INTRODUCING MYANMAR'S LESSER USED TIMBER SPECIES TO THE WORLD MARKET

ITTO Project PD 31/96 Rev. 2(MFI)

Project Completion Report

PROJECT IDENTIFICATION

(a)	Title	Introducing Myanmar's Lesser-used Timber Species to the World Market.
(b)	Serial Number	PD 31/96 Rev. 2 (M.F.I)
(c)	Executing Agency	Forest Department, Myanmar.
(d)	Host Government	Union of Myanmar
(e)	Starting Date	1st April 1997
(f)	Actual Duration	36 months
(g)	Actual Project Costs	US$ 2,988,533.50 f

PART I. EXECUTIVE SUMMARY

1. Background Information about the Project

1.1 The key problems it intended to solve (pre-project situation)

Myanmar's natural forests are known to contain at least seven hundred potential timber species. However, no more than twenty commercial species have been exported during the last decade in which volume of Teak comprises eighty percent. Actually the forest is capable of producing more volume of timber and contributing much more earning through efforts in promoting the lesser-used timber species (LUS) onto the market. But its acceptance by the consumers is restricted by a lack of knowledge of its properties. This restriction compounded with inadequate technological development in wood processing hinder the promotion of LUS to become marketable. The project, therefore, aimed to identify technical properties of some 50-60 LUS and develop proper processing technologies.

1.2 The specific objectives and outputs

Specific objective 1

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

Outputs

About 50,000 ha of forest at management level inventoried
Data of LUS in inventory area processed
Staff from forest inventory, computer/GIS sections trained overseas

Specific objective 2

Experimental scale introduction of 50-60 LUS to the market through identification of wood properties and further processing

Technical data of 50-60 LUS on wood properties and probable end-uses established
Sample finished products of LUS for public demonstration processed
Handbooks, pamphlets, videotapes, etc. on improved utilization of LUS for people's awareness through extension services produced

One person each in the field of Wood Anatomy, Wood Mechanic, Timber Seasoning, Timber Physics and Wood Preservation trained overseas
In-country training on handling wood working machinery organized
Holding annual workshops and workshop recommendation and project completion report generated.

1.3 Strategy adopted in carrying out the project

To understand the stand density and distribution by size classes is prerequisite for promoting LUS market. According to preliminary assessment of forest, Bago Yoma was found to be the most suitable location for initiating LUS promotion strategy due to its accessibility and species diversity. Selected location represented both northern and southern part of Bago Yoma comprising of most tree species of both sides.

Before the project very few species had been determined for their properties. Lack of knowledge in advance timber processing technology was another drawback in upgrading the quality of LUS. As the saying goes "seeing is believing" one of the major components in the project was to demonstrate attractive LUS products to the public.

Market study, both overseas and domestic, included in the project was another important feature of the project to keep in touch with the prevailing taste of consumers on species and design of finished products.

Training of project staff in handling wood processing machinery and technology on wood properties included in the project enhanced the capability of the staff to carry out the project successfully.

Finally, annual workshops and publications provided in the project document were the major outcomes of the project's effort to publicize the use of LUS.

1.4 Project's planned duration and planned overall costs

Project's planned duration was 36 months and planned overall costs were;

ITTO contribution	US$	498,500
Government of Myanmar	Kyats	9,690,850

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

The Forest Department and the Myanmar Timber Enterprise, under the Ministry of Forestry, are responsible bodies for conservation, harvesting, processing and marketing of forest products including timber. The Forest Products Joint Venture Cooperation and Timber Merchant's Association are cooperative and private agencies dealing with marketing and export of wood products. Implementation of the project was guided by the Project Steering Committee (PSC) headed by the Minister, Ministry of Forestry. Under the supervision of the PSC, all four agencies namely the Forest Department (FD), Myanmar Timber Enterprise (MTE), Forest Products Joint Venture Cooperation and the Timber Mar chant's Association jointly share their efforts in carrying out the task of LUS promotion within their capacity. While the Forest Department is responsible for planning, conservation and management of the forest all over the country, Myanmar Timber Enterprise is the sole agency for harvesting timber. Therefore, combination of these four elements is essential for successful implementation of the project.

2 Project Achievement

2.1 Outputs Achieved

The outputs mentioned in the Work Plan have been accomplished during the time frame of the project. These outputs, actually, were basis for further achievements to fulfill the requirements of the specific objectives outlined in the project document. Under the guidance of the ITTO these outputs in general terms have been materialized and thus following concrete outcomes have been obtained at the end of the project.

(1) A Handbook of Some Lesser-used Timber Species in Myanmar.
(2) A Database of LUS in Myanmar (CD-ROM).
(3) Timber Specimens of LUS in Myanmar.
(4) Videotape for LUS Promotion.
(5) Finished Products of Myanmar's LUS.
(6) Papers Presented in the Annual Workshops.
(7) Proceedings of the Workshops.

2.2 Specific Objective (s) Achieved

The project aimed to achieve two specific objectives as follows;

- to gather information on lesser-used timber species (LUS) for industrial planning purposes with particular reference to the stand class distribution status,
- experimental scale introduction of 50-60 LUS to the market through identification of wood properties and further processing.

Two consecutive forest inventories have been carried out in the project site during the open seasons of 1996-97 and 1997-98.

Systematic sampling design has been applied in the field inventory in which all trees 20 cm diameter at breast height and above were measured. With sampling intensity 0.93% total number of trees at prescribed diameter limit was found to be 3.9 millions at 95 percent confidence limit. The proportion of LUS among them was found to be 69.23%.

Altogether 54 sample tree species were collected from the project area and their properties tested at the Forest Research Institute, Yezin. Out of these species only 25 were selected for further processing of end-use products. Processed value-added products were demonstrated for their usefulness during the exhibition and sale of these products in conjunction with annual workshops.

2.3 Contribution to the Achievement of the Development Objective

The project has launched an initial step towards the accomplishment of the goal of the Development Objective. Detailed study on the availability of LUS in the project site would determine the approximate availability of LUS in the whole range of Bago Yoma based on the statistics available from the previous inventory operations. This can be applied also in other region in the country having similar forest types.

Similarly, lessons learnt from the detailed examination of properties of LUS would be useful for assessing the value of other LUS, not included in the project, based on the preliminary studies and literature.

Having these initiatives of the project further activities towards the achievement of the Development Objective were to strengthen the capability of the workers in the wood working industries through training and to expand the LUS market through study tours, exhibition and network among producers and consumers.

2.4 Situation prevailing after project completion, as compared to the pre-project situation

Pre-project situation has already mentioned in the earlier sections. After the completion of the project demand for LUS by the private sector has increased gradually. However, availability of LUS by species – wise is considered unlikely to meet the demand. There is a possibility of grouping the LUS of common properties as required by specific end-uses. For instance, structural timber requires high strength properties, decorative timber needs moderate strength and attractive appearance, and so on. Success of the Development Objective depends also on technological development. It is obvious that MDF, oriented strand board, particle board, etc. requires combination of various species having the common properties determined by specific requirements. After the project completion, a great improvement have been achieved in terms of personal capability and facilities at the Forest Research Institute for further scientific investigation.

3. Target Beneficiaries involvement

Target beneficiaries of the project were timber processing and marketing personnels of private, cooperative and government sectors and rural population. Since it was the first ITTO project in Myanmar, the Ministry of Forestry gave high consideration on successful implementation of the project. Therefore, all sectors involved in timber industry participated in implementation of the project though the Forest Department, the executing agency, was responsible for the project. It was not expected to get technical assistance from the rural community. But their involvement in forest inventory of the project identifying the species was worth mentioned here. The results of the project will be given to the state, cooperative and private sectors for further improvement in timber processing and for reference. After the completion of the project a working committee comprising of all relevant sectors will be formed to continue promotion of LUS as well as finished products market.

4. Lessons Learned

4.1 Development Lessons

4.1.1 Aspect of the design which most contributed to its success or failure in achieving the Development Objective

The design of the project was generally found to be quite appropriate. With a sufficient working force of inventory crew and advance implementation activities prescribed under specific objective (1) were successfully carried out well ahead of the work plan. On the other hand, work load on laboratory research was found to be very heavy due to the following reasons;

(1) Inadequacy of experience researchers,
(2) Number of species to be examined is too much (50-60 species) during the limited time frame,
(3) Unexpected failure of power supply ,

However, the project was successfully completed in time with concerted effort of the research workers. The prominent feature of the project was formation of project steering committee comprising of senior officials from all sectors of forestry headed by the Minister, Ministry of Forestry who gave close supervision on the progress of the project.

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

Relevant sectors, under the Ministry of Forestry, regarding the implementation of the project were coordinated from the beginning and throughout the project period. No changes have been made between the linkages among them. Therefore, no adverse effect has been experienced due to intersectoral links.

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

One journalist was invited to interview with the project personnel and thus an article on LUS project was documented in the magazine. This is a nation-wide magazine and some information on LUS was thus known to public efficiently. This kind of mass media presentation on the project was found to have a significant impact on publicizing the usefulness of LUS.

Similarly, an interview was made by the national television team at the exhibition of LUS finished products in conjunction with the International Workshop, ITTO PD 31/96. It was televised through out the country.

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

Currently harvesting of timber is confined to those commercial species. After the completion of the project there is likely to have more demand on LUS. For sustainability of the project there is a number of factors which will include efficient harvesting of timber, adequate knowledge on treatment and processing of timber, greater investment on installation of hi-tech facilities and international market study. This will entail a series of follow-up projects to fulfill the requirement of the Development Objective.

4.2 Operational Lessons

4.2.1 Project organization and management

The executing agency, the Forest Department, was responsible for overall implementation of the project. Under the guidance of the Director-General of the Forest Department, the Project Manager took the charge of planning, execution, reporting and general management of the project team. Field and laboratory activities were carried out by two separate divisions under the Forest Department, viz. the Planning and Statistics Division for specific objective (1) and the Forest Research Institute for specific objective (2). Execution and progress of

activities of whole project was guided and monitored by the Project Steering Committee including one representative from ITTO.

4.2.2 Project documentation

Responsibility of all project documentation was vested on the Project Manger. According to Article VI of the Agreement of the Project the documents, publications and Technical Reports shall be kept by the Executing Agency and all publications will be sent to ITTO.

4.2.3 Monitoring and evaluation

Besides the monitoring and evaluation by ITTO, the Project Steering Committee monitored and evaluated the progress of work monthly at the beginning 6 months and at 3-4 months intervals later.

4.2.4 Quality of project planning

Generally, the quality of project planning was satisfactory. As it is the first ITTO project in Myanmar improvement in planning could be made possible in subsequent projects.

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

The Forest Department took the role of overall implementation of the project. Under the Minister, Ministry of Forestry, the Planning and Statistics Department supported the Minister all relevant technical matters as required by the Minister. The project team led by the Project Manager submitted the progress to those bodies mentioned above and followed the instructions laid down by these authorities.

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

Great care should be taken at the planning phase to avoid variations between planned and actual implementation. All relevant parties should be involved in project planning.

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

No external factors that could have been forseen influenced the project implementation.

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

Electricity power failure during the research work greatly influenced the timely implementation of the project. Later a power generator was installed and overcome the difficulties.

5 Recommendations

Great care should be taken at the planning phase and all relevant parties should be involved in project planning.

It has already mentioned above the importance of planning phase. For project having long duration great care must be taken to foreseen the unpredictable external influences and to consider alternative means to overcome the problems.

Adequate time should be given for preparation well ahead of the actual starting date of the work schedule. It is especially important to do with the international agencies, consultants, and procurement of machinery and equipment from outside.

Secretarial work is very important for the successful implementation of the project. Qualified secretary and adequate facilities determine the quality of project implementation.

Access to related parts of the project through telephone, fax, e-mail, express mail played very important role in successful implementation of the project.

Adequacy of qualified staff, facilities and fund are the fundamental requirements and these should be considered before the actual implementation of the project.

PART II MAIN TEXT

1. Project Content

1.1 Background Information

The project was designed to identify the most promising LUS to be promoted for domestic and export market. Forest of Myanmar is endowed with variety of tree species amounting for about more than 1300 big trees. Mixed Deciduous Forest covers the largest portion (39%) and contains diversified species including valuable commercial hardwoods such as Teak. Bago Yoma lies in the central part of Myanmar in which Mixed Deciduous Forest dominates. Therefore, middle part of Bago Yoma was selected as the project location in which diversity of tree species exists. It was decided that the project area 50,000 ha was quite appropriate to cover a range of both ecological and tree species diversity. The exact project location was selected in parts of Phyu Kun and Kabaung Reserved Forests in Oktwin township, Bago Forest Division. Bago Yoma region including the project site was inventoried in 1981-89 using the pre-investment survey which is a systematic inventory with sampling intensity of 0.1%.

Prior to this project, attempts have been made to identify the properties of LUS with a view to utilize them efficiently and fulfill the needs of local demand. However, without adequate resources in terms of equipment and fund not much work has been done before the commencement of the project. Microscopic elucidation has been the most significant effort to examine the properties of LUS followed by Physical and Mechanical Tests of wood. Very few works have been done to identify other properties of LUS.

1.2 Development Objective and Specific Objectives

The primary aim of the project was to increase the economic contribution of Myanmar's forest resources by emphasizing the introduction of underutilized timber species. Although Myanmar has more than 1300 large trees only about 75-80 species have been harvested commercially and not more than 20 species has been exported in which only 5-6 are major exporting commercial timbers.

One of the requirements to expand the market of LUS and hence fully utilize its forest resources is to determine the availability of each and every tree species. Thus the specific objective (1) of the projective was " to gather information on LUS for industrial planning purposes with particular reference to the stand class distribution and regeneration status". In fact, Myanmar had launched a series of reconnaissance and pre-investment survey of some parts of forests during the FAO/UNDP projects in 1981-89 with sampling intensities 0.1 and 0.5 percent respectively. For the purpose of the project a management level forest inventory was conducted to acquire more precise information on availability of LUS.

Having examine the availability of LUS subsequent step to identify the promising species to be promoted was to determine the useful properties of commercially available LUS followed by demonstration on end-uses. Therefore, the second specific objective of the project was " experimental scale introduction of 50-60 LUS to the market through identification of wood properties and further processing". Altogether 54 LUS have been determined for their various properties.
The following examinations on these LUS have been made during the project:

(1) Microscopic structure
(2) Physical properties
(3) Mechanical properties
(4) Air-drying and Kiln Seasoning behavior
(5) Natural Durability
(6) Treatability with Preservatives
(7) Working properties

1.3 Outputs

The outputs mentioned in the Work Plan have been accomplished during the time frame of the project. Under the specific objectives there were 9 outputs specified as follows;

(1) about 50,000 ha of forest at management level inventoried,
(2) data of LUS in inventory area processed,
(3) staff from inventory and computer/ GIS sections trained overseas,
(4) technical data of about 50-60 LUS on properties tested,
(5) timber commodities for public demonstration processed,
(6) publication and extension on improved utilization of LUS materialized,
(7) staff from the Forest Research Institute trained overseas for Wood Anatomy, Timber Physics and Mechanic, Timber Seasoning, and Wood Preservation,
(8) In-country trainings on wood working technology organized,
(9) Workshop recommendations and project completion report generated.

These outputs, actually, were basis for further achievements to fulfill the requirements of the specific objectives outlined in the project document. Under the guidance of the ITTO, these outputs in general terms have been materialized and thus following concrete outcomes have been obtained at the end of the project.

(1) A Handbook of Some Lesser-used Timber Species in Myanmar
(2) Database of LUS in Myanmar (CD-ROM).
(3) Timber Specimens of LUS in Myanmar.
(4) Videotape for LUS Promotion.
(5) Finished Products of Myanmar's LUS.
(6) Research Papers Presented in the Annual Workshops.

(7) Proceedings of the Workshops.

1.4 Strategy

It has been stated in the earlier sections about reason for selection of project location. This location is most probably represented the whole range of the Bago Yoma. Therefore, results obtained from the project would be very useful to assess the quality of forest and quantity of timber resources of Bago Yoma.

Among the ASEAN countries Myanmar is the only nation covering the widest climatic zones from the snow capped mountains in the north through arid zone in the middle to the rainy long coastal belt in the west and south. Therefore, it contains various vegetation and forest types so also the number of tree species. Numerous tree species in a given area mean fewer stands for each species. Almost all of the tropical countries have the similar pattern of diversity in tree species composition.

Traditional preference on few prime species in the market neglected the others as LUS. Species consciousness is one of the difficulties facing the LUS market promotion in Myanmar. Many tropical countries export variety of similar species having common properties under one trade name only eg. dark Red Meranti. However, timbers of Myanmar are known species-wise in the trade. Therefore, one strategy to solve the problem is to establish end-use groupings of LUS after determining their properties. The project has accomplished part of this strategy by publishing A Handbook on LUS and producing A Database CD-ROM.

The primary aim of the project is to increase the economic contribution of Myanmar's forest resources by emphasizing the introduction of under utilized timber species. There have been a lot of lessons learnt from the experience of managing the forest resources and marketing of their products among the neighbouring countries in this respect. One remarkable example in increasing the benefit out of forest resources could be drawn from the experience of Malaysia. The country area, population, and natural forest cover are approximately one half of Myanmar. However, their export income from the forest resources is found to be more than twenty times as much that of Myanmar. There are two main reasons why this could happen. Their net export volume of timber in round log equivalent is about twelve times as much that of Myanmar. Also, average unit price of log from Malaysia is much lower than that of Myanmar. Closer examination on the export items of forest products reveals that forest industries of Malaysia has shifted their trend of production from just raw material to finished products such as wood-based panel and furniture since 1990 through 1996. Therefore, another strategy to promote the trade of LUS is to increase the production of attractive finished products out of LUS as required by the market. Annual exhibitions of LUS products during the project period gained wider acceptance by the public. Attractive designs and skilful finishing with synthetic resins make the products not distinguishable from those of commercial ones.

1.5 Work Plan

Three years work plan of the project has been approved by ITTO since the beginning of the project. However, the activities and duration of which under each output have been revised from time to time as required by the progress of implementation of the project. According to the specific objectives nine outputs have been achieved during the project period as follow;

(1) about 50,000 ha of forest at management level inventoried,
(2) data of LUS in inventory area processed,
(3) staff from inventory and computer/ GIS sections trained overseas,
(4) technical data of about 50-60 LUS on properties tested,
(5) timber commodities for public demonstration processed,
(6) publication and extension on improved utilization of LUS materialized,
(7) staff from the Forest Research Institute trained overseas,
(8) In-country training on wood working technology organized,
(9) Workshop recommendations and project completion report generated.

Advance in implementation of output (1) and (2) has been accomplished one year ahead. Activity (3), (4),(6), and (7) have been delayed but not very serious enough to hamper the progress towards the achievement of project's specific objectives.

1.6 Inputs

Man power (man-months)

◎	Specific objective (1)	185
◎	Specific objective (2)	440
◎	Administration	108
◎	Secretary	36
◎	Voluntary Consultant	36
◎	International Consultants (two persons)	2
◎	National Consultant (two persons)	24
◎	Other labours	72

Capital Inputs

- 4-sided Weinig Moulder and Grinder (imported)
- Shimadzu Universal Testing Machine (imported)
- Drying Ovens
- Air conditioners
- Computers and accessories
- Forest inventory field equipment
- Camping equipment
- Band Saw Blades
- Circular Saws
- Photocopier
- Video camera
- Inspection vehicle
- Truck
- Timber Seasoning Kiln
- Electric Transformer

1.7 Project Rationale

Although Myanmar has rich and diversified forest resources utilization of such resources is mainly confined to premier tree species. The quantity of species left in the forest is about the same volume as that of harvested. Wasteful utilization of those valuable species for

minor purpose poses reduced revenue for the nation and disturbs the species equilibrium in the forest. In the light of modern technology in timber processing many under-utilized trees species could be transformed into undistinguishable end-use products. Therefore, this project helps promote the value of timbers which otherwise be ignored as LUS.

1.8 Relevance to ITTO

This project is consistent with two objectives of ITTA (1983) which are;

- to help research and development which will improve forest management and wood use, and
- To encourage more and further processing of tropical timber in producer countries.

The project relates to the R and D of wood use especially, lesser-used timber species. The project also conforms to the criteria of ITTO as follow;

- it relates to the production and use of industrial tropical timbers,
- it yields benefits to the tropical timber economy as a whole and it is relevant to both producing and consuming countries,
- it relates to maintaining and expanding the international trade in tropical timbers,
- It offers reasonable prospects for positive economic returns in relation to costs,
- It makes maximum use of the existing research institutions and avoids duplication of effort to the maximum extent.

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 "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.

2 Project Context

This project underlies the Myanmar Government's Policy of attaining additional benefits from its natural resources by promoting the " export of value-added forest products and encourage use of under utilized species" (Myanmar Forest Policy, 1995, Section 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 products in the form of finished goods and other products. The Forest Department, which spearheads 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 products on a sustainable basis.

3 Project Design and Organization

3.1 Adequacy of the results of the "identification phase"

The authorities concerned have identified inefficient utilization of many non-Teak hardwoods since the beginning of 70's. However, it has never been an easy task to introduce LUS to the market due to traditional taste on Teak and its abundance. Therefore, Teak dominates both domestic and international markets. Since the value of Teak in international trade is significantly higher than that of others reduction in wasteful use of Teak in unnecessary purposes becomes a national concern. Substitution of Teak and other valuable hardwoods could be made possible by introduction of finished products of LUS (not raw LUS). With this background the Forest Department has initiated its efforts to introduce potential LUS to the

market about twenty years ago. Since then research on utilization of LUS has been one of the activities of the Forest Research Institute. Many years have been passed at this stage before the significant progress has been made to launch a project ITTO PD 31/96 Rev. 2 (M.F.I) approved by ITTO. As a producer member of ITTO and one of the wealthiest nations in forest resources in the region it seems quite appropriate for Myanmar to expand its forest product diversity and quantity.

3.2 Sound conceptual foundation of the project

Rational use of natural forest resources is one of the key factors underlying the sustainable management of the forest. Creaming the forest by harvesting relatively few species of valuable timbers causes imbalance in tree composition and renders increase in cost of production of timber per unit area. Secondly, there exists a greater room for optimal utilization of natural resources by adding new species to the market thereby fulfilling the demand of consumers for timber. This project aims to develop a foundation for proper and increased utilization of under-utilized timber species. It is predetermined that a series of projects is still required to accomplish the goal of the development objective.

3.3 Adequacy of time and other resources for project formulation

Since it is the first ITTO project for Myanmar there has been a number of revisions made before the project has been passed by the ITTO. Also, there have been some minor adjustments in budget components after getting approval by the ITTO. Slight changes in machinery inputs have been made in order to fulfill the exact requirement of the project. Apart from these adjustments time and other resources were found to be quite appropriate for project formulation. However, a considerable amount of the government financial input has been supplemented for successful implementation of the project. This lesson should be borne in mind in formulation of any further project proposal.

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

Under the guidance of the Project Steering Committee, the implementation agency, the Forest Department, was responsible for the design, execution and reporting of all the activities of the project. There were two separate divisions which conduct the activities outlined under two specific objectives. Planning and Statistics Division of the Forest Department took the role of implementing forest inventory and data processing while the Forest Research Institute executed the rest of the activities.

3.5 Beneficiary involvement with the project's effort and actions

Myanma Timber Enterprise, Forest Products Joint Venture Cooperation and Timber Merchant Association were the major beneficiaries of the project representing the government, cooperative and private sectors respectively. Their involvement in the project activities included participation in meetings, workshops and study tours. They also contributed their efforts in annual exhibitions of LUS products. Active participation of their efforts is due to the Minister, Ministry of Forestry, who took the Chair of the Project Steering Committee.

4 Project Implementation

4.1 The most critical differences between planned and actual project implementation

The planned overall cost was US$ 2,113,685.50 in which ITTO contribution was US$ 498,533.50 and Myanmar Government contribution was US$ 1,615,142 (Kyats 9,690,850). The actual expenditure was US$ 2,988,533.50.The difference (US$ 874,858) was due to extra amount spent on the side of government contribution for operational expenses.

There was no difference between the planned and actual duration, which was 36 months, for the project. However, subsequent activities such as submission of the Terminal Report and the final Financial Statement to ITTO was delayed for about 3 and 2 months respectively. As stated above the concrete outputs of the project such as Handbook of Myanmar LUS, Database CD-ROM, Sample Box of LUS were the significant achievements of the project which would be submitted to the ITTO for reference.

4.2 Measures and actions which could have avoided these variations

As it was mentioned in section 3.3 there were some weaknesses in formulating the project since it was the first of this kind in Myanmar. Great care should be taken in planning, especially financial component, before submitting the project proposal to the authorities. Adequate time frame should be allotted for each activity and careful monitoring of the progress of the activities should be given highest consideration by the project staff.

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

Assumptions made in the project document were found to be appropriate and there were no risks of failure during the project.

4.4 Project sustainability after project completion as a result of project implementation condition.

Although some project activities were delayed with respect to time frame implementation of the project followed strictly to the schedule outlined in the work plan. Generally, implementation of the project was regarded as satisfactory. More research on the rest of the LUS still need to be considered. With experience gained during implementation of the project and facilities installed at the Forest Research Institute similar research works could be carried out with less expense. Furthermore, continuation of effort should be made based on the results of the project in order to achieve the goal of the development objective.

4.5 Appropriateness of project inputs

Out of three national consultants proposed in the project document only two were appointed. One consultant for forest inventory was not employed due to unavailability of competent person from outside the government department and adequacy of skillful staff in the Forest Department.

ITTO contribution was quite sufficient for the project while there was an acute shortage of the government financial input against the allotted budget. The government supplemented this shortage.

Equipment and machinery procured were found to be appropriate for implementation of the project.

5 Project Results

5.1 Situation existing at project completion as compared to the preproject situation

The Forest Research Institute in collaboration with Myanmar Timber Enterprise published an illustrated book entitled "Some Commercial Timbers of Myanmar" in which technical properties of 25 commercial species were included. No such publication has been made since then. Activities of research work on LUS during that period were mostly confined to wood anatomy study. Few progress has been made in the area of Timber Physics and Mechanics, and the Wood Drying (not kiln seasoning). After the completion of the project technical properties of more than 50 LUS have been studied and published. Database in CD-ROM has also been prepared. These results contribute wide spread awareness on utilization of LUS by timber traders and consumers. Publication and Database of LUS would be distributed among member countries through ITTO.

5.2 Extent to which the project Specific Objectives were achieved

There were two specific objectives outlined in the project document as mentioned in section 1.2. Documents on data processing of LUS in project area and availability and annual allowable cut of LUS over the region of Bago Yoma has been elaborated in research papers presented during the annual workshops.

Altogether 54 LUS have been identified for their technical properties and school, office and household furniture made of 25 promising LUS have been exhibited during the annual workshops of the project. These achievements have been documented by publication of research papers, handbook, database CD-ROM, LUS sample box and end-use products.

5.3 Impact of the project results on the sectoral programme, on the physical environment, on the social environment, on the target beneficiaries.

Not much positive impact of the project could be expected on the physical environment (forest) at present. However, gradual shift towards the greater utilization of LUS can be forseen as the demand for timber become acute in the near future. Promotion in utilization of LUS is one of the role in formulation of long term programme in forestry and industry sectors. Awareness on use of LUS by the public is the achievement of the project. Selection of species for proper end-uses, design and finishing are found to be the important components in upgrading the quality of LUS finished products or value-added products. Exhibition and sale of such LUS products during the workshops contributed a great impact on the social environment. Among the target beneficiaries private entrepreneurs of timber industries got direct benefit from the project using the research results for commercial advertisement. With the expansion of timber trade in LUS social life of the rural population depending on forestry operation will become upgraded.

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

Prior to the implementation of this project very little scientific knowledge was accrued on LUS by the persons working with timber and adequate interest has not been given by the decision makers. Therefore, the strategic concept of the project was to present the quality and availability of LUS to those mentioned above in order to gain acceptance of LUS by them. A considerable improvement in recognizing the value of LUS has been obtained after the completion of the project. At least, greater attention on proper utilization of LUS was obtained from the consumers. This project marked a strong foundation for further formulation of projects to accomplish the ultimate goal of the development objective. Subsequently, training on basis and advance wood technology, investment in establishing timber processing industry, and international market study are suggested to be given priority in the follow-up projects on market promotion of LUS.

6 Synthesis of the Analysis

(a)	Specific Objective (s) achievement	☐ Realized ☐ Partly realized ☐ Unrealized
(b)	Outputs	☐ Realized ☐ Partly realized ☐ Unrealized
(c)	Schedule	☐ In advance / on time ☐ Delay but not seriously ☐ Seriously delayed
(d)	Actual Expenditure	☐ Below planned ☐ More than 10% above planned ☐ More than 20% above planned

Note: Expenditure exceeded the planned was borne by the government side of the host country.

PART III . CONCLUSIONS AND RECOMMENDATIONS

1 Development Lessons

Information on internal and external policies, constraints, statistics relevant to the project should be collected before the actual planning starts. Linkages among the various relevant sectors should be established to acquire cooperation through out the project implementation. The first ITTO project gained a remarkable experience of getting support by the Minister, Ministry of Forestry. Under the supervision and guidance of His Excellancy all parties were united and gave their utmost efforts to achieve the goal of the project.

Mass media should be part of the project activities to extend the knowledge gained by the project extensively.

2. Operational Lessons

The organization structure of the project was appropriate with various levels of command. As it was the first ITTO project strict guidance and monitoring of the progress of the project was exercised.

The implementation of the project specific objective (2) was delayed for about 6 months at the beginning due to lack of experience by the research workers and inadequate qualified staff. This problem was overcome by having qualified staff who got training on various field of study overseas.

For every project technical documents are key outputs which enable to prove the quality of the project.

3 Recommendations for Future Projects

3.1 Identification

This project formed the basis for further development of new projects aiming to achieve the goal of the Development Objective. As it was mentioned in the earlier sections follow-up projects should include the following topics.

(1) Basic training on wood technology, processing (seasoning, preservation, sawing, etc.) and advance training on mounding, laminating, finishing, etc. for personnels in wood working industry.
(2) Market study within the country and outside.
(3) Establishment of sale centers of LUS products at major cities.
(4) Networking with consumer's market through commercial attaché abroad.

3.2 Design

The design of the future project should be based on the results and experience obtained from this project. Specific objectives, outputs and activities should be clearly defined to secure the effective results in quantity and quality.

3.3 Implementation

Implementation agency should be the Forest Department which has enough experience in ITTO projects. However, expertise for other sectors at home and abroad should be recruited for special purposes. Also, trainers should be trained before the project implementation.

3.4 Organization

Structure of Organization in this project was found to be appropriate for future projects. Participation of professional staff from outside the Department or Ministry should be welcomed.

3.5 Management

Project leader or the project manager for the future projects should be independent from responsibilities other than the project in order to handle the operation efficiently. Sub-

contracting of specific portions of the project to competent persons or agencies is highly recommended. And enough budget for this purpose should be allocated.

Responsible for the Report

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