# Report of Ex-post Evaluation

## Project PD 185/91 Rev. 2 (F)

## Sustainable Forest Management and Development in Peninsular Malaysia – Phase II

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## PART II: EXECUTIVE SUMMARY

### 1: Background Information about the Project

Previous attempts by the Government of Malaysia to use enrichment planting techniques to rehabilitate large tracts of forests degraded by past over harvesting practices had not been successful due to:

- shortage of planting materials as a result of irregularity of flowering and fruiting of most of the indigenous dipterocarp species;
- the use of non-graded, low quality planting stocks;
- inadequate consideration of the need to closely match species with site conditions during planting; and
- lack of trained, skilled and dedicated forest workers.

To assist in addressing these issues, the Government of Malaysia, through the Forestry Department Headquarters (FDHQ), submitted a project to the International Tropical Timber Organization (ITTO) on refining enrichment planting techniques in Malaysia.

The project in two Phases was approved by the International Tropical Timber Council (ITTC) at its Eleventh Session in December 1991. Financing for the first Phase was secured during the Fourteenth Session of the ITTC. The Agreement to implement Phase I was signed on 15 December 1993. The ITTO's Forest Management and Reforestation Committee at its Twenty-third Session approved the work plan of Phase II and endorsed the proposed budget. The funds were secured during the ITTC (XXV). The Agreement regulating the implementation of Phase II was signed on 9 April 1999. The implementation was however delayed, due to internal changes in the Forestry Department of Peninsular Malaysia. The Consultant commenced work on 1 August 2000 for a three year period until July 2003.

The project's Developmental Objective was to enhance the sustainability of Malaysia's tropical rainforests at a minimum cost, while ensuring environmental quality and ecological balance, as part of the country's objective of achieving the sustainable management and use of its forest resources.

The project's Specific Objective was to undertake and refine enrichment planting techniques so as to increase the productivity of the logged-over productive forests of the Permanent Forest Estate in Peninsular Malaysia with the aim of enhancing the sustainability of forests in the area with minimum costs.

The main expected outputs from the project were:

Output 1: Preparation of guidelines on grading of seedlings and wildings, involving the development of grading standards; criteria for morphological grading; and grading standard for dipterocarp species.

Output 2: Preparation of guidelines for the selection, establishment and management of seed production areas (SPAs).

Output 3: Establishment of three (3) *in-situ* SPAs in the State of Johor for dipterocarp and non-dipterocarp species and one *ex-situ* SPA through progeny trials.

Output 4: Preparation of a manual for site preparation and enrichment planting techniques, and tending operations for the rehabilitation of LOF areas.

Output 5: Rehabilitation of 200 hectares of LOF in the Labis Forest Reserve in Johor through enrichment planting, by introducing a wider range of important dipterocarp species and also some selected non-dipterocarp species of commercial value.

Output 6: Establishment of growth and yield plots on all planted areas.

Output 7: Soil survey of the project area.

Output 8: Produce a report on vegetative propagation by stem cuttings.

Output 9: Training of the relevant forestry staff in enrichment planting.

The project's planned duration was three years, and its budget and sources of funding were:

| Source | $USD |
|---|---|
| ITTO | 539,789 |
| Government of Malaysia | 351,953 |
| TOTAL | 891,742 |

## 2: Evaluation Purpose

The ITTO commissioned the ex-post evaluation to provide a concise diagnosis of the Project, so as to point out the successful and unsuccessful outcomes, the reasons for successes and failures, and the Project's contribution towards ITTO's Objective 2000 and the ITTO Yokohama Action Plan, and to draw lessons that can be used to improve similar projects in the future.

The Evaluation Team, comprising Mr. Jean-Marie Samyn from Switzerland and Dr Kwame Asumadu from Australia, visited Malaysia from 4th to 11th July 2009. The actual duration of the evaluation was six days.

The evaluation methodology involved a review of the Project document; Project progress reports; technical reports and guidelines; Minutes of the Project Steering and Technical committees; the Project Completion Report; and the Project Final Report. There were interviews and discussions with the project implementation team, including the project consultant, as well as interviews and discussions with relevant officials and staff at both the District office of the State Forestry Department at Segamat in the State of Johor, and Forestry Department Headquarters (FDHQ) in Kuala Lumpur. The Evaluation Team also conducted field visits to the project site including nurseries, SPAs, and some of the compartments where enrichment planting was implemented.

## 3: Scope of the Evaluation

The project's original completion date of 31st July 2003 was not met. It was not completed until 31st January 2004. This was due to the long period of time (32 months) between the completion of Phase I and the start of Phase II, as well as the delay in awarding tenders. This hiatus resulted in the deterioration of some of the facilities such as the nursery and the clonal multiplication garden, which were critical to the timely start of Phase II. These facilities had to be completely overhauled before Phase II could commence.

Other operational issues which impacted on the project's efficiency were:

- delays in making decisions about important issues such as the choice of species to be planted and where, when and how to plant them to achieve optimum results;
- allocation of inadequate staff to the project in some situations; and
- delays in providing the project with reliable 4-wheeled vehicles from the onset of the Project.

The Evaluation Team concluded that, compared to Phase I, both the planned and scheduled activities for Phase II were ambitious relative to the assigned resources.

Notwithstanding these operational challenges, overall, the Evaluation Team found that the project was executed efficiently, and the allocated resources were used as per the project's budget and scheduled activities as detailed in the work plan.

The Evaluation Team's review of all Project documents, as well as discussions with the relevant Project Team members indicated that both the Project's Developmental Objective and Specific Objectives could have been better articulated in the project proposal. For example there were eleven (11) Specific Objectives, which the Evaluation Team considered were too many. In the Evaluation Team's view, the majority of the items described as Specific Objectives were indeed activities.

The Evaluation Team interpreted the Project's Developmental Objective as "enhancing the sustainability of Malaysia's tropical rainforest resources" and the Specific Objective as "refining the technique of enrichment planting in order to increase the productivity of logged-over forests (LOF)".

The design and implementation of Phase II was based on the following assumptions, some of which did not eventuate:

- that the facilities at the project site developed during Phase I would be in good working order;
- that the vegetative propagation technique developed during Phase I would be applicable for mass production of rooted stem cuttings;
- that the clonal multiplication garden established during Phase I would be adequate for producing the required quantities of cutting materials from the clonal materials already planted;
- that there would be available adequate number of field staff and permanent nursery staff already trained in vegetative propagation techniques; and
- that there would be adequate and properly maintained field vehicles.

The project consultant reported that when the implementation of Phase II started, the nursery required a complete overhaul to make it functional again, and the vegetative propagation technique developed during Phase I was found to be unsuitable for the mass production of rooted stem cuttings. Not only was the vegetative cutting shed inadequate for mass production of rooted stem cuttings, but it also lacked important devices for controlling and maintaining environmental conditions such as light, humidity and temperature, which are critical to successful vegetative propagation.

The clonal materials in the Clonal Multiplication garden were already old (more than 5 years old) and were therefore not suitable for stem cuttings as they had already passed the juvenile growth stage. The polyurethane boxes for preparing stem cuttings limited the quantities that could be prepared.

In the Evaluation Team's view, an adequate risk assessment should have been undertaken during the project design phase, and alternative options should have been identified for addressing these issues should it become necessary.

The project achieved the following outputs:

Output 1: Preparation of guidelines on grading of seedlings and wildings

The project successfully developed grading standards for the seedlings of four dipterocarp species (*Shorea leprosula, Shorea macroptera, Shorea assamica and Shorea ovalis)* based on growth vigor and other morphological criteria such as stem form and diameter at root collar and height. These were the only dipterocarp species for which seeds were available during the project's implementation period.

Output 2: Preparation of guidelines for the selection, establishment and management of seed production areas (SPAs)

The project successfully developed and published a manual on the establishment of both *in-situ* and *ex-situ* seed production areas.

Output 3: Establishment of three (3) *in-situ* SPAs in the State of Johor for dipterocarp and non-dipterocarp species and one *ex-situ* SPA through progeny trials

The project successfully established the following SPAs:

- Compartment 152 in the Maokil Forest reserve, Lenga, North Johor. Nineteen (19) mother trees were selected comprising 17 dipterocarp trees and 2 non-dipterocarp species. A total of 8 species are represented in this compartment.
- Compartment 12, Labis Forest Reserve, Segamat, North Johor. Twenty-five (25) mother trees were selected in this compartment comprising of 21 trees of dipterocarp species and four (4) non-dipterocarp species;
- Compartment 12, Gunung Arong Forest Reserve, Mersing, East Johor. Twenty-one (21) mother trees were selected comprising 17 trees of dipterocarp species and four (4) non-dipterocarp species. The 21 trees represented seven species; and

- an *Ex-situ* SPA was established in the Labis Forest Reserve in Compartments 39, 40 and 55 comprising five replicated plots and using progenies of eight (8) selected mother trees from eight (8) *Shorea* species (*Shorea leprosula, Shorea macroptera, Shorea assamica, Shorea ovalis, Shorea lepidota, Shorea pauciflora, Shorea bracteolate and Shorea parvifolia).*

Output 4: Preparation of a manual for site preparation and enrichment planting techniques and tending operations for the rehabilitation of LOF areas.

The project successfully developed and published a manual on enrichment planting in LOF in Peninsular Malaysia. The manual recommends the requirements for successful enrichment planting emphasizing the importance of matching species to site conditions and the use of graded seedlings. The manual also highlights:

- the respective responsibilities of the Forestry Department and the contractor if enrichment planting is outsourced;
- the need for effective supervision of contract workers by the Forestry Department field staff; and
- the importance of post-planting treatments.

Output 5: Rehabilitation of 200 hectares of LOF in the Labis Forest Reserve in Johor through enrichment planting by introducing a wider range of important dipterocarp species and also some selected non-dipterocarp species of commercial value.

The project successfully rehabilitated 200 hectares of LOF in the Labis Forest Reserve in Years 1, 2 and 3 using enrichment planting techniques comprising:

- 70 hectares in Compartment 123B;
- 80 hectares in Compartment 122; and
- 50 hectares in Compartment 111.

Output 6: Establishment of growth and yield plots on all planted areas.

Growth and yield plots were established in Compartments 123B and 122 in the Labis Forest Reserve.

Output 7: Soil survey of the project area

Soil surveys of the project area were carried out by a team of three soil scientists from the University of Putra Malaysia.

Output 8: Vegetative propagation by stem cuttings

Using techniques and guidelines developed in Phase 1 of the project, vegetative propagation by stem cutting was carried out with twelve (12) timber species. However, of the total of 1,377 stem cuttings prepared over the three year duration of the Project, only 528 (or 38.3%) successfully produced roots.

Output 9: Organise on-the-job training for local uniform staff on various aspects of enrichment planting and subsequent tending operations, nursery practices, grading of seedling for planting establishment and management of SPAs and vegetative propagation.

The following training programs were successfully organized for the Forestry Department uniform staff:

- thirty seven (37) uniform staff from eight (8) states in Peninsular Malaysia participated in a 5-day training course involving classroom lectures and field exercises in all aspects of enrichment planting including grading of seedlings, stem cutting preparations, establishment and management of SPAs and management of forest nurseries;
- project staff visited enrichment planting areas in the states of Pahang and Perak;
- some Forestry Department senior officers and project staff visited Java and Kalimantan respectively in Indonesia.

Output 10: Genetic study of *Shorea leprosula* and *Dipterocarpus cornutus*

The project also successfully completed an additional output involving a study to determine the genetic relatedness of selected individual trees of *Shorea leprosula* and *Dipterocarpus cornutus*.

The Evaluation Team concluded that generally, most of the project's activities were undertaken successfully except the following:

- production of 20,000 planting stocks to be produced from vegetative propagation techniques and used in Year 2 and 3 planting programs; and
- comparative cost-benefit studies of using the various planting materials such as potted seedlings, wildings and rooted stem cuttings for enrichment planting.

With most of the outputs achieved, the Evaluation Team found that the project's Specific Objective of refining the technique of enrichment planting in order to increase the productivity of logged over forests within the project area was largely achieved.

Malaysia currently has over 200,000 hectares of degraded forests caused by previous over-logging practices and shifting cultivation. Since 1970, the Forestry Department has been rehabilitating these areas through enrichment planting. Information provided by the Forestry Department indicated that, overall, the rate of enrichment planting has been reducing in recent years. For the 13-year period from 1970 to2003, the annual rate of enrichment planting averaged 2,115 hectares. The average for the period 2004 to 2007 was only 549 hectares.

Given the slow rate of rehabilitation of previously degraded forest and the gap in continuing with the project, the Evaluation Team concluded that, the project did not substantially contribute to the development objective of "enhancing the sustainability of Malaysia's tropical rainforest resources."

In relation to sustainability, the Evaluation Team found that the Forestry Department had not continued with the project in the manner envisaged in the project proposal. The Evaluation Team's conclusion was based on the following:

- the nursery and other facilities such as the clonal multiplication garden created for the project were no longer in use;
- since completing the project, the Forestry Department has not undertaken any enrichment planting activities in the area;
- the metal tags on the mother trees selected in the SPA in the Sungai Bantang Forest Reserve at Bekok were missing. Consequently, the mother trees in this SPA could not be located easily during the field visit;
- seeds and wildings of mother trees in the Sungai Bantang Forest Reserve were not being collected despite the fact that Dipterocarp species fruit irregularly;
- sample plots created in the Labis Forest Reserve for on-going growth measurements could not be easily located during the Team's field visit;
- the Forestry Department was not undertaking consistent measurements and collection of data in the sample plots established for the project, neither was it undertaking on-going silvicultural treatments of the rehabilitated areas;
- while enrichment plantings in the Labis Forest Reserve as part of the project could easily be accessed during the field visit, it was obvious that the area had been newly prepared purposely for the ex-post evaluation; and
- new members of staff who had joined the Forestry Department since the project's completion were generally not aware of the project.

In relation to the project's impacts and effects, the Evaluation Team found that:

- there has been a change of policy at the national level relating to harvesting activities; with selective harvesting in Malaysia's commercial forests now a firm national policy. While these changes in policy cannot be attributed directly to the project, it can be argued that it is considerably reducing current and future forest degradation resulting from commercial harvesting activities. Thus in the future, the need for rehabilitation planting in commercial production forest would be less, with plantings limited only to low stocked areas such as skid trails and log landings;
- in terms of refining enrichment planting techniques, the project can be considered to have had the following impacts:
    1. enrichment planting guidelines developed are being used nationally by the states to undertake forest rehabilitation activities;
    2. the Forestry Department is using the knowledge gained from the ITTO project in ongoing development of techniques and practices for enrichment planting;
    3. prior to the project, enrichment planting was undertaken with limited preparation but the ITTO project established the importance of reconnaissance surveys of the areas to be planted. This allows better matching of species to site conditions;
    4. over-mature seedlings that cannot be used in rehabilitation planting are being provided to schools and other community groups for use in amenity plantings; and
    5. Malaysia is establishing wildlife corridors (known as the Central Forest Spine) by linking disintegrated pockets of forests caused by timber harvesting and other land use practices. The enrichment planting guidelines developed by this ITTO project will be applied in the rehabilitation of these disintegrated pockets of forests to create wildlife corridors.
- the project has further developed the Forestry Department's capacity in enrichment planting techniques through:
    1. developing procedures for grading and selecting high quality nursery seedlings and wildings of commercial dipterocarp and non-dipterocarp species;
    2. establishment of seed production areas; and
    3. the development of clonal techniques for vegetative propagation.
- some of the project outputs are still being used by Headquarters as well as the state forestry departments for on-going research into various aspects of enrichment and rehabilitation planting, and the results of these R&D activities are being applied nationally including:
    1. grading of seedlings in Forestry Department nurseries nationally;
    2. testing of new enrichment planting techniques in different ecological regions; and
    3. assessment of different species for the purposes of matching with site conditions (climate, soils, canopy cover etc.);
- in relation to establishing SPAs, over 1,200 mother trees have been identified nationally, with each state now having a dedicated seed collection team which collects and processes seeds from these SPAs for use in the state nurseries. Training in safe tree climbing has recently been provided to up to 33 climbers, and the Department is continuing to develop and align its tree climbing techniques to international standards;
- knowledge and experience gained in raising seedlings are being applied to develop seedlings from both local and exotic species and also for commercial plantation development. Seedlings have been developed for plantings in areas in Malaysia which were affected by the 2004 Asia tsunami;

- the Forestry Department has also developed a more efficient method of transporting seedlings without damaging them, thereby giving them the best chance of survival. Similarly, a visual method for determining when planted seedlings require fertilizer such as nitrogen, phosphorus and potassium (NPK) has been developed, but more work is required to better understand how much to apply and also the most efficient way to do it to obtain maximum benefit; and
- the Forestry Department had used the experience and the knowledge gained from the ITTO project to influence the design and implementation of new projects such as those being funded by the Japanese International Co-operation Agency (JICA) and a new ITTO project being implemented at Perak.

## 4: Conclusions of the Evaluation

The Evaluation Team concluded that:

- the project was to a large extent executed efficiently;
- the specific objective of the project was largely achieved;
- continuity or sustainability of the project could have been better addressed by the Forestry Department; and
- while the direct impacts of the project were considered to be limited within the project area itself, there was sufficient evidence that the Forestry Department is using adequately the knowledge and experience gained from the project, to support the sustainable management and use of Malaysia's tropical forests.

## 5: Recommendations

### For the ITTO

Project sustainability is an important criterion in the ITTO's assessment of projects submitted for funding by member countries. The Evaluation Team recognizes that the ITTO's Expert Panel can only assess a project's sustainability based on the information on the subject provided by the submitting member country in the project proposal. The full value and impact of a completed project can only adequately be realized if there is a strategy in place to ensure the uptake of the outputs, or continuation of some of the project activities once it is completed and funding support from the ITTO has ceased. Given the importance of project sustainability in contributing to the full achievement of project objectives and benefit realization, the Evaluation Team recommends that the ITTO should consider investigating more effective ways of assessing the sustainability of submitted projects in the future.

### For the Country

It is recommended that:

- for future projects, the country should ensure that the recurrent costs necessary to ensure continuity and sustainability after the closure of an ITTO project are addressed, including the allocation of appropriate and adequate human resources and capital equipment that may be required. This could involve approaching other donors or identifying counterpart organizations such as universities and research institutions that have the capacity and capability to ensure continuity;
- the Forestry Department should consider developing the capacity of the private sector to produce quality seedlings backed by a quality assurance certification scheme developed and implemented by the Department;
- given the importance of enrichment planting to rehabilitate the remaining degraded forests, the Forestry Department should consider seeking further assistance from the ITTO to support additional projects, and also enhance the utilization of the knowledge and experience from this project;
- the Forestry department should consider providing appropriate technical support and supervision to ensure a high level of success when it involves the private sector in undertaking rehabilitation planting activities; and

- the Forestry Department should consider establishing special enrichment planting team(s) to monitor the progress of the national rehabilitation effort.

PART II

## 1. Project Context

Previous attempts made by the Government of Malaysia to use enrichment planting techniques to rehabilitate large tracts of forests degraded by previous over harvesting practices had not been successful due to:

- shortage of planting materials as a result of irregularity of flowering and fruiting of most of the indigenous dipterocarp species;
- the use of non-graded, low quality planting stocks;
- inadequate consideration of the need to closely match species with site conditions during planting; and
- lack of trained, skilled and dedicated forest workers.

To assist in addressing these issues, the Government of Malaysia, through the Forestry Department Headquarters (FDHQ), submitted a project to the International Tropical Timber Organisation (ITTO) on refining enrichment planting techniques in Malaysia.

The project in two Phases was approved by the International Tropical Timber Council (ITTC) at its Eleventh Session in December 1991. Financing for the first Phase was secured during the Fourteenth Session of the ITTC. The Agreement to implement Phase I was signed on 15 December 1993. The ITTO's Forest Management and Reforestation Committee at its Twenty-third Session approved the work plan of Phase II and endorsed the proposed budget. The funds were secured during the ITTC (XXV). The Agreement regulating the implementation of Phase II was signed on 9 April 1999. The implementation was however delayed, due to internal changes in the Forestry Department of Peninsular Malaysia. The Consultant commenced work on 1 August 2000 for a three year period until July 2003.

Unsuccessful production of planting material through the stem cutting method and the late award of the planting contract due to the newly introduced financial procedures by the State Government delayed the project's implementation. Based on the recommendation of the Project Steering Committee in March 2003, the Executing Agency requested a-three month extension of the project without additional funds, and submitted justifications, a work plan and a budget for the extension. These were considered justified by the Secretariat and a project extension until January 2004 was granted.

### 1.1: Project Objectives

The project's Developmental Objective was to enhance the sustainability of Malaysia's tropical rainforests at a minimum cost, while ensuring environmental quality and ecological balance, as part of the country's objective of achieving the sustainable management and use of its forest resources.

The project's Specific Objective was to undertake and refine enrichment planting techniques so as to increase the productivity of the logged-over productive forests of the Permanent Forest Estate in Peninsular Malaysia with the aim of enhancing the sustainability of forests in the area with minimum costs.

The project focused on the various aspects pertaining to nursery preparation of healthy and vigorous planting stock. This included the establishment of grading standards for different types of planting stock. In the implementation of enrichment planting, efforts were to be made to match species with sites. The project also aimed to collect cost data related to the implementation of enrichment planting in the Labis Forest Reserve at Johor.

Detailed aspects of the Specific Objectives presented in the project's document were as follows:

1. test ,at least, ten (10) additional dipterocarp and non-dipterocarp species of commercial value for vegetative propagation, to be followed by field planting of the successfully prepared stem cuttings;
2. produce 20,000 planting stocks using vegetative propagation technique for Year 2 and Year 3 planting programs;
3. prepare guidelines for grading of seedlings, wildings and stem cuttings at the nursery for the purpose of field planting;

4. prepare guidelines for selection, establishment and management of seed production areas based on phenological studies of the selected species;
5. establish and manage three (3) seed production areas (SPAs) in the state of Johor for dipterocarp and non-dipterocarp species other than those established under Phase 1 of the Project;
6. prepare and refine a manual for site preparation and enrichment planting techniques, tending operations, as well as fertilizer regimes for the rehabilitation of LOF areas;
7. rehabilitate 200 hectares of LOF in the Labis Forest Reserve in the State of Johor, through enrichment planting by introducing a wider range of important dipterocarp species and also some selected non-dipterocarp species of commercial value;
8. establish growth and yield plots on all the planted areas, and continue collecting and analyzing data from growth and yield plots established under Phase 1 of the Projects;
9. carry out a soil survey of the project area;
10. carry out comparative studies using various planting materials such as potted seedlings, wildings and rooted stem cuttings, and to identify and evaluate the various costs involved in their production and planting; and
11. organize on the-job-training programs for local uniform staff and three (3) training workshop programs on various aspects of enrichment planting and subsequent tending operations, nursery practices, grading of seedlings for planting, establishment and management of SPAs and vegetative propagation for local senior staff.

### 1.2: Project Strategy

The implementation strategy for Phase II involved the re-assessment of Phase I to identify its strengths and shortfalls as the basis for executing Phase II. The aim was to use the various positive achievements of Phase I to augment the scope of Phase II, particularly the nursery activities related to planting stock preparation, as well as emphasise the importance of matching species to planted to site conditions. There was also to be an emphasis on using contractors for the majority of the field planting and treatment activities under the supervision of project staff.

### 1.3: Expected outputs

The main expected outputs from the project were:

Output 1: Preparation of guidelines on grading of seedlings and wildings, involving the development of:

- grading standards;
- criteria for morphological grading; and
- grading standard for dipterocarp species.

Output 2: Preparation of guidelines for the selection, establishment and management of seed production areas (SPAs).

Output 3: Establishment of three (3) *in-situ* SPAs in the State of Johor for dipterocarp and non-dipterocarp species and one *ex-situ* SPA through progeny trials.

Output 4: Preparation of a manual for site preparation and enrichment planting techniques, and tending operations for the rehabilitation of LOF areas.

Output 5: Rehabilitation of 200 hectares of LOF in the Labis Forest Reserve in Johor through enrichment planting, by introducing a wider range of important dipterocarp species and also some selected non-dipterocarp species of commercial value.

Output 6: Establishment of growth and yield plots on all planted areas.

Output 7: Soil survey of the project area.

Output 8: Produce a report on vegetative propagation by stem cuttings.

Output 9: Training of the relevant forestry staff in enrichment planting.

### 1.4: Target Beneficiaries Involvement

Johor and other State Forestry Departments were expected to benefit from the approach developed by the project in the rehabilitation of degraded forest areas through enrichment planting, provided that there was total commitment by all levels of officers assigned to the rehabilitation program. During the project implementation, the Consultant was assisted by a Project Team comprising professional Forest Officers, Forest Ranger, field Foresters and forest workers. The private sector also participated during the project implementation through contract works in the planting, treatment/maintenance and supply of planting stock. The private sector was also used to upgrade forest roads within the project area.

### 1.5: Project Inputs

The budget and sources of funding for the project were:

| Source | $USD |
|---|---|
| ITTO | 539,789 |
| Government of Malaysia | 351,953 |
| TOTAL | 891,742 |

### 1.6: The ITTO/ITTA Context

The project's Development Objective of enhancing the sustainability of Malaysia's tropical rainforests at a minimum cost, while ensuring environmental quality and ecological balance was fully consistent with the objectives of the ITTA 1994. Similarly, the Project's Specific Objective of refining the technique of enrichment planting in order to increase the productivity of logged over forests (LOF) of Malaysia's Permanent Forest Estate (PFE) was also fully consistent with the objectives of the ITTA 1994.

Specifically, the Project's Development Objectives and Specific Objectives related to the following ITTA 1994 objectives:

(a) To provide an effective framework for consultation, international cooperation and policy development among all members with regard to all relevant aspects of the world timber economy.

(b) To provide a forum for consultation to promote non-discriminatory timber trade practices.

(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.

(e) To promote the expansion and diversification of international trade in tropical timber from sustainable sources by improving the structural conditions in international markets, by taking into account, on the one hand, a long-term increase in consumption and continuity of supplies, and, on the other, prices which reflect the costs of sustainable forest management and which are remunerative and equitable for members, and the improvement of market access.

(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.

In terms of ITTO's structure, the project was related to ITTO's Committee on Reforestation and Forest Management whose roles and responsibilities are concerned primarily with the sustainable management of the natural forest resource base for tropical timber.

The Project's objectives also met the objectives of the ITTO's Yokohama Action Plan, 2002 to 2006. The Goals of the Reforestation and Forest Management Committee in this Action Plan were to:

- support activities to secure the tropical timber resource base; and
- promote sustainable management of tropical forest resources.

Specific actions in the Action Plan which were also relevant to the project are:

- promoting the conservation, rehabilitation and sustainable management of threatened forest ecosystems, *inter alia* mangroves in collaboration with relevant organizations;
- assessing the current and potential productivity of major tropical forest types, taking into account the need to promote future growth and effective regeneration;
- improving the productive capacity of natural forests, where appropriate, through intensified silvicultural practices, better utilization of lesser-used species, the promotion of non-timber forest products, guided natural regeneration, enrichment planting and reforestation; and
- implementing research and development activities in the management of secondary tropical forests, restoration of degraded tropical forests and rehabilitation of degraded forest land, taking into consideration ITTO guidelines.

## 2: Evaluation Scope and Focus

The ITTO commissioned the ex-post evaluation to provide a concise diagnosis of the Project, so as to point out the successful and unsuccessful outcomes, the reasons for successes and failures, and the Project's contribution towards ITTO's Objective 2000 and the ITTO Yokohama Action Plan, and to draw lessons that can be used to improve similar projects in the future.

The ex-post evaluation's scope of work required an analysis and assessment of the project o determine:

1. the overall role and contribution of the project in light of sectoral policies, development programmes, priorities and requirements to improve forest management/inventory in the context of sustainable forest management (SFM) in Malaysia;
2. specific measures taken to incorporate project results in the national forestry and environmental policies and legislation;
3. the current status of forest management/inventory within the project's area of influence, the effectiveness of the project's implementation and its effectiveness in promoting SFM, as defined in the various *ITTO Guidelines* and other ITTO policy documents;
4. the contributions of the project in various forestry-related disciplines prepared by the project as regards the achievement of sustainable forest management in the project's area of influence and on other similar and/or related projects being implemented in Malaysia;
5. the results and potential impact of applied research conducted by the project(if any) and its contribution to the overall knowledge on forest management/inventory in Malaysia;
6. the impact of Project's activities on the improvements in forest management planning and on the livelihoods of the target populations;
7. the effectiveness of dissemination of the Project's results;
8. the overall post-project situation in the Project's area of influence;
9. the unexpected effects and impacts, either harmful or beneficial, and the reasons for their occurrences;

10. the cost efficiency in the implementation of the project, including the technical, financial and managerial aspects;
11. follow-up actions in order to enhance uptake of project results; and
12. the project's relative success or failure, including a summary of the key lessons learnt; and the identification of any issues or problems that should be taken into account in designing and implementing similar projects in the future.

The Evaluation Team comprising Mr. Jean-Marie Samyn from Switzerland and Dr Kwame Asumadu from Australia visited Malaysia from 4th to 11th July 2009. The actual duration of the evaluation was six days.

## 3: Evaluation Methodology

The evaluation methodology involved:

- a review of the:
  - Project document;
  - Project progress reports;
  - technical reports and guidelines;
  - Minutes of the Project Steering and Technical committees;
  - the Project Completion Report; and
  - the Project Final Report
- interviews and discussions with the project implementation team, including The project consultant;
- interviews and discussions with relevant officials and staff at both the District office of the State Forestry Department at Segamat in the State of Johor, and Forestry Department Headquarters (FDHQ) in Kuala Lumpur; and
- field visits to the project site including nurseries, SPAs, and some of the compartments where enrichment planting was implemented.

Detailed itinerary including the scheduled meeting and individuals who attended are at Appendices 1 and 2.

## 4: Findings and Lessons Learned

### 4.1: Efficiency

Efficiency relates to an assessment of how the project inputs and activities were used in producing outputs as well as the quality of the outputs produced.

Although the project was scheduled for completion on 31st July 2003, it was not completed until 31st January 2004 due to delays caused by the following:

- the long period of time (32 months) between the completion of Phase I and the start of Phase II (Phase I of the project was completed on 31st December 1997 and Phase II started on 1st August 2000). This hiatus resulted in the deterioration of some of the facilities such as the nursery and the clonal multiplication garden, which were pivotal to the timely commencement of Phase II. These facilities had to be completely overhauled prior to commencing Phase II; and
- the delay in awarding tenders.

Discussions with the project's consultant confirmed a number of operational issues which were also identified in the Project's Completion and Final Reports. These included:

- delays in making decisions about important issues such as the choice of species to be planted and where, when and how to plant them to achieve optimum results. Such decisions were made by committees when they could have been made more efficiently by a full-time senior professional officer on the ground;

- inadequate staff was allocated to the project in some situations. Occasionally, staff allocated to undertake some of the Project's planned activities was also deployed to other non-project activities; and
- delays in providing the project with reliable 4-wheeled vehicles from the onset of the Project. The vehicle provided experienced frequent breakdowns.

In relation to work plan implementation, the project's consultant commented during discussions that compared with Phase I, both planned and scheduled activities for Phase II were ambitious relative to the assigned resources.

Based on the review of the Project's Completion Report, Final Report, the various Progress Reports and discussions with individuals involved with the project's implementation, the Evaluation Team concluded that notwithstanding the operational difficulties discussed above, overall, the project was executed efficiently, and that allocated resources were used as per the project's budget and the scheduled activities.

### 4.2: Effectiveness

Effectiveness relates to an assessment of the project's achievements i.e. the outputs, and how the outputs contributed to the specific and development objectives.

After reviewing all Project documents and discussions with the relevant Project Team members, the Evaluation Team concluded that both the Project's Developmental Objective and Specific Objectives could have been better articulated in the project proposal. For example there were eleven (11) Specific Objectives, which the Evaluation Team considered were too many. In the Evaluation Team's view, the majority of the items described as Specific Objectives were activities.

The Evaluation Team therefore interpreted the Project's Developmental Objective as "enhancing the sustainability of Malaysia's tropical rainforest resources" and the Specific Objective as "refining the technique of enrichment planting in order to increase the productivity of logged-over forests (LOF)".

The design for Phase II was based on the following assumptions:

- that the facilities at the project site developed during Phase I would be in good working order;
- that the vegetative propagation technique developed during Phase I would be applicable for mass production of rooted stem cuttings;
- that the clonal multiplication garden established during Phase I would be adequate for producing the required quantities of cutting materials from the clonal materials already planted;
- that there would be available adequate number of field staff and permanent nursery staff already trained in vegetative propagation techniques; and
- that there would be adequate and properly maintained field vehicles.

In the view of the Evaluation Team, an adequate risk assessment should have been undertaken during the project design phase, and alternative options identified for addressing these issues should it become necessary.

The project consultant reported that when the implementation of Phase II started, the nursery required a complete overhaul to make it functional again, and the vegetative propagation technique developed during Phase I was found to be unsuitable for the mass production of rooted stem cuttings. Not only was the vegetative cutting shed inadequate for mass production of rooted stem cuttings, but it also lacked devices for controlling and maintaining environmental conditions such as light, humidity and temperature, which are critical to successful vegetative propagation.

The clonal material in the Clonal Multiplication garden were already old (more than 5 years old) and were therefore not suitable for stem cuttings as they had already passed the juvenile growth stage. The polyurethane boxes for preparing stem cuttings limited the quantities that could be prepared.

## 4.3: Effectiveness by Outputs

### 4.3.1: Details of Outputs Achieved by the Project

The project achieved the following outputs:

#### Output 1: Preparation of guidelines on grading of seedlings and wildings

The project successfully developed grading standards for the seedlings of four dipterocarp species (*Shorea leprosula, Shorea macroptera, Shorea assamica and Shorea ovalis)* based on growth vigor and other morphological criteria such as stem form and diameter at root collar and height. These were the only dipterocarp species for which seeds were available during the project's implementation period.

The Evaluation Team found during field visits that the original nurseries established for the project had been abandoned. The Forestry Department provided the following explanation for abandoning the original nurseries:

- remoteness of the nurseries' location from existing facilities;
- inadequate security because of the remote location of the nurseries; and
- constant threats to the safety of workers and the nurseries from wild animals such as tigers and elephants.

However, new nurseries have been established using the knowledge and experience gained from the ITTO project. Prior to the project's implementation, there was no more than one nursery per state. Today, there is a network of some 64 nurseries nationally, with 12 nurseries in the State of Johor alone. The Forestry Department has developed a simple but effective Excel spreadsheet of the 64 nurseries. Monthly reports on the seedling (species and quantities) held by each state are provided to Forestry Department Headquarters for inputting into the spreadsheet. This enables ready and easy sharing of information about seedling stocks held in each state.

Nurseries for endemic endangered, rare and threatened species (so called EERT nurseries) have also been established using the guidelines developed from the ITTO project.

Knowledge and experience gained in raising seedlings are being applied to develop seedlings from both local and exotic species and also for commercial plantation development. Similarly, the Forestry Department has developed a visual method of determining when planted seedlings require fertilizer such as nitrogen, phosphorus and potassium (NPK), but more work is necessary to better understand how much to apply and also the most efficient way to do it to obtain maximum benefit.

The Forestry Department has also developed a more efficient method of transporting seedlings without damaging them, thereby giving them the best chance of survival.

The Forestry Department reported that guidelines and manuals on establishing and grading seedlings developed and published as a result of the project are being used nationally. Seedlings are now graded based on stem size rather than height as was done previously. Further work has indicated that seedlings with diameter of between 0.6 and 0.9 cm were more suitable for rehabilitating roadsides, log landings and shifting cultivation areas.

The Forestry Department is applying the grading rules developed by the project in all the 64 nurseries established throughout the country. Similarly, private sector nurseries are applying the grading rules in their seedling development activities.

The Forestry Department was considering developing easy-to-follow non-technical versions of the seedling grading manuals to further encourage their use by both personnel from the Department and the private sector. The Department was also considering developing a certification system for managing the quality of seedlings produced by the private nurseries, and to provide a national quality assurance scheme for consumers of seedling products.

#### Output 2: Preparation of guidelines for the selection, establishment and management of seed production areas (SPAs)

The project successfully developed and published a manual on the establishment of both *in-situ* and *ex-situ* seed production areas.

Output 3: Establishment of three (3) *in-situ* SPAs in the State of Johor for dipterocarp and non-dipterocarp species and one *ex-situ* SPA through progeny trials

The project successfully established the following SPAs:

- Compartment 152 in the Maokil Forest Reserve, Lenga, North Johor. Nineteen (19) mother trees were selected comprising 17 dipterocarp trees and 2 non-dipterocarp species. A total of 8 species are represented in this compartment.
- Compartment 12, Labis Forest Reserve, Segamat, North Johor. Twenty-five (25) mother trees were selected in this compartment comprising of 21 trees of dipterocarp species and four (4) non-dipterocarp species;
- Compartment 12, Gunung Arong Forest Reserve, Mersing, East Johor. Twenty-one (21) mother trees were selected comprising 17 trees of dipterocarp species and four (4) non-dipterocarp species. The 21 trees represented seven species; and
- an *Ex-situ* SPA was established in the Labis Forest Reserve in Compartments 39, 40 and 55 comprising five replicated plots and using progenies of eight (8) selected mother trees from eight (8) *Shorea* species (*Shorea leprosula, Shorea macroptera, Shorea assamica, Shorea ovalis, Shorea lepidota, Shorea pauciflora, Shorea bracteolate and Shorea parvifolia).*

Four Seed Production Areas were established under the project, and the Forestry Department reported that each state now has its own seed production areas.

Output 4: Preparation of a manual for site preparation and enrichment planting techniques and tending operations for the rehabilitation of LOF areas.

The project successfully developed and published a manual on enrichment planting in LOF in Peninsular Malaysia. The manual recommends the requirements for successful enrichment planting emphasizing the importance of matching species to site conditions and the use of graded seedlings. The manual also highlights:

- the respective responsibilities of the Forestry Department and the contractor if enrichment planting is outsourced;
- the need for effective supervision of contract workers by the Forestry Department field staff; and
- the importance of post-planting silvicultural treatments.

The project has identified 20 species as being suitable for enrichment planting. Guidelines on enrichment planting have been developed and published; and each state is required to include enrichment planting in its forest management strategies.

Output 5: Rehabilitation of 200 hectares of LOF in the Labis Forest Reserve in Johor through enrichment planting by introducing a wider range of important dipterocarp species and also some selected non-dipterocarp species of commercial value.

The project successfully rehabilitated 200 hectares of LOF in the Labis Forest Reserve in Years 1, 2 and 3 using enrichment planting techniques comprising:

- 70 hectares in Compartment 123B;
- 80 hectares in Compartment 122; and
- 50 hectares in Compartment 111.

According to the Forestry Department, the project area has a total degraded area of 70,000 hectares. Of this, only 200hectares have been rehabilitated with enrichment planting, and this was done during the Project's implementation.

Output 6: Establishment of growth and yield plots on all planted areas.

Growth and yield plots were established in Compartments 123B and 122 in the Labis Forest Reserve.

Output 7: Soil survey of the project area

Soil surveys of the project area were carried out by a team of three soil scientists from the University of Putra Malaysia.

Output 8: Vegetative propagation by stem cuttings

Using techniques and guidelines developed in Phase 1 of the project, vegetative propagation by stem cutting was carried out with twelve (12) timber species. However, of the total of 1,377 stem cuttings prepared over the three year duration of the Project, only 528 (or 38.3%) successfully produced roots.

Output 9: Organise on-the-job training for local uniform staff on various aspects of enrichment planting and subsequent tending operations, nursery practices, grading of seedling for planting establishment and management of SPAs and vegetative propagation.

The following training programs were successfully organized for the Forestry Department uniform staff:

- thirty seven (37) uniform staff from eight (8) states in Peninsular Malaysia participated in a 5-day training course involving classroom lectures and field exercises in all aspects of enrichment planting including grading of seedlings, stem cutting preparations, establishment and management of SPAs and management of forest nurseries;
- project staff visited enrichment planting areas in the states of Pahang and Perak;
- some Forestry Department senior officers and project staff visited Java and Kalimantan respectively in Indonesia.

Output 10: Genetic study of *Shorea leprosula* and *Dipterocarpus cornutus*

This was an additional output which was not part of the original project proposal. A geneticist from the University Kebangsaan Malaysia conducted a study to determine the genetic relatedness of selected individual trees of *Shorea leprosula* and *Dipterocarpus cornutus*.

The Evaluation Team concluded that generally, most of the project's activities had been undertaken successfully except the following:

- production of 20,000 planting stocks to be produced from vegetative propagation techniques and used in Year 2 and 3 planting programs; and
- comparative cost-benefit studies of using the various planting materials such as potted seedlings, wildings and rooted stem cuttings for enrichment planting.

The Forestry Department explained that the reasons for the lack of success of these activities were:

- difficulties in obtaining rooted stem cuttings for the majority of the selected species;
- limitations in using the vegetative propagation technique developed during Phase I of the project for the mass production of rooted stem cuttings, even for the species that could produce roots easily. Critical factors such as humidity, temperature and light could not easily be controlled in the facilities developed for vegetative propagation. In addition, the use of polyurethane boxes limited the number the stem cuttings that could be produced; and
- seeds and wildings of species that rooted easily such as *Dyera costulata,* were not easily available.

In conclusion, the Evaluation Team found that with most of the outputs achieved, that the project's Specific Objective of refining the technique of enrichment planting in order to increase the productivity of logged over forests within the project area was largely achieved.

### 4.3.1: Project's Developmental Objective

Malaysia currently has over 200,000 hectares of degraded forests caused by previous over-logging practices and shifting cultivation. Since 1970, the Forestry Department has been rehabilitating these areas through enrichment planting. Information provided by the Forestry Department indicated that, overall, the rate of enrichment planting

has been reducing in recent years. For the 13-year period from 1970 to2003, the annual rate of enrichment planting averaged 2,115 hectares. The average for the period 2004 to 2007 was only 549 hectares.

Currently, enrichment planting is undertaken by Forest Development Units within each state forestry department. The Forestry Department accepted the Evaluation Team's suggestion to consider establishing a dedicated Enrichment Planting Team at Headquarters to provide national co-ordination for enrichment planting activities within Malaysia.

Given the slow rate of rehabilitation of previously degraded forest and the gap in continuing with the project (which is discussed in detail below), the Evaluation Team concluded that,." the project did not substantially contribute to the development objective of "enhancing the sustainability of Malaysia's tropical rainforest resources

### 4.4: Dissemination of Results

The results of the project were partly disseminated through the various meetings organized during the course of the project. The results have also been published and disseminated in the form of Technical Reports which are available from the Executing Agency and ITTO Secretariat upon request.

### 4.5: Project Sustainability

Although the ITTO project was successfully implemented, the Evaluation Team found that the Forestry Department had not continued with it. The Evaluation Team's conclusion was based on the following:

- the nursery and other facilities such as the clonal multiplication garden created for the project were no longer in use;
- since completing the project, the Forestry Department has not undertaken any enrichment planting activities in the area;
- the metal tags on the mother trees selected in the SPA in the Sungai Bantang Forest Reserve at Bekok were missing. Consequently, the mother trees in this SPA could not be located easily during the field visit. During the visit to the Forest Reserve at Sungai Bantang, the selected mother trees could not be identified readily as the identification metal tags had fallen off. This suggested that the selected mother trees in this area were not being maintained regularly. The Evaluation Team suggested that the coordinates for the selected mother trees could be logged into a global positioning system to enable easier location in the future. Alternatively, information about the locations of the mother trees should be documented and archived for future reference;
- seeds and wildings of mother trees in the Sungai Bantang Forest Reserve were not being collected even though dipterocarp species fruit irregularly. The Evaluation Team visited the seed production area in the Forest Reserve at Sungai Bantang in Bekok, and observed that although 2009 had been a good year for seed production, there was little evidence that the seeds were being collected. This was evidenced by the abundance of dipterocarp seeds observed accumulating on the forest floor. Similarly, there was abundance of wildings of different ages growing under the canopy which suggested that collection of wildings in the area had not occurred for some time;
- sample plots created in the Labis Forest Reserve for on-going growth measurements could not be easily located during the Team's field visit. During a field visit to the project site in the Labis Forest Reserve, the Evaluation Team observed that the area used for the project was adequately stocked. However, the performance of the planted seedlings was patchy due to the lack of consistent on-going management and maintenance;
- the Forestry Department was not undertaking consistent measurements and collection of data in the sample plots established for the project;
- the Forestry Department was not undertaking on-going silvicultural treatments of the rehabilitated areas;
- while enrichment plantings in the Labis Forest Reserve as part of the project could easily be accessed during the field visit, it was obvious that the area had been newly prepared purposely for the ex-post evaluation;

- the Forestry Department had not implemented the project consultant's recommendation (included in the Project Completion Report) to undertake a comprehensive inventory of completed activities in the project area, namely all the plantings including the growth plots, SPAs and the 200 hectare area rehabilitated through enrichment planting. As the project was implemented in the State of Johor, the Forestry Department should consider making the Development Division of the Segamat/Johor State Forest Department responsible for the upkeep of the project area ,and the Forestry Department should ensure that the Division is provided with the necessary resources it requires to carry out this function; and
- staff turnover is part of every organization, it is therefore important to ensure that there is a mechanism in place to enable effective and continual transfer of "corporate knowledge" about project s to new staff. The Evaluation Team found that some of the newer members of staff who had joined the Forestry Department since completion were generally not aware of the project.

The Forestry Department advised that continuation of growth measurements in the rehabilitated areas in the Labis Forest Reserve will be resumed because the resources required for this activity have been included in the budget for Malaysia's 2011 – 2015 National Plan. However, because of the interruption in the collection of field data, the Evaluation Team was concerned that scientific accuracy might be reduced.

Other activities which have been included in the budget are:

- post-harvest inventory; and
- rehabilitation of areas degraded by shifting cultivation and previous over-logging practices.

The Forestry Department's Silvicultural Division is developing and implementing several silvicultural activities, some of which have been influenced from the outputs from the ITTO project. Some of the new activities being undertaken include investigating the:

- relative merits of different planting techniques such as cluster planting, gap planting, line planting, rectangular and triangular planting;
- optimum conditions suitable for light tolerant and non-light tolerant species;
- survival rates of seedlings that develop tap roots relative to those that develop mostly lateral roots;
- species that are best suited for use in rehabilitating different gap sizes in the forest such as log landings, skid trails etc. and whether to use stem cuttings, seedlings or wildings; and
- best time to thin the stands to increase productivity including the optimum thinning distance.

### 4.6: Impact and Effects

There has been a change of policy at the national level relating to harvesting activities. Selective harvesting in Malaysia's commercial forests is now a firm national policy, and stringent requirements are in place to guide the conduct of harvesting activities based on a 30-year harvesting cycle. Concessionaires are required to ensure the retention of a minimum of 32 to 33 premium species per hectare, with a minimum diameter of 30cm. The policy also requires the retention of a minimum of four mother trees per hectare, and rare and endangered species are prohibited from harvesting. There is also a policy in place to maintain an annual national harvesting volume of 4 million cubic metres from Malaysia's natural forests. According to the Forestry Department, this target has been maintained over the past five years.

Concessionaires are also required to:

- rehabilitate poorly stocked areas such as log landings and skid trails within six months of completing harvesting activities;
- pay a performance bond; and
- make a financial contribution averaging $USD3-4 per cubic metre into a Forest Development Fund( also known as sustainable management financing or SESS), to assist the on-going maintenance and management of rehabilitated poorly stocked areas.

Malaysia now has 40% of its Permanent Reserve Forest under permanent protection with 60% available for commercial timber production. The rehabilitation of the previously degraded forest estimated at 200,000 hectares is still continuing, albeit at a slower rate. The Department is still assessing the status of these areas with the view to determining the appropriate types of species and planting techniques to use.

While these changes in policy cannot be attributed directly to the project, it should be noted that is considerably reducing current and future forest degradation resulting from commercial harvesting activities.

In terms of refining enrichment planting techniques, the project can be considered to have had the following impacts:

- guidelines on enrichment planting techniques developed are being used nationally by the states to undertake enrichment planting activities;
- knowledge gained from the ITTO project is being used in ongoing development of techniques and practices for enrichment planting;
- previously enrichment planting was undertaken without prior adequate preparation, but the ITTO project has established the importance of reconnaissance surveys of the areas to be planted. This allows better matching of species to site conditions;
- over-mature seedlings that cannot be used in rehabilitation planting are being provided to schools and other community groups for use in amenity plantings; and
- Malaysia is establishing wildlife corridors (known as the Central Forest Spine) by linking disintegrated pockets of forests caused by timber harvesting and other land use practices. The enrichment planting guidelines developed by this ITTO project will be applied in the rehabilitation of these disintegrated pockets of forests to create wildlife corridors.

The Department also reported on several on-going research and development activities on various aspects of enrichment planting techniques based on the requirements of different ecological regions and ecosystems.

The project has further developed the Forestry Department's capacity in enrichment planting techniques through:

- developing procedures for grading and selecting high quality nursery seedlings and wildings of commercial dipterocarp and non-dipterocarp species;
- establishment of seed production areas; and
- the development of clonal techniques for vegetative propagation.

The Evaluation Team, however, found that although new knowledge on enrichment planting and grading of seedlings was being generated continually from additional activities being implemented as a result of the ITTO project, there was less evidence that this new knowledge was being used to revise and upgrade the manuals and guidelines themselves. The Forestry Department had also not implemented the project consultant's recommendation that enrichment planting teams should be established in each state to monitor the national rehabilitation effort. The Forestry Department explained that this function was being carried out the Development Divisions within each State. At the operational level, the Evaluation Team also found less evidence of how the guidelines and manuals on enrichment planting were being used widely within the Forestry Department.

Evidence provided by the Forestry Department, however, convinced the Evaluation Team that although the project as such was not continued, some of the outputs are still being used by Headquarters as well as the state forestry departments for on-going research into various aspects of enrichment and rehabilitation planting, and that the results of these R&D activities are being applied nationally. Examples include the following:

- grading of seedlings in Forestry Department nurseries nationally;
- testing of new enrichment planting techniques in different ecological regions; and
- assessment of different species for the purposes of matching with site conditions (climate, soils, canopy cover etc.).

In relation to establishing SPAs, over 1,200 mother trees have been identified nationally. There are now dedicated seed collection teams in each state which collect and process seeds from these SPAs for use in the state nurseries. Training in safe tree climbing has recently been provided to up to 33 climbers, and the Department is continuing to develop and align its tree climbing techniques to international standards.

Knowledge and experience gained in raising seedlings are being applied to develop seedlings from both local and exotic species, and also for commercial plantation development. Seedlings have been developed for plantings in areas in Malaysia which were affected by the 2004 Asia tsunami.

The Forestry Department has also developed a more efficient method of transporting seedlings without damaging them, thereby giving them the best chance of survival. Similarly, a visual method for determining when planted seedlings require fertilizer such as nitrogen, phosphorus and potassium (NPK) has been developed, but more work is required to better understand how much fertilizer to apply and also the most efficient way to apply it to obtain maximum benefit.

The Forestry Department provided evidence which showed that it had used the experience and the knowledge gained from the ITTO project to influence the design and implementation of new projects such as those being funded by the Japanese International Co-operation Agency (JICA) and a new ITTO project being implemented at Perak.

In relation to the project's development objective of enhancing the sustainability of Malaysia's tropical rainforest resources, the Evaluation Team found that the impact of the project was limited. The Team's conclusion was based on the slow rate of rehabilitation of previously degraded forest, and the lack of evidence of how the guidelines and manuals on enrichment planting are being used widely within the Forestry Department.

## 5: Lessons Learned

The Evaluation Team, together with the executing agency, identified a number of issues with the project's implementation which could assist the design and execution of similar projects in the future, to further enhance their success and effectiveness.

Sustainable forest management is a journey and not a destination. Consequently, projects dealing with the sustainable management of tropical forests should be designed with a long term perspective in mind. This is important to ensure projects can be implemented effectively to produce the desired results that can continually influence the forest management practices of the submitting country.

It is important that the on-going sustainability of ITTO-funded projects can be assured, to ensure that the knowledge and experience gained from implementing these projects are not lost. Future SFM projects should include sustainability strategies and plans. The plans should detail how financial and human resources will be provided to continue implementation and/or adoption of the project outputs. This can include seeking funding from new donors or identifying counterpart organizations and/or agencies, which have the capacity and capability to continue the project in a manner that enables the submitting country to obtain maximum benefit from the initial funding from the ITTO.

The project generated a lot of useful knowledge and ideas, some of which were published as guidelines and manuals. The Evaluation Team, however, found that there had been limited sharing of knowledge and information among the key stakeholders. It was reassuring to learn that, as part of the new project cycle manual, ITTO is now requiring member countries to submit an information dissemination strategy as part of project proposals detailing how the outcomes of ITTO-funded projects will be shared with key stakeholders.

The project continues to contribute to the generation of new knowledge on enrichment planting techniques including the grading of seedlings. However, this knowledge is not being used to continually improve and revise the guidelines and manuals published from the project. It is important that the Forestry Department develops a strategy for using new knowledge and experience being gained to revise and update these manuals.

The manuals and guidelines developed from the project are currently published in technical language and also only in the English language. The usefulness and utility of these documents would be further enhanced if non-technical versions were developed and presented in an easy-to-understand format, particularly for the benefit of field staff. The Forestry Department should consider publishing these guidelines and manuals in Bahasa Melayu, Malaysia's national language.

## 6: Recommendations

### 6.1: For the ITTO

Project sustainability is an important criterion in the ITTO's assessment of projects submitted for funding by member countries. The Evaluation Team recognizes that the ITTO's Expert Panel can only assess a project's sustainability based on the information on the subject included in the project proposal by the submitting member country. The full value and impact of a completed project can only adequately be realized if there is a strategy in place to ensure the uptake of the outputs, or continuation of some of the project activities once it is completed and funding support from the ITTO has ceased. Given the importance of project sustainability in contributing to the full achievement of project objectives and benefit realization, the Evaluation Team recommends that the ITTO should consider investigating more effective ways of assessing the sustainability of submitted projects in the future.

### 6.2: For the Country

It is recommended that:

- for future projects, the country should ensure that the recurrent costs necessary to ensure continuity and sustainability after the closure of an ITTO project are addressed, including the allocation of appropriate and adequate human resources and capital equipment that may be required. This could involve approaching other donors or identifying counterpart organizations such as universities and research institutions that have the capacity and capability to ensure continuity;
- the Forestry Department should consider developing the capacity of the private sector to produce quality seedlings backed by a quality assurance certification scheme developed and implemented by the Department;
- given the importance of enrichment planting to rehabilitate the remaining degraded forests, the Forestry Department should consider seeking further assistance from the ITTO to support additional projects, and also enhance the utilization of the knowledge and experience from this project;
- the Forestry department should consider providing appropriate technical support and supervision to ensure a high level of success when it involves the private sector in undertaking rehabilitation planting activities; and
- the Forestry Department should consider establishing special enrichment planting team(s) to monitor the progress of the national rehabilitation effort.

## 7: Conclusions

Based on the review of project documents, field visits and discussions with relevant stakeholders, the Evaluation Team concluded that:

- the project was to a large extent executed efficiently;
- the specific objective of the project was largely achieved;
- continuity or sustainability of the project could have been better addressed by the Forestry Department; and
- while the direct impacts of the project were considered to be limited within the project area itself, there was sufficient evidence that the Forestry Department is using adequately the knowledge and experience gained from the project, to support the sustainable management and use of Malaysia's tropical forests.

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APPENDICES

Appendix 1

ITINERARY FOR TRIP TO MALAYSIA, 4TH TO 10TH JULY 2009 FOR THE EX-POST EVALUATION OF PD185/91 Rev.2 (F) – PHASE II

CONSULTANTS: MR. JEAN-MARIE SAMYN AND DR KWAME ASUMADU

| DATE | ACTIVITY |
|---|---|
| Saturday 4th July | Arrive in Kuala Lumpur and stay at the Hilton Hotel at Kuala Lumpur Sentral |
| Sunday, 5th July | Preparatory meeting (Kwame Asumadu & Jean-Marie Samyn), Night in Kuala Lumpur |
| Monday, 6th July | 9.00 am – 12.00 noon, Journey to Segamat/Labis, Johor<br>2.00 pm – 5.00 pm, Visit to project nursery, Labis, Johor, Night in Segamat. |
| Tuesday, 7th July | 9.00 am – 5.00 pm, Visit to project site, Labis Forest<br>Reserve, Labis, Johor. Night in Segamat. |
| Wednesday, 8th July | 10.00 am – 5.00 pm, Meeting with key stakeholders at the Segamat District Forest Office, Johor.<br>Journey back to Kuala Lumpur.<br>Night in Kuala Lumpur. |
| Thursday 9th July | 9.00 am – 5.00 pm, Examination of project records including interviews and discussions with relevant officers at the Forestry Department Headquarters.<br>Night in Kuala Lumpur. |
| Friday 10th July | 9.00 am – 12.00 noon, Wrap-up meeting at the Forestry Department Headquarters, Kuala Lumpur<br>Night in Kuala Lumpur. |
| Saturday 11th July | Departure from Kuala Lumpur. |

Appendix 2

List of Participants at the Wrap-up Meeting held on Friday, 10th July, 2009, at the Department of Forestry Headquarters, Kuala Lumpur

| Name | Agency |
|---|---|
| Dr Kwame Asumadu | Asumadu Pty Ltd, Australia |
| Jean-Marie Samyn | Intercooperation, Switzerland |
| Dr. Rahman Rahim | Forestry Department, Malaysia |
| Koh Hock Lye | Forestry Department, Malaysia |
| Mohamed Zin Yusof | Forestry Department, Malaysia |
| Shashiah Abd Karim | Forestry Department, Malaysia |
| Mohd. Fauzi Abu Bahar | Forestry Department, Malaysia |
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| Kamaruzaman Ali Budin | Forestry Department, Malaysia. |