used locally. 2. Statistics on timber supply 3. Forest inventory data.	

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Specific objective 1 1. To gather information on LUS for industrial planning purposes with particular reference to the stand class distribution and regeneration status	1. Rate of progress of inventoried area.	1. Inventoried area.	1. Efficient and skilled personnel
Output 1.1 About 50,000 ha of forest at Management level inventoried	1. Progress of field inventory program.	1. Annual work plan for field inventory program	1. Efficient Administration and Skilled personnel.
1.2 Data of LUS in inventoried area processed using computer facilities.	1. Inventory database.	1. Forest stand and stock tables	1. Efficient and skilled personnel.
1.3 Staff of forestry inventory, computer/ GIS trained.	1. Progress of training program.	1. Number of staff trained.	1. Efficient and skilled personnel.
Activities 1.1.1 Planning and preparation of yearly work plans for forest inventory operation.	1. Progress of sample plot delineation on maps. 2. Preparation of field instructions.	1. Number of sampling units to be surveyed yearly. 2. Printed field instruction books.	

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1.1.2 In-service training of forest inventory crews	1. Progress of field training.	1. Field training program.	1. Efficient and skilled personnel
1.1.3 Actual field work.	1. Progress of sample plot surveyed.	1. No of plots surveyed.	1. Efficient and skilled personnel
1.2.1 Processing and analysis of inventory data	1. Process of data processing.	1. Data file 2. Date entry programs 3. Data validation program 4. Data processing program	1. Efficient Administration Efficient and skilled personnel.
1.2.2 Volume table construction of selected LUS species or species groups	1. Progress of volume table construction	1. Volume data 2. Data entry program 3. Data validation program 4. Volume functions	1. Efficient and skilled personnel
1.2.3 Preparation of reports on inventory results.	1. Progress of report preparation	1. Publish report	1. Efficient Administration

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Specific Objective 2			
2. Experimental-scale introduction of 100 LUS to the market through identification and further processing.	1. Number of wood species tested for: (a) Physical (b) Mechanical (c) Anatomical (d) Drying (e) Durability (f) Treatability	1. Techanical reports	1. Trained personnel as proposed
	2. Number of sample finished products	2. Booklet, video tapes and personal assessment	2. Wood processing machineries procured
	3. Acceptance of attempted LUS in market.	3. Questionaires, Sales.	3. Quality products assured
Outputs			
2.1 Techanical data of 100 LUS on wood properties and propable end-uses established	1. Progress of testing of collected wood specimens	1. Assessment of technical reports. Personal inspection	1. Qualified researchers
2.2 Sample finished-products of LUS for publis\c demonstration processed	1. Progress of finished products prepared	2. Personal inspection	
2.3 Handbooks, phamplets video tapes etc., on improved utilization of LUS for peeoples' awareness through extension services	1. Progress of editing and publishing of documents on end-use production of LUS	3. Publuished information	

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
2.4 One person each in field of Wood Anatomy, Wood Mechanics, Wood Drying and Wood Preservation trained abroad during the first year.	1. Progress of training programme	4. Trained personnels	
2.5 Two persons each in the area of Saw-mill technology, Handicraft manufacturing, Turnery, Finishing wood products trained during the first year.	1. Success in producing wood products	5. Trained personnels	Consultancy and importation of required machineries assured.

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Activities			
1. Draw executing plan for sampling, material collection and timber testing	1. Consultancy (ITTO)		
2. Collection of timber, 50 species each year during 1st and 2nd year. About 10 m^3 per species.	1. One Forest Ranger, Four Deputy rangers, Eight forester. Logging and camping facilities.		
3. Preparation of timber specimens for various testings.	1. Spare band saws, spare parts for saw-mill facilities.		
4. Laboratory studies on anatomy, drying behaviour, durability, treatability, physical and mechanical properties.	1. National Consultancy		
6. Recruitment of qualified personnel for handling	1. National Consultancy 2. Cost of hiring for local experts.		
7. Preparation of timber collected for futher processing	1. Timber 2. Drying kiln		
8. Process finished products according to the recommended end-use.	1. Machineries for special purpose manufacturing		
9. Collection of data, photographs and videos thoroughout the implementation period	1. Audio-visual aids 2. Professionals		
10. Editing and processing	1. Operating expenses		
11. Publishing	1. Computers 2. Operating expenses		
12. Selection of suitable candiates for overseas studies	1. Candidates		

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
13. Training overseas at appropriate institutions for relevent studies	1. Host institutions for proper training.		
14. Selection of suitable candiates for local trainings	1. National Consultancy		
15. Procuring required machineries	1. Machinery for special purposes		
16. Training			

7. WORK PLAN

OUTPUT/ACTIVITIES	Respon-sible Party	SCHEDULE (in months)																																			
		YEAR 1						YEAR 2												YEAR 3												YEAR 4					
		7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Output 1.1																																					
50,000 ha inventory	Forest Depart-ment (FD)																																				
Activity 1.1.1 Planning and preparation of Field inventory																																					
Activity 1.1.2 In-service training.																																					
Activity 1.1.3 Field work.																																					
Output 1.2 Database of LUS																																					
Activity 1.2.1 Processing and Analysis of inventory data																																					
Activity 1.2.2 Construction of volume tables																																					
Activity 1.2.3 Preparation of reports on data analysis.																																					

7. WORK PLAN

OUTPUT/ACTIVITIES	Respon-sible Party	SCHEDULE (in months)																																	
		YEAR 1						YEAR 2												YEAR 3												YEAR 4					
		7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Output 1.3 Overseas Training																																					
Activity 1.3.1 Study overseas.																																					
Output 2.1 Data of 100 LUS on properties	Forest Depart-ment																																				
Activity 2.1.1 Planning																																					
Activity 2.1.2 Timber collection																																					
Activity 2.1.3 Specimen preparation																																					
Activity 2.1.4 Timber testing																																					
Activity 2.1.5 Report writing.																																					

7. WORK PLAN

OUTPUT/ACTIVITIES	Respon-sible Party	SCHEDULE (in months)																															
		YEAR 1						YEAR 2												YEAR 3												YEAR 4			
		7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Output 2.2 Timber commodities for public demonstration processed.	Forest Deaprt-ment																																				
Activity 2.2.1 Man power recruitment																																					
Activity 2.2.2 Pre-treatment of collected timber for processing.																																					
Activity 2.2.3 Processing of wood commodities for end use.																																					
Output 2.3 Publication and extension																																					
Activity 2.3.1 Preparation and collection of facts, pictures, photos and videos.																																					
Activity 2.3.2 Editing and processing.																																					

7. WORK PLAN

OUTPUT/ACTIVITIES	Respon-sible Party	SCHEDULE (in months)																																			
		YEAR 1						YEAR 2												YEAR 3												YEAR 4					
		7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Activity 2.3.3 Publishing and exhibition																																					
Output 2.4 Overseas training																																					
Activity 2.4.1 Selection of candidates for training																																					
Activity 2.4.2 Study (overseas)																																					
Output 2.5 In-country training																																					
Activity 2.5.1 Selection of candidates.																																					
Activity 2.5.2 Procuring required machineries																																					
Activity 2.5.3 Study (local)																																					

8. Institutional Arrangement For Execution And Operation

8.1 Management structure

The Ministry of Forestry (MOF) of the Union of Myanmar shall supervise the project and Forest Department (FD) will be directly responsible for the implementation of the project. The Project Steering Committee (PSC) will be made up of the Deputy Minister of MOF as the chairperson and ITTO representative, DG of Planning and Statistics Department , Director-General (DG) of FD, Managing Director (MD) of Myanmar Timber Enterprise, Rector of Institute of Forestry, Director of Forest Research Institute, and Project Manager as secretary of the committee.

The Project management will be under the responsibility of the DG of FD. The Project Manager will be responsible for the technical and administrative coordination of the project, and the preparation of annual plans and six monthly and final technical reports to be submitted to DG of FD and then PSC and ITTO.

The Forest Department, in agreement with ITTO, will select Chief Technical Advisor (Project Manager) as well as national and international consultants.

8.2 Future operation and maintenance

Investigation on the impact of increased extraction of LUS with respect to the tree composition in the stands and prescribed cultural operations is needed. A study on silvicultural implications and marketing might indicate possible continuation of the project.

FRI will be responsible for the implementation of research activities and its future operations and maintenance.

8.3 Key staff

Forest Department has technical expertise and staff to implement this project.

International consultancy is necessary for the propose of planning, procurement of machineries, and timber processing into marketable finish products. Therefore, the consultant should be qualified in Wood Technology preferably in the field of prefabrication of finish wood products. Ph.D. degree holder having international experience in project implementation experience in project implementation is acceptable. Two man-month schedule should be separated into two, one at the beginning and the other at the beginning of the third year .

9. Prior obligation and prerequisites

All necessary conditions to start project implementation are currently in place. This includes available staff, basic information relating to work area, infrastructure and minimum logistic support required. The Government of the Union of Myanmar will also take all necessary administrative support to ensure proper implementation of the project.

10. Possible future actions

It is expected that a second phase of the project will follow this first phase as a follow-up project. The second phase is expected to deal with sustainable natural forest management related to expanded utilization of LUS. Research and development is further needed for information of LUS into world market These requirements comply with the ITTOs' Agreement and specific objectives. Possible future assistance from ITTO would therefore be technical as well as financial.

PART III: MONITORING, REPORTING AND EVALUATION

Project progress reports will be prepared by the Project Manager to present to the executing agency, the Forest Department, whose responsibilities will be to have it examined and discussed at the Project Steering Committee.

Separate reports will be required for Forest Inventory (to include progress of overseas training) and Wood Properties (Timber Testing) modules. The latter will also include progress report of overseas training.

Inventory reports will be done on area to area basis and timber testing on batch to batch basis. Each batch of testing should be 30-35 species a year in order to meet the target of testing 100 species by the end of the project period.

Project completion report will be done as an terminal report within the prescribed period of three months before the project ends.

Monitoring visits should begin within six months of the start-up of inventory and timber testing works. A six-monthly series of PSC meeting is appropriate unless the situation development calls for a more regular schedule.

This is best evaluated at mid-stage of operations for possible major reviews.

PART IV: BUDGET

The following tables show a breakdown of estimated project costs as well as annual project budgets by source.

Inputs:

A. Contribution by Myanmar Government

The Myanmar Government will provide the following personnel for the project.

Sr.	Particulars	No.	Duration (Months)	Salary (Kyats)
	(1) Forest Inventory Operation			
1	Staff Officer	1	36	58,500
2	Forest Rangers	2	36	93,600
3	Deputy Ranger	10	18	207,000
4	Foresters	26	18	468,000
5	Data Processing Officer	1	36	58,500
6	Computer Programmer	1	36	46,800
7	Computer Operator	8	36	331,200
8	Drivers	2	36	82,800
9	Operating expenses			600,000
10	Daily subsistence allowances			336,150
	(1) Total			2,282,550
	(2) Wood Testing and Processing Operation			
1	Staff Officer	4	36	234,000
2	Forest Rangers	4	36	187,200
3	Deputy Rangers	8	36	331,200
4	Forester	16	36	576,000
5	Lab Assistant	8	36	331,200
6	Saw-mill Gunner	2	36	72,000
7	Saw-mill Assistant	4	36	122,400
8	Drying Kiln Operator	2	36	61,200
9	Preservative Treatment Plant Operator	2	36	61,200
10	Mechanical Assistant	2	36	72,000
11	Forest Taxonomist	1	36	58,500
12	Computer Terminal Operator	2	36	82,800
13	Support Staff	12	36	367,200
14	Operating expenses			4,430,000
15	Daily Subsistence Allowances			421,200
	(2) Total			7,408,100
	Grand Total			9,690,650

Myanmar Government Contribution (Kyats)

	Numbers of Personnel and Component.	No	Total	Year Components Year 1	Year 2	Year 3
	(1) Inventory Operation					
1	Staff Officer	1	58,500	19,500	19,500	19,500
2	Forest Rangers	2	93,600	31,200	31,200	31,200
3	Deputy Rangers	10	207,000	103,500	103,500	-
4	Foresters	26	468,000	234,000	234,000	-
5	Data Processing Officer	1	58,500	19,500	19,500	19,500
6	Computer Programmer	1	46,800	15,600	15,600	15,600
7	Computer Operators	8	331,200	110,400	110,400	110,400
8	Drivers	2	82,800	27,600	27,600	27,600
9	Operating Expenses		600,000	275,000	275,000	50,000
10	Daily Subsistence Allowances		336,150	168,075	168,075	-
	Sub-total		2,282,550	1,004,375	1,004,375	273,800
	(2) Wood Testing and Processing Operation					
1	Staff Officers	4	234,000	78,000	78,000	78,000
2	Forest Rangers	4	187,200	62,400	62,400	62,400
3	Deputy Rangers	8	331,200	110,400	110,400	110,400
4	Foresters	16	576,000	192,000	192,000	192,000
5	Lab Assistants	8	331,200	110,400	110,400	110,400
6	Saw-mill Gunners	2	72,000	24,000	24,000	24,000
7	Saw-mill Assistants	4	122,400	40,800	40,800	40,800
8	Drying Kiln Operator	2	61,200	20,400	20,400	20,400
9	Preservative Treatment plant Operator	2	61,200	20,400	20,400	20,400
10	Mechanical Assistants	2	72,000	24,000	24,000	24,000
11	Forest Taxonomist	1	58,500	19,500	19,500	19,500
12	Computer Terminal Operators	2	82,800	27,600	27,600	27,600
13	Support Staff	12	367,200	122,400	122,400	122,400
14	Operating Expenses		4,430,000	1,772,000	1772,000	886,000
15	Daily Subsistence allowance		421,200	168,480	168,480	84,240
	Sub-Total		7,408,100	2,792,780	2,792,780	1,822,540
	Grand Total		9,690,650	3,797,155	3,797,155	2,096,340

B. ITTO Contribution

Project budget by Component and Year (US $)

	Components	Total	Years Year 1	Year 2	Year 3
10	**Project Personnel**				
11	National Expert(Project Manager)	54,000	18,000	18,000	18,000
13	Consultants				
	International	24,000	24,000	-	-
	National	36,000	18,000	18,000	-
15	Fellowship and Training	28,000	20,000	8,000	-
19	Component total	142,000	80,000	44,000	18,000
30	**Duty Travel**				
31	Daily Subsistence Allowance	7,200	3,600	3,600	
33	International Travel	7,000	5,000	2,000	-
39	Component total	14,200	8,600	5,600	-
40	**Capital Items**				
42	Capital equipment	216,000	216,000	-	-
49	Component total	216,000	216,000	-	-
50	**Consumable items**				
53	Utilities	17,500	6,500	5,500	5,500
59	Component total	17,500	6,500	5,500	5,500
60	**Miscellaneous**				
62	Publication of Research Reports, Pamphlets and periodicals	23,000	2,000	6,000	15,000
65	Project Officer	15,000	5,000	5,000	5,000
66	International seminar	15,000	-	-	15,000
67	Terminal Report	2,000	-	-	2,000
69	Component Total	55,000	7,000	11,000	37,000
70	**ITTO Administration and Evaluation**				
71	Monitoring and Evaluation	25,000	-	12,500	12,500
72	Administration Cost	25,833.50	7,500	10,000	10,000
79	Component total	50,833.50	7,500	22,500	22,500
99	**Grand Total**	495,533.50	325,600	88,600	83,000

PROJECT BUDGET BY SOURCE

(In US $)

Source	Total	Year 1	Year 2	Year 3
Myanmar	1,615,108	632,859	632,859	349,390
ITTO	495,533.50	325,600	88,600	83,000
Total	2,110,641.50	958,459	721,459	432,390

Note: 6 Kyats (Myanmar Currency) is equivalent to 1 US $.

Appendix-1

ITTO Contribution (US$)

Forest Inventory

Equipment List		
1. Field Survey equipments	(1 lot)	9,500
2. Camping equipments	(1 lot)	12,600
3. Computer PC 486 with accessories	(5 nos)	13,500
4. Laser Jet Printer with accessories	(2 nos)	2,300
Vehicles.		
1. Inspection vehicle. (Toyota Hilux)	(1 no).	15,000
2. Truck	(1 no)	37,000
		89,900

Wood Testing

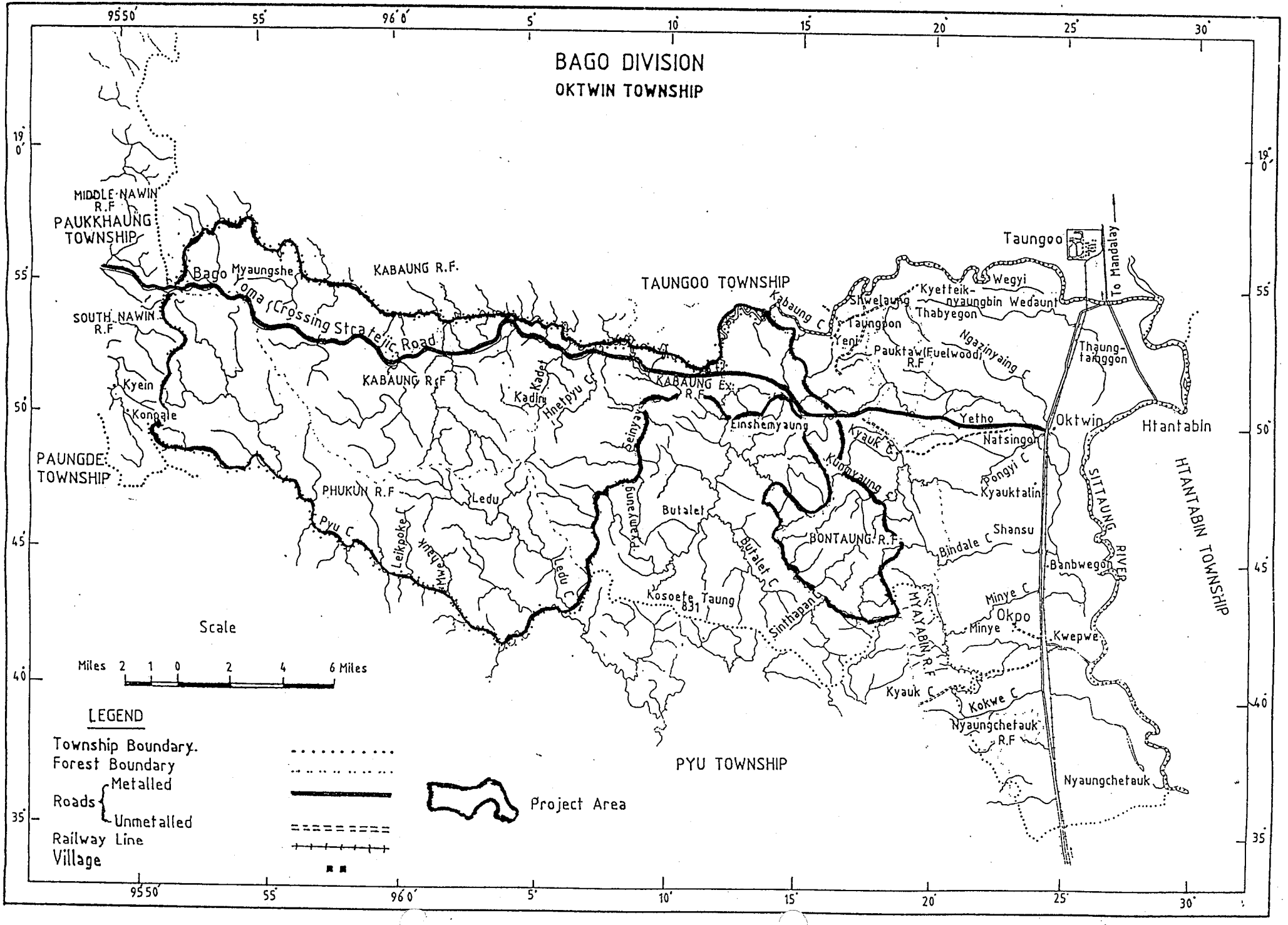
Physical & Mechanical	1 Unit	4,100
1. Stress and Strain plotter for Avery Testing Machine.		
2. Conditioning facilities for timber testing room	1 Lot	5,600
3. Halt-Tunner impact drop machine.	1 Unit	9,400
4. Ventilated oven for drying wood samples	1 Unit	3,700
5. Accessories for conditioning wood samples	1 Unit	5,900
Wood Anatomy		
6. High resolution profile projection unit	1 Unit	9,000
7. Sonic digitizer for measuring fibre length including computer	1 Unit	6,000
8. Spare parts for microtones sharpening machine (knives, diamond plates, diamond compounds etc.)	1 Unit	7,000
9. Accessories for photomicroscope	1 Lot	6,000
10. Machine knife and tool sharpener	1 Unit	800
11. Small band-saw for wood specimen preparation	1 Unit	1,600
12. Wood drying and preservation	1 Lot	5,000
(i) Apparatus for Wood drying (Moisture meters, hygrometers, etc.)		
(ii) Apparatus for wood preservation	1 Lot	5,000
(iii)Meter and guages for wood preservation lab	1 Lot	1,000
(iv) Pressure pump and accessories	1 Lot	1,000
13. Bandsaw blades and accessories	3 Lots	21,000
14. Moulding machine	1 Lot	14,000
15. Hydraulic hot-press machine	1 Unit	12,000
16. Computers (PC and accessories)	2 Unit	8,000
		126,100

Consumable Items

1. Preservatives and chemicals for wood drying and preservation	9,000
2. Glues and varnishes for hydraulic hot-press	8.500
	17,5000

Miscellaneous

Books & Periodicals & Journals	23,000
Terminal report	2,000
Project Office	15,000
Seminar	15,000
	55,000


BAGO DIVISION
OKTWIN TOWNSHIP
MIDDLE NAWIN R.F
PAUKKHAUNG TOWNSHIP
SOUTH NAWIN R.F
PAUNGDE TOWNSHIP
PHUKUN R.F
KABAUNG R.F.
KABAUNG R.F
KABAUNG E. R.F
TAUNGOO TOWNSHIP
BONTAUNG R.F
MYAYABIN R.F
PYU TOWNSHIP
HTANTABIN TOWNSHIP
Bago
Myaungshe
Oma Crossing Strategic Road
Kyein
Kongale
Ledu
Pyu C
Leikpoke
Kadin
Kadet
Hnetpyu C
Seinyay
Butalet
Butalet C
Ledu C
Kosoete
Taung 831
Sinthapan C
Einshemyaung
Kabaung C
Shwelaung
Taungpon
Yeni
Pauktaw (Fuelwood) R.F
Kyetteik-nyaungbin Wedaunt
Wegyi
Thabyegon
Ngazinyaing C
Thaung-tanggon
Taungoo
To Mandalay
Yetho
Natsingon
Oktwin
Htantabin
Kyauk C
Kunmyaung C
Pongyi C
Kyauktalin
Shansu
Bindale C
Banbwegon
SITTAUNG RIVER
Minye C
Okpo
Minye
Kwepwe
Kyauk C
Kokwe C
Nyaungchetauk R.F
Nyaungchetauk
Scale
Miles 2 1 0 2 4 6 Miles
LEGEND
Township Boundary.
Forest Boundary
Roads
Metalled
Unmetalled
Railway Line
Village
Project Area