

INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT DOCUMENT

TITLE	EX-SITU AND IN-SITU CONSERVATION OF TEAK (<i>TECTONA GRANDIS</i> L.F.) TO SUPPORT SUSTAINABLE FOREST MANAGEMENT
SERIAL NUMBER	PD 270/04 Rev.2 (F)
COMMITTEE	REFORESTATION AND FOREST MANAGEMENT
SUBMITTED BY	GOVERNMENT OF MYANMAR
ORIGINAL LANGUAGE	ENGLISH

SUMMARY

Myanmar quality teak has been heavily harvested from the natural forests for over a century, and it is time that the superior genetic resources are preserved and reproduced in plantations so as to maintain the quality of Myanmar teak sustainably. The aim of this project is to improve the quality of plantation teak production through initiation of tree improvement programme. It will be in support of increased timber production, particularly teak, so that internationally, trades of high quality tropical timber would be sustained and enhanced for the benefits of both producer and consumer member countries of ITTO. The project will establish 150 acres of model Seed Production Areas (SPA) in 6 Districts. As a preparation to a more sophisticated tree improvement programme, identification of plus trees, collection of seeds and clones for provenance trial and establishment of hedge garden will be carried out. Tissue culture laboratory will also be strengthened for production of superior plantlets. The project will also try to get the participation of the local community through community development, sensitization, trainings, workshops and study tours that will be conducted both for the community and the Forest Department staff. It is expected that after completion of the project, large quantity of high quality seed will be available from the SPAs for the plantation programme, and at the same time, the local community will also benefit by collecting seeds from these SPAs and selling them back to the Forest Department.

EXECUTING AGENCY FOREST DEPARTMENT OF MYANMAR

COOPERATING GOVERNMENTS ---

DURATION 36 MONTHS

APPROXIMATE STARTING DATE TO BE DETERMINED

BUDGET AND PROPOSED SOURCES OF FINANCE	Source	Contribution in US\$	Local Currency Equivalent (Kyats)
	ITTO	474,941	
	Gov't of Myanmar		9,270,800 (in kind)
	TOTAL	474,941	9,270,800

PART I: CONTEXT

1. Origin

The project proposal, *Ex-Situ and In-Situ Conservation of Teak (Tectona grandis L. f) to Support Sustainable Forest* arises from the recognition of the need for sufficient supply of good quality seed for the teak plantation programme in Myanmar. Myanmar has been harvesting and exporting its quality teak all over the world from its natural forests since time immemorial. In order to support the production from the natural forests and assure sustainable forest development, the Forest Department of Myanmar is also planting approximately 80,000 acres of forest plantations annually, out of which about 35,000 acres or over 43% are teak.

Although the Forest Department is aware of the need for tree improvement programme and systematic collection of quality seed for these teak plantations, seeds have been, and still is, being collected unsystematically and at *ad hoc* basis, as most of the field staffs do not have sufficient expertise in this field. In order to maintain its market for quality teak by producing and planting with good quality seed, and assure sustainable production of valuable high quality tropical timber, there is the need to initiate a proper tree improvement programme and the Forest Department is therefore seeking assistance from ITTO to initiate this programme for teak.

2. Sectoral Policies

Myanmar Forestry Sector has formulated its Forest Policy (1995) in a holistic and balanced manner within the overall context of the environment and sustainable development with full recognition of the forestry principles adopted at the United Nations Conference on Environment and Development 1992.

The policy has identified six imperatives which the Government gives the highest priority in order to achieve broader national goals and objectives. These imperatives are:

1. Protection of soil, water, catchments, wildlife, biodiversity and environment;
2. Sustainability of forest resources to ensure perpetual supply of both tangible and intangible benefits accrued from the forests for the present and future generation;
3. Basic needs of the people for fuel, shelter, food and recreation;
4. Efficiency to harness, in the socio-environmentally friendly manner, the full economic potential of the forest resources;
5. Participation of the people in the conservation and utilization of the forests; and
6. Public awareness on the vital role of the forests in the well being and socio-economic development of the nation.

The proposed project is directly, and in some cases, indirectly related with the majority of these six imperatives.

The old Forest Act of 1902 was replaced by the new Forest Law which was enacted in 1992. This proposed project is also directly, and in some cases, indirectly related with some of the following basic principles of the new Forest Law (1992):

1. To implement the forest policy of the Government;
2. To implement the environmental conservation policy of the Government
3. To promote the sector of public co-operation in implementing the forest policy and the environmental conservation policy of the Government;
4. To develop the economy of the State, to contribute towards the food, clothing and shelter needs of the public and for perpetual enjoyment of benefits by conservation and protection of forests;
5. To carry out in accordance with international agreements relating to conservation of forests and conservation of environment;
6. To prevent the dangers of destruction of forest and bio-diversity, outbreak of fires, infestation of insects and occurrence of plant disease;
7. To carry out simultaneously conservation of natural forests and establishment of forest plantations;
8. To contribute towards the fuel requirement of the country.

3. Programmes and Operational Activities

Although the Forest Department is aware of the need for systematic collection of teak seed from good mother trees since the initiation of scientific forestry in Myanmar, proper and effective tree improvement programme still do not exist. Attempts were made by the Forest Research Institute (FRI) to establish some seed orchards, but only one, which was poorly designed, exists. The follow up activities and maintenance was poor.

In 1996, modest efforts were made by the Forest Department by issuing targets and instructions on how to establish Seed Production Area (SPA) to the Forest Departments in the States and Divisions. Due to the lack of training, interest and monitoring, the accomplishment was poor.

Another attempt was again made by issuing instructions for the establishment of SPA to the Forest Departments in the States and Divisions in June 2001. The target set was met but the quality was poor due to the limited capacity of the local staff. Thus, capacity building with field demonstrations is urgently needed.

PART II: THE PROJECT

1. Project Objectives

1.1 Development Objective

To promote the production of high quality teak through its genetic improvement in order to support sustainable forest management in Myanmar.

To enhance the economy of the country through sustainable production and export of high quality teak by using good quality seed for planting. The project will be in support of increased timber production, particularly teak, so that internationally, trades of high quality tropical timber would be sustained and enhanced for the benefits of both producer and consumer member countries of ITTO.

High quality teak – High quality teak can be defined as dominant teak trees with good growth, long straight bole with good form, straight grain, circular in cross section, limited fluting and buttressing, branching character true to form and not competing with the main axis.

1.2 Specific Objectives

Specific Objective 1: To establish Seed Production Areas (SPA) and initiate activities for the establishment of Seed Orchards for production of high quality seed.

Specific Objective 2: To strengthen the Tissue Culture Laboratory and produce high quality plantlets through tissue culture and shoot cutting from hedge garden.

2. Justification

2.1 Problems to be addressed

Myanmar has been exporting teak, its premier timber, since time immemorial. This timber is one of the major foreign exchange earning natural resources of the country. With the present economic situation of the country, the dependence on teak for the development of the country is more prominent.

On the other hand, natural teak forests are being depleted through the practice of shifting cultivation, some unauthorized cutting for commercial purposes, inadequate awareness of the local communities on sustainable forest management and absence of partnership and management responsibility sharing between Forest Department, the local communities and other related sectors, and the inability to restock the forests with quality teak plantations.

Teak is therefore planted extensively in order to meet the heavy demand on high quality Myanmar teak sustainably. For this programme to succeed, sufficient supply of quality teak seed will be needed. However, it may not be possible to get sufficient quantity of quality seed soon after the establishment of SPA. Therefore, the required seeds will have to be supplemented with plantlets produced from tissue culture laboratory, hedge garden and the nursery. Moreover, the tissue culture laboratory and the hedge garden will further be used for a more advanced tree breeding programme.

Currently, due to the lack of proper tree improvement and seed supply programme, there is a problem of availability of teak seed in sufficient amount in almost all the States and Divisions except Magway. According to a report submitted in June 2001:

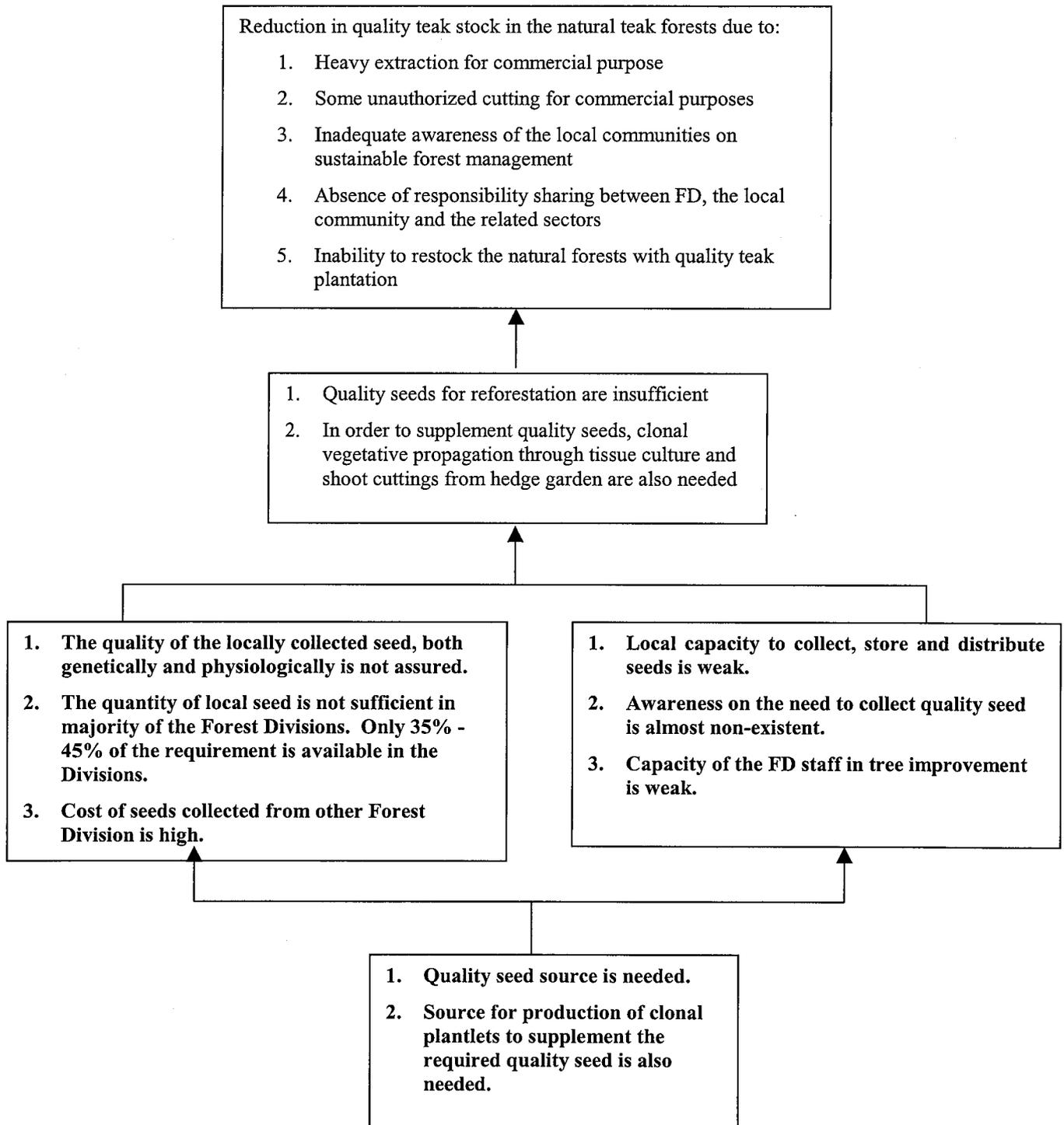
- (1) Bago (East) Division is able to collect only 35% of its seed requirement from its Division while 65% has to be imported from Magway Division.
- (2) Bago (West) Division is able to collect only 45% of its seed requirement from its Division while 55% has to be imported from Magway Division.
- (3) Mandalay Division is able to collect only 35% of its seed requirement from its Division while 65% has to be imported from Magway Division.

(4) Ayeyarwaddy Division is able to collect only 45% of its seed requirement from its Division while 55% has to be imported from Magway and other Divisions.

(5) Only Magway Division is self sufficient and is even able to export its surplus seeds to other Divisions.

From this report, it is very clear that most of the Divisions that are involved in carrying out special teak planting programme do not even have sufficient normal seeds for its annual requirement. Apart from Magway Division, the rest have only 35% - 45% normal teak seed available locally. The best and quickest solution therefore would be to boost up quality seed production in the required States and Divisions by the establishment of SPA and supplying planting stock by using shoot cuttings from hedge garden.

Problem – Tree



In order to supplement the available quality seeds from the SPA, more quality plantlets should also be produced from the recently initiated poorly equipped tissue culture laboratory and shoot cuttings from hedge garden. Thus, it is very important that the tissue culture laboratory be strengthened, and more hedge garden be established so as to be able to produce more quality plantlets in the nursery.

On the other hand research and development programmes for teak tree improvement is also needed. However, the local FD's staff lack the capacity in this area. FRI staffs should also help in the capacity building of the local staffs so that proper SPA could be established by them. However, the capacity of the FRI staffs in this field itself is very limited. Thus, capacity building for the FRI staffs itself is also urgently and greatly needed. Moreover, the local communities lack awareness in the need for collection of quality seed, and the capacity for collection, storage and distribution of seed is also weak.

2.2 Intended situation after Project completion

This proposed project could enhance the capacity of the staffs of the Forest Department and the local community in tree improvement and related activities. The intended situations after the completion of the project are as follows:

- (1) Teak SPAs will be established for seed collection, and demonstration for further multiplication.
- (2) Tissue culture laboratory will be strengthened and tissue cultured plantlets will be in production.
- (3) Hedge Garden, a nursery and provenance trial plots will be established for the production of quality plantlets and as a preparation for further establishment of Seed Orchard.
- (4) Capacity of the local communities will be enhanced, and their participation in the tending and protection of the SPAs will be achieved.
- (5) Capacity of the staffs of the Forest Department and FRI will be enhanced especially in the fields of seed handling techniques, tree improvement and community development.

2.3 Project strategy

The following approach will be adopted to meet the objectives of the project

Co-operation with relevant organization: The project executing agency will work with relevant agency such as Myanmar Agriculture Service (MAS), Forest Resource Environment Development & Conservation Association (FREDA), IPGRI **and Income Generation (IG) groups that exist at the Special Teak Centre (selected project areas)** so as to make efficient use of time and material to meet the objectives.

Establishment of SPA: SPAs are areas selected in natural forests or plantations to ensure a supply of seed of known geographic origin and parentage. They constitute a reliable source of seed of certain genetic quality, variable according to the quality of the formation, until such time as seed orchards prove necessary and come into

production. Since they constitute a local source, usually in, or near plantation areas in which a certain natural selection has already occurred, they offer the advantage of providing seed that is genetically more reliable for the site than seed brought from outside or from different environmental conditions.

SPAs will be established in 6 districts of the country (see map, ANNEX C). **This activity will be sub-contracted to either an NGO and/or IG groups that exist at the selected project sites. The IG groups, if sub-contracted will have to hire professional foresters to work with them. Whichever group may be sub-contracted, the activities will have to be implemented under the close instructions and guidance of the National Consultants and the Project staffs.** This activity will be carried out with the participation of the local community. The plots will be handed over in a usufruct basic to the communities of the nearby villages (**which may be the same people from the IG groups**) for protection and seed collection. Forest Department will support with technical guidelines and buy all the seeds collected by the communities responsible for the SPAs.

Strengthening of Tissue Culture Laboratory: A building or rooms will be provided by the Forest Department for use as tissue culture laboratory. Equipments, chemicals and staffs will be strengthened. Staffs will be given both theoretical and practical training and the required equipments and chemicals will be acquired by the project.

Establishment of Provenance Trials: Zonation of the provenances within the country will be delineated based on climograms for identification of genetic variation within the species. Seeds from each provenance will be collected for use in Provenance Trials. Provenance Trials will be established.

Establishment of Hedge Garden: Hedge Gardens and a Nursery will be established. Clones (propagules) will be collected from phenologically superior plus trees in each of the provenances for the establishment of Hedge Gardens. Plus trees will be registered. The Hedge Gardens will be used for production of vegetative planting stock by shoot-cutting and for conservation purpose. The shoot cuttings will be rooted in the nursery for the production of quality plantlets.

People's Participation: Local communities will be sensitized and mobilized to participate in the establishment and protection of SPAs. The SPAs will be handed over, on usufruct basis, to the community of the nearby villages and they will be given the right to protect the SPAs and collect seeds from them for the Forest Department at prevailing prices. The community will be given training and also supported by the staffs of the Forest Department on tending operations and protection of the SPA. At the same time community development activities will also be carried out so as to alleviate the livelihood of the local community and get better participation.

Training and Workshops: Training on tree improvement activities and seed & clones collection from different provenances will be given both to the field staffs of the Forest Department and the local communities. Seminars and study tours will also be organized for the field staffs and the local communities.

2.4 Target beneficiaries

The FRI is in great need of human resource development. Capacity building for the staffs of FRI by this project will greatly benefit the Institute in particular. Thus, the main target beneficiaries will be the local communities, FRI, **CFDTC** and the Forest Department itself. The local community will be able to generate income through the job opportunities that will be created through the project activities, community development activities of the project, and the sales of quality teak seeds to the FD. However, since the production of quality seed will produce quality timber for export and enhance the FE earnings of the country, the target beneficiaries will include all the people of Myanmar as a whole.

2.5 Technical and scientific aspects

Teak occurs naturally in India, Myanmar, Thailand and Laos. Myanmar, which is situated in the center of its distribution is known to have the best teak.

In Myanmar, natural teak occurs between latitude 25° 30' N and 10° N. It can be found in semi-evergreen forests, lower mixed deciduous forests, moist upper mixed deciduous forests, dry upper mixed deciduous forests and the Indaing or deciduous dipterocarp forests. These types of forests are prevalent almost throughout the country and so is teak. However, the quality varies between different forest types and from place to place. Bago Yoma, which is situated in the heart of the country is said to be the best teak area of Myanmar. However, scientific identification of the best teak provenance is still needed.

With the increase in population and the need for development of the country, the pressure on natural teak forests is great. With the object of reducing the pressure on the natural forests, the Forest Department, on the other hand, is also planting 80,000 acres annually, out of which approximately 43% are teak. In order to assure that the planted teak is as good as the famous Myanmar natural teak, it is becoming critical that the good gene pool in the natural forests be conserved for multiplication before the good trees are taken out.

Initially, zonation of provenances based on climograms derived from temperature and rainfall of different areas in the country will be carried out. Plus trees will be identified in every provenance, clones and seeds will be collected from these plus trees and conserved in provenance trial plots and hedge (clone) garden.

Thus, provenance trials will be carried out in this project in order to identify the performance of teak from different provenances. Randomized Complete Block Design (RCBD) will be used so that the results can be statistically analyzed. Hedge garden and a nursery will also be established to conserve and propagate the clones either by shoot cutting or through tissue culture.

At the same time SPAs will also be established in the selected 6 districts. SPAs are areas selected in natural forests or plantations to ensure a supply of seed of known geographic origin and parentage. They constitute a reliable source of seed of certain genetic quality, variable according to the quality of the formation, until such time as seed orchards prove necessary and come into production. Since they constitute a

local source, usually in, or near plantation areas in which a certain natural selection has already occurred, they offer the advantage of providing seed that is genetically more reliable for the site than seed brought from outside or from different environmental conditions.

Thus, established good teak plantations of age 10 years and over will be selected in each of the 6 divisions for conversion into SPA. These plantations will be thinned to E-grade with the participation of the local community. Further removal of the remaining forked, twisted and crooked trees will also be carried out by responsible Forest Department officer after the thinning. The area will be fenced and a guard house will be built. Soils in each SPA will be tested and appropriate fertilizer applied where necessary. These SPAs will be handed over to the community from the nearby villages for maintenance, protection and seed collection. Forest Department will buy all the seed collected by the community. SPAs are meant for a quick supply of reasonably good quality seed in quantity for the respective division before a more sophisticated seed orchard can be established and in production.

The existing tissue culture laboratory will be upgraded through support from this project. More staffs will be trained in this field and production of tissue-cultured plantlets will be carried out both for research and field demonstrations in supplementing the deficit in seed supply.

Tissue culture can be defined as a method for the propagation of plants under aseptic condition. A tiny piece of plant, tissue or small organs called explants from a selected plant will be removed and placed in sterile test tube on a gel-like medium enriched with hormones and nutrients that regulate into plants. The rooted plantlets are acclimatized in chamber under justification of light and temperature for out-planting.

Tissue culture can be applied for propagation of plant which has no sexual means. The plant produced is identical to the mother and these can be mass-produced with minimum space.

This tissue culture unit will also establish hedge gardens with selected clones. In order to establish hedge garden, selection and recording of plus trees are first to be carried out. Clones are then collected from the plus trees and these clones are vegetatively propagated either by branch cutting, grafting or budding in the establishment of hedge garden. The plants in the hedge garden are normally given treatment for shoot multiplication by pruning and bending the branches. Shootlets from the hedge garden are collected for rooting at the nursery. These rooted plantlets, which are of superior clones, are then used for planting out in the field. For further improvement, plantlets of each plus tree are to be planted in separate plots and their growth performance evaluated. Backward selection is then done and roguing is carried out in the hedge garden if necessary. The plus tree from which the rogued plant in the hedge garden originated will also be rejected. Selected clones from this hedge garden will be used as ex-plant for tissue culture and vegetative propagation activities.

Training, workshops and seminars on the related activities will also be organized so as to enhance the capacity of the staffs of the Forest Department and the local communities. Study tours will also broaden the outlook and awareness of both the staffs of the Forest Department and the local communities.

The next step will be to execute the proper tree improvement programme by establishing Seed Orchards based on the results and materials obtained from this project and the established tissue culture laboratory and hedge gardens. In this way, more genetic gain can be expected from the planting materials used for the establishment of teak plantations.

2.6 Economic aspects

In Myanmar, timber is one of the major foreign exchange earning products. It contributed an average of 24.14% of foreign exchange earnings of the country between the years 1990 to 2000. Teak, which is a premier timber, contributes the major share of foreign exchange earnings in the export of timber. Thus, the economy of the country depended, to a great extent, on teak.

Because of the size and the quality of its timber, Myanmar teak fetches a very good price and has well-established markets. In order to sustain these price and market, it is very important that the size, quantity and quality of the teak timber are also sustained. It is therefore very important that the teak timber produced from the plantations that are being planted is as good as that, produced from the natural forests and also contributes to sustainable production.

This proposed project, which will produce good quality seed for planting will be a great contribution to the production of good quality teak that is needed to upkeep the price of Myanmar teak and sustain its world market. In other word, it will contribute, to a great extent, to the economy of the country and the people of Myanmar.

Collecting of teak seed from the SPAs and selling them to the Forest Department will also contribute to the income of the local communities. Moreover, the community development activities in this project will also create income generation for the local communities, and thereby also benefit them economically.

2.7 Environment aspects

Deforestation is a serious problem in Myanmar. It involves degradation of fragile forest ecosystems, deterioration of the quantity and productivity of the remaining tropical forests, and depletion of biological diversity. So far, Myanmar still has a forest cover of 498,621 km², out of which 7.5% are degraded forests and 22.8% are forest affected by shifting cultivation. As plantations are normally planted in these degraded forests and forest affected by shifting cultivation, it can provide many environmental benefits such as rehabilitation of eroded forest lands and carbon sequestration. Moreover, as the area planted becomes forested again and the habitat of the wildlife is restored, the biodiversity of the area will also be replenished.

2.8 Social aspects

Socio-economic needs of the local communities through sustainable management of the SPA will also be addressed in this project. The local communities will be sensitized and mobilized so as to build a relationship between them and the project and get their participation in the establishment and protection of the SPAs and provenance trials. They will participate and work together with the staff of the FD in the selection of the plantation, in thinnings, cleaning, soil testing, fertilization and in protecting the plantation. They will also be involved in the establishment of provenance trials and this is another source of job opportunity for them. Seed produced from the SPA will be collected by the community and sold to the FD. This will provide them with income which will give them incentive to look after and protect the SPAs. Community development activities such as income generation activities in the field of livestock breeding and agriculture will also be implemented. It is expected that their socio-economic condition will improve with the income received from selling of teak seeds, and also from the support received from the community development activities of the project.

Moreover, additional employment opportunities will also be created for the local communities in the establishment activities of the SPAs, such as thinning, cleaning, fencing and other cultural operations, and establishment of provenance trials.

2.9 Risks

No major risk is expected in the implementation of this proposed project apart from the fact that the participation of the local communities may not be sustainable after the termination of this project. Dealing with the local community is a delicate issue and staffs of the Forest Department still lack skills and experience in community mobilization and community development activities. The progress in this component of the project may be slow, but, the objective can be achieved by giving training to the staffs concerned and their continued friendly working relationship with the local communities after the termination of the project.

Moreover, international experts on participatory forestry and tree improvement will be recruited in the early part of the project. These international experts, together with some experienced national consultants, which will also be recruited, are expected to facilitate the smooth and successful implementation of this project.

3. **Outputs**

3.1 Specific Objective 1

To establish Seed Production Areas (SPA) and initiate activities for the establishment of Seed Orchards for production of high quality seed.

Output 1.1: A total of 150 acres of SPA established at Shwebo, Yamethin, Gangaw, Pyay, Yangon (North) and Hinthada districts.

Output 1.2: Provenance trials, hedge gardens and a nursery established.

Output 1.3: Trainings, workshops and study tours organized and implemented.

Output 1.4: Capacity of the local community in the management of SPA enhanced and their livelihood sustained and improved.

3.2 Specific Objective 2

To strengthen the Tissue Culture Laboratory and produce high quality clonal plantlets through tissue culture and shoot cutting from hedge garden.

Output 2.1: Tissue Culture Laboratory strengthened

Output 2.2: High quality vegetatively propagated plantlets in production from tissue culture and hedge garden

Output 2.3: Training and seminars organized and convened

4. Activities

4.1 Output 1.1

A total of 150 acres of SPA established at Shwebo, Yamethin, Gangaw, Pyay, Yangon (North) and Hinthada districts.

Activity 1.1.1: Site will be selected in very good teak plantations of age 10 years and over. The plantation will be thinned to at least E-grade and all suppressed, fork, crooked, twisted and malformed trees will be further removed. The area will be fenced with a guardhouse constructed within the fence.

Activity 1.1.2: Soils in each SPA will be analysed and fertilizer will be applied where necessary.

4.2 Output 1.2

Provenance trials, a hedge garden and a nursery established.

Activity 1.2.1: Zonation of provenances will be carried out base on the climograms of different parts of the country where teak occurs naturally.

Activity 1.2.2: Plus trees will be identified from each of the provenances and clone and seed collection from these plus trees will be organized.

Activity 1.2.3: Provenance trials will be established.

Activity 1.2.4: Soils in each plot will be analysed and recorded.

Activity 1.2.5: Hedge (Clonal) gardens will be established and a nursery constructed for the production of clonal cutting plantlets.

4.3 Output 1.3

Trainings, seminars, workshops and study tours organized and implemented.

Activity 1.3.1: Trainings, workshops and seminars will be organized both for the staff of the Forest Department and the local community.

Activity 1.3.2: In-country study tours will be conducted for each of the 6 centres, while study tour abroad will also be conducted both for the staff of the Forest Department and representatives of the members of the interested local community.

4.4 Output 1.4

Capacity of the local community in the management of SPA enhanced and their livelihood improved

Activity 1.4.1: Local communities from the nearby villages will be sensitized and mobilized to participate in the establishment and protection of the SPA. The SPAs will be handed over to the community in a usufruct basis after establishment. At the same time community development activities, such as income generation in the field of livestock and agriculture will also be carried out so as to alleviate their livelihood and get better participation in the sustainable development of the SPAs.

Activity 1.4.2: Local community from the nearby villages will participate in site selection, thinning, tending and protection activities of the SPA. Finally, seeds will be collected by the local community group and sold to the Forest Department. This will provide them income which will give them incentive to protect and look after these SPAs.

4.5 Output 2.1

Tissue Culture Laboratory strengthened.

Activity 2.1.1: The existing inadequately equipped tissue culture laboratory will be strengthened through the provision of a building or rooms by the Forest Department, and the required equipment and chemicals purchased with the support from this project.

4.6 Output 2.2

High quality vegetatively propagated plantlets in production from tissue culture and hedge garden.

Activity 2.2.1: Tissue culture and shoot cutting from hedge garden activities will be carried out and vegetatively propagated plantlets of selected clones will be produced.

4.7 Output 2.3

Training and seminars organized and convened

Activity 2.3.1 In order to strengthen the capacity of the staffs of the Forest Department and the local community in tree improvement and particularly on hedge garden management and tissue culture technique, training and seminars on these subjects will be organized and conducted.

5. Logical Framework Worksheet

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Development Objective</p> <p>To enhance the economy of the country through sustainable production and export of high quality teak by using good quality seed for planting</p>	<p>The economy of the country is enhanced through production and export of 220,000 tons high quality teak logs.</p>	<p>Statistical year book, Myanmar.</p> <p>Annual reports of the Ministry of Forestry.</p>	<p>Local community gets economic benefit through selling teak seed from SPA.</p> <p>Continued participation of the local community in protection of the SPAs.</p> <p>Forest Department will be able to produce good quality teak timber from plantations.</p>
<p>Specific Objective 1.</p> <p>To establish Seed Production Areas (SPA) and initiate activities for the establishment of Seed Orchards for production of high quality seed.</p>	<p>An increase in about 1,000 kg/year of good quality teak seeds for planting, and economic benefit to the local community.</p> <p>About 10 acres of Provenance trials established, and high quality teak plantlets in production as required for planting.</p>	<p>Forest Department statistics.</p> <p>Progress reports.</p> <p>Technical reports by FRI.</p> <p>Project terminal report.</p>	<p>Forest Department staff will get better idea on the establishment of SPA and tree improvement work.</p> <p>Good quality seed will be available in sufficient quantity for the Special Teak Plantation Programme.</p> <p>It is a good starting ground for more future sophisticated tree improvement programme.</p>
<p>Output 1.1</p> <p>A total of 150 acres of SPA established at Shwebo, Yamethin, Gangaw, Pyay, Yangon (N) & Hinthada districts.</p>	<p>Three SPAs (75 acres) established by the end of year 1 and another 3 (75 acres) by the end of year 2.</p>	<p>Forest Department statistics.</p> <p>Progress reports.</p> <p>Project terminal report.</p>	<p>Good teak plantations will be available for conversion into SPA.</p> <p>Forest Department will use these SPAs as demonstration plots also.</p>

<p>Output 1.2</p> <p>Provenance trials, a hedge garden and a nursery established.</p>	<p>About 10 acres Provenance trials established by the end of year 3.</p> <p>A hedge garden containing 50 clones and a nursery established by the end of year 2.</p>	<p>Technical reports by FRI and CFDTC.</p> <p>Progress reports.</p> <p>Project terminal report.</p>	<p>Results of the provenance trials will be used for future tree improvement programme.</p> <p>More good quality vegetatively reproduced teak plantlets will be used for plantation programme.</p>
<p>Output 1.3</p> <p>Trainings, seminars workshops and study tours organized and implemented.</p>	<p>Training on SPA establishment, maintenance and seed handling completed by the end of year 1.</p> <p>Workshops on SPA establishment and seminar on tree improvement convened in year 2 and 3 respectively.</p> <p>In-country study tours for 6 centres, and study tour abroad both for staff of FD and communities implemented in year 2 and 3.</p>	<p>Training materials.</p> <p>Workshop proceedings.</p> <p>Progress reports.</p> <p>Project terminal report.</p>	<p>Qualified instructors will be available.</p> <p>Capacity of the staffs of Forest Department and the community will be enhanced.</p> <p>Awareness on the importance of tree improvement is fully raised.</p> <p>Better participation by the local community.</p>
<p>Output 1.4</p> <p>Capacity of the local community in the management of SPA enhanced and their livelihood improved</p>	<p>Community will appreciate and will be able to maintain, protect, collect, handle and distribute seed more efficiently.</p> <p>The livelihood of the community will be improved.</p>	<p>More and physiologically better seeds will be available.</p> <p>Progress reports.</p> <p>The livelihood of the local community improved</p>	<p>The awareness of the community on the need for quality seed and their capacity to handle seed will be enhanced.</p> <p>Forest Department will get more high quality teak seeds for the Special Teak Plantation Programme.</p> <p>The livelihood of the local community will be alleviated.</p>

<p>Specific Objective 2</p> <p>To strengthen the tissue culture laboratory and produce high quality clonal plantlets.</p>	<p>Vegetatively reproduced high quality teak plantlets in production for planting at the end of the project period.</p>	<p>Forest Department statistics. Progress reports. Project terminal report.</p>	<p>More Forestry staffs will be trained and gain experience in tissue culture work.</p>
<p>Output 2.1</p> <p>Tissue culture laboratory strengthened.</p>	<p>Full fledge tissue culture laboratory in operation by the end of the project.</p>	<p>Technical report by CFDTC. Progress reports. Project terminal report.</p>	<p>Continuing support from the Forest Department for this activity.</p>
<p>Output 2.2</p> <p>High quality vegetatively propagated plantlets in production from tissue culture and hedge garden.</p>	<p>Vegetatively propagated plantlets produced for planting by the end of year 3.</p>	<p>Forest Department statistics. Progress reports. Project terminal report.</p>	<p>Tissue cultured plantlets of other commercial species also produced.</p>
<p>Output 2.3</p> <p>Training and seminars organized and convened.</p>	<p>Training tissue culture and hedge garden completed by the end of year 1.</p> <p>One seminar on tissue culture & hedge garden convened by the end of year 2 and another on tree breeding at the end of year 3.</p>	<p>Training materials. Seminar proceedings. Progress reports. Project terminal report.</p>	<p>Qualified instructors will be available.</p> <p>More Forest Department staffs will be trained in tissue culture technique and be able to participate in the activity.</p> <p>Awareness, on the importance of tissue culture in tree improvement programme, will be raised.</p>

6. WORK PLAN

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<p>Output 1.1 A total of 150 acres of SPA established at Shwebo, Yamethin, Gangaw, Pyay, Yangon (N) & Hinthada Districts</p>													
<p>Activity 1.1.1 Site will be selected in very good teak plantations of age 10 years and over. The plantation will be thinned to at least E-grade and all suppressed, forked, crooked, twisted and mal-formed trees will be further removed. The area will be fenced with a guard house constructed within the fence.</p>	FD, NPM, Project Unit												
<p>Activity 1.1.2 Soils in each SPA will be analyzed and fertilizer will be applied where necessary.</p>	NPM, FRI, Project Unit												
<p>Output 1.2 Provenance trials, a hedge garden and a nursery established</p>													
<p>Activity 1.2.1 Zonation of the provenances will be carried out based on the climograms of different parts of the country where teak occurs naturally.</p>	FD, NPM, Project Unit												
<p>Activity 1.2.2 Plus trees will be identified from each of the provenances and clone and seed collection from these plus trees will be organized.</p>	FD, NPM, Project Unit												

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Activity 1.2.3 Provenance trials will be established.	FD, NPM, Project Unit												
Activity 1.2.4 Soils in each plot will be analysed and recorded.	NPM, FRI, Project Unit												
Activity 1.2.5 Hedge (Clonal) garden will be established and a nursery constructed for the production of clonal cuttings	FD, NPM, Project Unit												
Output 1.3 Trainings, workshops and study tours organized and implemented.													
Activity 1.3.1 Trainings, workshops and seminars will be organized both for the staffs of the Forest Department and the local community.	FD, NPM, CFDTC, Local Community, Project Unit												
Activity 1.3.2 In-country study tours will be conducted for each of the 6 centres while study tour abroad will also be conducted both for the staff of Forest Department and representatives of the members of the interested local community.	FD, NPM, Local Community, Project Unit												
Output 1.4 Capacity of the local community in the management of SPA enhanced and their livelihood improved.													

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<p>Activity 1.4.1 Local communities from the nearby villages will be sensitized and mobilized to participate in the establishment of, and protection of the SPA. The SPAs will be handed over to the community after establishment. At the same time community development activities will also be carried out so as to alleviate their livelihood and get better participation.</p>	FD, NPM, Local Community, Project Unit												
<p>Activity 1.4.2 Local community from nearby villages will participate in site selection, thinning, tending and protection activities of the SPA. Finally, seeds will be collected by the local community group and sold to the Forest Department.</p>	FD, NPM, Local Community, Project Unit												
<p>Output 2.1 Tissue culture Laboratory Strengthened</p>													
<p>Activity 2.1.1 The existing inadequately equipped tissue culture laboratory will be strengthened through provision of a building by the Forest Department and the required equipments and chemicals purchased with the support of the project.</p>	FD, NPM, CFDTC												
<p>Output 2.2 High quality vegetatively propagated plantlets in will be in production from tissue culture and hedge garden.</p>													

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<p>Activity 2.2.1 Tissue culture and shoot cutting from hedge garden activities will be carried out and vegetative plantlets of selected clones will be produced.</p> <p>Output 2.3 Trainings and seminars organized and convened.</p>	FD, NPM, Project Unit												
<p>Activity 2.3.1 In order to strengthen the capacity of the staffs of the Forest Department and the local community in tree improvement and particularly on hedge garden management and tissue culture technique, trainings and seminars on these subjects will be organized and conducted.</p>	FD, NPM, CFDTC												

7. Budget

7.1 OVERALL PROJECT BUDGET BY ACTIVITY (USD) by ITTO

Outputs/ Activities Non-Activity Based Expenses	BUDGET COMPONENTS. (USD)							Quarter Year	GRAND TOTAL
	10 Project Personnel	20 Sub- Contracts	30 Duty Travel	40 Capital items	50 Consum- able items	60 Miscella- neous			
ACTIVITIES									
Output 1.1									
A.1.1.1: Site Selection, Thinning & Fencing (6-SPAS)	26,500	20,000	8,000	30,000	4,000	1,000	Q1-4, Yr 1&2	89,500	
A.1.1.2: Soil analysis and Treatment within SPAs	11,900	-	3,000	4,000	3,000	1,000	Q1-4, Yr 1&2	22,900	
<i>Sub-Total.1</i>	38,400	20,000	11,000	34,000	7,000	2,000		112,400	
Output 1.2									
A.1.2.1: Provenances Zonation	8,500	-	2,000	-	-	-	Yr1	10,500	
A.1.2.2: Plus trees identified and collection of seeds and clone	9,500	-	3,000	-	4,000	1,000	Yr1&Yr2	17,500	
A.1.2.3: Provenance trials establishment	13,800	-	4,000	4,000	8,000	2,000	Q3&4, Yr1	31,800	
							Q1&2, Yr2		
A.1.2.4: Soil analysis and documentation	8,900	-	3,000	-	-	1,000	Q2-4, Yr 1	12,900	
							Q1-3, Yr 2		
A.1.2.5: Hedge (clonal) garden establishment	9,500	-	4,000	4,000	3,000	2,000	Q3&4, Yr1	22,500	
							Q1-4, Yr2		
<i>Sub-Total.2</i>	50,200	-	16,000	8,000	15,000	6,000		95,200	
Output 1.3									
A.1.3.1: Trainings, Workshops & Seminars	24,100	10,000	-	-	5,500	-	Q4, Yr1	39,600	
							Q2&4, Yr2		
							Q2, Yr3		
A.1.3.2: In Country Study Tours and Study Tour Abroad	16,600	-	-	-	2,500	1,000	Q1, Yr2	20,100	
							Q1, Yr3		
<i>Sub-Total.3</i>	40,700	10,000	-	-	8,000	1,000		59,700	
Output 1.4									
A.1.4.1: Local Community Developments at villages	26,900	20,000	4,000	-	15,000	2,000	Yr1-3	67,900	
<i>Sub-Total.4</i>	26,900	20,000	4,000	-	15,000	2,000		67,900	
Output 2.1									
A.2.1.1: Strengthening existing Tissue Culture Laboratory	11,000	-	-	3,000	3,000	2,000	Yr1-Yr3	19,000	
<i>Sub-Total.5</i>	11,000	-	-	3,000	3,000	2,000		19,000	
Output 2.2									
A.2.2.1: Production of Tissue Culture Plantlets	11,000	-	5,000	-	2,500	3,000	Q2-4Yr2& Q1-4, Yr3	21,500	
<i>Sub-Total.6</i>	11,000	-	5,000	-	2,500	3,000		21,500	
Output 2.3									
A.2.3.1: Trainings and Seminars on tree improvement, hedge garden and tissue culture	18,800	5,000	2,000	-	5,260	-	Q3 in Yr1-3	31,060	
<i>Sub-Total.7</i>	18,800	5,000	2,000	-	5,260	-		31,060	
Component Total	197,000	55,000	38,000	45,000	55,760	16,000		406,760	
ITTO Monitoring & Review Costs								18,000	
ITTO Evaluation Costs								15,000	
ITTO Programme Support costs								35,180	
GRAND TOTAL	197,000	55,000	38,000	45,000	55,760	16,000		474,940	

Items	ITTO (USD)	Myanmar (Kyats)
30. Duty Travel		
31. National Travel allowance	20,000	
32. International Travel allowance	10,000	
33. Transport cost	8,000	
39. Component Total	38,000	
40. Capital items		
41. Premises		360,000
42. Land		180,000
43. 4x4 Inspection Vehicle (1) Nos.	25,000	
44. Capital equipments		
3 computer sets-US\$2,000	6,000	
4 measurement equipment-US\$500	2,000	
1 unit Electronic Balance (.001 gm 3 Digits)	2,500	
1 unit Electronic Balance (.01 gm 2 Digits)	1,500	
2 unit Aircon (2HP) for culture room	1,500	
1 unit Lighting timber switch	500	
1 unit Digital pH meter with spare electrode	1,000	
2 Digital Cameras @ USD 500	1,000	
1 Lap-Top computer @ USD 2500	2,500	
Survey equipment (Clinometa, compass, etc.)	1,500	
49. Component Total	45,000	540,000
50. Consumable items		
52. Spares	5,000	50,000
53. Fuel and Utilities	20,000	
54. Office Supplies	10,760	60,000
55. Plants, seeds, etc.	15,000	
56. Preparation of training materials	5,000	
59. Component Total	55,760	110,000
60. Miscellaneous.		
61. Sundry	10,000	
62. Auditing	6,000	
69. Component total	16,000	
70. Executing Agency Management Cost		
79. Component total	406,760	150,000
80. ITTO Monitoring Evaluation & Administration		
81. Monitoring and Review Costs	18,000	
82. Evaluation Costs	15,000	
83. Programme Support Costs (8%)	35,180	
89. Component Total	68,180	
90. Refund of Pre-project Costs		
100. GRAND TOTAL	474,940	9,270,800

7.3 Project Consolidated Yearly Budget by Component and Source

Items	Year 1		Year 2		Year 3		Total	
	ITTO (USD)	GOM (Kyats)	ITTO (USD)	GOM (Kyats)	ITTO (USD)	GOM (Kyats)	ITTO (USD)	GOM (Kyats)
10. Project Personnel								
11. National Experts (36 months)								
(1) National Project Manager		150,000		150,000		150,000		450,000
(6) Township co-cordinators		612,000		612,000		612,000		1,836,000
(6) Technical officers		424,800		424,800		424,800		1,274,400
12. National Consultants								
(1) SPA Management/Silviculture	12,000		12,000		12,000		36,000	
(1) Training, Research and Community Development	6,000		12,000		6,000		24,000	
(1) Tree Improvement			3,000				3,000	
(1) Soil-site	3,000						3,000	
(1) Tissue Culture			3,000				3,000	
13. Support & Labourer								
(1) Secretary	2,400		2,400		2,400		7,200	
(1) Office Assistant	1,200		1,200		1,200		3,600	
(8) Clerical assistant		451,200		451,200		451,200		1,353,600
(8) Admin Assistant		508,800		508,800		508,800		1,526,400
(12) Field Staff		676,800		676,800		676,800		2,030,400
(2) Driver-Cum-Messenger	2,400		2,400		2,400		7,200	
Unskilled Labourer	10,000		10,000		10,000		30,000	
14. Fellowship and Training								
Overseas Training Groups			10,000		10,000		20,000	
In country study tours			5,000		5,000		10,000	
15 International Consultants								
(1) Socio-Economic	10,000						10,000	
(1) Tissue culture			30,000				30,000	
(1) Tree Improvement			10,000				10,000	
19. Component Total	47,000	2,823,600	101,000	2,823,600	49,000	2,823,600	197,000	8,470,800
20. Sub-contracts								
21. Seed Production Areas	6,000		8,000		6,000		20,000	
22. Community Development	5,000		7,000		8,000		20,000	
23. Publishing technical papers and workshop proceedings	2,000		5,000		8,000		15,000	
29. Component Total	13,000		20,000		22,000		55,000	
30. Duty Travel								
31. National Travel allowance	6,000		7,000		7,000		20,000	
32. International Travel allowance	2,000		8,000				10,000	
33. Transport cost	2,000		3,000		3,000		8,000	
39. Component Total	10,000		18,000		10,000		38,000	

Items	Year 1		Year 2		Year 3		Total	
	ITTO (USD)	GOM (Kyats)						
40. Capital items								
41. Premises		360,000						360,000
42. Land		180,000						180,000
43. 4x4 Inspection Vehicle (1) Nos.			25,000				25,000	
44. Capital equipments	8,000		12,000				20,000	
49. Component Total	8,000	540,000	37,000				45,000	540,000
50. Consumable items								
52. Spares	1,000	10,000	2,000	20,000	2,000	20,000	5,000	50,000
53. Fuel and Utilities	6,000		8,000		6,000		20,000	
54. Office Supplies	3,760	20,000	4,000	20,000	3,000	20,000	10,760	60,000
55. Plants, seeds, etc.	5,000		5,000		5,000		15,000	
56. Preparation of training materials	1,000		2,000		2,000		5,000	
59. Component Total	16,760	30,000	21,000	40,000	18,000	40,000	55,760	110,000
60. Miscellaneous.								
61. Sundry	3,000		3,000		4,000		10,000	
62. Auditing	2,000		2,000		2,000		6,000	
69. Component total	5,000		5,000		6,000		16,000	
70. Executing Agency Management Cost		50,000		50,000		50,000		150,000
79. Component total		50,000		50,000		50,000		150,000
80. ITTO Monitoring Evaluation & Administration								
81. Monitoring and Review Costs	18,000						18,000	
82. Evaluation Costs	15,000						15,000	
83. Programme Support Costs	35,180						35,180	
89. Component Total	68,180						68,180	
90. Refund of Pre-project Costs								
100. GRAND TOTAL	167,940	3,443,600	202,000	2,913,600	105,000	2,913,600	474,940	9,270,800

PART III: OPERATIONAL ARRANGEMENTS

1. Management Structure

The project will be implemented under the overall supervision of the Ministry of Forestry. A Project Steering Committee (PSC) will be formed and the executing agency will be the Forest Department, Ministry of Forestry. A Project Unit, comprising of national consultants will be assisting the NPM in the technical aspects at all project sites. The Training and Research Programme Division (including CFDTC*), Forest Research Institute and the 6 respective Forest Divisions will undertake the role of project implementation. The structure of the project is presented diagrammatically below.

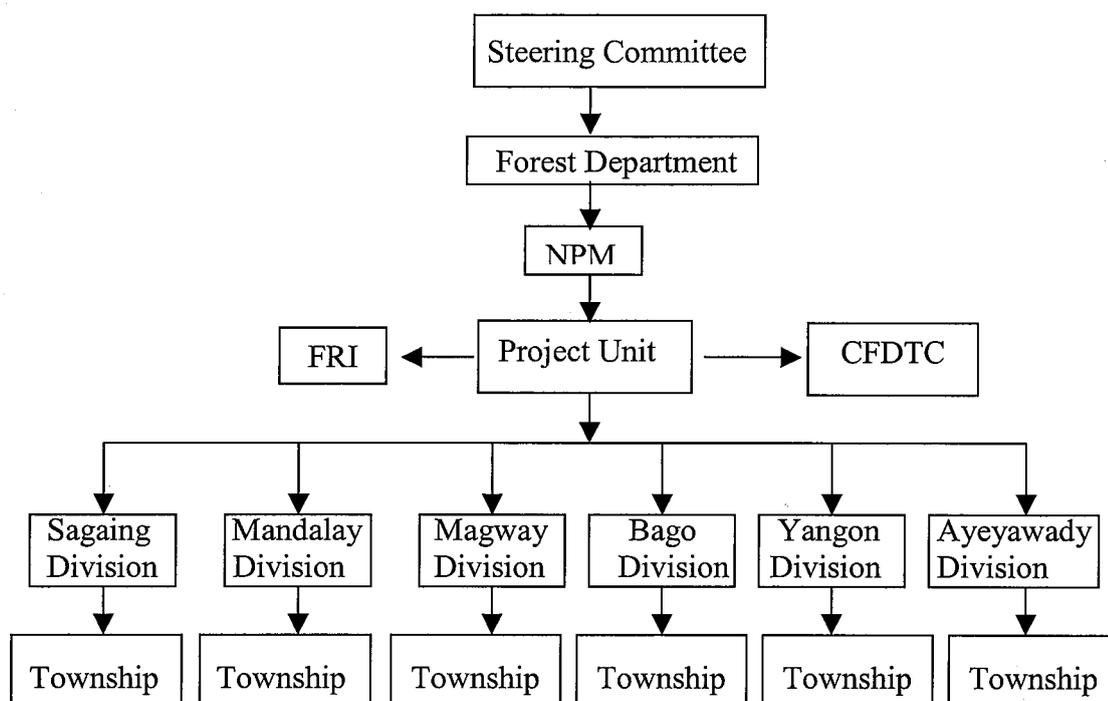
The (PSC) will be chaired by the Director General of the Forest Department. This committee will guide and monitor the implementation of the project. The structure of the PSC will be as follows:

Director General of the Forest Department -----	Chairman
Representative from ITTO -----	Member
Deputy Director General, Planning and Statistics Department -----	Member
Deputy Director General, Forest Department -----	Member
Director, FRI, Forest Department -----	Member
Director, Planning and Statistics Division -----	Member
Director, Natural Forest and Plantation Division -----	Member
Director, Training and Research Programme Division (NPM) -----	Secretary

Implementation of the project will be closely evaluated and guided by the members of the PSC under the authorization given by the Chairman. As a person who has to take the overall responsibility of the project, the Director General of the Forest Department will also be in close and continuous supervision and guidance to the National Project Manager (NPM).

* Central Forestry Development Training Centre

Project Structure



2. Monitoring, Reporting and Evaluation

(a) Project progress reports – Bi-annual progress reports of the project will be made available to ITTO twice a year, 4 weeks before the intended date of monitoring visits and 2 months before the ITTO Council Sessions. Assuming the project starts on 1st January in Year 1, tentative month of submission of progress reports to ITTO will be as follows:

1 st Progress report	December, year 1
2 nd Progress report	June, year 2
3 rd Progress report	December year 2
4 th Progress report	June, year 3
5 th Progress report	December, year 3

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 within 3 months of the completion of the project. The NPM will undertake this responsibility in compliance with the Project Agreement and *ITTO Manual for Project formulation (1999)*.

(c) **Project Technical Reports** – Project technical reports will be submitted to ITTO whenever technical results are available or within 3 months of the completion of the project. The reports will be prepared in conformity with the *ITTO Manual for Project Monitoring, Review and Evaluation*.

(d) **Monitoring, Review and Steering Committee's Visit** – The project will be subjected to monitoring by ITTO representatives according to ITTO's guidelines. Monitoring visits by ITTO representative(s) may be fixed by the ITTO in consultation with the Executing Agency. Appropriate time for monitoring visit is in February every year, and PSC meeting will be planned to coincide with this visit.

3. Future Operation and Maintenance

There are **four** major portions in this project that need future operation and maintenance.

(1) Established SPAs and community development, (2) Established provenance trials and (3) Established hedge garden and nursery, (4) Strengthened tissue culture laboratory.

(1) Established SPAs will be handed over to the local community in a usufruct basic for protection and follow up cultural operations. The technical side of management of the SPA will be supported by the Forest Department. The local community, on the other hand, will get economic benefit by collecting seed from the SPAs and selling them to the Forest Department thereby contributing to the alleviation of poverty of the local community. It is expected, that the economic benefit received through selling of quality seed and income generation activities through community development, will give the local community enough incentive to maintain and protect the SPAs for sustainability.

(2) The provenance trials will be maintained and regular measurements taken by the FRI. The results will be used for a more sophisticated tree improvement programme.

(3) The established hedge garden and the nursery will be maintained and utilized by the CFDTC. Clones from the hedge garden will be used either for cuttings that are to be propagated vegetatively or tissue culture, and the plantlets raised in the nursery.

(4) The strengthened tissue culture laboratory will be utilized for future tree improvement programme as a part of ex-situ conservation and technology dissemination to researchers, students and FD staff.

PART IV: TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTA 1994 Objectives

This project proposal is in full compliance with the following ITTA 1994 Objectives:

(c) To contribute to the process of sustainable development;

(d) To enhance the capacity of members to implement a strategy for achieving exports of tropical timber and timber products from sustainably managed sources by the year 2000;

- (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;
- (j) To encourage members to support and develop industrial tropical timber reforestation and forest management activities as well as rehabilitation of degraded forest land, with due regard for the interests of local communities dependent on forest resources;
- (l) To encourage members to develop national policies aimed at sustainable utilization and conservation of timber producing forests and their genetic resources and at maintaining the ecological balance in the regions concerned, in the context of tropical timber trade.

2. Compliance with ITTO Yokohama Action Plan

The project is in compliance with the following goals established by the Committee on Reforestation and Forest Management.

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

- (2) *Support networking and the exchange of information with relevant international organizations to maintain the integrity of the resource base, including protected area networks*

The project will be implemented in collaboration with Myanmar Agriculture Service (MAS), Forest Resource Environment Development & Conservation Association (FREDA) and IPGRI so as to make efficient use of time and material to meet the objectives.

- (4) *Promote the conservation, rehabilitation and sustainable management of threatened forest ecosystems, inter alia mangroves, in collaboration with relevant organizations.*

This project will promote the conservation, rehabilitation and sustainable management of threatened good teak forest in cooperation with TEAKNET.

- (7) *Encourage members and assist, where appropriate, to: Develop innovative mechanisms, and relevant legislative frameworks, including incentives and market-based instruments to secure and expand, where appropriate, the forest resource base.*

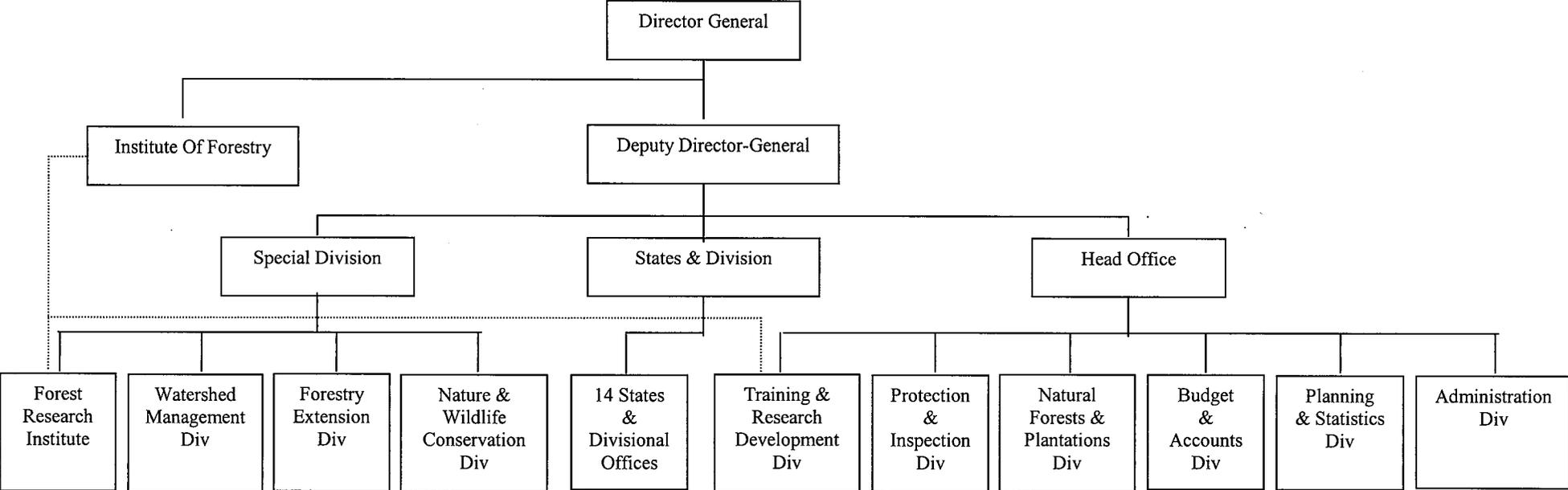
This project will develop innovative mechanism to give incentive to the local community to own, collect and sell teak seeds from the SPAs to the Forest Department so as to secure and expand the forest resource base.

Goal 2: Promote Sustainable Management of Tropical Forest Resources

- (10) *Encourage members and assist, where appropriate, to: Improve the productive capacity of natural forests, 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.*

Degraded natural forests will be reforested with high quality teak plantations. The productive capacity of these reforested areas of the natural forests will be enhanced by using good quality seeds from the SPAs.

ORGANIZATION OF THE FOREST DEPARTMENT



Terms of Reference for National and International Consultants

The project unit will include eight professionals, 5 national and 3 international consultants. The 5 national consultants will be assigned for SPA management/silviculture, training research and community development, tree improvement, soil-site and tissue culture. They will also have to participate in the implementation of the activities of their specialized areas. The 3 international consultants will be assigned for socio-economic, tissue culture and tree improvement.

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

SPA management/Silviculture national consultant (36 m/m)

The SPA management/Silviculture national consultant must be a Myanmar forester with great experience in silviculture or tree improvement, holding at least a Master degree in silviculture or tree improvement and proficient in English.

The main responsibilities of the SPA management/Silviculture national consultant will include:

- Zonation of provenances within the country
- Site selection for SPAs
- Producing thinning instructions for SPA
- Monitoring thinning operations
- Cooperating with FRI in the planning for seed collection for provenance trials
- Cooperating with FRI in the planning and establishment of provenance trials
- Conducting training on the establishment of SPA
- Assisting NPM in the formulation and implementation of work plan
- Preparation of reports

National consultant on training, research and community development (24m/m)

The National consultant on training, research and community development must be a Myanmar forester with experience in training, research and community development, holding at least a Master degree and proficient in English.

The main responsibilities of the national consultant in training, research and community development will include:

- Organizing trainings, workshops and seminars
- Organizing study tours
- Studying the productive capacity of the SPAs in cooperation with the SPA management/Silviculture national consultant
- Sensitizing the local community on project activities
- Conducting community development activities
- Participating in extension activities
- Preparation of training materials, manuals and reports

National consultant on tree improvement (3m/m)

The national consultant in tree improvement must be a Myanmar citizen with experience in tree improvement or plantation silviculture, holding at least a Master degree in Science and proficient in English.

The main responsibilities of the national consultant in tree improvement will include:

- Preparation of training material for tree improvement training
- Conducting trainings on tree improvement
- Preparation of instruction for the identification of plus trees
- Participating in the identification of plus trees
- Participating in the establishment of hedge garden
- Preparation of reports and manuals

National consultant on tissue culture (3m/m)

The national consultant on tissue culture must be a Myanmar citizen with experience in tissue culture or horticulture, holding at least a degree in Science and proficient in English.

The main responsibilities of the national consultant in tissue culture will include:

- Gathering and providing information on the equipments and chemicals needed for tissue culture laboratory
- Preparation of training materials for training on tissue culture techniques
- Conducting training on vegetative propagation and tissue culture techniques
- Participating in the production of tissue cultured and clonal cutting plantlets
- Preparation of reports and manuals

National consultant on soil-site (3m/m)

The national consultant on soil-site must be a Myanmar citizen with experience in, soil-site matching, holding at least a Master degree in Science and proficient in English.

The main responsibilities of the national consultant in soil-site will include:

- Conducting soil testing in all the SPA and provenance trials sites
- Recommending application of fertilizers where necessary
- Preparation of instructions for the application of fertilizer
- Recommending soil cover management in the SPAs
- Preparation of training materials on soil fertility management
- Conducting trainings on soil fertility management
- Preparation of reports and manuals

International consultant on socio-economic (1mm)

The international consultant on socio-economic must be a graduate in the field of social science or forest science with at least 10 years experience in community forestry programmes in tropical countries and fluent in English.

The main responsibilities of the international consultant in socio-economic will include:

- Conducting socio-economic survey of the project sites
- Preparation of training materials for training on community development
- Conducting training on community development
- Giving necessary advice to the NPM and senior staffs on community development activities
- Preparation of reports and manuals

International consultant on tissue culture (1mm)

The international consultant on tissue culture must be a graduate scientist who has at least 7 years experience in tissue culture and is fluent in English.

The main responsibilities of the international consultant in tissue culture will include:

- Advising on strengthening of tissue culture laboratory
- Cooperating with the national consultant in tissue culture on the preparation of training materials for training on tissue culture techniques
- Conducting practical training on tissue culture techniques for the staffs of the Forest Department
- Preparation of reports and manual on tissue culture

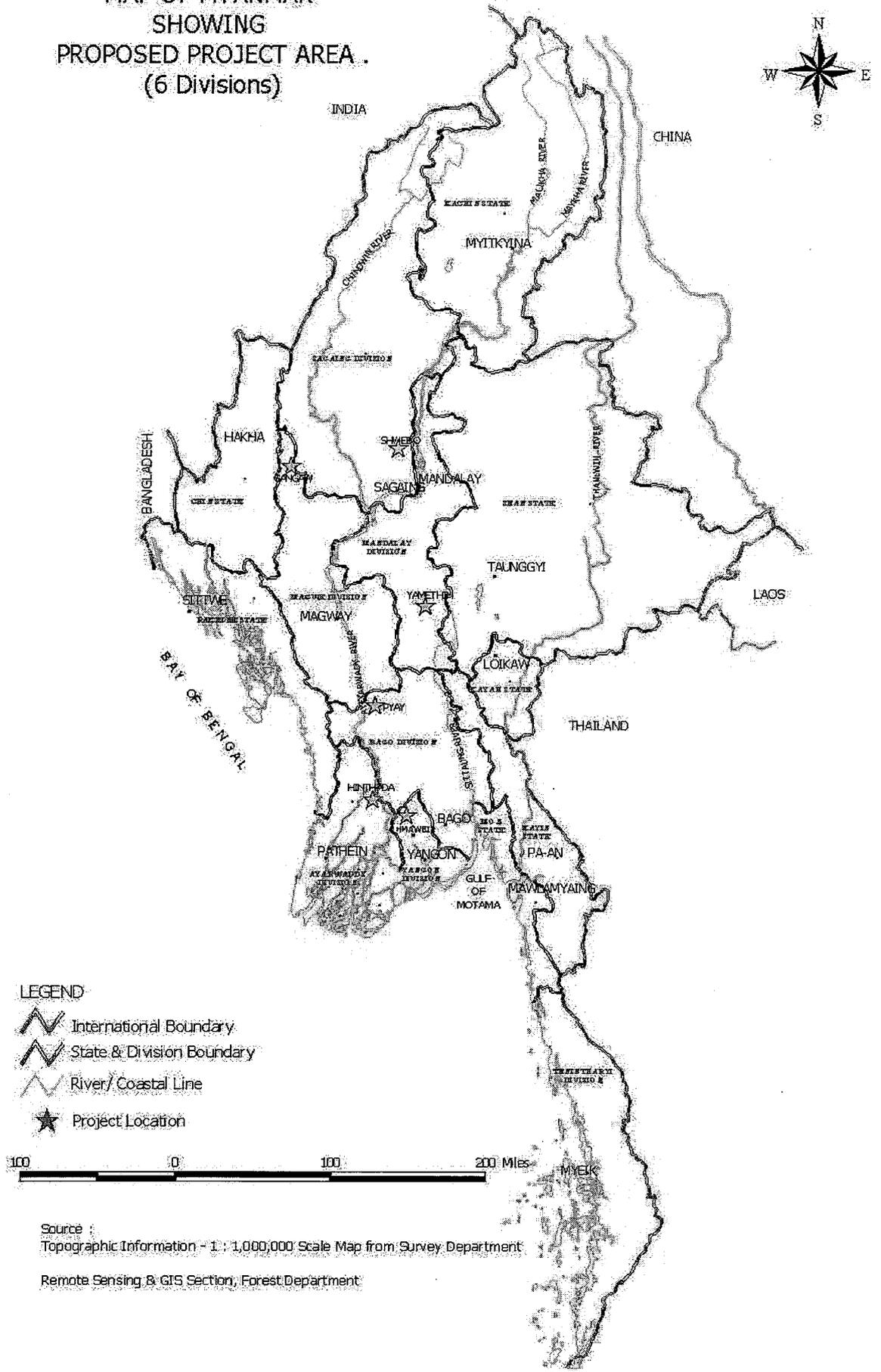
International consultant on tree improvement (1mm)

The international consultant on tree improvement must be a scientist who holds a Master degree in genetics or forestry, has at least 7 years experience in tree improvement programme and is fluent in English.

The main responsibilities of the international consultant in tree improvement will include:

- Advising NPM on the present project activities
- Preparing training material for training on tree improvement
- Conducting training to the Forest Department staffs on tree improvement
- Preparing a tree improvement programme for the Forest Department
- Preparing reports and manuals

MAP OF MYANMAR
SHOWING
PROPOSED PROJECT AREA .
(6 Divisions)



LEGEND

- International Boundary
- State & Division Boundary
- River/Coastal Line
- Project Location

100 0 100 200 Miles

Source :
Topographic Information - 1 : 1,000,000 Scale Map from Survey Department

Remote Sensing & GIS Section, Forest Department

Profiles of the Forest Research Institute (FRI) and the Central Forestry Development and Training Centre (CFDTC)

Forest Research Institute

Forestry research in Myanmar started in 1914, and a Research Division was formed in 1922 as part of the Forest Department. In 1952, a Forest Research and Training Circle, which is the forerunner to the present Forest Research Institute (FRI) was set up.

The present Forest Research Institute was established at Yezin, which is 255 miles north of Yangon in 1978. It was established with the financial assistance of the UNDP and technical assistance of the FAO. Forest Department, on behalf of the Government of the Union of Myanmar at that time, was the project implementing agency. As an advisory service, UNDP awarded a contract to the College of Environment Science and Forestry (ESF), State University of New York. The main objective of the FRI is to provide technical information on all aspects of forestry and forest based activities so as to increase the contribution of the forest and forestlands to the well being of the nation. Nowadays, FRI is the only institution taking responsibility for forestry research in Myanmar. The research activities of the FRI are conducted under the supervision of the Forest Research Advisory Committee. The Director of the FRI is taking responsibility both in the administration and technical aspects. There are altogether 77 researchers and 202 supporting staff carrying out research activities in various fields of forestry under 3 major divisions namely, (a) Forest Development Division, (b) Wood Utilization Division and (c) Administration and Finance Division, and 8 specific sections.

Central Forestry Development Training Centre

The Central Forestry Development Training Centre (CFDTC) is situated at Hmawbi, which is about 35 miles north of Yangon. It was established jointly by the Forest Department (FD) and the Japan International Cooperation Agency (JICA) in 1990. It is meant for the provision of systematic forestry training and educational opportunities to in-service personnel and to local people with the advanced technologies. About 30 types of training have been conducted since 1990. As a part of the second phase of the project, FD and JICA have also established a sub-centre at Mandalay which will emphasize on community participation in forestry activities.

Terms of Reference for Sub-contracts

Within this project, sub-contracts will be awarded for: (1) Seed Production Area establishment, (2) Community Development activities and (3) Publishing technical papers and workshop proceedings.

(1) Establishment of Seed Production Area (SPA)

Sub-contract for the establishment of Seed Production Areas will be awarded to any NGO group/groups that are qualified to implement the activity.

1. The group must have experienced and trained foresters in their group who are capable of establishing SPA. Proof of the existence of such foresters in their group should be given when applying for the sub-contract.
2. If there are no experienced and trained foresters in the group, the group can hire experienced and trained foresters for the implementation of this activity. Proof of the availability of such experienced and trained foresters should be given when applying for the sub-contract.
3. The sub-contractors must implement the activity strictly according to the instructions issued by the project.
4. The sub-contractors should be prepared to work closely under the instruction and guidance of the National Consultants and the Project Staffs
5. Payment for the sub-contract will be issued in (3) installments.
6. The second and the third installments will be paid only when the National Consultants or the authorized Project Staffs are satisfied with their work.

Group/Groups that are awarded the sub-contract for the establishment of SPA will have to carry out: (a) selection of suitable teak plantations of age 10-15 years; (b) thinning of the selected plantation to a desired density; (c) the removal of the remaining undesirable trees; (d) climber cutting and cleaning; (e) soil testing and fertilization and (f) fencing and construction of a guardhouse.

(2) Community Development Activities

Sub-contract for implementing community development activities will be awarded to any NGO group/groups that are qualified to implement the activities.

1. Group/Groups that apply for sub-contract for community development activities must at least have a member who has experience in community development activity.
2. The sub-contractors must implement the activity strictly according to the instructions issued by the project.
3. The sub-contractors should be prepared to work closely under the instruction and guidance of the National Consultants and the Project Staffs.
4. Payment for the sub-contract will be issued in (3) installments.
5. The second and the third installments will be paid only when the National Consultants or the authorized Project Staffs are satisfied with their performance.

Group/Groups that are awarded the sub-contract for community development activities will have to: (a) mobilize the local community; (b) sensitize the local community on SPA and the benefits that they can obtain from it; (c) conduct income generation activities for the community; (d) facilitate selection of local communities for training and study tours.

(3) Publishing technical papers and workshop proceedings

Sub-contract for publishing technical papers and workshop proceedings will be awarded to any group that is qualified to implement the activity.

- 1. The group that apply for the sub-contract must have at least a member that is good in English.**
- 2. The group must have a person who is experienced in writing and editing papers both in Myanmar and in English.**
- 3. The group must have a member who is capable with the computer.**
- 4. Payment for the sub-contract will be issued in (2) installments.**

The group that is awarded with the sub-contract will be responsible for editing, typing and printing of the technical papers and workshop proceedings.

Recommendations of the 27th Panel

Sr. No.	Recommendations	Modifications	Remarks
1	Improve problem analysis, including problem tree and justify the relevance of the second specific objective	<ul style="list-style-type: none"> - Problem analysis improved - Problem tree included - 	
2	Improve logical framework matrix providing quantitative, measurable indicators and assumptions that create framework conditions, which assure project success	Logical framework improved by providing quantitative, measurable indicators wherever possible	
3	Strengthen the section on social aspects and target beneficiaries by providing information on the role of local communities. Their participation should also be reflected in the output	<ul style="list-style-type: none"> - The section on social aspect is strengthened with the provision of information on the role of local community in the project implementation. - The participation of the local community is also reflected in output 1.4 	
4	Provide detailed information in the section on technical and scientific aspects on tissue culture lab., seed production areas, hedge gardens and nursery; the sustainability of these after project completion should be well addressed in the section on future operation and maintenance	<ul style="list-style-type: none"> - Detailed information on tissue culture lab, SPA, hedge gardens and nursery is provided in section on technical and scientific aspects. - The sustainability of these after project completion is also addressed in the section on future operation and maintenance. 	
5	Provide information on the FRI and the CFDTC which will be involved in project implementation	Information on FRI and CFDTC is provided in Annex D	
6	Include terms of reference for the sub-contracts and training	Terms of reference for sub-contracts is provided in Annex E.	Training will be provided by the project unit.
7	<p>Revise the budget in the following ways:</p> <ul style="list-style-type: none"> - include a list of inputs showing realistic quantities and unit costs - provide a detailed consolidated yearly budget by component and source - include US\$18,000 for ITTO monitoring and evaluation costs and US\$15,000 for ex-post evaluation. - recalculate the ITTO programme support costs at 8% of the total ITTO project costs as decided by the 35th. ITTC - budget figures in Table 7.1 and 7.2 should be consistent 	<ul style="list-style-type: none"> - list of inputs with quantities and unit costs is included. - detailed consolidated yearly budget by component and source is provided in 7.3. - US\$18,000 for ITTO monitoring and evaluation and US\$15,000 for ex-post evaluation are included. - ITTO programme support costs is recalculated at 8% of the total project costs. - budget figures in table 7.1 and 7.2 are corrected. 	
8	Include an Annex which shows the recommendation of the 27th Panel and the respective modifications in tabular form	Annex included as Annex F	

Recommendations of the 28th Expert Panel

Sr. No.	Recommendations	Modifications	Remarks
1.	Improve presentation of the problem analysis by eliminating unnecessary boxes from the problem tree.	- Unnecessary boxes from the problem tree were removed	
2.	Elaborate the terms of references for the sub-contracts.	- The terms of references for the sub-contract elaborated under para 2.3 and in Annex E	
3.	Recalculate the ITTO's programme support costs at the new standard of 8% of total ITTO project costs as decided by the 35th. ITTC.	- The ITTO programme support costs recalculated at 8% of total ITTO project costs as decided by the 35th. ITTC.	
4.	Clearly define the "high quality teak"	- Definition of "high quality teak" added to the document	
5.	Change the Executing Agency from "the Government of Myanmar" to "Forest Department of Myanmar" or as appropriate.	- The Executing Agency has been changed from "the Government of Myanmar to "Forest Department of Myanmar.	
6.	Include an annex that shows the recommendations of the 28th. Panel and the respective modifications in tabular form.	- Annex included as Annex G.	