EX-POST EVALUATION REPORT

ITTO PROJECT PD 16/96 Rev.4 (F)

"Ex Situ Conservation of Shorea Leprosula and Lophopetalum Multinervium and their Use in Future Breeding and Biotechnology"
(Indonesia)

Prepared for ITTO
by
Henri-Félix Maître and Don Wijewardana

September 2004
1. INTRODUCTION

This report provides an ex-post evaluation of the above project undertaken by the ITTO team of consultants - Henri-Félix Maître and Don Wijewardana - on the basis of Terms of Reference given in Appendix 1. The team visited Indonesia during the period of 12 to 18 April 2004. The visit included meetings with officials of the Ministry of Forestry, representatives of the forestry companies involved in the project, discussions with the Project Team of the Executing Agency (Faculty of Forestry, Gadjah Mada University of Yogyakarta) and visits to several project sites in Java.

The ex-post evaluation team wishes to thank Prof. Mohammad Na’iem, Prof. Soekotjo leaders of the Executing Agency for their valuable help and cooperation, without which we would not have been able to complete this evaluation successfully and in time.

The purpose of the evaluation was to provide a concise diagnosis of the projects so as to:

a) point out the successful and unsuccessful outcomes,

b) the reasons for successes and failures,

c) the contribution of the projects towards the achievement of ITTO’s Objective 2000, and

d) draw lessons that can be used to improve similar projects in the future.

2. BACKGROUND

Deforestation and forest degradation due to excessive logging and forest fires have led to a rapid loss of forest genetic resources in Indonesia. Current forestry research is largely concerned with the silvicultural improvement of the oldest plantations of teak (*Tectona grandis*). In relation to natural forests, research and management are focusing on growth and harvesting; in particular low impact logging. So far dipterocarp species have not been introduced in plantations. (There has been some work in Malaysia). The Government of Indonesia has taken a number of initiatives to address these problems. These include the formulation of an Indonesian Forestry Action Programme (IFAP). It has also identified conservation and sustainable development of biological resources as a national priority to ensure the dynamic stability of ecosystems.

The Council approved the project at its Twenty-third Session in December 1997. Financing was made available for the implementation of the project during the XXIV ITTC, in May 1998, in Gabon. The Agreement regulating project implementation was signed on 10 August 1998 (duration: three years). Project implementation began after the first disbursement of funds was made on 7 September 1998.
2.1 Project Objective

The project was aimed at initiating fundamental research activities that will (1) avert a decline in the genetic variability of *Shorea leprosula*, and *Lophopetalum multinervium* and (2) use these genetic collections for more efficient breeding and biotechnology programs in the future.

2.2 Specific objectives

**Specific objective 1**: Create effective programs of education and technology transfer that may be used to train appropriate personnel in methods for ex situ conservation of tropical forest trees.

**Specific objective 2**: Establish ex situ conservation methodologies for *Shorea leprosula* and *Lophopetalum multinervium* and develop these as methods for general ex situ conservation techniques for tropical tree species.

2.3 Expected Outputs

With regard to **Specific Objective 1**

**Output 1.1**: Technology transfer by US experts to Indonesian scientists.

**Output 1.2**: Well-trained personnel in ex situ gene conservation theory, biotechnology (genetic structure) and tree improvement.

**Output 1.3**: Dissemination of research results.

With regard to **Specific Objective 2**

**Output 2.1**: Collections representing existing genetic variability in each of the two selected species are established in test plantations.

**Output 2.2**: Report on the results of isozyme analysis and other biochemical analyses of genetic structure of each geographic population of each of two selected species.

2.4 Project Strategy and Activities

The main goal of the project is to carry out fundamental research on genetic conservation by plantation establishment with native forest species, for which very little information exists. Most existing information on plantation species is for exotics such as *Acacia mangium* or Teak, but this project makes a valuable contribution to maintaining biological diversity by studying the potential for reforestation with local species that occur in the natural forests.

In order to achieve the first specific objective, the Executing Agency had invited well-known scientists and project managers both from Indonesia and other countries, to give
lectures and provide training on aspects of genetics, conservation, tree breeding and biotechnology. This has been followed up later with a number of students being sent to overseas universities to specialise in areas specific to the project objectives. The pursuit of the second objective has involved the collection of genetic material of the two species from selected populations. A major component of the project strategy has been the close collaboration with six state-owned forestry companies. Natural populations have been surveyed and the sites for ex situ conservation have been located in their concessions. [See Appendix 2 for location map and detailed information].

3. REPORT

The ex-post evaluation team, through its study of the relevant documentation, meetings and visits, assessed the contribution of the project in relation to a number of criteria. These are listed below.

3.1 The overall role and contribution of the project in light of sectoral policies, development programmes, priorities and requirements to achieve sustainable management of forest resources in Indonesia.

Deforestation and forest degradation due to excessive logging and forest fires have led to a rapid loss of forest genetic resources in Indonesia. The Government has taken a number of initiatives to address this problem, including the formulation of an Indonesian Forestry Action Programme (IFAP), and has identified conservation and sustainable development of forests as a national priority. The essential elements of a strategy to achieve these objectives include the conservation of genetic diversity, and in the long term, the establishment of forest plantations to meet the country’s wood needs and to take the pressure off natural forests. This project could be seen as the foundation for such a strategy.

Of the two selected species *Shorea leprosula* is widespread in Indonesia (as well as in Malaysia and Thailand) and *Lophopetalum multinervium* can constitute small pure or semi-pure stands in swampy areas. These single species stands of *Lophopetalum spp.* (Perupok) are exceptional within tropical natural forests and are confined to Eastern Borneo.

The main justification for selecting these two species were:

- Their timber is highly valued and in great demand in export markets. While *Shorea leprosula* has a steady demand *Lophopetalum multinervium* fetches four times more because of its usefulness for decorative purposes.
- Similar to most Dipterocarp species, there had been no previous studies undertaken on the genetic variation of the two species.
- The need to conserve and improve the genetic variation of the two species to ensure their long-term sustainability. The government of Indonesia gives high priority to the conservation and sustainable development of biological resources.
- To gain knowledge from studies on these two species, which could be relevant for other species growing under similar conditions.
The species selection was undertaken in consultation between the Faculty of Forestry of Gadjah Mada University, the Director General of Forest protection and Nature Conservation and the Associate Director of the Oregon State University Forest Research Laboratory as well as the forestry Companies INHUTANI I-V. A fourth group that should have participated in the species selection were the farmers whose land was to be used as sites for some of the research plots, but they have not been involved.

There was ample justification for selecting *Shorea leprosula* which grows in well-drained soils of up to 700m above sea level that cover most regions of Indonesia. However, there was less justification for choosing *Lophopetalum multinervium*. Although highly valued as a commercial species it has a limited range growing only in flooded plains from the sea level up to about 1500 metres altitude in peat soils. This is also the land popular with paddy farmers and will most likely not be used for forest plantations.

3.2 The current management status of forest plantations within the project’s area of influence, the effectiveness of the project’s implementation and its effectiveness in promoting sustainable plantation management.

The target for *Shorea leprosula* collection was five provenances per year, for a period of three years, or fifteen provenances in total during the project period. In the implementation fifteen populations of *Shorea leprosula* in the form of wild seedlings were collected, and subsequently they were established in conservation plots in five locations: 2 sites in East Kalimantan, 2 sites in South Kalimantan, two sites in West Sumatra, two sites in Jambi and two sites in Banten/West Java.

For *Lophopetalum multinervium*, a total of 40,302 seedlings (from 3 populations) were raised and established in East Kalimantan (2 sites), Central Kalimantan (2 sites), Riau (2 sites) and South Sumatra (2 sites). These achievements were in compliance with the target.

Most *Shorea leprosula* planting by the project was done by line-planting especially in encroached forestry plots or logged over forests. Most of these areas were within forest company concessions, thus ensuring their continued protection. There have been instances of damage by farmers who had encroached on these areas but this has been solved through negotiation.

In relation to *Lophopetalum multinervium* there was less stability given that they were in peat/swampy areas, which are also suitable for cultivation of paddy and other similar crops. Some farmers have tended to consider the planting as a threat to their livelihood. Also, the research plots in Central Kalimantan were destroyed by forest fire and those in East Kalimantan by encroachment. Another factor that had some impact was the limited availability of naturally occurring *Lophopetalum multinervium* to East Kalimantan: this limited the availability of seeds for planting.
In spite of the setbacks related to *Lophopetalum multinervium* the project outcomes have helped to identify directions for more targeted research towards establishing sustainable plantation forests in Indonesia.

### 3.3 The contributions of the specific studies in various disciplines (genetic conservation, ecology, socio-economy, silviculture, rehabilitation, etc.) prepared by the project to the development of forestry in the project’s area of influence.

During its implementation the project has produced 31 reports and publications in Bahasa Indonesia and in English, covering various aspects of the project. They included workshops and seminars held by experts from both overseas and from Indonesia. The publications have been widely distributed both within the country as well as overseas as appropriate. A list of publications is provided in the Project Completion Report.

The project has helped Indonesia to gain knowledge of new technology on forest conservation and genetics, to put in place a well-trained team of foresters in ex-situ conservation, biotechnology and tree improvement, to establish collections representing the existing genetic variability of the two species in test plantations, and to introduce ways to identify genetic diversity and genetic structures through isozyme and DNA tests. The Forestry Faculty of the Gadjah Mada University, which is the Executing Agency for the project, has skilled research staff and wide experience to undertake such work, which has been complemented by advanced technical input from the Oregon State University (OSU). The OSU conducted short courses in genetic conservation theory and techniques and provided post-graduate programmes in genetics and conservation for selected Indonesian participants. They were also closely involved with the international workshop on the two species held in Indonesia.

### 3.4 The results and potential impact of the applied research conducted by the project on the application of plantation establishment/management practices and its contribution to the overall forestry-related knowledge in the region.

As this project was the first of its kind in Indonesia the Executing Agency did not have much useful information available on a number of key aspects for starting off the project, e.g. determining the project scope, identifying appropriate planting stock and availability, locating the research plots, involvement of stakeholders etc. In spite of these information gaps the research has identified and generated many useful outcomes. These include:

- Expanding the knowledge base on genetic conservation, identifying gaps in available expertise and organising training in the identified areas within the country and overseas.
- Acquiring knowledge about the wide variation in the rate of growth of *Shorea leprosula*, which depends largely on the source of seeds; as a result future research can be based on a much narrower range of source material.
The ability to apply the same techniques successfully used in the project to other similar species.

Recognition by the government that the findings of the project provide a basis for the establishment of plantation forests to offset over-cutting in the past, illegal logging etc., which affect its SFM objectives.

Creating a new interest among forestry companies to participate in such work as a basis for their own long term development. With over-harvesting in the past, forestry companies are now facing declining levels of wood supply. This research has made them aware that the only long term solution is to establish forest plantations.

The final result/justification of co-operation by forest companies has been obtained through the following projects: ITTO PD 106/01: Increasing genetic diversity of *Shorea leproulsa* and *Lophopetalum multinervium* for breeding and genetic improvement, involving state and private companies like: Perum perhutani, PT INHUTANI I & II, PT Musi Hutan Persada, PT ITCI Kartika Utama and HPH Alas Kusuma Group. ITTO PD 41/00: Model development to establish commercial plantation of Dipterocarps involves also other companies among them: Sari Bumi Kusuma, and PT Dwimajaya Utama.

3.5 The impact of project activities on the livelihoods of target populations.

The project has potential for a long-term positive impact on the livelihoods of the people if the knowledge gained is translated into establishing plantation forests, which benefit the local populations. However, the direct impact on livelihoods was limited since the project was a research undertaking. A potential negative impact could arise if future plantations of *Lophopetalum multinervium* are established on land that is used by farmers for rice cultivation. Paddy farmers, who feared that their land would be taken away from them through *Lophopetalum multinervium* planting, removed the seedlings planted in some of the research plots. This demonstrated the need for closer stakeholder consultation and involvement in planning and executing such projects.

3.6 The effectiveness of dissemination of project results.

There are a number of indicators that suggest the successful dissemination of results of the project both within and outside Indonesia. They are:

- Recognition by the Indonesian government of the importance of the project results in furthering its sustainable management objectives.
- Approval and funding of two follow-up projects by ITTO. (see section 3.10 for details).
- Willingness by more than ten forestry companies, especially private companies, to participate in the follow-up projects. At the moment six companies are participating, both in project PD 106/01 Rev.1 (F) and PD 41/00 Rev. 3 (F,M), including funding.
3.7 *The overall post-project situation in the project’s area of influence.*

Available information suggests that 90 percent of plantings of *Shorea leprosula* remain in good condition. Since most of these were within forestry company concessions these have taken the responsibility for their care.

Research plots can continue to provide useful information long after the original purpose of establishment has been fulfilled. But very often research agencies, which undertake such work, do not have the capacity (mainly funding and committed personnel) to continue maintaining the plots. Going along with a forestry company (which as part of its own on-going work will maintain the plots) has been a strategically important decision for this project. Additionally there is a need for an MOU between the parties to ensure not only the protection and maintenance of the research plots but also access to researchers. This project has taken all these into consideration.

For *Lophopetalum multinervium* (Perupok) the survival of planted trees has not been satisfactory for a number of reasons:

- Areas suitable for planting were limited since it requires low-lying swampy soils.
- Most such areas are also farming land and farmers have not been very supportive fearing competition for their land.
- Suitable fruiting trees to obtain seed were available only in limited quantities in selected sites.
- Destruction of trees planted in South Sumatra and East Kalimantan by encroachment and in Central Kalimantan by fire.
- The choice of the Perupok for this specialized research is certainly controversial. Conservation and smooth management of the existing natural stands should be the appropriate way to preserve this species and biodiversity.

For *Shorea leprosula* (and Dipterocarps): The irregular flowering and seed production is an inexplicable pitfall for seed collection in a planting programme. This has forced the project team to use wild seedlings to meet the time schedule in the project plan.

3.8 *Unexpected effects and impacts, either harmful or beneficial, and the reasons for their occurrences.*

Among the many unexpected positive impacts of the project the following two should be highlighted:

- Acceptance of the results by the Indonesian government as a basis for creating forest plantations to meet the wood needs of the country and promoting SFM.
- Recognition by forestry companies of the importance of the findings in enhancing the long term wood supply in their concession areas.

The reasons for these beneficial effects were the positive results from the project and the effective communication maintained throughout the project period.
Harmful effect:
The lack of involvement of farmers in the design and planning stage of the project resulted in the destruction of some research plots of Lophopetalum by farmers who feared that they would lose their land. If they had been involved from the planning stage of the project their understanding and support could have been gained and the hostile reaction could have been avoided. In addition, in such projects the local people can help in maintaining the saplings and they could make a major contribution to the success of the project.

This harmful effect has been a lesson learnt, from which the subsequent projects have benefited. In the follow-up project the Executing Agency has committed itself to ensuring the involvement of stakeholders.

3.9 The cost efficiency in the implementation of the project, including the technical, financial and managerial aspects

Upon project completion US$ 45,401.85 (including bank interest) of unspent funds were returned to ITTO. The spending was below expectation because part of the travel fund provided for the foreign expert was unspent. Some of them were unable to come again during the international conference.

| Total budget | US$ 1,006,626 |
| Government of Indonesia | US$ 407,000 |
| Government of Japan | US$ 599,626 |

A factor that determines the cost efficiency of a project is the timely project completion, i.e. achieving all the objectives and outcomes within the allocated time frame. In this instance the delay in the fruiting of Shorea leprosula trees affected seed collection, which resulted in the postponement of project completion by one year. Although this did not involve any extra financial cost the delay in obtaining the expected results has been an additional real cost of the project.

The institutional arrangements for the management of the project included a Project Steering Committee (PSC) and a Project Executing Agency (PEA). The PSC appointed by the Minister of Forestry had the responsibility for oversight of the project and, in particular, approval of programmes and budget, regular evaluation of the project including annual reviews and approval of progress reports. The Faculty of Forestry at Gadjah Mada University was selected as the PEA. It was responsible for all matters relating to implementation.

In general the project seems to have been managed well. However, there were some outcomes, which have tended to affect the results of the project. Such outcomes included:
• The choice of species: whether another species should have been selected for research in place of *Lophopetalum multinervium*, which has a limited range.
• Lack of involvement of major stakeholders: the destruction of some research plots by farmers was due to this reason.
• Unavailability of fruits of *Shorea leprosula* to obtain seed for planting: this is an unpredictable though common problem with Dipterocarp species.
• The delay in project completion adding to the real cost of the project.

Some of these were due to unforeseen circumstances while some others were caused by lack of adequate information on executing such projects (this being the first of this nature). Some other unfavourable outcomes could have been avoided with better planning.

3.10 *Follow-up actions in order to enhance uptake of project results.*

The project PD16/96 (F) has been followed up with two other projects to complete the research that was hampered by the unavailability of *Shorea leprosula* seed for use during the project period and advance the findings of PD 16/96 to a further level towards the development of commercial plantations:

- **PD 106/01 Rev.1 (F)** for increasing genetic diversity of *Shorea leprosula* and *Lophopetalum multinervium* for breeding and genetic improvement. The aim of this new project is to complete plantation establishment of *Shorea leprosula* with seeds from selected mother trees. In spite of the negative experiences in the previous project PD 16/96 this project continues doing research on *Lophopetalum multinervium*.

- **PD 41/00 Rev.3 (F, M)** The main goal concerns demonstration plantations to define a model development to establish commercial plantations focused on Dipterocarps (*Shorea leprosula, Shorea parviflora, Shorea smithiana* etc).

3.11 *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 project had two main objectives:

- Creation of an effective programs of education and technology transfer in methods for *ex situ* conservation of tropical forest trees; and

- Establishment of *ex situ* conservation methodologies of *Shorea leprosula* and *Lophopetalum multinervium* and to develop these as methods for general *ex situ* conservation techniques for tropical tree species.

The Evaluation team was impressed with the efforts made towards achieving the first objective. A number of training programmes have been held and a number of publications have been produced as detailed below:
- **Output 1.1 Technology transfer**: Training courses, workshops and visits on conservation and forest genetics have been carried out with the help of US experts for Indonesian scientists and technicians (Completion Report Appendix 6a, 6b, 6c, 7a, and 7d).

- **Output 1.2 Well trained personnel**: 96 technicians and decision makers have been trained through courses on such topics as *ex situ* conservation theory, including biotechnology and tree improvement (Completion Report Appendix 7b, 7c and 7e).

- **Output 1.3 Dissemination of research results**: Research results of the project have been disseminated through technical reports, which have been widely distributed to forestry companies, universities, NGOs, research organizations and individuals; An International Conference on *In Situ* and *Ex Situ* Conservation of Commercial Tropical Trees was held on 11-13 June 2001 in Yogyakarta. The Conference was attended by 112 participants from 10 countries. Discussions focused on the importance of genetic conservation of commercial tropical trees and the relationship with selection, breeding and biotechnology programs (Completion Report Appendix 8).

With regard to the second objective:

- **Output 2.1 Collections representing genetic variability** in each of the two species (test plantations): A total of 15 populations of *Shorea leprosula* have been surveyed and 162,673 wildlings collected. These have been established in conservation plots in five locations. For *Lophopetalum multinervium*, 40,302 seedlings have been raised and established in eight locations. However, the results of these plantings were mixed. As for *Shorea* the expected outcomes were achieved although with some delay due to the trees not fruiting at the expected time to obtain seeds. This was overcome with using seeds from wildings. But with regard to *Lophopetalum* major areas planted were either damaged by fire or destroyed by farmers who were antagonistic towards the use of the agricultural land. As a result the project was not able to deliver the expected outputs. But the project team is committed to continuing the research with the support of the farmers and has obtained new funding for this purpose.

- **Output 2.2** Studies on *isozyme analysis* for the two species have been carried out and reported. In addition, reports have been published on the use of *DNA markers* for determining population genetic diversity and population structure of *Shorea leprosula* (Completion report Appendix 10, 11a and 11b).

*Relative success or failure*

The project has been successful in achieving much of its main objectives. A number of technology transfer programmes have been undertaken where over 200 people have actively taken part. Altogether 31 publications have been produced by the project team, which included a number of technical reports. Representatives of industry, officials, researchers and students have participated in training workshops.
It has enabled to identify the existing knowledge gaps which have been addressed through appropriate training both within Indonesia and overseas.

The research on *Shorea leprosula* has yielded very useful practical information. The prolonged dry season appears to have affected the fruiting of trees which required the project to fall back on using wild seedlings. But this is to be corrected in the follow up project approved by ITTO. The research on *Lophopetalum multinervium* has not yielded the expected results because of a range of unforeseen circumstances such as the lack of cooperation of farmers and the destruction of some plots by fire and encroachment. Lessons learnt will no doubt help in the future to ensure the involvement of all key stakeholders in the planning and implementation of projects.

An important unexpected outcome of the project has been the opportunity it provided for forest managers and policy makers to understand and appreciate the opportunities that *ex situ* genetic conservation could offer for the future development of the forestry sector in Indonesia. The forestry sector is facing a critical situation with dwindling wood supplies as a result of past over-cutting and illegal logging. Many of the forestry companies are facing wood shortages to meet their processing requirements. The establishment of forest plantations is the only positive way to respond to the situation. This project has helped to confirm that it is a feasible option for *Shorea leprosula*.

The delay of one year in the project completion though at no extra financial cost had the effect of increasing its real cost.

**Reasons for successes**

- Having a dedicated and very knowledgeable team to run the project has been a major factor in the success.
- Technology transfer involving the Oregon State University has also been an important factor in its achievements.
- The project started at a time when the government and the forest industry were searching for options to address a likely shortage of timber due to past over cutting.

**Reasons for failures**

- Failure to involve local people in the design and implementation process has been responsible for some of the damage caused to planted seedlings. Stakeholder involvement in the critical stages of a project is particularly important for its success. The project team has realised this and is consulting with all parties involved in the follow-up project.
- In selecting species for study it is important that consideration is given to the importance of the species, availability of seeds and suitability to range of locations within the country. The selection of *Lophopetalum multinervium* did not meet these criteria and another species should be selected for the follow-up project PD 106/01.
Key lessons learnt

- It is important for the Executing Agency to dedicate adequate time and effort to planning and designing the project and has been a major success factor.
- The involvement of the key stakeholders, the university, research institute, forestry companies and the affected sections of the public, from the beginning are important.
- The ability of the research to contribute to a key government objective of sustainable forest management facilitated the endorsement by policy makers.
- Appropriate planning and care is necessary to facilitate the growth of selected plus trees in the planted plots. They need the canopy opened for adequate growth and this could lead to damage to other planted trees.
- For future work of this nature the involvement of private companies will be more effective than that of state companies since the latter appear to be becoming less effective entities with the ongoing restructuring of the sector.
- With respect to the selection of appropriate species for research the follow-up project should not have continued with *Lophopetalum multinervium*. An evaluation should have been carried out before designing the follow-up project in order to provide a better orientation.

Issues to be taken into account in future such projects

- Research and training as conducted by this project, which can have major implications for conservation and plantation forest development, are vital to underpin policy decisions. Hence they should be encouraged and supported both by international donors and governments.
- Similarly, such projects should be seen as the first step in a process, which should eventually provide essential information for commercial plantation development.
- Involvement of major stakeholders in the design and planning stages is vital for the success of such projects. Where appropriate it will also be useful to enter into MOUs which can clearly identify the duties and responsibilities of each partner.
- Similarly, efforts to enhance the awareness of policy makers can also be a critical success factor.
- Research and training on genetic conservation of important tree species can have implications not only for the country concerned but also for the region and even countries outside the region. For instance *Shorea leprosula* is found in a number of Asian countries such as Malaysia and Thailand. All countries would benefit from joint research and regional projects for important timber species should be encouraged and supported.
3.12 The overall role and meaningful contribution of the project in achieving sustainable management of forest resources in tropical timber producing countries taking into account ITTO’s objectives, the ITTO Yokohama Action Plan 2002-2006 and Objective 2000.

The project meets a fundamental objective of Article 1 of ITTA 1994: promotion of research to improve forest management, support the development of industrial wood production, and rehabilitate degraded land.

This project indirectly contributes to the achievement of the Objective 2000 by providing research to facilitate the establishment of planted forests. These will not only be the renewable sources for future exports but can also help take the pressure off natural forests.

The project complies with the ITTO Guidelines for the Establishment and Sustainable Management of Planted Tropical Forests. Many of the recommendations are applicable to this project (especially the Principle 35 including the actions 34 & 35 on research concerning native species).

The project is also related to the ITTO Guidelines for Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests. Collection plantings have been established in encroachment forestry plots or logged over forests for genetic conservation purposes, and the project complies with the Principle 30: Applied research is essential to guide and inform adaptive management. In addition, the results can be used in future restoration activities in degraded forests.

Concerning the ITTO Yokohama Action Plan 2002-2006, the project complies with: The objective (f): To promote and support research and development with the 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.

For the Reforestation and Forest Management Committee, the main goal related to this (f) objective is to: Promote sustainable management of tropical forest resources of which the actions are mainly to encourage to:

- Improve 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;
- Strengthen training institutions and intensify training of forestry personnel and other stakeholders in silviculture, RIL and resource assessment, and in the management of both natural forests and timber plantations.
CONCLUSIONS

This project is significant for a number of reasons. It represents an important step towards afforestation with native forest species, for which very little information was available before the implementation in a country where over-cutting and illegal logging have severely diminished the resource base. Its focus on *ex situ* conservation is a strong basis for establishing plantation forests. In addition, the project will have wider implications since *Shorea leprosula* is an important species in a number of major Asian countries such as Malaysia and Thailand. For these reasons the following aspects should be noted:

**Promotion and coordination:** The Executing Agency has taken a major step in holding a number of seminars and workshops benefiting from the expertise of overseas researchers such as the Oregon State University. Most of the findings have also been published. While the research needs to continue it is also important to broaden the interest in the research involving other countries that could potentially benefit from such work.

**Continuity:** The problem with many research projects is that once the initially planned results have been obtained research sites are neglected or abandoned. This is the likely outcome when the original research body is not funded to maintain them. The result is the loss of valuable time and resources for others who may want to carry the research and its findings to further levels. In this instance the team at Gadjah Mada University has been fortunate that some of the research plots are within forests owned by Inhutani I, which is continuing to maintain the sites. It would be useful to incorporate special conditions in funding agreements to ensure the future protection of research sites where appropriate.

**Stakeholder involvement:** The success of any project depends to a large extent on the cooperation and involvement of key stakeholders. While many of the key players were involved in the planning and implementation of this project, omission of farmers has led to damage to some of the research plots as they felt threatened by the establishment of *Lophopetalum multinervium* plantings. It is important to recognize the importance of stakeholder involvement in future project planning.

**General comments and conclusions**

- The project has benefited from the highly skilled and enthusiastic leadership of the project team and the transfer of technology from Oregon State University.
- The outcome of the project has been affected by unforeseen factors as well as lack of adequate planning in some areas:
  - The choice of species: whether another species should have been selected for research in place of *Lophopetalum*, which has a limited range, especially for the follow-up project.
  - Lack of involvement of major stakeholders: the destruction of some research plots by farmers was due to this reason.
Unavailability of fruits of *Shorea leprosula* to obtain seed for planting: this is an unpredictable though common problem.

It is to be noted, however, that this being the first project of this nature the team was ‘learning by doing’ and future projects are to benefit from the lessons learnt.

The project marks the beginning of ex-situ conservation as a basis for promoting forest plantations in Indonesia. Given the scale of the problem, availability of resources both land and capital, there is no doubt that the private sector has to play an important role in establishing future plantations. The involvement of the forest industry as a key player in the research effort will also help in taking their views into account as well as ensuring funding and maintaining the research sites for ongoing use.

**Recommendations**

This project constitutes the initial step in promoting the establishment of plantation forests of main timber species of importance to Indonesia. It also has broader relevance to other Asian countries in a similar situation. It is therefore important to:

- Ensure good project planning to avoid delays in completion because they add to the real cost of the project.
- Involve the private sector closely in research to ensure continuity, uptake of findings and maintenance of research sites.
- Involve other countries, especially those involved in similar reasearch and with similar problems like the unpredictable fruiting seasons of the Dipterocarps.
- Involve all key stakeholders in design, planning and implementation of projects so that they contribute to achieving the expected results.
- Make every effort to ensure transfer of technology by attracting overseas research institutions with relevant expertise to assist in project activities.
- Publish findings widely taking into account modern technology such as web-based dissemination so that other parties can also benefit from the research findings.
- Before designing a follow-up project an evaluation should be carried out in order to assure that the lessons learned from the project are fully incorporated, particularly as regards the choice of species for research.
Appendix I

Terms of Reference

Ex-Post Evaluation of ITTO Projects on
Forest Plantations

II. Purpose and Scope of Evaluation

A) Purpose

The primary purpose of the evaluation is to provide a concise diagnosis of five projects related to Forest Plantations so as to:

   e) point out the successful and unsuccessful outcomes,
   f) the reasons for successes and failures,
   g) the contribution of the projects towards the achievement of ITTO’s Objective 2000, and
   h) draw lessons that can be used to improve similar projects in the future.

B) Scope

a) Analyze and assess for each project:

   2. The overall role and contribution of the project in light of sectoral policies, development programmes, priorities and requirements to achieve sustainable management of forest resources in the country concerned.
   3. The current management status of forest plantations within the project’s area of influence, the effectiveness of the project’s implementation and its effectiveness in promoting sustainable plantation management as defined in the ITTO Guidelines for the Establishment and Sustainable Management of Planted Tropical Forests and the ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests.
   4. The contributions of the specific studies in various disciplines (genetic conservation, ecology, socio-economy, silviculture, rehabilitation, etc.) prepared by the project to the development of forestry in the project’s area of influence.
   5. The results and potential impact of the applied research conducted by the project on the application of plantation establishment/management practices and its contribution to the overall forestry-related knowledge in the region.
   6. The impact of project activities on the livelihoods of target populations.
7. The effectiveness of dissemination of project 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.
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.

b) Provide a synthesis to:

1. assess the overall role and meaningful contribution of the five projects in achieving sustainable management of forest resources in tropical timber producing countries taking into account ITTO’s objectives, the ITTO Yokohama Action Plan 2002-2006 and Objective 2000.
2. evaluate the overall contribution of the five projects to plantation establishment/management in the tropics and to the restoration, management and rehabilitation of degraded and secondary tropical forests.
3. evaluate the overall impact on and relevance of the five projects for the Executing Agencies, the forest industry sector and local communities being served and the countries concerned.
4. evaluate the overall attainment of the objectives and to assess the overall effectiveness of the five projects.
5. evaluate the overall appropriateness of the costs and cost structure and use of resources within the five projects.

And make recommendations on:

1. the needs for similar projects in the future;
2. innovative approaches/designs for projects aiming at promoting plantation establishment and management in the tropics and at the restoration, management and rehabilitation of degraded and secondary tropical forests;
3. appropriate target groups, e.g. countries, government, organizations, forestry sector, local communities;
4. the organizational arrangements of such projects;
5. follow-up and evaluation practices; and
6. further actions needed to sustain or increase the intended effects on sustainable management of forest resources and Objective 2000 and to draw conclusions, which may be of relevance to other ITTO projects.
1. PT. Inhutani I in East Kalimantan:
   A. *Shorea leprosula* plantation: Batu Ampar
   B. *Lophopetalum multinervium*: Berau and Tarakan

2. PT. Inhutani II in Pulau Laut, South Kalimantan
   A. *Shorea leprosula* plantation: Semaras
   B. *Lophopetalum multinervium*: no plantation

3. PT. Inhutani III in Central Kalimantan
   A. *Shorea leprosula*: no plantation
   B. *Lophopetalum multinervium*: Terantang and Cempaga

4. PT. Inhutani IV in Riau, Sumatra
   A. *Shorea leprosula* plantation: Gunung Medan, West Sumatra
   B. *Lophopetalum multinervium*: Cinaku, Rengat, Riau

5. PT. Inhutani V in Jambi
   A. *Shorea leprosula* plantation: Sei Lalan, Palembang
   B. *Lophopetalum multinervium*: Sei Lalan, Palembang

6. Perum Perhutani, Banten Province (Formerly: West Java Province)
   A. *Shorea leprosula* plantations: Gunung Kencana and Carita
   B. *Lophopetalum multinervium*: no plantation

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