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REPORT ON FINANCIAL COST-BENEFIT ANALYSIS OF FOREST CERTIFICATION AND IMPLEMENTATION OF PHASED APPROACHES

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ABBREVIATIONS AND ACRONYMS

AAC	annual allowable cut
ABNT	Brazilian Association of Technical Standards
BMP	Best Management Practice
BRR	Brazilian Real (1 USD = 3.0 BRR)
BVQI	Bureau Veritas Quality International
C&I	Criteria and Indicators for Sustainable Forest Management
CAR	Corrective Actions Request
CBA	cost-benefit analysis
CEO	Chief Executive Officer
CERFLOR	National System of Forest Certification (Brazil)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CL	conventional logging
cm	centimeter
CoC	Chain of Custody
DBH	diameter at breast height
DRT	PT Diamond Raya Timber
DSA	daily subsistence allowance
e	estimate
EIA	environmental impact assessment
EUR	Euro
FAO	Food and Agriculture Organization
FMP	forest management plan
FMU	forest management unit
FRIM	Forest Research Institute of Malaysia
FSC	Forest Stewardship Council
FUNAI	National Foundation of the Indigenous People (Brazil)
GIS	Geographic information system
GTZ	Gesellschaft für Technische Zusammenarbeit
ha	Hectare
HCVF	high conservation value forest
HPH	Natural Forest Concession (Indonesia)
INMETRO	National Institute of Metrology, Standardization and Industrial Quality (Brazil)
INPACEL	Indústria de Papel Arapoti Ltda
IPE	Individual Protection Equipment
ITC	Integrated Timber Complex
ITTC	International Tropical Timber Council
ITTO	International Tropical Timber Organization
JCP	Joint Certification Program (FSC & LEI)
km	kilometer
KPKKT	Kumpulan Pengurusan Kayu Kayan Terengganu Sdn. Bhd.
LEI	Lembaga Ekolabel Indonesia (Indonesian National Forest Certification and Labeling System)
m	meter
m^3	cubic meter
MC&I	Malaysian Criteria and Indicators
MDF	medium-density fibreboard
mill.	million

MIS	Management Information System
MMU	mill management unit
MOF	Ministry of Forestry (Indonesia)
MTCC	Malaysian Timber Certification Council
NGO	non-governmental organization
NPV	Net Present Value
NTFP	non-timber forest product
OSB	oriented strandboard
OSHA	Occupational Safety and Health Act (Malaysia)
PEFC	Programme for Endorsement of Forest Certification
PFE	permanent forest estate
PITC	Perak Integrated Timber Complex
POA	annual operational plan (Brazil)
PSP	permanent sample plot
PUP	permanent measurement plot (Indonesia)
R&D	Research & development
RIL	reduced impact logging
RKPH	Rencana Karya Pengelolaan Hutan (20-year forest management plan) (Indonesia)
RKT	Rencana Karya Tahunan (annual harvesting plan) (Indonesia)
RM	Malaysian Ringgit (1 USD = 3,8 RM)
Rp	Indonesian Rupee (1 USD = 8400 Rp)
SCS	Scientific Certification Systems
SEDC	Perak State Economic Development Cooperation
SFD	Sabah Forest Department
SFI	Sustainable Forestry Initiative
SFM	sustainable forest management
SGS	Société Générale de Surveillance
SOCSO	Social Security Organisation (Malaysia)
SOP	standard operating procedure
TFT	Tropical Forest Trust
TPI	Tebang Pilih Indonesia – Indonesian Selective Cutting System
TPTI	Tebang Pilih Tanam Indonesia – Indonesian Selective Cutting and Planting System
UK	United Kingdom
UPA	annual production unit
US	United States
USD	United States dollar
yr	year

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EXECUTIVE SUMMARY

1. Background

Benefits and costs of forest certification have been subject to debate since the inception of this instrument was introduced to the market about ten years ago. The importance of costs and benefits of certification has been recognized by various international forums. Cost-effectiveness has also been singled out as a desirable element for certification as a tool to promote sustainable forest management. However, there is only limited factual systematic information available on costs and benefits of certification at the FMU level. This is why there is a common concern about cost implications of certification and uncertainty about possible market and other benefits for tropical timber producers. Phased approaches have been seen as one option to address these issues.

2. Objectives

The objectives of the study were to (i) elaborate on possible analytical models or approaches for assessing costs and benefits of forest certification and phased approaches; (ii) carry out voluntary field-level case studies on the costs and benefits of certified forest management units (FMUs) in selected ITTO producing member countries, and (iii) identify under which conditions forest certification can be financially feasible, including through a phased approach, and managed ways how to reduce costs and increase benefits due to certification in tropical forests.

3. Earlier Studies on Costs and Benefits of Forest Certification

A considerable research effort has touched the issue of costs and benefits of certification although in-depth site-specific analyses are still rare. Methodologies tend to vary and the basis of assessment is not always clearly defined. This makes comparisons difficult and limits conclusions to be made.

The earlier research suggests that the opportunity costs of SFM practices are usually significant. These costs depend on the pre-certification management standard and/or the country's legal regulations, whatever is considered the baseline. Producing countries may be unwilling to admit the true opportunity costs because this could reveal that FMUs were not operating legally before certification. It is important to carefully consider where the expected benefits will exceed the costs, as these are the situations where certification is most likely to be an appropriate instrument.

In general, certification costs tend to be much heavier for primary producers than processors. On the contrary, market benefits of certification tend to be realized by actors down in the supply chain. Therefore, at present, the main winners from forest certification appear to be more or less far from the forest, particularly in the case of tropical forests. Many of the environmental and social benefits appear to be reaped by society, not by the FMU which has generated them.

Without tangible benefits deriving from certification in terms of profitability or competitiveness, enterprises will have little incentive to improve forest management with higher costs. There would be even less motivation for the industry to submit themselves to stricter controls than those at present. The problem is particularly serious in the case of tropical timber producing countries. Phased approaches can assist in such situations. However, comprehensive development strategies towards SFM would often be needed where certification and labeling can play a useful complementary role.

4. Analytical Framework

The costs associated with certification are divided into direct and indirect (compliance) costs. The direct costs are associated with certification process. Both costs are fixed by nature. The compliance costs are due to action taken by the FMU to comply with the requirements of the certification standard (both performance and management system criteria). They can be considered opportunity costs of managing the FMU according to the standard requirements, yielding less net income than could be achieved by conventional profit maximization approach alone.

There are two possible baseline situations against which additional costs can be assessed: (a) the actual pre-certification level of forest management and (b) legal requirements. These two levels do not necessarily coincide. In the study, the national legal requirements were used as a baseline for the assessment of additional costs. However, legal requirements vary by countries. With a similar standard, what is considered incremental in one country may not be the same in another.

Benefits can be direct (financial) or indirect (economic, social and environmental). Direct benefits may come from additional sales volume or price premium for certified products. Indirect economic benefits result from cost reductions and avoidance of loss of sales revenue in the markets which require certification.

Environmental benefits are derived from improved mitigation of environmental impacts in forest operations and enhanced measures of conservation of biodiversity, ecological functions of forests as well as soil and water. Social benefits also include a broad range depending on the local conditions. In general, the less developed social infrastructure in the region, the more significant impact of certification.

The cost-benefit assessment was made using conventional NPV calculations for the With and Without Certification cases covering the first validity period of forest certification. Data limitations, uncertainties about projections and various underlying assumptions related to quantification of indirect costs and benefits tend to represent constraints for any cost-benefit analysis. Therefore, the results are no more than indicative by nature.

5. Case Study Forest Management Units

Five case studies were carried out in three countries, i.e., Brazil, Indonesia and Malaysia. All of them represent medium to large-scale forest management. All have long-term tenurial rights to their lands. The FMUs were selected to represent different certification systems. The FMUs varied in terms of size, type of forest, production level and ownership of their forest resource. Four were natural forest management units and one was plantation. All companies had management systems well above the prevailing average in their respective countries.

6. Costs Related to Certification

The total costs related to certification over a five-year period are significant and measured in hundreds of thousands or millions of dollars at the FMU level. The costs are relatively higher in natural forests than in plantations. The total annual costs range from about USD 50,000 to USD 575,000 and the variation is mainly due to indirect costs.

The direct costs represent from 8 to 41% of the total costs. The share is high in plantation forestry where indirect costs appear to be limited if the FMU has already high management standards before certification. The composition of compliance costs varies extensively between FMUs. This is

explained by differences in (i) baselines (legal requirements) and pre-certification situations, (ii) level of socio-economic development in the area, and (iii) level of existing knowledge on forest resources and management practices. In Brazil, the compliance costs due to management system criteria appear to be more pronounced in relative terms than in the two Asian countries where compliance with forest management and environmental performance criteria was the main source of additional costs.

Compliance costs are usually due to environmental and biodiversity surveys and monitoring, socio-economic studies, detailed forest inventories, etc. Typical areas which cause additional costs in forest management practices include reduced impact logging, road building, biodiversity conservation, research and development, occupational safety and health, training, etc. Clarifying the rights of the traditional and local communities was a significant cost element in one of the FMUs. On the other hand, some of these additional costs may have also led to cost reductions elsewhere in the operations (e.g. improvements of the management system, RIL occupational safety, etc.). Cost savings in the case studies were probably only partially quantified on the benefit side, which leads to a negative bias in the assessment of financial feasibility of certification.

The unit area costs vary extensively from USD 3 to 32/ha of the total area of the FMU over a five-year period. There is a marked effect of economies of scale, i.e., the unit costs are lower the larger the FMU. The economies-of-scale effect is observed both in direct and indirect (compliance) costs and represents a hurdle for small-sized FMUs which are common among local entrepreneurs.

The unit costs per log production in the certified natural forests vary also extensively, ranging from a fraction to USD 10/m^3. In some situations, the opportunity costs of certification can be high but at least in the case study FMUs, they are generally low. This can be partly explained by a high pre-certification performance level but it is likely that the opportunity costs are also underestimated due to lack of understanding by FMU managers.

7. Time Distribution of Costs

Certification is an investment for FMUs. The first-year costs tend to represent at least about 50% of the total costs related to certification. Thereafter, the costs are usually relatively stable over the rest of the 5-year period, from about 4 to 15 % of the total costs in each subsequent year. The high initial cost amplifies the barrier to certification for tropical FMUs which generally tend to suffer from liquidity problems. A decision on certification investment is primarily an economic issue of internal resource allocation even though other strategic considerations are also taken into account. Therefore, certification should be financially feasible from the FMU's perspective.

8. Benefits Derived from Certification

Benefits derived from certification are generally more difficult to estimate than costs. First, they come forward with a time lag. Second, many of them cannot be quantified in monetary terms. Third, managers may not be aware of possible sources of benefits and they remain unaccounted. Fourth, the sharing of benefits in integrated companies involved both in forest management and industrial processing is not transparent and based on clear principles. Market benefits are generally reaped mostly by industrial processing units and they are not necessarily duly transferred to wood raw material production, i.e. FMUs.

Although market benefits through increased or protected market share and price premium are perceived as the main motivation in all the FMUs studied, indirect benefits can also be significant. The economic indirect benefits are mostly derived from productivity increase and reduced distribution costs of finished products due to elimination of unnecessary intermediaries.

Avoidance of loss in sales to markets that require certification is also important but its quantification is difficult. Only two FMUs reported to have obtained price premiums.

Apart from one FMU (Indonesia), quantification of social and environmental benefits was not possible. In this case, cost savings accounted for 70% of the total, environmental benefits for 20% and social benefits for the rest. Only the cost savings were tapped by the FMU in monetary terms while the other benefits were reaped by workers, the local community and society at large.

9. Cost-Benefit Analysis

In three cases, the NPV estimates suggest forest certification to be an economically viable option for FMU. One of them was plantation FMU and one of the natural forest FMUs had received external financing which covered all the first-year initial costs.

The sensitivity analyses indicate that:

- the NPV is not very sensitive to the choice of the discount rate due to the importance of the first-year costs in the cash-flow
- the financial calculations are not very sensitive to small adjustments in additional costs occurring in years 2 to 5
- if market benefits are not quantifiable and cannot be taken into account in the assessment, certification appears to be rarely a financially viable option for FMUs operating in natural tropical forests in view of the fact the sample FMUs represent above average performance in their countries
- even a minor loss in sales revenue due to lack of certification can make certification financially feasible in many instances
- external assistance can make certification financially viable but it should be sufficient to cover a significant part of the additional costs.

In all the FMUs, the management perception of the cost-benefit ratio of certification was positive. This may be due to the fact that cost-benefit assessment of certification in integrated companies is in practice carried out at the group level.

10. Implications of the Case Studies

The field-level case studies revealed that (i) forest certification involves significant costs for FMUs in the tropical timber producing countries, and (ii) the bulk of these costs tend to occur before a certificate is issued to the applicant. The case study FMUs tend to paint an excessively rosy picture of the economics of certification because they represent above average level of management systems and environmental and social performance.

Certification in tropical FMUs appears to be mainly driven by anticipated restrictions to market access when an increasing amount of buyers demand for certified products and are unwilling to accept alternatives. If producers are forced to drop out from their traditional markets as has already happened in some cases, product prices are driven down. There is a true risk that this can lead in some countries to reduction of the value of the resource, encouraging its conversion into other uses. Even though certification was originally introduced as a countermeasure to forest degradation, its slow progress in the tropical countries and the mounting market access barriers in consuming countries can lead to an opposite outcome where certification accelerates forest conversion and degradation. Stakeholders should be fully aware of this risk when setting their demands as to how certification should be carried out.

Small-scale FMUs, community forests and non-integrated FMUs which are not integrated into industrial processing have different economic dynamics from that of large integrated FMUs. This means that the relative cost burden is high in small-sized FMUs. Another issue is their limited access to market benefits. Community forests and small FMUs have serious constraints in this respect and, therefore, some externally funded certifications were discontinued when the external financial support dried up.

11. Pre-conditions for Financial Feasibility of Forest Certification

Forest certification should be financially feasible for tropical FMUs to justify the respective investment. The case studies revealed that only in rare cases of natural tropical forests that financial feasibility of certification can be achieved without market benefits. These may come from avoidance of loss of sales to markets which require certification or obtaining increased sales revenue. As price premiums are expected to be short-lived with increasing supply of certified timber, market access benefits will be crucial in the long run.

The other financial benefits (e.g. cost savings) appear to be rarely sufficient enough to compensate the costs related to certification. Best prospects for tapping of these benefits appear to be found among large-scale integrated operations.

12. Phased Approach as a Means to Reduce Economic Barriers to Certification

Phased approaches have a potential to offer a badly needed instrument to reduce economic barriers to certification in tropical timber producing countries. They can allow FMUs to tap some benefits (in particular ensuring continued market access) during the process when the compliance with the standard requirements is built up. The issue is not limited to better capacity to bear the burden of additional costs but it also covers the time period which is necessarily required by the FMU to implement standard requirements. Such a process can take up to 3 to 5 years depending on the pre-certification status of the FMU.

Concerning intermediate steps between legality and full certification, there are two views: (i) the FMUs would like to have freedom to choose these steps, and (ii) some buyers want to define (at least part of) these steps by exclusion of various unwanted sources. These may not conflict with each other as, if an FMU has an adequate management system in place, only marginal costs would be involved in demonstrating and verifying that such sources are not used for logging by the FMU in question.

Cost impacts are influenced by how the phasing of various performance requirements are scheduled over the defined time period within which full certification should be achieved. It can be assumed that FMUs would tend to phase the compliance of complex or costly certification criteria towards the end of the period. Some degree of regulation could be introduced by the respective certification system if this proves to be a problem.

Phased approaches would have to be put in place by certification systems. In defining their own provisions for implementation, systems should try to seek a balance between cost impacts for tropical FMUs and desirable timing of compliance with specific requirements. FMUs are often very hesitant to embark on certification and, therefore, in early stages of phased implementation of the standard, one could focus on elements which are not too difficult to implement and can bring immediate benefits (e.g. cost savings, reduction of environmental impacts, establishing the legality of the supply source, etc.).

In order to be able to capture market benefits, FMUs should be able to make market-oriented claims so that their engagement in the process and their progress toward full certification can be communicated to buyers and other interested parties. As most of the demand for certification is in business-to-business trade, the issue of product labeling could be dealt with when consumer markets are targeted at.

13. Other Potential Means to Reduce Costs and Improve Benefits

One of the dilemmas of sustainable forest management is that it creates significant social, environmental and economic benefits from which the producer gets no or hardly any compensation. Beneficiaries are local communities, workers, governments and society at large. For these reasons, public sector support could be considered to cover (part of) direct or compliance costs. However, subsidizing certification in developing countries may lead to overestimation of benefits and underestimation of risks. On the other hand, financial support to landowners and forest managers to implement certification requirements can be more efficient and effective to generate these benefits than direct subsidies.

Existing certification systems and standards tend to use different concepts of forest management and conservation from those applied by e.g. national legislation. However, conservation of forest values may also take place through appropriate models and practices which are currently in use in a country or even provided in its national legislation. To avoid unnecessary costs, it would be preferable to rely as much as possible on local definitions, concepts and practices for achieving what is required in an existing certification standard, be it based on a national or international framework.

Group certification has proved to be effective in reducing the cost barrier to access for certification by small-sized FMUs and community forests but it has not been frequently used in the tropical countries. Group certification requires that participating FMUs and forest enterprises are organized into a cooperative arrangement. Promotional work is needed to widen the use of group certification in tropical timber producing countries to test alternative concepts designed to meet the specific country requirements.

14. Development of National Certification Standards and Schemes in Tropical Timber Producing Countries

It appears that without developing national certification standards and systems, the progress in the tropics continues to be slow. The problem is widely recognized but efforts to accelerate the developments have had only a limited impact. This is demonstrated by the fact that in June 2004, only seven percent of the world's certified forests (183 mil. ha) was found in the developing countries. The development of national schemes and standards appears, therefore, the only option for many countries to make faster progress than in the past. However, these schemes have been frequently criticized or challenged for not being credible or just serving as greenwashing.

It is important that support to the development of robust national standards and schemes is increased as they can best accommodate the specific local conditions. Their potential to accelerate the expansion of certified area can be enhanced if phased approaches are incorporated into their provisions. The development of certification in tropical timber producing countries should be understood as a dynamic learning process in which credibility can be built up over time in the same way as in the schemes which have been and are being developed in the developed world.

15. Areas for future action

ITTO

- Further develop the methodological approaches to cost-benefit assessment of SFM, its certification and legal compliance, considering a full range of opportunity costs applicable in varying country conditions
- Carry out further field-level studies and collect relevant statistical information on certified tropical FMUs to improve the understanding of the economic feasibility of certification in different conditions. Such studies and analyses would be particularly required in Africa, which was not possible to be covered in this study. Further economic analyses should consider the impact of certification on the value of the resource and risks related to its conversion into other uses, or encouraging unsustainable practices if the barrier to certification continues to be maintained too high.
- Through special studies and market monitoring, improve transparency on the sharing of benefits and costs between FMUs, industry and trade as a result of certification. This would contribute to a more equitable distribution than at present where most of the benefits appear to be reaped down in the supply chain in export markets.
- Implement pilot projects among small-scale FMUs and community forests for forest certification through group certification arrangements and involving phased approaches. Such projects would be particularly useful in the Congo Basin and also in some countries in Latin America and Asia-Pacific. Projects should include technical assistance to both group organizations and individual FMUs.

Governments and Public Agencies

- Governments in tropical timber producing countries where preconditions for certification exist should carry out studies to establish the feasibility of public sector support to landowners and forest managers in implementing forest certification as a public policy option, particularly as an alternative for subsidies.
- Governments in tropical timber consuming countries should clarify the requirements set for acceptable or recognized certification standards and systems and their phased approaches (particularly if referred to in their procurement policies), taking into account the specific hurdles that tropical timber producing countries have in meeting these requirements.
- Governments in consuming countries should examine the cost and trade implications of their public procurement policies for tropical timber producers, particularly market access restrictions, before such policies are put in place.
- Donor agencies are encouraged to support certification processes and their phased approaches in tropical timber producing countries as a measure to reduce cost barriers. Such support should, however, be demand driven and its sustainability implications should be duly considered in the case of small-scale FMUs and community forests.

Forest Management Units/Enterprises

- Carry out *ex ante* and *ex post* financial analyses of forest certification to establish its feasibility in their particular situations and to improve knowledge how the related costs could be reduced and benefits increased in their specific contexts

Certification Systems and Other Stakeholders

- International and national certification schemes and bodies should examine the cost implications of their assessment services and make adjustments to avoid unnecessary costs for tropical timber producers
- Existing certification systems and services should make provisions for phased approaches for mainstreaming phased approaches, as developments are presently largely driven by individual buyers and their groups.
- Proponents of various certification schemes are encouraged to carry out comprehensive reviews of their policies and advocacy work and campaigning related to certification which are often unduly limiting market access to tropical timber and timber products. This would be needed to avoid risks that certification becomes a perverse incentive for forest conversion and degradation through value reduction of such forests which cannot be certified under existing systems in specific country situations.

1. INTRODUCTION

1.1 Background

Benefits and costs of forest certification have been subject to debate since the inception of this instrument was introduced to the market about ten years ago. Tropical timber producing countries have been concerned about two main issues related to certification: market access and cost competitiveness. Certification has been seen as a useful tool for defending or increasing market shares in environmentally sensitive markets and also price premiums have been referred to as additional potential benefits. As certification has been mainly demanded in some market segments and there has been declared resistance by many buyers to pay higher prices for certified products, the importance of market benefits has been difficult to quantify. In addition, the market development of certified products has been relatively slow partly due to limited availability of supply.

Certification increases costs. External auditing costs have to be paid by the forest management unit (FMU) and certification of chain of custody (CoC) incurs some limited costs. In addition to these direct costs, forest management has to comply with the standard requirements. Tropical timber producing countries have been particularly concerned about these additional costs that they have to pay to achieve certification. The relative costs of tropical producers are perceived to be higher than the respective costs among producers in the temperate and boreal zones. The latter tend to have better management systems to provide the necessary information for audits and their current performance level may be nearer the standard requirements than in the case of tropical timber producers.

The importance of costs and benefits of certification has been recognized by various international forums. The International Tropical Timber Council (ITTC) has recognized this issue in its certification-related deliberations and decisions. The Intergovernmental Panel on Forests (IPF) identified cost-effectiveness as one of the concepts to be considered in the development of certification as a potential tool for promoting sustainable forest management (IPF 1996). Cost-effectiveness has also been singled out as a desirable element by many other parties having an interest in using certification as a tool to promote sustainable forest management (e.g., World Bank 2002, Elliott 1999).

There is a wealth of research, studies, reports and documentation on certification in different parts of the world. However, there is only limited factual systematic information available on costs and benefits of certification at the FMU level. Therefore, detailed analyses are needed.

The idea of phased approaches was introduced as a measure for addressing potential adverse impacts on the competitiveness tropical timber producers. These approaches could also allow them sufficient time periods to adjust their management systems and performance to meet the requirements of forest certification standards. A basic study on the phased approach concept was carried out by ITTO in 2003 (Simula et. al. 2003) involving organization of three regional workshops on the subject. All of them considered cost implications that certification has for the management of tropical forests. The conclusions on this issue are perhaps best encapsulated in the proceedings of the ITTO Latin American Workshop held in Panama City in June 2003 (Box 1.1).

Box 1.1 Costs and Benefits – Conclusions of the ITTO Regional Workshop on Phased Approaches to Certification (Latin America)

Costs due to certification continue to be a key issue for producers. In addition, there continues to be uncertainty about market benefits of certification. The recent preliminary economic analyses carried out in Indonesia show that the costs of improved forest management represent a significant investment for the certified producers which tends to put them at a cost disadvantage compared to their uncertified competitors. The currently obtained price premiums from certified products do not appear to be sufficient to justify the additional investment and operational costs due to certification. This makes it difficult for producers to start the certification process. Increasing or protecting market share appear to be the primary drivers behind certification at this time, with price premium being secondary.

Some elements of the certification standard can be particularly costly for tropical forest managers. In the analysis of non-quantitative costs to meet certification in 16 natural forest areas in Central America, about 20 corrective action requirements have been identified per certification audit on an average and addressing them has often proved to be costly. In some cases in Asia, meeting the social requirements (e.g. management of social conflicts) has accounted for more than a half of the total additional costs. It was observed that more costly elements could eventually be implemented at a later stage under a phased approach.

Forest managers are already overburdened with information and extensive requirements, and a structured approach through a phased approach could assist them in implementing certification. On the other hand, external support, which has been available to producers, has not lead to the desired results but been often piecemeal interventions not covering all the necessary areas. Phased approaches could help in structuring and orienting the available external support in a cost-effective way.

There is a need for detailed field-level studies on the costs due to certification and respective benefits to assist forest managers, industry and trade in their decisions concerning certified products. There is also a need to develop appropriate protocols and procedures for phased approaches which can lead to cost reductions in certification.

The deliberations and decisions of the ITTC have shown that there is a common concern about cost implications of certification and uncertainty about possible benefits for tropical timber producers. Phased approaches have been seen as one option to address these issues.

1.2 Objectives of the Study

The procedures for phased approaches have been further elaborated in a parallel report (Pinto de Abreu & Simula 2004) which was requested to be carried out by the ITTC in its Decision 10 (XXXIV). The same decision also called for a financial cost-benefit analysis (CBA) for forest management units for the implementation of phased approaches to certification in selected ITTO Producing Member Countries from the three producing regions. The terms of reference define the objectives of the study as follows:

(a) Elaborate on possible analytical models or approaches for assessing costs and benefits of forest certification and phased approaches;

(b) Carry out voluntary field-level case studies on the costs and benefits of certified forest management units in selected ITTO producing member countries, delineating those costs and benefits associated with meeting certification requirements and those associated with certification assessments;

(c) Based on the analysis, identify under which conditions forest certification can be financially feasible, including through a phased approach, and managed ways how to reduce costs and increase benefits due to certification in tropical forests;

1.3 Methodology

The study was elaborated through the following main steps:

(i) Review of the existing research related to costs and benefits of certification (presented in Chapter 2)
(ii) Development of an analytical framework for the FMU level cost-benefit analysis (Chapter 3)
(iii) Identification of possible pilot FMUs which could voluntarily participate in the case studies and be representative to typical conditions prevailing in tropical timber countries
(iv) Consultations with the selected FMUs
(v) Data collection from the FMUs involving preparation of questionnaires, field visits and consultations with the management
(vi) Analysis and case study report preparation (included as Annexes 1 to 3 in this report)
(vii) Comparative analysis between the case studies on the costs and benefits (Chapter 4)
(viii) Analysis of the implications of costs and benefits for the development of phased approaches to forest certification (Chapter 5).

The case studies are listed in Table 1.1. They were carried out in three countries, i.e., Brazil, Indonesia and Malaysia. These countries are principal tropical timber producers for the international market. In Africa, a series of contacts was made with two certified companies and one company which is undergoing an assessment. However, these companies were not able to participate in this study although two of them showed an interest in such an exercise.

Table 1.1 Forest Management Units of the Case Studies

Country	FMU	Type of operation	Type of FMU	Certification system
Brazil	Inpacel	Plantation, integrated with sawmilling and pulp and paper	Own forest	CERFLOR
	Cikel	Natural forest integrated with processing	Own forest	FSC
Indonesia	PT Diamond Raya Timber (DRT)	Natural forest integrated with processing	Concession	Joint certification under LEI and FSC
Malaysia	KPKKT	Natural forest integrated with processing	Concession	MTCC and FSC (under way)
	Perak ITC (PITC)	Natural forest	Concession	FSC
	Deramakot Model Forest	Natural forest (This case was covered based on secondary data only)	State forest organization	FSC

All the FMUs selected represent large-scale forest management. All have long-term tenurial rights to their lands either through company ownership or long-term concession agreements. The FMUs were selected to represent different certification systems. Five were certified under the FSC system

and three under the respective national systems. The selected FMUs do not include any community forests as they have been covered in the earlier research (e.g., Bass et al. 2001, Molnar 2003).

Data collection and preparation of the individual case studies were carried out by national consultants who had in-depth knowledge of the local conditions. It needs to be emphasized that in spite of common methodology and instructions, the case studies differ from each other in terms of coverage of cost and benefit items and the depth of analysis. This is mainly due to the fact that there was a wide variation among the FMUs in the availability of data: some data were either simply not available or it could not be released for the reasons of confidentiality. In addition, the FMU staff had difficulties in separating or estimating the indirect costs and benefits of certification. The most comprehensive analysis was produced in the Indonesian case study.

2. REVIEW OF EARLIER STUDIES ON COSTS AND BENEFITS OF FOREST CERTIFICATION

2.1 Costs of Forest Certification

As pointed out in section 1.1, the available information on the costs and benefits of forest certification is limited. There also appears to be conceptual differences related to how the costs and benefits due to certification should be accounted and assessed. The costs of the certification process can be considered as direct costs and the costs due to compliance with the certification standard can be regarded as indirect costs. Relatively few systematic studies have been carried out on the indirect costs of certification and much of the available information is anecdotal. Direct external costs are relatively well recorded but benefits and indirect costs are still less known.

The main difficulty in the cost side is how compliance costs to meet the standard requirements should be treated. Similar difficulties are encountered when the incremental costs of sustainable forest management (SFM) have been estimated. There is a close linkage with those studies as the certification standards are a means to define what good or sustainable forest management is in practice.

Pearce et al. (1999) have prepared a useful summary of the various studies which analyzed the financial profitability of SFM in the tropics compared to conventional logging. Many of these studies focused on the economics of reduced impact logging (RIL). The key conclusion was that sustainable timber management is potentially profitable at reasonable discount rates (5-10%) but it is less profitable than unsustainable ('liquidation') forestry. The results suggest that improvement costs of logging methods could be borne by operators even though this would not correspond to their short-term profit maximization objective (which partly explains slow progress in taking these methods into use). However, most of the studies reviewed by Pearce et al. did not consider all the aspects of SFM, focusing on improved logging systems only.

Apart from these studies, very little is known on the potential compliance costs of certification criteria defining SFM in practice. One of the few studies has been carried out by Malmi (2000) in Finland. He collected data both on the compliance and auditing costs of forest certification. It was concluded that the first-year costs would be EUR 11.31 per ha, of which compliance would be EUR 11.14/ha (mainly due to opportunity cost due to lost revenue because of setting aside preservation areas and leaving retention trees on the logging site). The costs of auditing (including surveillance) were EUR 0.04 and internal management system costs were EUR 0.13/ha. These costs correspond to a large area covered by group certification with efficient forest organizations and well-developed information systems.

In the tropics, a cost-benefit assessment has been carried out in Madagascar by Ramamonjisoa & Rakotomanjaka (2003). The baseline was taken to represent the current arrangements for legal compliance. The additional costs were due to costs of the new forestry control system, respective reorganization costs of forest management (e.g. participatory management planning), and documentation and communication costs. The second component of additional costs was due to compliance with the specific requirements of the certification standard (management plan, EIA, change in management techniques, organizational costs, etc.). The third category of additional costs was those accruing to communities in the context of community management (control of illegal operations, mechanisms to address conflicts, etc.). No distinction was made between fixed and variable costs. Four options were analyzed: legal exploitation, informal logging, certified operation of high value species, and certified operation of all species. Due to the assumptions made and the method of calculation, certified operations were found to yield negative economic result but also legal operation appeared unprofitable. Only informal logging not involving management plan preparation, environmental and social impact studies, regulation measures, staff training, occupational safety and health measures, etc. showed a positive economic result. Informal operators can keep the product prices low as their compliance costs are negligible and no re-investment in the resource is made. On the contrary, informal operators are associated with forest clearing by shifting cultivators. On the other hand, certified operations are penalized by high costs of EIA and social studies and need to formalize management procedures. The study concluded that in the prevailing conditions in Madagascar, certification is not economically feasible, not least because most of production is sold to the local market.

The main direct costs of certification of forest management and chain of custody are the payments to the certification body. Direct costs of forest management certification are often relatively higher for tropical forests than temperate forests, partly because many certifiers are located in temperate countries and partly because tropical forests are complex both ecologically and socially. The direct costs are also relatively higher for small FMUs or forest organizations than for large ones.

The external direct costs of forest certification have been better researched than compliance costs. Baharuddin & Simula (1994) reported them to be USD 0.30 to 0.60 per ha in developed countries in large FMUs while auditing costs were assumed to be higher in developing countries. In addition, they pointed out that direct certification costs of planted forests would be lower than those of natural forests. In a later study on Indonesia, LEI was reported to charge USD 15,000 to 30,000 per audit and USD 6.20 to 11.90 per m^3 for chain of custody tracking (Baharuddin & Simula 1998). These initial cost estimates reflect a situation where certification bodies and systems were still in an early stage of their learning curve.

De Camino & Alfaro (1998) analyzed six certified forests in Central America and found that the direct certification costs of the first year per area unit increase with the decreasing size of FMU. In an FMU of 36,000 ha, the cost was USD 0.45/ha while in the smallest FMU studied (750 ha), the respective cost was USD 10.66/ha. The similar relationship was also observed in annual verification costs.

One of the few studies assessing both costs and benefits of two certification systems, Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI), has been prepared by Cubbage et al. (2003). The study concluded that the total initial costs were USD 4.92/ha for FSC and USD 5.69/ha for SFI covering inspection costs and preparation costs. Three forests of different sizes were included in the assessment and it was found that the costs were in the same range in all the cases independently from the size of FMU. Compliance costs were recognized but they were not estimated.

As regards developing countries, Bass et al. (2001) reported direct unit cost of USD 0.02/ha in Zambia (Muzama Crafts Ltd.) to USD 0.90/ha in Bolivia (Lomerio). The former figure was, however, distorted by the very large area certified (1.2 mill. ha) of which only part was used for production. The compliance costs in this case were USD 340,000 which were practically covered entirely by donor support (Thornber 2000). The study also suggested that subsidizing certification in developing countries leads to overestimation of benefits and underestimation of risks.

Molnar (2003), in her comprehensive review on forest certification and communities, concluded that there is a wide range of variation in the cost of community certification. In general, the cost is unacceptably high for communities to bear them on their own. Without measures to simplify the process or grouping communities, they cannot be expected to embark on certification if there is no external support (Nussbaum et al. 2001). The various studies reviewed by Molnar (2003) revealed that the direct initial cost of certification was in the range of USD 5,000 to 47,000 while the compliance cost (cost of recommended action) was generally in the range of USD 10,000 to 12,000/year. As cash costs, these are generally beyond the possibilities of communities to justify them.

As certification costs have a strong element of fixed costs, small-scale forest owners have been put at a disadvantage in accessing this market instrument. Rosenberger and Huff (2001) studied the economic thresholds of non-industrial private forest owners to certification in Maine, the United States. They found that certification costs for FMUs less than 400 ha are about USD 5,800 plus an annual cost of USD 1,500 or the total costs of USD 11,800 over the five-year period (validity period of the certificate). This represents from USD 29.50/ha upwards depending on the size of holding. The authors called for (i) subsidies and support by governmental and non-governmental organizations in order to overcome the spatial, temporal and scale issues within the financial and management objectives, and (ii) grouping of individual holdings. The latter operation is already widely practiced in certification of small-scale private forestry.

2.2 Costs of Chain of Custody Certification

Costs of chain of custody depend on the management system of the enterprise, particularly control measures and records. Many timber-processing companies produce and/or use both certified and non-certified products, which implies additional costs related to the separation of the two types of raw materials and products. Some internationally operating companies are CoC certified under two international systems (FSC or PEFC) which also has an impact on the costs.

The CoC certification costs are generally only a fraction of the costs of forest management certification. As a whole, CoC certification tends to be more costly in the tropical countries than in the developed countries due to less developed management systems of the industry. Due to their minor importance for a single enterprise, the direct costs of CoC certification have not been intensively researched (Vogt et al. 2000).

2.3 Benefits

On the benefit side, it has been difficult to separate and accurately measure possible certification benefits as many of them include elements that are difficult to quantify. A summary of the types of benefit is given in Box 2.1.

Box 2.1 Potential Benefits from Forest Certification

The list below summarizes the potential benefits from certification proposed by a number of different commentators. It should be noted that different stakeholder groups attach different degrees of importance to each benefit, and that producers in developed and developing countries are in different situations with regard to gaining from the different potential benefits.

Forest management and economic benefits

- Improved performance standards
- Enhanced control of resources
- Improved management systems, including internal mechanisms of planning, monitoring, evaluation and reporting
- Reduced regulatory control
- Permanent economic viability, opening of new markets
- Improved market access and occasional higher prices
- Improved enterprise image and business ethics

Social benefits

- Addressing environmental and social concerns of the public in forest management
- Balancing the objectives of forest owners, other stakeholders and the society
- Empowering the poor and less-favored
- Poverty alleviation
- Community participation
- Improved worker's rights and living conditions

Environmental benefits

- Environmental conservation
- Maintenance and enhancement of biodiversity
- Maintenance and enhancement of high conversation values of forests

Sources: Rametsteiner & Simula 2001; Nussbaum & Simula (forthcoming)

The impact on forest management is derived from two main factors: (a) the standard requirements and (b) enhanced control. The standard requirements are, by definition, not below regulation as all the existing certification schemes (in the same way as the C&I for SFM) make reference to compliance with the law. Most standards have elements which represent a higher than legal performance requirements for forest management. Standards may incorporate silvicultural or logging guidelines (such as for reduced impact logging) which may be the forest authorities' recommendations but not mandatory, or they may pinpoint specific aspects in the management which are critical for environmental and social impacts in local conditions.

2.3.1 Economic Benefits

The main economic benefits of certification are considered to be price premiums and market access. Price premiums have been captured by the processing and distribution chain but they are, in any case, likely to be short-term as the supply of certified products increases. Nevertheless, this has been an important driver for some of the pioneers of certification in the tropics who were at least able to recoup their costs (Eba'a & Simula 2002).

Although some certified suppliers have obtained price premiums, the overall trend suggests that there is no price premium to be expected from certification in the long run. However, as the current demand for certified tropical timber exceeds supply in some export markets, some suppliers report price premiums ranging from 5% to 65% in tropical sawnwood and plywood. The higher figures refer to special products (decorative and others) sold through retail outlets but their share of the total

production of the respective mill can be low in tropical countries. In integrated operations, part of these benefits go to pay for increased costs of forest management but how they may have translated into higher log prices for non-integrated producers remains unclear. Benefits are likely to be mostly related to market shares and access. Some tropical timber producers have been able to enter new markets as a result of certification, some others have been able to protect their markets which would have been lost without certification. Several certified producers of tropical timber have reported to have obtained access to new markets and customers in Europe (mainly in the United Kingdom, the Netherlands and Germany) and the United States. Some of these customers have been retailers belonging to Buyers' Group who in turn have gained in terms of reputation (Eba'a & Simula 2002).

While certification is becoming a baseline requirement for timber suppliers in some markets and market segments, buyers may not be expected to pay any extra for certification, even though certification adds value to the product in the sense that it provides information on the environmental quality of the product. Slow progress of certification in the natural tropical forests means that shortage of supply will remain for some years to come. This can enable advanced exporters to benefit from an eventual price premium, which varies by product, market and end-use segment. With increasing supply, the premium is likely to disappear as in the case of other types of timber.

As regards other benefits, Cubbage et al. (2003) have found that most of those obtained were indirect, including better professional image, improved worker safety and training, better records, more active public involvement, etc. Management saw the Corrective Action Requests (CARs) as opportunities for improvement, which would have been made anyway, but action was prompted by certification. Such improvements included (i) establishment of an environmental management system, (ii) improving training and record keeping, (iii) improved adherence to Best Management Practices (BMPs), (iv) enhancing and clarifying policies regarding silvicultural prescriptions and utilization standards, (v) identifying natural areas and wildlife habitat requirements, (vi) enhancing forest data bases, GIS coverage and allowable harvest levels, and (vii) developing more explicit procedures for public involvement and input into forest management decisions. Part of these benefits accrues to the FMU and others to society.

Bass et al. (2001) found that community-based enterprises are often unable to tap expected market benefits due to constraints in opening export channels and meeting quality, price and delivery terms of buyers. Benefits are, therefore, often mostly indirect such as improvements in administration and management of community production. Molnar (2003) also reached the same conclusion as only some communities receive a price premium for their products. Indirect benefits can, however, be significant and diverse, including contribution to consolidation and establishment of tenurial rights, simplified bureaucratic procedures for certified forests in approval and issuance of management plans and other official documents, reduction of illegal activities, mobilization of donor funding, etc.

2.3.2 Environmental Benefits

Among the environmental impacts of certification, improved conservation of biodiversity appears to be a consistent benefit (Thornber 1999; Rametsteiner 2000). CARs raised in FSC certifications in Europe included requirements for increased protection of representative ecosystems and rare, threatened or endangered species, and for more rigorous assessments of environmental impacts. Rametsteiner (2000) found that certification can lead to the establishment of significant areas of protected set aside reserves within certified forest estates.

The exact extent to which these measures improve ecosystem functions, increase biodiversity or lead to better survival of endangered species is something that conservation biologists continue to debate and, in the absence of reliable techniques for assessing true ecological sustainability, any definitive answer is unlikely. However, it is clear that certification is having a significant impact on the way that forest managers think about and implement conservation measures within their forest areas (Nussbaum & Simula, forthcoming). Quantification of these benefits is difficult, particularly if measured in economic terms.

In Papua New Guinea, Hunt (2001) estimated the total costs of certification at USD 47/m^3. Although a respective price premium was not obtained, he argued that the environmental benefits in certified small-scale forest management are so large that subsidizing certification could be more efficient and effective than direct payments to landowners for forest conservation.

2.3.3 Social Benefits

Social impacts have been more difficult to quantify, as certification standards tend to have a broad scope addressing labor relations, occupational safety and health, resource use rights, employment, etc. These elements are part of sustainability and in the past, they have been considered issues to be managed separately, but, as a result of certification, they are now an integral part of the management of certified FMUs. Anecdotal evidence from certification bodies indicates that there has been a range of benefits including improvements in health and safety, greater respect for workers' rights and increased capacity for consultation and collaboration with local communities. It is less clear though how consistent these impacts are between countries and between schemes (Nussbaum & Simula, forthcoming).

Some of the social benefits can be measured in economic terms for the FMU. For instance, improved occupational health and safety generally leads to reduction of accidents and thereby lower associated costs for the employer. Better social standards induced by forest certification lead to enhanced safety conditions and thereby increased productivity (Street, pers. comm.). Quantitative assessment of such benefits has, however, been rarely done.

In many regions, certification has highlighted the problems of land rights (Ozinga 2004), but it has not necessarily contributed to solving them on national or sub-national scale. As with the problem of deforestation, it appears that land rights may be an issue, which needs to be addressed at the level of national governance rather than through certification. However, certified operations have usually solved their own social and rights conflicts through local measures.

The development of national standards has provided a forum for the involvement of a far wider range of stakeholders than have traditionally been provided with access to forest policy development. This has served two important functions: (i) change in the balance of power, giving more influence to environmental and social interests, and (ii) provision of a mechanism for learning and engagement to find compromises for different stakeholder views on how forests should be managed. Such processes of engagement of a wide range of stakeholders has probably been often important in combating some of the wider problems faced by the forest sector such as corruption, deforestation and illegal logging (Nussbaum & Simula 2004). On the other hand, it is also important to note that the uptake of certification has been slow in areas where corrupt, unsustainable and illegal practices are common. Good existing governance is an important enabling condition for certification, while certification can also contribute to the development of governance (cf. Rametsteiner 2000). Qualification of such stakeholder benefits or improvements in governance in economic terms is not possible with the available information.

2.4 Sharing Costs and Benefits

Another issue is how costs and benefits related to certification should be shared. In general, certification costs tend to be much larger for primary producers (FMUs) than processors while the market benefits of certification tend to be reaped by actors further down in the supply chain. Therefore, at present, the main financial winners from forest certification appear to be processors and retailers rather than forest owners or managers. This may be one of the barriers preventing a more rapid and extensive uptake of certification and suggests that in the absence of other incentives for forest managers, lack of direct financial benefits may often continue to act as a disincentive (Eba'a Atyi & Simula 2002).

The retailers who have promoted certified products to protect their corporate reputation and market share have often reaped market benefits in environmentally sensitive markets. Any premiums that have materialized have been driven more by a shortage of certified products at the retail end, rather than a conscious willingness on the part of the purchasers to pay a price for sustainability (Rametsteiner 2002). In general, producers have not benefited to the expected degree. In a survey undertaken by FSC as part of the development of its percentage claims rules, respondents were asked whether they had ever received a price premium for their certified products. None of the responding forest managers reported a premium, whereas almost half of processors and two-thirds of retailers at least sometimes had received a premium (FSC, 2002).

Being aware of the unequal access and distribution of benefits, development agencies have started to support tropical countries, particularly community forests and small producers in achieving certification. In the industrial forestry context, this support has been justified by environmental benefits of SFM, which would not come forward without public sector support (e.g. in the Congo Basin). In the community forestry context, public support to certification has been justified based on both social and environmental grounds. However, external support can often be problematic due to its unsustainability, being driven by other than community interests without duly considering pre-conditions of successful certification (Bass et al. 2001). In small-scale private forestry, subsidies to certification have been argued because SFM practices result in both an enhanced quality of life in the region and a forest products market advantage among environmentally sensitive consumers. Such subsidies could significantly accelerate expansion of certified areas and they could be factored through tax relief and other mechanisms (Teisl et al. 2001). Subsidizing certification was also argued by Hunt (2001) in the case of Papua New Guinea.

2.5 Conclusions

A considerable research effort has touched the issue of costs and benefits of certification although in-depth site-specific analyses are still rare. Methodologies tend to vary and the basis of assessment is not always clearly defined. This makes comparisons difficult and limits conclusions to be made.

Cost impacts are often significant. They are mostly due to measures taken to achieve compliance with the certification standard. The estimation of compliance costs has proved to be problematic for a number of reasons. Baselines are difficult to establish and data for costing of additional measures is often not available. The same problems are also found in valuing the benefits of certification.

The earlier research suggests that the opportunity costs of SFM practices are usually significant. These costs depend on the existing or pre-certification management standard and/or the country's legal regulations, whatever is considered the baseline. Producing countries may be unwilling to

admit the true opportunity costs because this could reveal that FMUs were not operating legally before certification (Richards, pers. comm.).

To what extent potential benefits can be reaped in practice and how cost impacts can be minimized will vary from one local situation to another depending on how certification is promoted and implemented. It is important to carefully consider where the expected benefits will exceed the costs, as these are the situations where certification is most likely to be an appropriate instrument.

In general, certification costs tend to be much heavier for primary producers than processors. On the contrary, the benefits of certification, which relate mainly to market access, tend to be realized by actors down in the supply chain. Therefore, at present, the main winners from forest certification appear to be far from the forest, particularly in the case of tropical forests. Many of the environmental and social benefits appear to be reaped by society, not by the FMU which has generated them.

Without tangible benefits deriving from certification in terms of profitability or competitiveness, enterprises will have little incentive to improve forest management with higher costs. There would be even less motivation for the industry to submit themselves to stricter controls than those at present. The problem is particularly serious in the case of developing country producers who find themselves far from being in compliance with the certification standard (van Dam 2001). Phased approaches can assist in such situations. However, comprehensive development strategies towards SFM would be often needed where certification and labeling can play a useful complementary role.

3. ANALYTICAL FRAMEWORK

3.1 Purpose

The following analytical framework is aimed at serving as a tool to assess costs and benefits through case studies at the level of forest management unit and individual enterprise. Such an analysis should preferably cover the entire chain of production, including forest management and processing as well as export and domestic sales.

The key questions for which answers are sought for are:

(i) Do financial benefits exceed respective costs?
(ii) Can the FMUs in the tropical countries bear the costs associated with certification?
(iii) How could non-financial costs and benefits be expressed in monetary terms?
(iv) How could the cost burden be distributed over a period during which phased approaches are implemented?
(v) How benefits could be generated by phases to help FMUs in the tropical timber producing countries bear the respective costs?

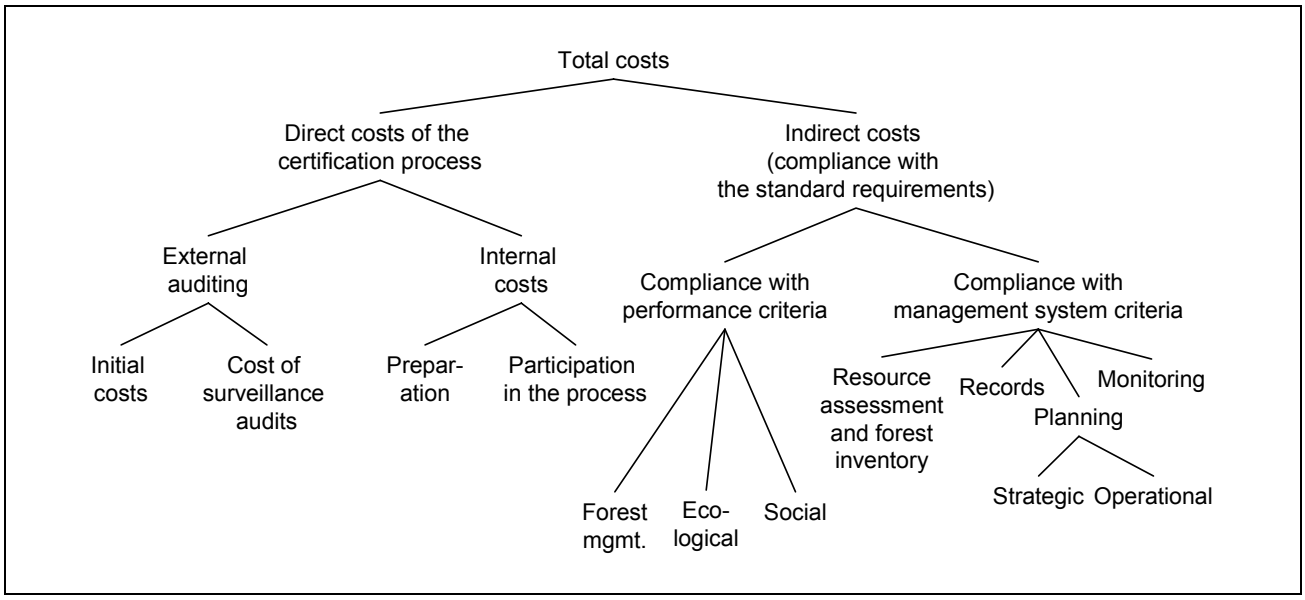
3.2 Assessment of Costs

The costs associated with certification are divided into direct and indirect costs and an overview of their classification is given in Figure 3.1. Costs can be initial outlays or annual/permanent incremental costs due to actions required by certification.

3.2.1 Direct Costs

The direct costs are associated with certification process and they include (1) internal and (2) external elements as explained below. These costs are fixed by nature including higher initial outlays during the certification process and lower annual costs during the years when surveillance audits are carried out.

Figure 3.1 Classification of Costs Associated with Forest Certification



3.2.1.1 Direct Internal Costs

These costs are due to working time inputs of the FMU's staff (costed at wage/salary rates including social charges) and various direct costs (travel, data acquisition, etc.) to prepare for certification and assist during the external audits. These costs may include such items as:

(a) Documentation preparation and meetings
(b) Internal auditing if carried out
(c) Use of consultants
(d) Initial training of staff on the certification process
(e) Communication to employees and stakeholders on the certification process)
(f) Application costs (e.g. invitation of bids, tendering process, etc.).

3.2.1.2 Direct External Costs

These costs are due to external auditing and the associated certification process and they are paid to the certification body. They can be broken down into:

(a) Scoping/preassessment
(b) Main audit
(c) Possible follow-up audits (to verify compliance of the major Corrective Action Requests (CARs) to be addressed before a certificate can be issued)
(d) Annual surveillance audits.

The costs above involve fees of the audit team, their travel and daily subsistence allowance and company overheads.

The cost stream is structured so that most of the direct costs incur during the initial year of certification while the costs of annual surveillance audits are considerably lower. The external direct costs are usually defined in the certification contract for the whole period of validity of the certificate to be issued.

3.2.2 Indirect (Compliance) Costs

These costs are due to action to be taken by the FMU (in the case of CoC certification the industrial or commercial enterprise) to comply with the requirements of the certification standard. These costs may be due to:

(i) compliance with the performance criteria in forest management covering economic, social and environmental aspects
(ii) compliance with the management system criteria.

Most forest certification standards include elements of both types of criteria.

There are two possible baseline situations against which additional (indirect compliance) costs can be assessed: (a) the actual pre-certification level of forest management and (b) legal requirements. These two levels do not necessarily coincide depending on how legality is defined and to what extent requirements have been enforced (see e.g. Pinto de Abreu & Simula 2004). In this report, we have used the national legal requirements as a baseline for the assessment of the additional cost due to certification.

Certification standard requirements tend to be higher and broader than the regulations. However, in practice these are not always easily separable. Furthermore, legal requirements may sometimes be in conflict with the certification criteria, complicating the analysis.

Legal requirements vary by countries. With a similar standard, what is considered incremental in one country may not be the same in another due to differences in the baseline. This should be considered when costs due to certification are compared between countries.

Compliance costs with the performance criteria can be considered opportunity costs of managing the FMU according to the standard requirements yielding less net income than could be achieved by conventional profit maximization approach alone (cf. Cubbage et al. 2003). These costs can be due to a wide range of reasons:

(i) *Forestry operations*. Certification criteria are aimed at minimizing environmental impacts and ensuring sustainable timber production. Associated opportunity costs may be due to:

  (a) Adjustment of allowable harvest volumes over time to ensure future sustainable production levels
  (b) Additional areas set aside from production for protection
  (c) Reduced impact logging equipment and methods

(d) Other additional measures to be taken during harvesting (e.g., leaving retention trees for biodiversity, seed trees for regeneration or core trees for future harvest, protection of endangered species, measures to conserve soil and water resources)

(e) Changes in regeneration and other silvicultural practices, (e.g. enrichment planting, tending, non-commercial thinning, use of fertilizers and pesticides, etc.)

(f) Road building (change in road standards, additional conservation measures, road density, etc.)

(g) Management of landings and woodyards (e.g. minimization of waste and environmental loads, systems for chain of custody).

(ii) *Social aspects*. Certification criteria are generally aimed at improving workers' safety and health and access to, and benefits from, forestry to local communities. Associated costs may be, *inter alia,* due to:

(a) Measures to improve occupational safety and health, including workers' camps
(b) Provision of social services for workers and local communities
(c) Participation of local communities (e.g. in preparation of forest management plan)
(d) Procedures to solve conflicts related to land rights and the customary rights of local population, incl. indigenous people.

(iii) *Management system*. Certification criteria can include requirements for the following elements of the management system:

(a) Resource assessment and inventory
(b) Management planning
(c) Operational planning
(d) Monitoring system/internal auditing
(e) Documentation
(f) R&D activities.

Some of the management system costs are associated with performance criteria. As an example, RIL influencing implementation costs also requires tree mapping which is an element of the management system.

Most of the compliance costs are fixed by nature. Some of the performance requirements of forestry operations have, however, an impact on variable costs of harvesting such as reduced impact logging methods.

The above elements are related to forest management operations. There are also indirect costs in further processing and marketing due to the need to establish adequate management systems for controlling timber and fiber flows. These may include major investments in advanced technologies of timber tracking and information systems throughout the supply chain. In the case of reconstituted panels (particle board, OSB, MDF and other fiberboard) as well as pulp and paper, the investment needs may be substantial in mills which use both certified and uncertified raw materials and have to keep these separate in storage areas and during processing. In addition, operational costs may increase due to less efficient use of equipment and increased handling requirements when certified and uncertified raw materials are processed separately (Vogt et al. 2000). These problems can also occur in further processing of tropical timber into furniture and joinery products if these must contain a specified percentage of certified material.

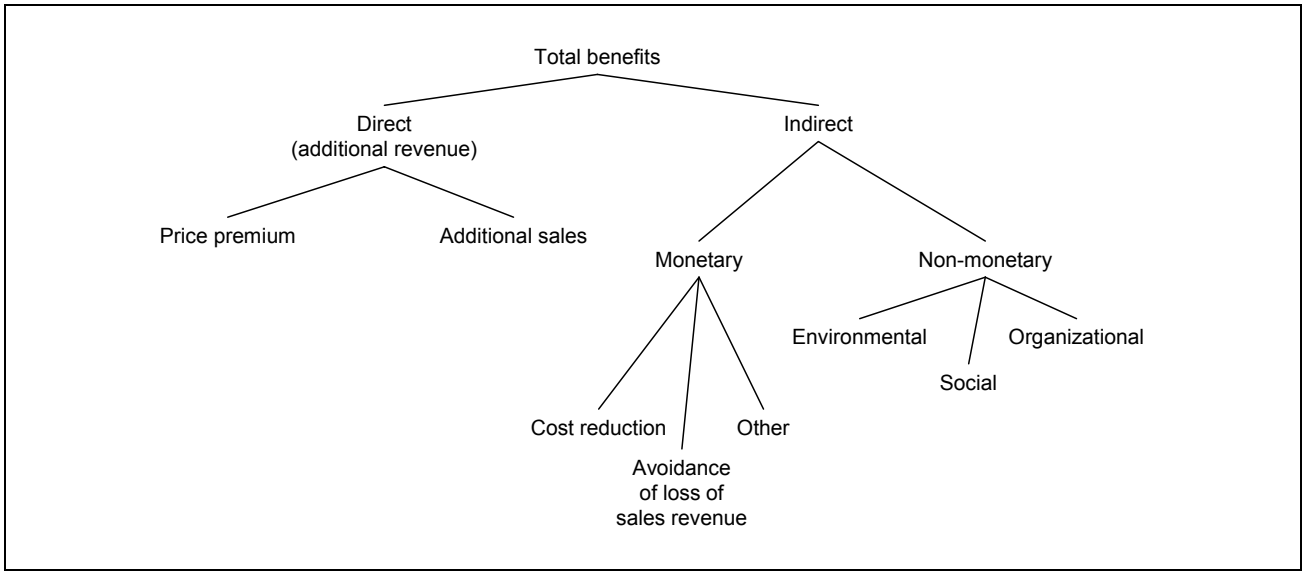
The chain of custody compliance costs can become high in situations where the wood supply is very fragmented, coming from a very large number of small and medium-scale landowners. As regards

tropical timber, such situations occur among e.g., small-scale rubberwood producers in Asia, in off-reserve harvesting in Ghana, and in logging operations of small-scale local entrepreneurs in the Congo Basin. This is also the case for various tree farm and outgrower schemes which are expanding rapidly in different parts of the developing world (FAO 2003).

3.3 Benefits

Benefits can be direct or indirect, which may be reaped either by the FMU/enterprise or other stakeholders (e.g. workers, community, etc.). Benefits are here divided into direct (financial) benefits and indirect benefits, which include economic, environmental, social and other benefits (Figure 3.2).

Figure 3.2 Classification of Benefits Associated with Forest Certification



3.3.1 Economic Benefits

3.3.1.1 Direct Financial Benefits (Revenues)

There are two main sources for possible additional revenues as a result of certification:

(a) Price premium for the products sold. The eventual revenue derived from the price premium of certified products in different markets depends on:
   - the size of the premium which can vary by product, market and client
   - the share of production which has benefited from the premium; this usually varies by product.

(b) Additional sales volume as a result of certification. This may be a result of gaining additional sales among the existing customers and markets, or penetration into new markets as a result of certification.

The assessment of these benefits should consider not only the current situation but also what may be expected in the future. Many producers have only recently been certified and their market benefits

are likely to change as the markets for certified products are still evolving. The premiums currently obtained in some markets and segments may be short-lived when certified supply expands.

Direct financial benefits tend to be reaped by industrial downstream processors holding CoC certificates rather than FMUs which are supplying the raw material to them. Therefore, benefits should be measured at the two levels. In integrated enterprises involved both in forest management and industrial processing, this is often problematic depending on company policies related to transfer pricing or profit allocation between business units.

3.3.1.2 Indirect Economic Benefits

There are several possible sources for indirect economic benefits from certification. These can be classified into two main groups: cost reduction and avoidance of loss of sales revenue in the markets which have started to require certification. Cost reductions can be a result of:

(a) efficiency improvements in the production and logistic chain which have been possible thanks to better information and planning of operations. These gains may come from better use of machinery and workers (reduced downtime, less moving time of machinery between logging sites, reduced need for repair and maintenance, etc.) or improvements in stock control (raw materials, intermediate products and finished products). These cost savings can occur both in forest management and industrial processing.
(b) shortening of the distribution chain through elimination of intermediaries thereby avoiding payment of unnecessary commissions or mark-ups.

The other major reason for possible indirect economic benefits is avoidance of sales volume loss or price discount due to lack of certification. In the markets that require certification, non-certified suppliers have to face the risk of being phased out. If they can continue to operate in these markets, their bargaining position is weak and significant discounts may have to be offered. These discounts can vary depending on the overall demand-supply situation but anecdotal evidence suggests that they can easily be in the range of 5 to 25%.

3.3.2 Environmental Benefits

Environmental benefits are derived from improved mitigation of environmental impacts in forest operations and enhanced measures of conservation of biodiversity, ecological functions of forests, as well as soil and water. These benefits are generated by:

(a) performance requirements of the certification standard which are broader and higher than those of regulations
(b) improved respect of the rules and regulations in the forest operations (harvesting, silviculture, road construction and maintenance, etc.).

Some of the environmental costs may be assessed in economic terms. This can be done based on the opportunity costs but other valuation methods (e.g. contingency valuation) can be applied provided that necessary information is available.

Most of the environmental benefits generated by forest certification accrue to society. However, some of them, either directly or indirectly, contribute to the FMU's operating conditions in the long run. Without environmental sustainability, the future flow of timber can often be jeopardized.

3.3.3 Social Benefits

Social benefits are derived in a similar way as environmental benefits. They can include a broad range depending on the local conditions. In general, the less developed the social infrastructure is in the region, the more significant is the impact of certification. Social benefits can cover such areas as:

(a) Direct and indirect employment to workers of the FMU/forest enterprise or its service providers
(b) Increased income to communities, forest dwellers and other local people through stumpage revenue or wages and salaries paid
(c) Multiplier effects of paid employment for the local economy
(d) Clarification of land rights and conflict resolution
(e) Construction of infrastructure including access roads, telecommunication, etc.
(f) Provision of social services (schools, medical services for workers and community members, recreation areas, etc.)
(g) Support to local entrepreneurs in provision of services and local processing and trade of various forest products (construction poles, fuelwood, honey and other non-timber products, etc.)
(h) Strengthened community organization and management through involvement and participation in the formal economy within the sustainable development framework
(i) Improved regulated food supply (nutrition of workers and their families, regulated supply of bushmeat and game meat from the forest)
(j) Improved security through reduction in illicit activities and in general improvement of enforcement which is induced by certification
(k) Community participation in, and awareness on, the benefits of forest management.

Some of the social benefits can be assessed in economic terms e.g., based on opportunity costs of alternative means to generate these benefits. Other valuation methods are also possible.

Social benefits accrue to the communities which are directly impacted by the FMU's activities and society at large. These benefits tend to indirectly contribute to the FMU's operating environment.

3.4 Financing

As the direct and indirect costs associated with certification are significant, they have represented a barrier to make progress in tropical timber producing countries. While financing usually comes from the FMU's own resources, in a number of cases, external financing has been vital, particularly in community forests. In a cost-benefit assessment, possible sharing of costs with external parties should be considered.

External financing has come from donor agencies, NGOs or other sources. Some donors have included certification in their aid policies related to forests and many international organizations, including ITTO, are providing support to capacity building in this area. Important sources of external financing to certification in some FMUs have been contributions from major buyers. This has generally been direct support, often in kind (technical assistance), to non-operational costs. The Tropical Forest Trust (TFT) is an example of an intermediate organization between buyers and FMUs providing such assistance to FMUs that comply with the respective procurement policies.

3.5 Cost-Benefit Analysis

The cost-benefit assessment requires information on how the respective value streams are spread over time. Certificates have a validity period, which generally varies from 3 to 5 years. First-year investment costs are usually higher than the annual costs of surveillance and maintenance of compliance once the targeted level has been reached. While costs tend to be higher during the initial phase when performance is improved and the management system is strengthened, benefits tend to come forward gradually depending on the effectiveness of the organization to capitalize them through marketing, cost savings and other means.

Limiting the cost-benefit analysis to the first five-year period as applied in this report, leads to a possible bias in the analysis for a number of reasons:

- investment cost in certification are made in the beginning of the first five-year period; subsequent five-year periods would not incur similar additional costs and, therefore, extension of the evaluation period beyond the first five years could improve the economic feasibility of certification
- some benefits will accrue only in the longer run: there are cases where allowable harvest volumes have been first adjusted downward and the species composition of logging has been changed to ensure higher sustainable production levels of desired species in the future.

The assessment of net cost-benefit ratio involves either discounting or depreciation of investment-type outlays and the analysis should cover at least the validity period of the certification. In this report, the comparisons between FMUs have been made using the Net Present Value (NPV) as an indicator of financial feasibility. NPV was calculated for the difference between the cash flows of With and Without Certification in the case study FMUs.

Any assessment of costs and benefits related to forest certification is bound to be hypothetical and the results can be no more than indicative by nature. Data limitations, uncertainties about projections and various underlying assumptions related to quantification of indirect costs and benefits tend to represent constraints for any cost-benefit analysis.

4. RESULTS OF CASE STUDIES

4.1 Case Study Forest Management Units

The five case study FMUs varied in terms of size, type of forest, production level and ownership of their forest resource (Table 1.1 and Table 4.7). The FMU gross area ranged from 9,000 ha (PITC in Malaysia) to 140,658 ha (Cikel in Brazil). However, three FMUs fall into the same size category (CIKEL, KPKKT and DRT).

All FMUs but one were natural forests. Inpacel in Brazil was the only plantation forest in the sample. The Brazilian FMUs own their forest resources while the others have long-term concessions.

KPKKT is a long-established company that has built up its capability in forest management over several years. PITC is a relatively new company which targeted its management practices and systems at certification from the very beginning. Cikel is one of the pioneers of certification in Brazil but has been operating already for several years. PT Diamond Raya in Indonesia is comparable to Cikel in this respect. In 2000, the company renewed its 20-year concession license

and it was the first natural forest management unit which has been certified under two certification systems (LEI and FSC) in Indonesia.

Table 4.1 Area and Production of the Case Study Forest Management Units

FMU	Total area	Annual timber production	
	ha	m^3	m^3/ha
Inpacel, Brazil (plantation)	49,942	1,400,000	28.03
Cikel, Brazil (natural)	140,658	80,000	0.57
DRT, Indonesia (natural)	90,656	57,177	1.59
KPKKT Malaysia (natural)	136,000	112,568	0.83
PITC, Malaysia (natural)	9,000	10,000	1.11

The intensity of timber production varies in natural forests within a relatively small range (from 0.57 to1.59 m3/ha/year) in spite of the variation in the local conditions. Inpacel has a typical plantation yield in the southern Brazilian conditions.

Obviously, all the case study FMUs are well managed. Perhaps, none of them can be considered an average certified FMU in the tropical countries due to their historical record. This is a constraint for drawing general conclusions from the cost-benefit analysis based on field-level case studies. On the other hand, information on the sample FMUs is likely to capture some key differences between countries.

In spite of common instructions, the case studies (Annexes 1 to 3) are quite different. This is due to several reasons:

- The data availability varies between countries and FMUs
- There was in many cases lack of records on indirect costs
- Information on direct financial benefits (sales revenue increase) is considered generally confidential
- There is lack of management perception of indirect (financial and non-financial) benefits and limited or no data for their quantification; however, some areas where they might have occurred were identified.
- The pre-certification situations varied: Inpacel had already a certified environmental management system (ISO 14001) in place before CERFLOR certification and KPKKT had implemented the Malaysian C&I before its FMU-level certification under FSC
- The baselines expressed in national legislation vary between countries.

These are some of the reasons why the results of the case studies summarized are not directly comparable.

4.2 Costs Related to Certification

4.2.1 Total Costs

The total costs related to certification over a five-year period are significant and measured in hundreds of thousands or millions of dollars at the FMU level (Table 4.2). The cost burden due to certification is, therefore, significant. In an average FMU in the ITTO tropical timber producing countries, the costs are likely to be higher than in the case study FMUs. The results support the earlier assumption that the total costs are relatively higher in natural forests than in plantations.

The variation between FMUs is partly due to the approach to how the costs have been calculated, i.e., which items are included in each case in direct and indirect costs. It should be noted that PITC was not able to measure indirect compliance costs apart from initial preparation costs (biodiversity monitoring, studies, surveys, etc.) at all, while some compliance elements are included in all the other FMUs. In the case of PITC, compliance with the certification requirements was considered when the company's operations were set up and they were, therefore, fully internalized from the very beginning. The most comprehensive cost analysis was carried out on DRT and its results are not directly comparable with the other FMUs.

Table 4.2 Total Certification Related Costs of the Case Study Forest Management Units

FMU	Direct	Indirect	Total	Average annual cost[1)]
	USD 1,000 in the 5-year period			USD 1,000
Inpacel, Brazil (plantation)	77.0	184.9	261.9	52.4
Cikel, Brazil (natural)	144.6	875.5	1,020.1	204.0
DRT, Indonesia (natural)	215.2	2,660.7	2,875.9	575.2
KPKKT, Malaysia (natural)	93.6	281.6	375.2	75.0
PITC, Malaysia (natural)	94.6	135.2	229.8	46.0

1) Excluding interest

The total annual costs range from about USD 50,000 to USD 575,000 (Table 4.2). The variation is mainly due to the indirect costs (Cikel and DRT having significantly higher compliance costs than the others). The direct annual costs are relatively similar (in the range of USD 15,000 to 43,000/yr).

4.2.2 Direct and Indirect Costs

The direct costs range from 8 to 41% of the total costs (Table 4.3). The share is high in plantation forestry where indirect costs appear to be limited if the FMU has already high management standards before certification. The indirect costs in the plantation FMU (Inpacel) were mainly due to labor and equipment needed for improvement of the forest inventory as compliance with environmental and social aspects of the certification standard did not lead to significant additional costs. In the case of DRT and KPKKT, the indirect compliance costs were more significant in relative terms than in the other FMUs which is explained by broader coverage of the cost analysis.

Table 4.3 Share of Direct and Indirect Costs in the Total Costs Due to Certification in the Case Study Forest Management Units

FMU	Direct total	Indirect total
	percent	
Inpacel	29.4	70.6
Cikel	14.2	85.8
DRT	7.5	92.5
KPKKT	24.9	75.1
PITC	41.2	58.8

4.2.3 Compliance Costs

The composition of compliance costs varies extensively between FMUs (Table 4.4). A number of reasons explain this including (i) different baselines (legal requirements) and pre-certification situations, (ii) level of socio-economic development in the area, and (iii) level of existing knowledge on forest resources and management practices. However, in Brazil the compliance costs due to management system criteria appear to be more pronounced in relative terms than in the two Asian countries where compliance with forest management and environmental performance criteria was the main source of additional costs.

Table 4.4 Composition of Compliance Costs in the Case Study Forest Management Units

Compliance area	Inpacel	Cikel	DRT	KPKKT	PITC
	Percent				
Forest management and environmental criteria	..[1)]	18	56	72	84
Social criteria	45	8	32	7	..
Management system	55	74[2)]	12[3)]	21	16
Total	**100**	**100**	**100**	**100**	**100**

1) Covered in earlier ISO 14001 certification
2) The largest item is forest inventory
3) Includes CoC system

Among the initial additional compliance costs due to certification, the typical elements include environmental and biodiversity surveys and monitoring, socio-economic studies and alike. Detailed inventories are commonly a significant cost item. Typical areas which cause additional costs in forest management practices include reduced impact logging, road building, biodiversity conservation, research and development (e.g. permanent sample plots), occupational safety and health, training related to practices, etc. Clarifying the rights of the traditional and local communities was a significant cost element in one of the FMUs (Cikel). On the other hand, many of these additional costs may have also led to cost reductions elsewhere in the operations (e.g. improvements of the management system, RIL occupational safety, etc.). Cost savings in the case studies were probably only partially quantified on the benefit side, which leads to a negative bias in the assessment of financial feasibility of certification.

4.2.4 External Auditing Costs

Among the direct costs, the most reliable data is available on external auditing costs; i.e. the payments made to the certification body (Table 4.5). The total costs vary within a relatively small range from (USD 47,000 to about 100,000) suggesting that these costs are largely fixed and not significantly correlated with the size of the FMU. The direct costs, therefore, represent a hurdle for small-sized FMUs which are common among local entrepreneurs e.g. in the Congo Basin. Small natural forest management units have also been certified, e.g. in Brazil.

Table 4.5 External Auditing Costs of the Case Study Forest Management Units

FMU	Initial	Surveillance	Total
	USD 1,000/year		USD 1,000
Inpacel	35.0	10.0	75.0
Cikel	34.6	9.0	70.6
DRT[1)]	74.74	25.4	176.3
KPKKT	34.4	4.8	53.6
PITC	31.8	3.8	47.0
1) Includes cost of double certification (FSC and LEI) and cost of CoC certification			

The external auditing costs are influenced by the competition between certification bodies. Certification of tropical forest management is a fast-growing business area for certification companies and the market is competitive as contracts are usually made based on bidding involving several service providers. This has kept the costs within fairly standardized rates although promotional prices are sometimes offered (e.g. in the case of Inpacel).

On the other hand, double certification under two systems can significantly increase direct costs as can be observed in the case of DRT (certified under FSC and LEI). Double certification may become more common if timber and timber products are sold to buyers, which have different certification requirements. Mutual recognition between schemes would make it possible to combine raw materials certified under different systems to achieve a target level, which would enable product labeling.

Cost differences between schemes are also influenced by their auditing requirements. For example, some certifiers require bi-annual surveillance audits while one annual surveillance audit is generally considered sufficient.

4.2.5 Unit Costs

The unit area costs vary extensively from USD 3 to 32/ha of the total area of the FMU over a five-year period (or USD 0.6 to 6.4/ha/yr) (Table 4.6). There is a marked effect of economies of scale, i.e., the unit costs are lower the larger the FMU (DRT is an exception due to its more comprehensive coverage of costs than in the other FMUs). The economies-of-scale effect is observed both in direct and indirect (compliance) costs.

The unit costs per log production in the certified natural forests also vary extensively, ranging from a fraction to USD 10/m^3 (Table 4.6). In some situations, the opportunity costs of certification can be high but at least in the case study FMUs, they are generally low. This can be partly explained by a high pre-certification performance level but it is likely that the opportunity costs are also underestimated in the natural forest management cases. This assumption can be considered plausible in view of other studies carried out on the opportunity cost of reduced impact logging and other sustainable practices compared to conventional logging (e.g. Pearce et al. 1999).

Table 4.6 Unit Certification Related Costs of the Case Study Forest Management Units

FMU	Per ha	Per m^3
	USD	
Inpacel	8.75	0.04
Cikel	7.25	2.55
DRT	31.72	10.06
KPKKT	2.76	0.67
PITC	25.53	4.60

Note: Area unit costs have been calculated over the five-year period.

In plantation forestry, the large production volume explains the low unit cost but, on the other hand, the respective log prices are also lower than in natural forests. In the Inpacel case, the cost impact was also limited by the fact that the company had recently implemented ISO 14001 certification under which many of the requirements of the forest certification standard were put in place.

In natural forest management, certification can significantly add to the total production costs, thereby influencing the cost competitiveness of producers. This appears to vary between FMUs and countries. In Brazil, the average costs are likely to be higher than the Cikel case which is a particularly well-managed FMU, having implemented many requirements even before certification was started. PITC's unit costs are clearly influenced by the small size of the FMU. In a typical Malaysian case in this size category, the unit costs could be significantly higher as PITC's compliance costs were accounted for the initial preparatory period only while certifiability was built into the company's management system over a longer period time.

The low unit costs of KPKKT are influenced by the large size of the FMU and implementation of the MC&I before certification was introduced. The historical data on the internalization of these costs in KPKKT suggested relatively higher figures. The ITTO study (2002) on a small harvesting area which was carried out in 1996 in the KPKKT concession analyzed the opportunity costs of compliance with the Malaysian C&I compared to conventional logging. The difference between the two systems (at the current exchange rate) was USD 5.91/m^3. Since the study was published, the company took improved technology into use in all its operations. This good pre-certification level probably explains why the additional cost due to certification was marginal (see Annex 3, section 2.2).

As the management perception of the additional costs was deemed to represent too low a level of compliance costs during years 2 to 5, an alternative calculation was prepared for KPKKT. The unit costs could have been in this case USD 4.08/ha and USD 0.99/m^3, still representing the lowest level among the sample natural forest management units.

As already stated, the sample FMUs are not typical and represent better than average performance in each country. In addition, only DRT's analysis was able to cover opportunity costs in a holistic way. Therefore, its results are probably more indicative than those of the other FMUs.

4.2.6 Time Distribution of Costs

Certification is an investment for FMUs. The first-year costs tend to represent at least about 50% of the total costs related to certification (Table 4.7). Thereafter, the costs are usually relatively stable over the rest of the 5-year period from about 4 to 15 % of the total costs in each subsequent year. In the Malaysian cases, the first-year costs are higher than in the other cases. In PITC, this is explained by the fact that no compliance costs were identified after the first year as they were fully internalized by the company before certification. In KPKKT, the additional costs, as perceived by the company management, were probably too low and, therefore, an alternative calculation was prepared. In this case, the share of the first-year costs was reduced to 54.8%, corresponding to the level of Cikel. DRT's cost flow is different from the other FMUs, which is likely explained by the more comprehensive analysis of opportunity costs.

The high initial cost amplifies the barrier to certification for tropical FMUs which generally tend to suffer from liquidity problems. The size of certification investment is comparable to expenditure for main logging or road building equipment, or a new product line in processing with which certification has to compete in internal resource allocation. Particularly, small FMUs and community forests would find certification costs impossible to finance from their own resources. A decision on certification investment is primarily an economic issue even though other strategic considerations are usually also taken into account. Therefore, certification should be financially feasible.

Table 4.7 Time Distribution of Costs Due to Certification in the Case Study Forest Management Units

FMU	First year	Years 2 to 5	Total
	percent		
Inpacel	38.9	15.3	100.0
Cikel	44.4	13.9	100.0
DRT	21.2	19.7	100.0
KPKKT	81.0	4.8	100.0
PITC	84.7	3.8	100.0

The case studies were carried out with the common assumptions that:

- all the pre-certification costs occur during year 1
- the benefits are received from year 2 onwards.

These assumptions are simplifications as in practice, the pre-certification costs are often spread over a longer period of time (sometimes up to 2 to 3 years). On the other hand, benefits may take some time to come forward and, therefore, their tapping by FMU can be gradual.

During the subsequent five-year periods, the cost flow would be more even as the compliance costs would remain relatively stable while for the direct costs of external auditing, there would be a peak in the beginning of each new certification period due to the main audit. As certification standards are periodically reviewed, some new compliance elements are likely to emerge but their cost impacts can be assumed to be less significant than those of the first certification period.

4.3 Benefits Derived from Certification

4.3.1 Assessment of Benefits

Benefits derived from certification are generally more difficult to estimate than costs. First, as pointed out above, they come forward with a time lag. Second, many of them cannot be quantified in monetary terms. Third, managers may not be aware of possible sources of benefits and they remain unaccounted. Fourth, the sharing of benefits in integrated companies involved both in forest management and industrial processing is not transparent and not based on clear principles. Zero budgeting (all costs are covered by the budget with no surplus or deficit in the forest management business unit), which is practiced by many companies, does not allow a proper assessment on business unit-level returns and it is likely to bias management decisions. Market benefits are generally mostly reaped by industrial processing units and they are not necessarily duly transferred to wood raw material production, i.e. FMUs.

Although market benefits through increased or protected market share and price premium are perceived as the main motivation in all the FMUs studied, indirect benefits are also recognized. The economic indirect benefits are mostly derived from productivity increase and reduced distribution costs of finished products due to elimination of unnecessary intermediaries. Avoidance of loss in sales to markets that require certification is also important but its quantification is difficult. Comparative information would have been required on non-certified FMUs selling to the same markets as the certified FMUs included in the study. In order to assess this element, an alternative calculation was made for the Malaysian FMUs for which data on sales revenue was available. In the Indonesian case, two alternative scenarios were developed with differing assumptions on price premium.

Apart from DRT in Indonesia, full quantification of certification benefits was not possible but part of indirect economic benefits were measured in the case of Cikel.

4.3.2 Economic Benefits

In the case of Inpacel, it was not possible to assess economic benefits due to the fact that certification was recent. As the company was already very well managed using an advanced information system before certification, no significant cost reductions were foreseen. The main driver was ensuring market access.

In the case of Cikel, the basic price of timber was reported to have increased by 30% as a result of certification and new markets opened. On the other hand, the production volume had to be reduced to ensure future sustainability of raw material supply (from 25 to 13 m^3/ha). Two areas of cost reductions were identified as a result of improved skidding, productivity and lower road construction costs (the respective total annual gain was estimated at USD 196,000). As a whole, the company reported a four-percent increase in net profit after certification was implemented. Only the cost savings were possible to include in the cash-flow analysis.

DRT's significant indirect economic benefits were mainly (93%) a result of cost reduction due to elimination of intermediaries in export trade and thereby accountable to CoC certification. The minor savings in forest management costs were due to reduced bureaucracy, thanks to certification and effective application of the silvicultural system.

The group to which KPKKT belongs buys the entire output of the FMU. No price premium is obtained from the parent company because of certification. However, the group is paying a price premium for imported certified timber. As zero budgeting is applied, enough resources have been allocated to KPKKT to bear the additional costs of certification. The main driver for certification in this case is market access benefits which were assessed through an alternative calculation assuming a 5% loss in sales revenue in case there is no certification.

In the case of PITC, no additional economic benefits were observed. It is, however, possible that the group's sister company that buys the entire production of PITC (at subsidized prices) gets some market benefits but these could not be assessed. The main driver for certification is probably ensuring market access for the parent company.

4.3.3 Environmental Benefits

As Inpacel had already implemented most of the environmental requirements as part of the ISO 14001 certification, there were no additional benefits from forest certification. In the case of Cikel, several areas of environmental benefits were identified including less impact on the forest resource, better habitats for fauna, less environmental impact of road construction, improved maintenance of ecological functions, less impact on soils and water, etc. (typical win-win examples of improved practices; see also section 4.3.2)

The quantified benefits of DRT were mainly (90%) a result of reduction in residual stand damage but reduction in open canopy and loss of small trees due to logging contributed to the total. Certification was reported to generate similar environmental benefits for KPKKT as in the case of Cikel. However, the additional impact was probably lower as the company's performance was already high before certification. In PITC's case, additional environmental benefits were not quantified, having been generated during the build-up phase of the company.

4.3.4 Social Benefits

In Inpacel, the main social benefit generated by the costs related to certification was the establishment of clear land tenure through conflict resolution between the company and the community. Several other typical social benefits were also observed such as health programs, training, local employment generation and, in general, intensified involvement by the company in the community's activities. Also in the case of Cikel, a whole range of benefits was identified for workers and the local community. In spite of reduced production volume, more employment was created.

The economic value of social benefits in DRT was generated by a broad range of impacts. Community social services were improved by the company's support, security was strengthened in the region as a result of better enforcement, additional employment was created, and production of non-timber forest products was increased. There was also a range of other minor social benefits which were generated as impacts of certification.

In KPKKT's case, the main social benefits were derived from paid local employment and contract jobs but the additional impact was reported to be marginal. The same was also reported for PITC. In the Malaysian cases, the analysis was less comprehensive than in the Brazilian and Indonesian FMUs.

4.3.5 Total Benefits

Only in the case of DRT, the indirect benefits were estimated and they came from the following sources:

	percent
- Cost savings (indirect economic benefits	70
- Environmental benefits	20
- Social benefits	10

Only the cost savings were tapped by the FMU in monetary terms while the other benefits were reaped by workers, the local community and the Indonesian society at large.

4.4 Cost-Benefit Analysis

4.4.1 Assessment

The cost-benefit analysis was carried out for all FMUs even though there were differences in the coverage of data. Net Present Value was calculated for the differential net cash flow between With and Without Certification cases in each FMU. In the basic calculation the discount rate used was 12%, indicating the annual opportunity cost of capital. The rate allows only some element of risk premium which tropical timber producers have to pay in the financial markets. The selected discount rate is probably on the low side as in the case countries higher returns are usually required from forestry investments. However, a higher rate was not applied as the calculations were made in fixed prices. In order to assess the impact on NPV of the discount rate, a sensitivity analysis was carried out using alternative rates (5 and 0%).

In the cases in Malaysia an alternative calculation was made adjusting additional costs to what was considered a more realistic level. In addition, in the Without Certification case, it was assumed that a loss of sales revenue of 5% could happen if the present markets which require certification would have to be maintained with no certification. This assumption was based on interviews with various companies involved in exporting to markets where certification is required. However, the calculation can be considered theoretical, with the main purpose of indicating sensitivity of the financial feasibility of certification to eventual loss in sales revenue.

As pointed out in section 4.2.6, the simplified assumptions on the time distribution of pre-certification costs and benefits are likely to represent a negative bias in the NPV calculations. Limiting the basic analysis to the first five-year period is likely to add to this bias (depending on the coverage of cost and benefit data). These impacts may be significant and this is another reason, in addition to data problems, why the reported results should be interpreted with care.

4.4.2 Net Present Value Estimates

The NPVs reported in Table 4.8 illustrate that only in the cases of Inpacel and DRT, the available data suggests forest certification to be an economically viable option for FMUs. However, it is likely that the balance would have been positive also for Cikel, had the increased basic price of timber been possible to take into account in the NPV calculation.

It was possible for the cost-benefit analysis of DRT to be carried out from the perspective of the company and the national economy. In the former case, the basic assessment considered only cost savings on the benefit side while all the estimated costs were included. This option is reported in Table 4.8. In the analysis from the national economy perspective, the estimated environmental and social benefits were included in the net cash-flow. This had a significant positive impact on the NPV which increased from USD 0.2 mil. to USD 1.2 mil. (see Annex 2 Table 5.2 for details).

The opportunity costs of labor and capital were not, however, considered in the calculation. This would have likely changed the estimated figures even more positively due to high labor intensity of the additional activities and presumably low shadow price of labor. The social and environmental benefits generated through the introduction of certification are significant but DRT is only indirectly benefiting from them.

In the case of PITC, the company received USD 300,000 to finance the investment cost of certification. This was an extraordinary item and was not considered in the basic cash-flow calculation reported in Table 4.8. About USD 108,900 of these funds were used for external consultancies and the balance for covering the cost of forest management plan, environmental and biodiversity monitoring and the direct cost of the certification process. All these costs amounted to about USD 275,000 during the first year. Had the external financing been taken into account as additional revenue, the NPV of PITC would have been positive, independently from the alternative discount rates.

Table 4.8 Net Present Value of Certification in the Case Study Forest Management Units

FMU	Discount rate 12%	Discount rate 5%	Discount rate 0%
	USD 1000		
Inpacel	+199.4	+232.1	+261.9
Cikel	-257.3	-248.3	-236.1
DRT	+194.8	+338.3	+477.5
KPKKT	-319.7	-349.6	-375.2
PITC	-197.6	-215.1	-229.8

Due to lack of data on compliance costs, an alternative NPV calculation was prepared for PITC including additional costs of USD 144,600 to cover annual biodiversity monitoring and internal auditing costs in years 2 to 5 in the With Certification option and 5% reduction in the sales revenue in the Without Certification case (cumulative effect USD 248,500). With these adjustments, but excluding the external financing referred to in the previous paragraph, the NPV would still remain negative with all the alternative discount rates (USD -75,600 with the discount rate of 12%).

An alternative calculation was also prepared for KPKKT including (i) additional costs of USD 180,000 to cover estimated annual costs of road maintenance, R&D and occupational health and safety costs in years 2 to 5 in the With Certification option, and (ii) 5% reduction in the sales revenue in the Without Certification case (cumulative effect USD 3,720,250). With these adjustments, the NPV would be positive with all the discount rates due to the importance of the sales price loss (NPV USD 2,240,396 with the discount rate of 12%). The cost adjustment would not have been enough to make the NPV positive.

The sensitivity analyses indicate that:

- the NPV is not very sensitive to the choice of the discount rate due to the importance of the first-year costs in the cash-flow (and limited information on benefits in subsequent years)
- the financial calculations are not very sensitive to small adjustments in additional costs occurring in years 2 to 5
- if market benefits are not quantifiable and cannot be taken into account in the assessment, certification appears to be rarely a financially viable option for FMUs operating in natural tropical forests in view of the fact that the sample FMUs represent above average performance in their countries
- even a minor loss in sales revenue due to lack of certification can make certification financially feasible in many instances
- external assistance can make certification financially viable but it should be sufficient to cover a significant part of the additional costs.

4.4.3 Management Perception and Cost-Benefit Analysis

It is noteworthy that in all the FMUs, the management perception of the cost-benefit ratio of certification was positive (Table 4.9). This corresponded to the results of the economic analysis in three cases (Inpacel, DRT and PITC). In the case of KPKKT, the assessment result was negative and the positive management perception may be explained by consideration at the group level where market benefits have apparently been obtained although they were not possible to quantify in the case study. The same appears to be also the case with Cikel. In fact, Cikel's profit improvement (by 4%) was reported to be directly associated with certification. It is obvious that the cost-benefit analysis of certification in integrated companies should be carried out at the group level. In this study this was not, however, possibly due to limitations related to data availability.

Table 4.9 Summary of Cost-Benefit Assessment of Certification in the Case Study Forest Management Units

FMU	Financial C-B ratio based on the analysis	Management perception	Comment
Inpacel, Brazil	Positive	Positive	Main motivation is ensuring access to future markets requiring certification
Cikel, Brazil	Likely positive (partial analysis negative)	Positive	Cost reductions were significant but not sufficient to compensate additional costs. The market benefits of certification are the driving force
DRT, Indonesia	Highly positive	Positive	Extensive indirect benefits make certification an economic option
KPKKT, Malaysia	Negative	Positive	Even relatively limited market benefits would tip the cost-benefit ratio positive
PITC, Malaysia	Positive with external assistance	Positive	In a smaller FMU external assistance was necessary to make certification economically viable

5. FINANCIAL FEASIBILITY OF FOREST CERTIFICATION AND PHASED APPROACHES

5.1 Implications of Case Studies

The field-level case studies have revealed that (i) forest certification involves significant costs for FMUs in the tropical timber producing countries, and (ii) the bulk of these costs tend to occur before a certificate is issued to the applicant. The case study FMUs tend to paint an excessively rosy picture of the economics of certification because they represent above average level of management systems and environmental and social performance. In typical FMUs, the path to certification may take several years, often up to 3 to 5 years.

Certification in tropical FMUs appears to be mainly driven by anticipated restrictions to market access when an increasing number of buyers demand for certified products and are unwilling to accept alternatives. If producers are forced to drop out from their traditional markets as has already happened in some cases, this – if taking place on a larger scale - will drive product prices down. There is a true risk that this can lead in some countries to reduction of the value of the resource, encouraging its conversion into other uses. Even though certification was originally introduced as a countermeasure to forest degradation, the slow progress in the tropical countries and the mounting market access barriers in consuming countries can lead to an opposite outcome where certification accelerates forest conversion and degradation. Stakeholders should be fully aware of this risk when setting their demands as to how certification should be implemented.

The results of this study provide only a partial biased view on the economics of certification and a broader sample is, therefore, needed including small-scale FMUs, community forests and non-integrated FMUs which are not linked with industrial processing. All these groups have different economic dynamics from that of large integrated FMUs. Both auditing and compliance costs are fixed costs. This means that the relative cost burden is high in small-sized FMUs. Another issue is limited access to market benefits. Community forests and small FMUs have serious constraints in this respect and, therefore, some externally funded certifications were discontinued when the financial support dried up.

In this study, many areas of opportunity cost could not be duly analyzed (e.g. foregone production in protected or set aside areas) and many of the longer term impacts could not be quantified (e.g. the long-term impact on the volume and species composition of the product flow). A schematic extension of the cash-flow analysis over a longer time period would not have been useful without due consideration on respective impacts on production.

The costs and benefits appear to be poorly assessed by management of certified operations. Cost implications are not well recorded and sometimes not even duly identified. There seems to be even less clarity about benefits. Landowners, forest managers and enterprises operating in natural tropical forests should clarify the financial and strategic feasibility of certification in their particular conditions.

5.2 Pre-conditions for Financial Feasibility of Forest Certification

Forest certification should be financially feasible for tropical FMUs to justify the respective investment. The case studies revealed that only in rare cases of natural tropical forests that the financial feasibility of certification may be achieved without market benefits. These may come from avoidance of loss of sales to markets which require certification or obtaining increased sales

revenue either through increased sales volume to new or existing markets, or through a price premium. As price premiums are expected to be short-lived with increasing supply of certified timber, market access benefits will be crucial in the long run.

The other financial benefits (e.g. cost savings) appear to be rarely sufficient enough to compensate the costs related to certification. Best prospects for tapping of these benefits appear to be found among large-scale integrated operations.

5.3 Phased Approach as a Means to Reduce Economic Barriers to Certification

Phased approaches have a potential to offer a badly needed instrument to reduce economic barriers to certification faced by FMUs in tropical timber producing countries. They can allow FMUs to tap some benefits (in particular ensuring continued market access) during the process when the compliance with the standard requirements is built up, which can take several years. The issue is not limited to better capacity to bear the burden of additional costs but it also covers the time period, which is necessarily required by the FMU to implement standard requirements. Such a process can take up to 3 to 5 years, depending on the pre-certification status of the FMU.

The concept of the phased approach is based on the following notions (Pinto de Abreu & Simula 2004) which are also present in various buyers' purchasing policies:

- Entry or baseline requirements
- Intermediate steps
- Full certification

There is a broad view that the baseline requirements should cover (at least) legal compliance. This has two dimensions: (i) verified information on the legal source of tropical timber and (ii) compliance with the relevant legal requirements. The former concerns timber trade and processing industry while the latter is FMU's responsibility.

If further requirements are set for unwanted sources as some buyers and their groups have done, verification of CoC should progressively establish that such sources are not used for the production of purchased goods. From the FMU's point of view, this means that from the very beginning, a verifiable CoC system needs to be put in place. The respective cost for the primary producer is, however, relatively minor and would not represent a barrier, with a possible exception of such small enterprises which deal with both certified and uncertified materials.

As regards legal compliance of forest management, several steps can be set for its verification. This can be a complex exercise and, therefore, phasing is often needed. There are different views on whether legal compliance should be required in the baseline level and its strict application could preclude many FMUs from embarking on certification through a phased approach (Pinto de Abreu & Simula 2004).

This study did not examine the cost of legal compliance. Legality was taken as a baseline and the case studies focused on clarifying the additional cost of a certification standard and the associated certification process in relation to national regulation. The underlying view was that legality should be achieved in all FMUs and, therefore, additionality of certification should be related to it.

Concerning intermediate steps between legality and full certification, there are two views: (i) the FMUs would like to have freedom to choose these steps, and (ii) some buyers want to define (at least part of) these steps by exclusion of unwanted sources. Protected areas, endangered forests,

high conservation value forests, conversion forests, etc. are examples for concepts used in this context. The analysis of this study suggests that if an FMU has an adequate management system in place, only marginal costs would be involved in demonstrating and verifying that such forests are not used for logging by the FMU in question. The problem becomes complex and also more costly to solve if an industrial or commercial enterprise procures from a large number of sources in the local timber market.

Cost impacts are influenced by how various performance requirements are phased over the defined time period within which full certification should be achieved. It can be assumed that FMUs would tend to schedule the compliance of complex or costly certification criteria towards the end of the period. The case studies suggest that such requirements could be related to tenure and social conflicts (which tend to be costly to address) and other areas where costs are high (e.g. information systems, biodiversity surveys, R&D, etc.). Incidentally, e.g. in the Indonesian case study, one of the most significant compliance cost factors was due to measures to prevent illegal logging in the FMU.

Phased approaches would have to be put in place by certification systems. In defining their own provisions for implementation, certification systems should try to seek a balance between cost impacts for tropical FMUs and desirable timing of compliance with specific requirements. Some degree of regulation could be introduced by the respective certification systems if this proves to be a problem. It is, however, important to note that FMUs are often very hesitant to embark on certification. Therefore, in early stages of phased implementation of the standard, one could focus on elements which are not too difficult to implement and can bring immediate benefits (e.g. cost savings, reduction of environmental impacts, establishing the legality of the supply source, etc.).

In order to be able to capture market benefits, FMUs should be able to make market oriented claims so that their engagement in the process and their progress toward full certification can be communicated to buyers and other interested parties. As pointed out by e.g. Nussbaum & Simula (2004), most of the demand for certification is in business-to-business trade. Therefore, the issue of product labeling, which can become necessary in some end products and market segments, could be dealt with later when consumer markets are targeted at. Guidance for cost-effective communication has been provided in the parallel ITTO study on the procedures of the phased approach (Pinto de Abreu & Simula 2004).

5.4 Other Potential Means to Reduce Costs and Improve Benefits

One of the dilemmas of sustainable forest management is that it creates significant social, environmental and economic benefits from which the producer gets no or hardly any compensation. Beneficiaries are local communities, workers, governments and society at large.

Because of the importance of environmental and social benefits of certification, there is a reason to consider public sector support to finance part of direct or compliance costs. This is, however, a double-edged sword as subsidizing certification in developing countries easily leads to overestimation of benefits and underestimation of risks as noted by Bass et al. (2001). Financial support to landowners and forest managers to implement certification requirements can, however, be more efficient and effective to generate these benefits than direct subsidies to forest owners or managers. The potential feasibility of such public sector support should be established through country-specific analyses.

Double certification can have added value in some conditions, particularly if the FMU wants to prepare itself for selling timber and timber products to customers who demand or appreciate international and national system certificates. This can significantly add to certification-related costs while the respective benefits are not often clear. Double certifications should be limited to cases where there are strong market reasons. In the long run, certification systems should overcome the need for such double work through cooperative arrangements.

Existing certification systems and standards tend to use their own different concepts of forest management and conservation from those applied by, e.g., national legislation. It should, however, be noted that conservation of forest values can also take place through other appropriate models and practices which may be currently in use in a country, or even provided in national legislation. To avoid unnecessary costs, it would be preferable to rely as much as possible on local definitions, concepts and practices for achieving what is required in an existing certification standard, be it based on a national or international framework.

Group certification has proved to be effective in reducing the barrier to access for small-sized FMUs and community forests. It has not been frequently used in the tropical countries in spite of the fact that auditing costs and sometimes also compliance costs per ha could be significantly reduced. Group certification requires that participating FMUs and forest enterprises are organized under a cooperative arrangement such as an association, extension network, marketing arrangement, or another form (e.g. through a common service provider assisting in the certification process). Tree farm schemes for plantations, which are widely practiced also in developing countries, show that organization of landowners can be effective if there is a strong economic interest. Promotional work is needed to widen the use of group certification in tropical timber producing countries to test alternative concepts designed to meet the specific country requirements.

Some certification schemes/bodies have provisions for surveillance audits twice a year. This may be well justified in some situations but, in general, one annual surveillance assessment should be considered sufficient to reduce costs.

5.5 Development of National Certification Standards and Schemes in Tropical Timber Producing Countries

It appears that without developing national certification standard and schemes, the progress in the tropics continues to be slow. The problem is widely recognized but efforts to accelerate the developments have had only a limited impact. This is demonstrated by the fact that in June 2004, only seven percent of the world's certified forests (183 mil. ha) was found in the developing countries.

The development of national schemes and standards appears, therefore, the only option for many countries to make faster progress than in the past. However, these schemes have been frequently criticized or challenged for not being credible or just serving as greenwashing. It is important that support to the development of national standards and schemes is increased to make them more robust as they can best accommodate the specific local conditions. Their potential to accelerate the expansion of certified area could be enhanced if phased approaches are incorporated into their provisions. Existing schemes have been slow or even reluctant to adopt phased approaches which could help tropical timber producers.

The development of certification in tropical timber producing countries should be understood as a dynamic learning process in which credibility can be built up over time in the same way as the schemes which have been and are being developed in the developed world.

6. AREAS FOR FUTURE ACTION

The following areas of possible future action have been identified based on this study to improve the cost-benefit ratio of certification in tropical timber producing countries and to accelerate the development of certification through phased approaches.

6.1 ITTO

- Further develop the methodological approaches to cost-benefit assessment of SFM, its certification and legal compliance, considering a full range of opportunity costs applicable in varying country conditions
- Carry out further field-level studies and collect relevant statistical information on certified tropical FMUs to improve the understanding of the economic feasibility of certification in different conditions. Such studies and analyses would be particularly required in Africa, which was not possible to be covered in this study. Further economic analyses should consider the impact of certification on the value of the resource and risks related to its conversion into other uses, or encouraging unsustainable practices if the barrier to certification continues to be maintained too high.
- Through special studies and market monitoring, improve transparency on the sharing of benefits and costs between FMUs, industry and trade as a result of certification. This would contribute to a more equitable distribution than at present where most of the benefits appear to be reaped down in the supply chain in export markets.
- Implement pilot projects among small-scale FMUs and community forests for forest certification through group certification arrangements and involving phased approaches. Such projects would be particularly useful in the Congo Basin and also in some countries in Latin America and Asia-Pacific. Projects should include technical assistance to both group organizations and individual FMUs.

6.2 Governments and Public Agencies

- Governments in tropical timber producing countries where preconditions for certification exist should carry out studies to establish the feasibility of public sector support to landowners and forest managers in implementing forest certification as a public policy option, particularly as an alternative for subsidies.
- Governments in tropical timber consuming countries should clarify the requirements set for acceptable or recognized certification standards and systems and their phased approaches (particularly if referred to in their procurement policies), taking into account the specific hurdles that tropical timber producing countries have in meeting these requirements.
- Governments in consuming countries should examine the cost and trade implications of their public procurement policies for tropical timber producers, particularly market access restrictions, before such policies are put in place.
- Donor agencies are encouraged to support certification processes and their phased approaches in tropical timber producing countries as a measure to reduce cost barriers. Such support should,

however, be demand driven and its sustainability implications should be duly considered in the case of small-scale FMUs and community forests.

6.3 Forest Management Units/Enterprises

Carry out *ex ante* and *ex post* financial analyses of forest certification to establish its feasibility in their particular situations and to improve knowledge how the related costs could be reduced and benefits increased in their specific contexts

6.4 Certification Systems and Other Stakeholders

- International and national certification schemes and bodies should examine the cost implications of their assessment services and make adjustments to avoid unnecessary costs for tropical timber producers
- Existing certification systems and services should make provisions for phased approaches for their mainstreaming as developments are presently largely driven by individual buyers and their groups.
- Proponents of various certification schemes are encouraged to carry out comprehensive reviews of their policies and advocacy work and campaigning related to certification which are often unduly limiting market access to tropical timber and timber products. This would be needed to avoid risks that certification becomes a perverse incentive for forest conversion and degradation through value reduction of such forests which cannot be certified under existing systems in specific country situations.

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ANNEX 1

CASE STUDY ON BRAZIL

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Exchange rate: USD 1= BRR 2.90

1. INTRODUCTION

In Brazil, the first certifications were already made in 1996. After a relatively slow start the area has rapidly increased, reaching a total of 3.1 million ha in September 2004. More than 90% has been certified under the FSC system covering 1.6 million ha of plantations and 1.3 million ha of natural forests in 50 FMUs.

Brazil has also a national forest certification system, CERFLOR, which was developed through a series of efforts since the mid-1990s. In February 2002, the first standard was officially published by the *Associação Brasileira de Normas Técnicas* (ABNT - Brazilian Association of Technical Standards). It was the national certification standard for planted forests, NBR 14789 *Princípios, Critérios e Indicadores para Plantações Florestais* (Principles, Criteria, and Indicators for Forest Plantations). Certification to this standard has been started and CERFLOR is in the process of developing a standard for natural forests. Two plantation forests have been certified under the national system covering a total area of 216,000 ha.

Two case studies are reported in this annex on two certified companies, one under the national scheme and the other under FSC. The purpose was to identify the costs and benefits in each case, one representing natural tropical forests and the other plantation forests.

2. METHODOLOGY

2.1 Choice of Companies

The following companies were chosen for the study:

(i) Cikel Brasil Verde S.A., is the forest company of the Cikel Group, which produces tropical timber coming from its forest management areas located in the State of Pará. The company's main forest holding, the Rio Capim Farm, covers 140,658 ha which has been certified according to FSC Principles and Criteria since May 2001. CIKEL also has four chain-of-custody certificates.

(ii) Inpacel, Indústria de Papel Arapoti Ltda., has paper and solid wood products manufacturing industry which since 2000 belongs to the *International Paper do Brasil* group. The company's raw material supply comes from its *Pinus sp*. plantations. The forests have been certified according to the standard NBR 14.789/2001 of the National System of Forest Certification, CERFLOR.

CIKEL is representative of well-managed state-of-the-art tropical timber business enterprises in the Brazilian conditions. Inpacel, being part of the world's largest pulp and paper company International Paper, has also well-developed management systems. As they both are above average in terms of management standards, the results have to be interpreted within this perspective.

2.2 Elaboration of Case Studies

In order to collect the necessary information, a questionnaire was sent to both companies. They assigned a staff member to provide the data requested and served as the focal point for the consultants.

The questionnaire was designed in accordance with the analytical framework developed for the entire study (Chapter 3 in the main report). The replies sent by the companies were analyzed.

Consultations were then held with the company representative to clarify various details and to fill the gaps. Some of the missing information was estimated based on the Consultant's experience and knowledge on both forest certification processes.

3. CASE STUDY ON CERTIFICATION OF PLANTATION FOREST MANAGEMENT

3.1 Enterprise and the Forest Management Unit

3.1.1 Company

Inpacel was started up in 1993 as an independent company but it was acquired in 1998 by Champion Papel e Celulose. In 2000, the acquisition of Champion International Corporation by International Paper Corporation led to a change in the company's name from Champion Papel e Celulose to International Paper do Brasil Ltda., the Brazilian company responsible for controlling Inpacel.

Inpacel has an integrated mechanical pulp and paper mill operating since 1993. The company's raw material supply comes from the plantations in the state of Parana.

International Paper do Brasil has two other subsidiary companies, Inpacel AgroFlorestal, responsible for the forest management of the company and Serraria Inpacel, a sawmill which produces solid planed wood products for exports.

The company is building up a new industrial unit for the production of solid wood products, which is expected to start in 2004 with a timber production capacity of 150,000 m^3 per year. After the start-up of this new unit, the company will apply for chain-of-custody certification.

3.1.2 Location

The company's headquarters are located in the Barra Mansa Farm, the municipality of Arapoti, PR, and the forest areas are located in six municipalities (Arapoti, Jaguariaíva, Curiúva, Reserva, Tomazina, and São José da Boa Vista).

3.1.3 Forest Area

The total area of the company's holdings is 49,942 ha of which 29,942 ha are plantations oriented towards timber production (81% of pine, 16% of eucalyptus, and 3% of araucaria). The area of legal reserve and permanent preservation is 15,337 ha, leaving 4,663 ha for other uses. Inpacel's forests are divided into six farms, as shown in Table 3.1.

Table 3.1 Inpacel - Composition of the Company's Forests

Farm	Plantation Area (ha)			Total
	Pine	*Eucalyptus*	*Araucaria*	
Barra Mansa	2,688	2,153	63	4,904
Caeté	3,742	840	414	4,996
Coqueiros	3,298	-	104	3,402
Matarazzo	436	118	-	554
Planalto	143	218	-	361
S. Cavalcante	-	29	37	66
S. Nicolau	14,029	1,441	187	15,657
TOTAL	**24,337**	**4,799**	**806**	**29,942**

3.1.4 Wood Production

In 2002, Inpacel produced more than 1.3 million m^3 of timber or 43 m^3/ha. About 15% were pulpwood for the paper mill, 7% were logs delivered to the company's sawmill, and the remaining 78% were sold in the domestic market. Many external clients are already certified under FSC and they have demonstrated an interest in buying timber certified under CERFLOR. As Inpacel will open a new industrial unit for the manufacture of export-oriented solid wood products this year, the company has a keen interest in certification.

3.1.5 Markets of Finished Products

The company's paper production is sold in the export and domestic markets. Sawnwood production is entirely export-oriented.

Approximately 30% of the company's paper production are exported to a large number of countries in Latin America, Central Europe, Africa, Asia, and in the Middle East. Certification is an issue only in the exports to Europe.

3.1.6 Certification

In 2003, Bureau Veritas Quality International (BVQI), a certification body accredited by INMETRO (National Institute of Metrology, Standardization and Industrial Quality), carried out an audit of the company to assess the compliance with the requirements of NBR 14789. The company was subsequently certified under the National System of Forest Certification, CERFLOR.

In 2001 the company had obtained an ISO 14001 certificate which had established a solid management system significantly facilitating the forest certification process to NBR 14789 standard.

3.2 Costs

The costs associated with certification are divided into internal and external costs, and further into the main cost factors. The total investment costs for certification were estimated at USD 70,000.

3.2.1 Direct Costs

3.2.1.1 Direct Internal Costs

The internal direct costs related to the preparation process of certification are due to various internally developed activities. As the company has many staff responsible for various activities, most of these costs are included in the company fixed costs and cannot be accurately estimated.

The relevant activities included preparation of necessary documents for certification and internal meetings for clarifying how the various criteria could be complied with, including changes in current system and practices. In addition, internal audits were carried out during the preparatory period.

Some minor variable costs can be identified which are related to accompanying the external audit teams and internal and external communication activities during the certification process. These variable costs were estimated at about USD 2,000 but they do not include the opportunity cost of staff time during the process.

3.2.1.2 Direct External Costs

The direct external costs of certification are due to the contract with the auditing body. The total value of the contract with BVQI was approximately USD 20,000. About 20% (USD 4,000) is related to the pre-assessment, 30% (USD 6,000) to the main audit, and 50% (USD 10,000) covers the annual follow-up audits. This cost is related to forest management certification only as the chain-of-custody has not yet been certified. These costs were based on a promotional rate for starting audits under the CERFLOR. The regular costs for the first-year audits are much higher, estimated at USD 35,000 which is the figure used in the assessment.

3.2.2 Indirect (Compliance) Costs

3.2.2.1 Forest Management Costs

These costs result from the adjustment of the company's technical procedures to comply with the legal requirements and requirements related to the standard used for the certification.

With respect to forest management, NBR 14789 requires the company to have its operations under control in an efficient, organized, and objective manner. Thus, the standard does not specifically require activities that exceed legislation. The company does not have to carry out special investments if their business is well organized as in the case of Inpacel.

As an example, the annual costs related to road maintenance (USD 7,000/km) and silvicultural work (USD 465/ha) are not considered as costs related to forest certification as they represent common practice before the operations were certified.

Regarding the introduction of new technologies and equipment, Inpacel already possesses a very advanced control system of its forest operations. Therefore, there was no need of acquiring new machines or technologies in the harvesting operations. However, with the objective of reducing the volume of waste generated during harvesting, the company is studying the acquisition of a chipper. The decision has not yet been made and the costs are not known.

The company does not have a certified raw material monitoring system (chain-of-custody) and some modification in the current management system may prove necessary to meet the requirements of CoC certification.

3.2.2.2 Costs Related to Social Aspects

The costs related to the adjustment of the company's operations to meet social requirements of the certification standard were significant, approximately USD 29,000, representing about 30% of the total investments due to forest certification.

The company's occupational health and safety system was improved, costing approximately USD 4,670. This included costs related to social programs and services oriented towards local workers and communities. The health and security systems of the company were already developed before the forest certification process. Only few modifications were made in order to upgrade the company procedures to the NBR 14789 requirements and no additional costs are foreseen by the company in the subsequent years.

The local community does not participate in the implementation of any of the company's operational activities. The forest management plan was made known to the community by means of a website and brochures, and the cost of their elaboration and dissemination were approximately USD 1,000.

The cost related to the activities clarifying and ensuring the rights of local communities was USD 23,300, or about a quarter of the total of the first-year costs due to certification.

3.2.2.3 Costs Related to the Management System

The necessary costs of adjusting the forest management system were mostly investments in labor and equipment for forest inventory. Four employees were specifically hired for working in the inventory area. The services of a consulting company were procured for adjustment of growth and yield equations and respective calculations. These investments represent the most significant element in the compliance costs (USD 35,000). Besides the initial investment, an annual cost of USD 30,000 will have to be paid for continuous implementation of the improved system.

There were no additional costs related to the elaboration or adjustment of the forest management plan and operational plans, since these activities had already been carried out in connection with certification to ISO 14001 in 2001. Improvement of other required documents within the company's forest management system accounted for 2% of the total cost for the implementation of the standard NBR-14789 (USD 935).

3.2.3 Total Costs

Table 3.2 summarizes the total costs related to the forest certification. The direct costs represent about a third of the total estimated costs. The indirect (compliance) costs are mostly due to improved inventory and related activities (USD 35,000) but the costs related to social aspects were also significant (USD 29,000).

The first-year investment costs were about USD 102,000 and the annual costs of audits and compliance are estimated at USD 40,000. Assuming a validity period of five years, the total cumulative costs would be about USD 262,000.

Table 3.2 Inpacel - Total Costs Due to Forest Certification

COST	COSTS (USD)	
	Investment	Operational/yr
Direct Internal Costs		
Follow-up of the external audits	1,300	
Publicity costs associated with the certification process	650	
Sub-total direct internal costs	***1,950***	
Direct External Costs [1)]		
Pre-audit	10,000	
Principal Audit	25,000	
Follow-up Audits		10,000
Sub-total direct external costs	***35,000***	**10,000**
Indirect Costs		
Social aspects		
Adaptation of the health and security systems	4,670	
Rights of the traditional and local communities	23,300	
Publicizing of the Management Plan	1,000	
Management system		
Inventory and related cots	35,000	30,000
Documentation	935	
Sub-total indirect costs	***64,905***	***30,000***
Total	**101,855**	**40,000**
Grand total costs of the validity period of the certificate	**USD 261,855**	

1) Based on estimated normal rates

The unit costs due to certification during the first year can be estimated at USD 3.40/ha and USD 1.34/ha during the subsequent years of the certification's validity period. The unit costs per m^3 produced are estimated at USD 0.04/m^3 and they can be considered insignificant. This is probably illustrative for well-managed large-scale industrial plantations in the Brazilian conditions.

3.3 Benefits

3.3.1 Economic Benefits

3.3.1.1 Direct Benefits

Although the company, due to strategic reasons, did not provide information on price increases of its products as a result of certification, the direct economic benefits of Inpacel's forest certification are clear both in the short and medium term.

At present, only 2% of the company's clients require certification. Yet there is increasing awareness that the situation will change in the near future. The forest certification decision was made with a view to obtain certification of the chain of custody for solid wood product exports in the near future. This will be particularly important for the company's new sawmill which will start its activities in 2004. The chain-of-custody certification will ensure market access to the company in case forest certification becomes a general requirement.

Certification has not yet increased the number of the company's clients. Growth in the company's business volume and consumer market is, however, expected after the expansion of export-oriented sawnwood production and this will be facilitated by certification.

3.3.1.2 Indirect Economic Benefits (Cost Reduction)

Since the company's certification is recent, there are still no detailed analyses that could provide reliable information regarding cost reductions after certification and how these may have been distributed between forest management, processing, and transport. The improved information system will, however, provide more reliable data for production planning, which is likely to facilitate cost optimization of the harvesting and logistic chain.

With respect to the production processes and the control of the chain of custody, no significant improvements have taken place. Productivity gains with the optimization of the machines, labor, and transport logistics are likely to be limited, since the company's entire productive process is under effective control and has proved to be efficient and exemplary.

3.3.2 Environmental Benefits

Additional environmental benefits have not been created with the NBR 14789 certification, since most of the potential was already realized when Inpacel was certified to NBR ISO 14001. The company had already developed various activities for the assessment of the environmental impacts of its operations, including:

(i) Detailed research on fauna and flora;
(ii) Survey/ monitoring of soils in the company's holdings
(iii) Maintenance of sustainability of forest production
(iv) Monitoring (including research) of the effects on the quality and quantity of water in the associated microbasins.

Surveys on the flora, fauna, soils and water are regular activities of the company which are part of the certified environmental management system (ISO 14001). Their costs and benefits are not, therefore, considered additional due to forest certification.

Plantation planning and the company's forest operations are carried out in a way which is aimed at the maintenance of flora and fauna, including by means of ecological corridors.

3.3.3 Social Benefits

The main benefit generated by the costs related to the rights of the local communities was the establishment of clear land tenure through conflict resolution between the company and the community. In addition, the health programs were adapted, aiming at meeting the needs of each municipality. Promotional campaigns, training courses and awareness raising seminars have been organized for employees and local people.

The company contributes to the development of the region, giving priority to hiring of local labor. Besides this, when necessary, it tries to hire the services of local companies, preferably those belonging to former employees.

The company's involvement with the community was intensified as a result of the certification. The supply of technical information to local, state, and federal educational institutions and to other

concerned institutions has now become a common practice. As a result of the partnership with the Forest Police, surveillance and security in the company's forest holdings has improved. Local inhabitants are also allowed access to the company-owned areas for tourism and recreation provided that there is no predatory behavior.

3.4 Cost-Benefit Analysis

As it was not possible to quantify benefits in monetary terms, a cost-benefit assessment was not possible. The net-present value of the additional costs was USD 199,419 (discount rate 12%)

3.5 Financing

All investments necessary for meeting the requirements of forest certification were carried out by Inpacel's own resources. No external financing was received.

4. CASE STUDY ON CERTIFICATION OF NATURAL TROPICAL FOREST MANAGEMENT

4.1 Enterprise and the Forest Management Unit

4.1.1 Company Policy and Certification

Cikel Brasil Verde S/A, the forest company of the Cikel Group, was founded with the purpose of meeting the demand of tropical timber products and by-products, using innovative techniques of forest management and harvesting in order to improve forest productivity and mitigate environmental impacts.

The company is located in the Amazon region and is composed of four industrial units in various locations in the state of Pará. There is also another branch in the state of Maranhão. Together, these industries annually process a volume larger than 205,000 m^3, including sawnwood, plywood, peeled, veneer, sliced veneer, and other wood products. Recently a high-technology mill was started for the manufacture of wood flooring and decking.

As a result of the commitment of the Board of Directors and employees of the company, the forest management processes have been continuously improved, supported by the various research and development institutes. It was, therefore, logical that Cikel Brasil Verde S/A decided in September 2000 to apply for the process of audit for the assessment of certification of natural forest management in an area of 140,658 ha. This represents the largest management unit of certified tropical forests in Brazil.

On May 7, 2001, Cikel Brasil Verde S.A. received the forest management certificate (SCS-FM/COC-00031N) and the certificate of chain-of-custody (SCS-CoC-00274). Today, Cikel has four international certificates in its branches, being the company that has the greatest number of FSC certificates in Brazil.

4.1.2 Location

Cikel's certified forest of the Rio Capim farm is located in the municipality of Paragominas, Pará, approximately 300 km from the capital of the state, Belém.

4.1.3 Forest Management

Cikel's forest management is carried out based on detailed planning and efficient logistics. Only a small number of trees per ha, compared to the total stock in the forest, is harvested. A large number of remaining trees for the next cutting cycle and necessary seed trees are maintained to ensure adequate forest regeneration.

In the Rio Capim Farm, 5,000 ha are annually harvested. The annual production volume is about 80,000 m^3. The harvest is strategically planned in order not to leave clearings in the forest, choosing the location of each tree to be felled and avoiding damage to the remaining trees.

4.1.4 Market

Cikel annually produces approximately 120,000 m^3 of plywood, sliced veneer, peeled veneer, sleepers, sawnwood, and wood products. Raw materials are various hardwood tropical timber species such as *angelim vermelho, angelim, pedra, sucupira, jatobá, ipê, maçaranduba, tatajuba, cedro, piquiá, louro vermelho, muiracatiara*, among others. Besides using timber coming from of its own areas, the company also purchases logs from third parties.

About 70% of the company's annual production (120,000 m^3) is exported to clients in Europe, the United States of America, the Caribbean, and Asia. The Netherlands alone takes 40% of Cikel's entire exports. The remaining 30% of the manufactured products are marketed in the domestic market.

4.1.5 Organization

Cikel Verde has a staff of 130 employees of which 3 are forest engineers, 4 forest technicians, 8 skidder operators, 15 chainsaw operators, among other duly trained staff.

4.2 Costs

4.2.1 Direct Costs

4.2.1.1 Direct Internal Costs

Direct internal costs are related to the preparatory process of certification. The managerial system is well developed and, therefore, estimation of additional costs is difficult. However, the total direct internal costs were significant, amounting to USD 74,000.

The costs related to preparation of technical documentation for the certification process were approximately USD 15,000. The cost of internal audits and monitoring is estimated at USD 24,000/year.

The follow-up of external audits by the company's own team and hired external consultants required an expenditure of USD 25,000. In addition, there were costs due to communication on certification process to the company employees and the community, which for the initial phase, are estimated at USD 10,000.

4.2.1.2 Direct External Costs

In order to carry out the pre-assessment audit and main audit, USD 5,630 was spent, including on travel tickets and per diems of the auditors. The main audit was costed at USD 26,600 and the total initial costs were USD 34,600.The cost of the annual follow-up audits is of USD 9,000.

4.2.2 Indirect (Compliance) Costs

4.2.2.1 Forest Management

Cikel has its own forest management area and does not have to acquire new areas to maintain its production. However, the company has made partnership agreements with companies that have forests to rent.

The adjustment of the road construction within the forest management unit (conservation, maintenance and planning) required the highest cost in this category, i.e. USD 46,200.

Regarding the cost of adjusting harvesting methods (introduction of new technologies and equipment for impact reduction), USD 7,000 was spent for the acquisition of new equipment. In addition, there was an increase of fixed cost of USD 5,200/year due to the training of workers. The low cost is due to the fact that RIL was already practiced by CIKEL before certification.

Changes in the timber processing, implied by the FSC requirements, required little investment, since the company was already very well managed in these respects. The most important single cost item in this category was the establishment of the chain-of-custody control covering the forest, industry and charcoal plant, which required an investment of USD 11,150.

In 2004, Cikel intends to carry out a study of the silvicultural treatments which will initially involve study tours to areas which are more advanced in this field. The estimated expenditure in this activity is USD 860.

The company has signed a four-year agreement with various research institutes, involving specialists on social, environmental, and economic aspects. Jointly with Cikel's staff, they elaborated a forest management plan (FMP) for the company. In addition, various research activities were carried out on reduced impact logging, forest management techniques, monitoring of fauna and flora, soil and water studies, social impact assessment, etc. The cost of the research agreement was approximately USD 69,000 for Cikel. A significant part of these costs were related to social aspects but, lacking a detailed breakdown, the entire amount was allocated to forest management.

4.2.2.2 Costs Related to Social Aspects

In order to meet the FSC requirements in relation to social aspects, Cikel initially adopted a new occupational health and safety system to ensure ideal working conditions for its direct and indirect labor. The cost of this system was USD 66,000.

Part of the program and social services was also extended to the communities. For instance, a school was established that meets the needs of the company's employees and family members and those of the other members of the community. The extension of the social programs for the community represented an additional investment of USD 10,100 for the company.

Regarding the establishment of the rights of local communities, there was no significant expenditure, since the neighboring community consists of small and medium-scale rural land owners and forest workers. Only those owners were visited who had expressed concerns related to land tenure.

Three years after the elaboration of the Forest Management Plan, the company was approached by FUNAI (National Foundation of Indigenous People), informing the existence of an indigenous population in the region and requesting full access of the institution's vehicles within the farm.

4.2.2.3 Costs Related to Management System

A major source of cost increase was due to additional activities resulting from new practices in the inventory procedure of the company. The procedure now includes a 100% inventory of trees to be logged (forest census). Increased labor costs (geo-processing analyst, computer operators and others) are estimated at USD 16,700 per year.

The costs related to the forest management system represent a high annual investment for the company. The execution of the 100% tree inventory costs USD 106,000/year and the elaboration of the Annual Operational Plan (POA) USD 4,800. These costs are comparable with those observed by the consultants elsewhere in similar cases. POA is not just a legal requirement as, in the case of Cikel, it is a detailed document well beyond what is defined by regulation covering environmental and social aspects, reduced impact management techniques, etc. Therefore, the costs of POA are included in compliance costs related to the forest certification standard and not only in the baseline.

The elaboration of the Forest Management Plan document under the sustainable regime cost USD 2,400, another USD 1,700 was needed for processing of documents, and USD 2,800 was spent on external consulting services.

The costs regarding the forest management research programs are included in the costs related to the agreements with the research institutes (USD 69,000). They were included in the forest management.

4.2.2.4 Total Costs

Table 4.1 shows a summary of the company's major costs (direct and indirect) due to forest certification.

The total cumulative costs for the 5-year period of the validity period of the certificate are estimated at about USD 1 million of which 39% is first-year investment cost and the rest is annual cost amounting to about USD 140,000/yr.

Direct costs (USD 144,600) represent about 14% of the total cumulative costs. Most costs are due to compliance and the tree census inventory is the largest individual cost item. Compliance costs with the social requirements of the standard were also significant even though in the Cikel case there were no major social conflicts in the area.

Table 4.1 Cikel – Total Costs Due to Forest Certification

Activities	*Cost (USD)*	
	Investment	***Operational/yr***
Internal Direct Costs		
Technical meetings and preparation of documents	15,000	
Internal-audits and monitoring	24,000	
Follow up of audits (own employees and consultants)	25,000	
Publicity of the certification process	10,000	
Sub-total	***74,000***	
External Direct Costs		
Pre-audit	8,000	
Principal Audit (forest management and chain of custody)	26,600	
Follow-up Audits (forest management and chain of custody)		9,000
Sub-total	***34,600***	***9,000***
Indirect Costs		
Forest management		
- Acquisition of equipment	7,000	
- Training of labor		5,200
- Improvement of Chain of Custody	11,150	
- Adaptation of roads	46,200	
- Study tour		(860 year 3)
- Research/FMP studies	69,000	
Sub-total	***13, 350***	***5,200***
Social aspects		
- Occupational safety and health	66,000	
- Contributions to the community	10,100	
Sub-total	***76,100***	
Management system		
- Specialized labor (100% inventory)	16,700	16,700
- Forest inventory	106,000	106,000
- Annual Operational Plan	4,800	4,800
- Elaboration of the FMPs	2,400	
- Regularization of the documents	1,700	
- Consulting services	2,800	
Sub-total	***134,400***	***127,500***
Total	**452,450**	**141,700**
Grand Total for the 5-year period	**USD 1,020,110**	

More than 50% of the direct certification costs refer to internal costs of the company's own technical team.

The unit costs per ha were estimated at USD 7.25 and per output unit at USD 2.55/m^3 considering the entire 5-year period.

4.3 Benefits

4.3.1 Economic Benefits

4.3.1.1 Direct Economic Benefits

After obtaining forest certification, there was an increase of approximately 30% in the basic price of timber. The share of production which benefited from the premium was, by product, as follows:

	%
• Sawnwood:	53
• Plywood	90
• Flooring	1

In addition, the certification opened new markets, such as Germany, and helped ensure that the company kept its existing clients, particularly in the Netherlands and Belgium.

On the other hand, the adjustment of the company's forest management to the standards that assure sustainability led to a reduction in the production volume and, consequently, in the company's sales volume. Thus, the industry's raw material demand was adjusted to the sustainable supply of the forest.

Cikel understands that the economic benefits resulting from certification are modest at present, but they are expected to increase in the future, especially in the export markets. The company's perception regarding the behavior of the consumer markets is as follows:

(i) Export markets

(a) **Past**: the consumer market purchased any product based on quality and price.
(b) **Present**: the consumer market is more demanding, particularly in Europe. There are already clients that purchase only certified wood.
(c) **Future**: The consumer market becomes more demanding with regard to certification.

(ii) Domestic markets

(a) **Past**: Purchasing based on quality and price.
(b) **Present**: The buyer behavior has practically not changed at all, the domestic consumer does not demand for any certificates.
(c) **Future**: The new generation will understand better environmental issues and demand certified products.

4.3.1.2 Indirect Benefits (Cost Reduction)

The main certification benefits for the company were indirect. The control of the productive chain is now carried out in a very effective manner. All the phases of the production process are fully controlled.

In terms of indirect benefits, the greatest gain was in the optimization of machine use in some operations, as shown in Table 4.2, where skidding and road construction are used as examples.

Table 4.2 Cikel - Result of the Optimization in the Use of Machines after Forest Certification

	Before	After
Log Skidding Productivity (m^3/day)	540	736
Road construction Productivity (m/day)	1800 (3 machines)	1200 (1 machine)

After the optimization, the daily productivity of the log skidding operation increased by about 36%, which, in volume terms, represents an annual gain of 15,300 m^3/year, or USD 112,000 calculated on the basis of timber value.

In road construction, less machines are used as a result of productivity improvement, representing an annual gain of USD 84,000.

There was an increase in the number of workers due to the need for increased operational planning and control but as the above figures show, the improved planning and control represented significant economic advantages for the company.

In general terms, considering the increase of revenue in timber sales and cost reduction due to the optimization of the operations, the certification represented a net benefit of 30% on the company's gross profit. However, since a large share of the gain is absorbed by the forest management operations, the economic benefit resulting from the certification on the company's net profit is only about 4%.

4.3.2 Environmental Benefits

The company adopted a series of safeguards for ensuring the environmental benefits in its operations as follows:

(i) Harvesting

As a whole 60 species are being harvested. The company has no preference for any species in particular, the choice of trees to be skidded is made based on the occurrence of the species in the area of harvesting. As previously explained, there was a need for reduction in the volume of harvested timber due to adjusting the production level to the forest sustainability. The current average volume per hectare, (13 m^3), is considered low when compared to the volume harvested before certification (25 m^3/ha). The opening of clearings is now controlled.

(ii) Fauna

In order to have full knowledge of migration of the fauna in the forest area, an inventory on fauna is made before and after harvesting by the cooperating research institutes. This will provide adequate information for conservation of fauna within the FMU.

The designation of the area to be annually harvested (Annual Production Units – UPAs) is done in a random and non-continuous way. As a result, formation of large secondary forest blocks is avoided, enabling the migration of animals from the operational area to nearby habitats where the forest is primary and there is no human disturbance.

(iii) Road construction

The main and secondary roads are built with 5 meters in width at most. This makes it possible for primates to cross the road and their habitat is not limited by the road. The width generally used in road construction in non-certified forests in the Amazon varies between 8 and 10 meters.

(iv) Maintenance of the forest ecological function

In the areas harvested five years ago, forest recovery can be clearly observed with a large increase of natural regeneration. This process is being monitored by EMBRAPA researchers.

(v) Soils

The operation of machines is controlled and the impacts are distributed in order to avoid soil compaction. Therefore, standard operational procedures for forest management define that for each skidding track, a maximum of 15 trees can be skidded.

(vi) Water

Although stipulated in the law (Law 4 771/65 – National Forest Code), the respect of permanent preservation areas is not a common practice in Brazil. In Cikel's area, the river springs are conserved, leaving a buffer zone of 50 m without harvesting around them as required by the law. During the winter, running water can be observed in these places.

In order to avoid problems in the permanent preservation areas, the trees in them are not inventoried and thus the operators have no possibilities of error in harvesting them by accident.

In the main roads, bridges and drainage are built for the passing of water and secondary roads are built only outside the permanent preservation areas. It is forbidden to cross rivers and wetlands with secondary roads.

4.3.3 Social Benefits

Forest certification has indirectly brought various benefits to the employees of the company and to the community. These benefits, resulting from the new social policy adopted in connection with forest certification, are considered additional, since they are not observed in the majority of non-certified companies of the forest sector.

Benefits generated to the local community included *inter alia*:

(i) Establishment of a school for the employees, their children, and other members of the community
(ii) Salaries and wages above the local average
(iii) The company purchases daily consumption goods (foodstuff, hygienic materials, etc.) from the local community. The practice generates employment and income for the surrounding municipality
(iv) The company contributes significantly to tax collection in the region.

Regarding the employees, changes associated with the forest certification were mostly related to the working environment to make it more adequate for productive activities. The main benefits generated are as follows:

(i) Significant improvement in the local infrastructure
(ii) Free medical care for workers is available, once a week

(iii) The employees who live next to the Forest Management Unit are taken on Saturdays to their villages, and are brought back on Mondays, for free

(iv) The company provides basic food to employees through discounts in various supermarkets of the region

(v) Nutrition planning is free for the workers. A nutritionist supervises the canteen to ensure that the food is as good as possible for employees.

The main social contribution of certification is, however, generation of jobs in the local community. Taking all of the company's forest operations into consideration, there was an increase of 55% in the hired labor. The forest harvesting operation alone recorded an increase of more than 100% in the number of employees involved. The increase in wage costs is compensated by the optimization of machine use in the skidding and road construction operations (cf. Table 4.2).

The company has generated social benefits also through the dissemination of information and technologies. Cikel receives several visits from companies and educational and research institutions of the region interested in good forest management practices. Cikel makes its technical staff available for participating in various external training events.

After the adoption of improved forest management practices, the number of occupational accidents has drastically reduced. An occupational safety engineer and two technicians were hired (one for the industry and the other for the forest). There was a major investment in the acquisition of Individual Protection Equipment (IPE) that are distributed free of charge.

Cikel has excellent relations with the Goianésia community of Pará, the closest urban center to the FMU area. The company has also signed an agreement with the local municipality in the area of environmental education. Under the agreement with the State Department of Environment, Cikel's operations are used for teaching environmental education courses for teachers and students of the municipal network.

4.4 Cost-Benefit Analysis

Only partial cost-benefit analysis was possible based on the available data, as sufficient information on the increased sales revenue could not be obtained. Based on the additional costs (Table 4.1) and annual cost savings (from year 2 onwards), a partial net cash-flow was calculated. Its net present value at the discount rate of 12% was -USD 257,263. The negative NPV was heavily influenced by high investment costs. These were accounted for the first year but, in fact, the costs were distributed over a longer period of time before the certification process was completed. Taking the time distribution of these costs into account would have made the NPV even more negative.

Had there been comprehensive information available on the economic benefits, the net present value due to certification would have been clearly positive as a result of sales price increase (30%). This conclusion is supported by the fact that the company reported a 4% increase in its profit margin.

4.5 Financing

Cikel has not received external financing for covering the certification costs. However, the company has received support from ITTO for some minor projects not related to the certification. On the other hand, the company spent USD 69,000 as counterpart inputs (logistical support, technical follow-up, etc.) for these activities.

5. CONCLUSIONS

The results of the case studies carried out clearly illustrate the current situation of the Brazilian forest sector. While the plantation sector stands out as it applies modern technologies, respects the legislation and takes care of social and environmental impacts, the natural forest sector is still often linked with a technically obsolete production process, far behind the other sector (Cikel is an exception).

Inpacel is a very well-structured company which belongs to a large industrial group located in the southeast, the most developed region in the country. Forest certification is a common concern for the group's operations in various sites. Incremental impacts on the performance and management systems of certification tend, however, to remain limited.

Even before the beginning of its preparation for certification under CERFLOR, Inpacel has already been applying high technical, environmental, and social standards as part of their ISO 14 001 certified environmental management system. The relatively low compliance costs related to forest certification reflect an existing satisfactory status with regard to meeting the environmental and social criteria of the NBR 14789 standard.

Inpacel was the first company audited according to NBR 14789. Therefore, BVQI significantly reduced the pre-audit and main audit costs (direct external cost). This cost is very low compared to the audits cost carried out in Cikel.

Cikel is a national timber company operating within the traditional context of timber harvesting in the Amazon, characterized by generation of short-term benefits without the concern on sustainability of natural resources. This explains why the company's preparation for certification was a slow and onerous process which required re-structuring of some operations and high investments for meeting the environmental and social criteria of FSC. Cikel's operational adjustments to the requirements of forest certification were carried out by means of its own capital in spite of relatively high investment costs.

The differences observed in the forest certification process of the two companies make it difficult to compare the cost-effectiveness of the two certification systems. Due to the fact that Inpacel's forest certification is recent (2003), the company is still not yet in a position to carry out a proper assessment of the maintenance costs and the benefits resulting from their achievement. As for Cikel, it has a complete databank on the periodic costs related to certification since the last three years, being the first FMU certified under FSC in Brazil.

A more informative comparative study between the two certification systems could be carried out later when the first companies in the natural forest sector get certified under the CERFLOR NBR 15789 (National Standards for the Sustainable Forest Management of Natural Forests), or through an analysis of two companies of the plantation sector which have been certified under different systems. Such studies would be meaningful when a sufficient time period has elapsed since the issuance of the first certificate to the FMUs.

ANNEX 2

CASE STUDY ON INDONESIA

PT DIAMOND RAYA TIMBER
RIAU PROVINCE

Prepared by

Satria Astana

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Exchange rate: 1 USD = 8 400 Rp (2003)

1. INTRODUCTION

Natural production forest in Indonesia has traditionally been managed under the Government regulations. All activities from forest management planning up to marketing are subject to government interventions and control. Forest utilization, especially of natural production forest, has been managed by the so-called Tebang Pilih Indonesia (TPI - Indonesian Selective Cutting System) which was changed by introduction of Tebang Pilih Tanam Indonesia (TPTI - Indonesian Selective Cutting and Planting System).

The system includes a series of operations: forest gazzetment, pre-harvest inventory, road building, harvesting, post-harvest inventory, refining, liberation cutting, enrichment planting and thinning. The new system (TPTI) is similar to TPI except including the word "planting" for reminding that it is an important issue. Indeed, lack of planting by forest concession holders during the application of TPI (even though planting had actually been mentioned under the TPI system) pushed the Government to revise the system. Under the TPTI system, planting activity has been given a high priority in regulating the utilization of natural production forest.

A forest concessionaire not following the new system can be given penalty by revoking their license. In 1995, it was reported that out of a total of 541 forest concessionaires, only 54 succeeded to extend their licenses, while 84 licenses were revoked. The rest had been given to be managed by PT. INHUTANI (state forest enterprise) (Majalah Hukum dan Demokrasi Forum, 1995).

The Ministry of Forestry (MOF) had committed to implement eco-labelling certification by the year 2000. However, the policy was not successful in shifting conventional forest management towards sustainable forest management. For example, Soemitro (1996) reported that out of 61 sampled natural forest concession HPH units, only 15 were more or less ready for certification, 26 were almost ready, and 20 not yet ready. There was no HPH classified as fully complying with the standard. Later on, Soemitro (2002) reviewed a sample of 19 HPH units and the result revealed that 56% were inactive and 44% were active but not in full operation. The Ministry of Forestry (2003) reported that in January 2001, the number of active HPH was 359 units but in December 2001 it had dropped to 351 units. In January 2003, there were 270 HPH units left, of which only 14 units were undergoing certification assessment. Of there 14 units, one passed under joint certification of the FSC and LEI systems, 5 units passed under the national LEI system, in 2 units the assessment was still incomplete, and the rest (6 units) did not pass under the LEI system (LEI, 2003).

PT. Diamond Raya Timber (DRT) has been the HPH unit holding a certificate of both FSC and LEI systems. The company possessed the license of forest concession for the first 20-year period based on Forestry Agreement No. FA/N/039/VI/1978 and the Minister of Agriculture Decree No. 403/Kpts/um/6/1979 dated 27 July 1979. The forest area was 115,000 ha and the license expired on 27 June 1999. During the first 20-year concession period (1979/1980-1998/1999), the forest harvesting covered an area of 21,009 ha with a total log production of some 630,600 m^3.

PT. DRT has its license extended for the following next 20-year concession period. It has been approved by Minister of Forestry and Estate Crops Decree No. 443/Kpts-II/1998 dated 8 May 1998. The forest area is 90,656 ha and the license will expire in 2019. The reduction of the area (24,344 ha), compared to the first 20-year period, was due to the forest conversion for other uses such as oil palm plantation, transmigration and local community estate. Of the 90,656 ha, 80,000 ha have been designated as the effective production forest area with a cutting cycle of 40 years and annual allowable cut (AAC) of 2,000 ha. However, to secure its forest production in the long run, PT. DRT has considered to reduce its AAC by 10%, down to 1,800 ha.

PT. DRT has applied for forest certification since 1998. Under the Second Joint Certification Program between LEI and FSC (JCP II), it passed the LEI system in 2000 and the FSC system in 2001 (LEI, 2001).

2. FOREST CONCESSION OF PT. DIAMOND RAYA TIMBER

2.1 Organization

PT. DRT belongs to the same group with PT. Uniseraya involved in wood processing industry, both under the management of holding company called Uniseraya Group. PT. DRT is run by an Executive Director assisted by a Deputy Director and 6 managers (Figure 2.1). The six managers are: (1) administrative and finance, (2) forest camp, (3) forest planning and management, (4) harvesting, (5) environment, and (6) local community development and forest security. The harvesting department is the largest one while the environment department is the smallest one (PT. Diamond Raya Timber, 2000). The total number of permanent workers was 136 persons and non-permanent workers 125 persons.

2.2 Forest

2.2.1 Area

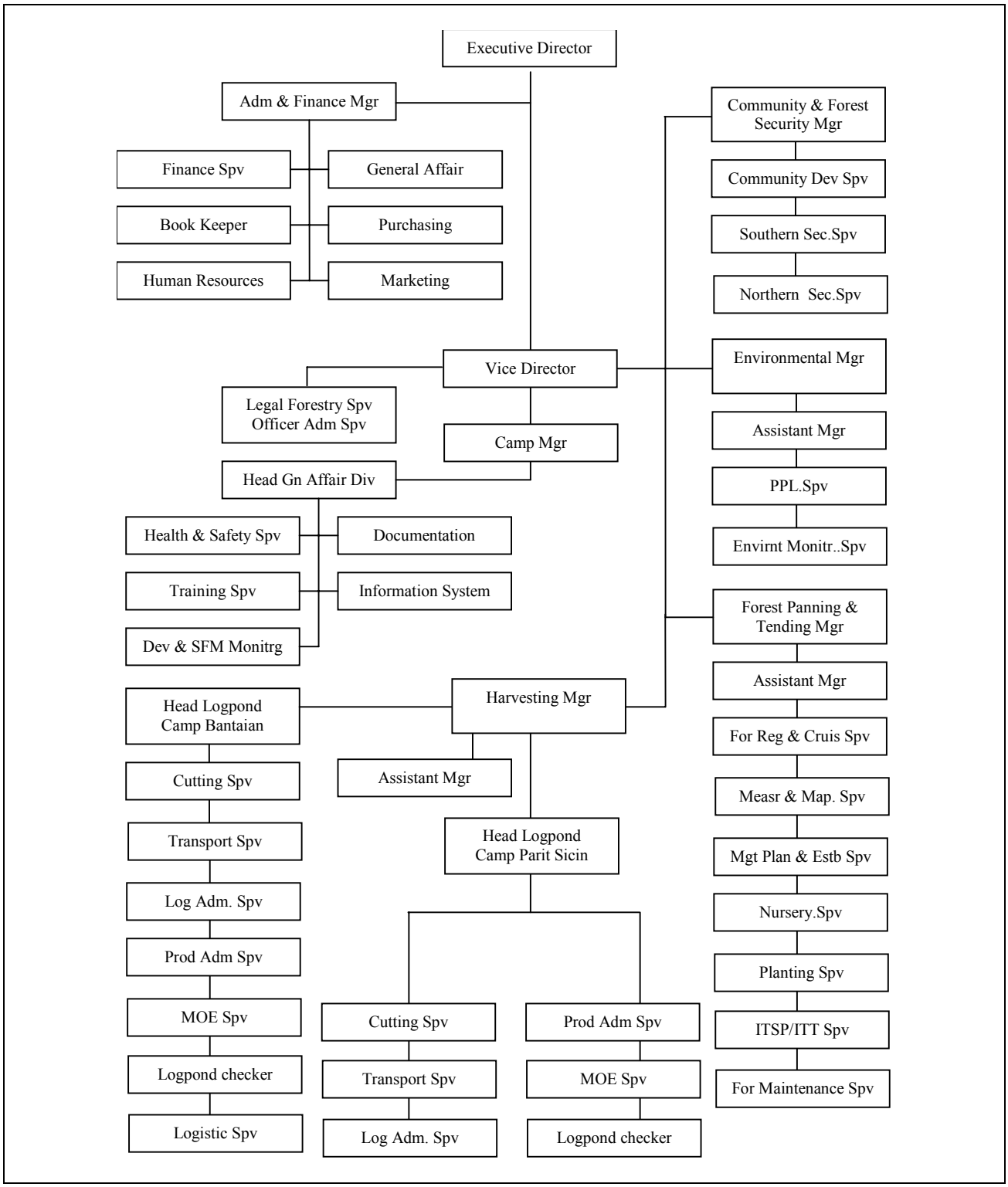
Based on the Minister of Forestry and Estate Crops Decree, the forest area of PT. DRT is 90,656 ha. Of this, 87,578 ha is considered productive forest consisting of 31,481 ha of logged-over area and 56,097 ha of virgin forest. Mangrove forest covers 1,611 ha and uncovered land area is 1,052 ha.

Of the productive forest area, 2,578 ha will be allocated for conservation forest (HCVF) and 5,000 ha for buffer zones, leaving net 80,000 ha for productive forest. At present, PT. DRT has allocated 350 ha for HCVF (Protected area/Kawasan Perlindungan Plasma Nutfah)[1]. The company has planned to allocate an additional area of 700 ha for HCVF[2]. The rest of 1,350 ha will be allocated for wildlife conservation forest at the forest border with the forest concession of PT. Silvasaki representing all types of ecosystems within the forest concession of PT. DRT; and other conservation forest for ecological research on flora and fauna (PT. Diamond Raya Timber, 2000).

[1] Sites no. 1027 1061 and 1 062 (300 ha), and 50 ha at sites no 1089 and 1090

[2] In the Sites no. 1027, 1061, 1062, 1089, 1090, 1192, 1147, 1123, 1052, 1051, 1036 and 1037

Figure 2.1 Organization Structure of PT. Diamond Raya Timber



2.2.2 Forest Location

The physical borders of PT. DRT are:

Northern parts	Malacca Straits (27 km)
Southern parts	HPH PT Silvasaki and PT Riau Tanah Putih (47,5 km)
Western parts	Rokan River (77,5 km)
Eastern parts	Malacca Straits (29 km)

2.2.3 Administrative Context

PT. DRT is under the following local government administration units:
- Province: Riau
- Regency: Bengkalis
- District: Rimba Melintang and Bangko

Forestry administration of PT. DRT is under the supervision of:
- Provincial Forest Authority in Pekan Baru
- Forest Authority Branch at Dumai District
- Forest Management Administration Unit at Bagan District
- Forest Management Administration Resort at Bagan District

2.3 Type of Forest

The forest concession of PT. DRT has two types of forest ecosystems: peat swamp forest and mangrove forest. The peat swamp forest is part of the lowland region between Rokan River and Malacca Straits. The vegetation peat swamp forest of PT. DRT concession has three forest types: (i) Terentang (*Campnosperma spp.*) - Pulai (*Alstonia pneumatophora*), (ii) Balam (*Palaquium obovatum)* - Meranti Batu (*Shorea uliginosa*), and (iii) Ramin (*Gonystylus bancanus*) - Suntai (*Callophyllum Macrocarpum*). The mangrove forest has two associations: *Sonneratia-Rhizophora spp.* and *Xylocarpus-Bruguera spp.,* i.e. from sea direction and from river direction, starting with Nipah (*Nypa fruticans*), *Xylocarpus granatum* up to *Bruguera cylindrica* in the middle part. *Bruguera cylindrica* is a commercial and dominant species with the diameter of 30-40 cm used generally as raw material for charcoal (PT. Diamond Raya Timber, 2000).

Within the forest, several types of fauna are found:
- mammals including: Harimau Sumatra (*Panthera tigris Sumatrae*), Harimau Dahan (*Panthera pardus*), Beruang (*Helarctos malayanus*), Trenggiling (*Manis javanica*), Ungko (*Hylobates agilis*), Lutung (*Presbytis cristata*), Beruk (*Macaca nemestrina*), Monyet Ekor Panjang (*Macaca fascicularis*), and Babi Hutan (*Sus barbatus*);
- more than 50 bird species including: Murai Batu (*Monticola solitarius*), Rangkong (*Buceros rhinoceros*), Murai Daun (*Cloropsis sonnerati*), Ciung Air (*Macronarus gularis*), and Bondol (*Lhonchura striata*) (PT. Diamond Raya Timber, 2000).

2.4 Type and Size of Production

Commercial timber species that are being harvested include: Suntai (*Callophyllum macrocarpum*), Meranti Bunga (*Shorea teysmaniana*), Meranti Batu (*Shorea uliginosa*), Ramin (*Gonystylus bancanus*), Pisang-Pisang (*Mezzotia parvifolia*), Balam (*Palaquium obovatum*), Punah (*Tetramerista glabra*), Medang Telur (*Cryptocarya crassinervia*), Bintangor (*Callophyllum inophyllum*), Durian Burung (*Durio cerinatum*), Pasal Linggo (*Aglaia ubiginosa*), and Serapat (*Callophyllum spp*). During the first 20-year concession period (1979/1980-1998/1999), the forest harvesting covered a total forest area of 21,009 ha and the volume of logs harvested was 630,636.47 m^3 (Table 2.1). In that period, the average annual forest area harvested was 1,167.17 ha yielding 35,035.36 m^3 of logs or 30.02 m^3 per ha.

Table 2.1 Actual Log Production of PT. Diamond Raya Timber during the First 20-Year Concession Period, 1979/80-1998/99

Year	Harvesting area (ha)	Volume (m^3)
1979/80	200	8,094.30
1980/81	820	16,200.53
1981/82	0	0
1982/83	155	1,851.09
1983/84	62	1,110.00
Sub-total	***1,237***	***27,255.92***
1984/85	144	3,873.79
1985/86	0	0
1986/87	80	2,672.85
1987/88	575	19,525.35
1988/89	963	38,495.13
Sub-total	***1,762***	***64,567.12***
1989/90	1,433	46,415.80
1990/91	1,595	39,423.35
1991/92	1,375	42,554.87
1992/93	1,633	47,154.70
1993/94	1,475	40,037.01
Sub-total	***7,511***	***215,585.73***
1994/95	1,724	49,335.07
1995/96	2,210	70,108.69
1996/97	2,202	69,043.11
1997/98	2,577	79,388.25
1998/99	1,786	55,352.58
Sub-total	***10,499***	***323,227.70***
Grand Total	**21,009**	**630,636.47**

Source: PT. Diamond Raya Timber, 2000

In the next 20 years, PT. DRT is planning to annually produce 57,177 m^3 or 31.7 m^3 per ha, or slightly higher than that of the first 20-year concession period (PT. Diamond Raya Timber, 2000). This corresponds to the annual harvesting area of 1,800 ha.

2.5 Socio-economic Aspects of Local Communities

2.5.1 Location and Distribution of Local Communities

The location and population of local communities are listed in Table 2.2. The communities are located in three districts: Bagan (4 villages), Bangko (10 villages), and Rimba Melintang (2 villages). The villages are outside the forest, i.e. in the western and eastern side of the concession area. Villages are located at the edges of the FMU and along the public road.

Three ethnic groups are living in the communities: Melayu, transmigrant of Java (Javanese), and Chinese. Bagan Siapi-api is the town where the majority of ethnic Chinese live. In the villages, majority of people is Melayu and there is also a small number of Javanese. The total population living around the forest area of PT. DRT was 66,142 persons.

Table 2.2 Location and Distribution of Local Communities around Forest Concession of PT. Diamond Raya Timber

District/Village	Population
Bagan District	
1. Bagan Kota (Bagan Siapi-api)	10,497
2. Bagan Barat	12,876
3. Bagan Timur	7,384
4. Bagan Hulu	8,974
Bangko District	
1. Bantaian	1,110
2. Sungai Sialang	1,423
3. Labuhan Tangga Kecil	1,189
4. Labuhan Tangga Besar	1,826
5. Bagan Punak	6,758
6. Bagan Jawa	4,607
7. Parit Aman	2,729
8. Raja Bejamu	2,413
9. Sungai Bakau	1,417
10. Sinaboi	2,862
Rimba Melintang District	
1. Lenggadai Hulu	1,385
2. Lenggadai Hilir	659
Total	**66,142**

Source: PT. Diamond Raya Timber, 2000

2.5.2 Livelihood of Local Communities

The majority of local people living in the northern parts tends to derive their main income from fishing and estate crops farming. Only few of them derive their income from timber and non-timber forest products. In contrast, the majority of local people living in the southern parts tends to derive their income from forest (medang and pinang) and dryland farming (paddy). However, only few of them are working as labor in the forest concession. Most of the workers in the forest concession were recruited from other regions, including from Java island.

2.6 Markets

Most of logs produced by PT. DRT are sold to the sister company PT. Uniseraya which has a wood-working mill. PT. DRT supplies 70% of PT. Uniseraya's raw material needs. The main species supplied are ramin and suntai. The wood products processed and exported are mouldings, louvre doors, furniture and finger-jointed timber. A majority of production is exported to the European markets (UK, Italy, the Netherlands), and the rest to the Asian markets (China and Japan) and Australia. The total volume of the products exported has been about 15,200 m^3 per year on average (Table 2.3).

Table 2.3 Export Volume

Year	m^3
2004e*	12,900.0
2003	19,269.1
2002	14,323.4
2001	12,953.3
2000	14,177.5

* estimate

3. COSTS OF CERTIFICATION

Costs of forest certification are classified into two categories: direct costs and indirect costs. Direct costs are defined as costs spent in relation to the administrative process of holding a certificate. Direct costs constitute direct internal costs and direct external costs. Direct internal costs are spent by the forest management unit (FMU) during the administrative process of acquiring and holding a certificate, excluding contract costs of certification assessment by an independent third party. Indirect costs are defined as costs spent in relation to achieving and maintaining sustainable forest management (SFM).

Such a cost classification is workable in a situation where there is a change in forest management from conventional to sustainable practices and a situation where forest is already sustainably managed. The PT. DRT case is an example of the former situation. Under conventional harvesting in Indonesia, only a small percentage of the great variety of species and tree sizes are harvested but the damage to residual trees and environment is extensive, which is wasteful. In order to improve the overall performance, the Indonesian Government and industry have been developing better technologies (Matikainen and Natadiwirya, 2001).

3.1 Direct Cost

In the case of PT. DRT, the certification process has experienced three cycles of assessment. In 1998, the forest concession was assessed under the LEI system and on 15 March 1999, it was announced that PT. DRT passed. However, there were many complaints from the public, and a reassessment was conducted under JCP I. On 3 January 2000, it was declared that PT. DRT should implement major Corrective Action Requests under the FSC system. A reassessment was then continued under JCP II. On 28 October 2000, PT. DRT was declared to have passed under the LEI system and on 27 March 2001, PT. DRT was declared to have passed under the FSC system (LEI, 2001).

3.1.1 Direct Internal Costs

The direct internal costs of certification may be classified into four categories:

(i) Costs spent for consultants. The tasks of consultants are to help the FMU in interpreting and advising the implementation of SFM. In the case of PT. DRT, there were six consultants hired: 2 specialists in ecology and wildlife management and conservation (peat swamp forest; mangrove forest), 2 specialists in forest management and silviculture (peat swamp forest; mangrove forest), and 2 specialists in growth and yield (peat swamp forest; mangrove forest).

(ii) Costs spent for internal auditing. The objective of internal auditing was to check the implementation of SFM as a whole prior to the formal certification assessment. In the case of PT. DRT, the internal auditing was conducted by the Executive Director and Deputy Director.

(iii) Costs spent for invitation of bids. According to the rules of LEI system, the invitations of bids were announced in local and national daily newspapers.

(iv) Costs of own staff spent for meetings prior to and during formal certification assessment. The costs of meetings consist of transportation and accommodation costs recurring due to consultation process in planning and implementing SFM with the consultants. Verification sessions of the decision making process on certification assessment by Expert Panel I and II were held in both Riau and Jakarta.

Based on the above information, the direct internal cost of forest resource certification was estimated at USD 72,571.43 (USD 14,514.29/year or USD 0.25/m^3) (Table 3.1).

Table 3.1 Total Direct Internal Costs of Certification

Item	Internal costs of certification	USD
1	Consultants	32,143
2	Internal auditing	2,381
3	Application costs	2,024
4	Meeting visits in relation to consultation process of preparation with consultants	5,952
5	Meeting visits in relation to certification decision making process in expert panel I and II	2,857
	Total	**45,357**
	Total cost (USD/year)*	**9,071**
	Total cost (USD/m^3)**	0.16

Notes:
Items 1,2,3,4,5 were treated as direct internal (investment) costs of certification. The validity period of certificate is 5 years. Interest rate of 12 % per year was applied to calculate total direct internal (investment) costs of certification.
* Total direct internal cost of certification divided by 5 years.
** Total direct internal cost of certification per year divided by annual log production (57 177 m^3)
Details on each cost item are as follows:
1: Consisting of field visits (accommodation & transportation) and fee, including acquiring references and printing the report (Management Plan for Sustainable Production Forest of PT. Diamond Raya Timber). The costs spent were for 6 persons @ Rp 45 mill.
2: Internal auditing was conducted by Executive Director and Vice Director through field visits to check the readiness of the FMU to be assessed in implementing SFM. The costs spent were for 2 persons, 10 times of inspection @ Rp 1 mill.
3: A LEI system rule. The costs spent consisted of invitation bids at national daily Kompas @ Rp 16 mill. and at local daily Riau Pos @ Rp 1 mill.
4: Meeting visits in relation to consultation process with the consultants in planning and implementing SFM. The costs spent consist of transportation and accommodation costs. The costs spent were for 2 persons, 5 times a visit in Bogor @ Rp 5 mill.
5. Verification sessions of decision making process of certification in the Expert Panel I and II. The costs spent consisted of transportation and accommodation costs, calculated for 2 persons, 2 times a visit in Riau @ 1 mill. and 2 persons, 2 times a visit in Jakarta @Rp 5 mill.

The annual costs of certification related to internal activities were calculated by dividing the initial investment costs by five years, i.e. the validity period of certification. The unit costs per m^3 was calculated by dividing the annual cost by the expected annual production (57,177 m^3).

3.1.2 Direct External Costs

The direct external costs of certification may be classified into three categories:

(i) Costs spent for scoping/pre-assessment. Under the LEI system, it is called Expert Panel I. If the company passes pre-assessment, the process will continue to Expert Panel II. The cost consisted of transportation and accommodation costs and fees. For the FSC system, the cost spent was estimated based on per field visit expenditure.

(ii) Costs of the main audit. Under the LEI system, the main audit is called Expert Panel II. This Panel decides whether the applicant passes or not the certification assessment. Under the FSC system, there is no such facility. Instead, major Corrective Actions Requests (CARs) are identified which should be implemented successfully within a defined deadline (6 months). If the FMU cannot fulfill these CARs, then the certificate will be suspended.

(iii) Cost of surveillance. The surveillance is conducted during the validity period of the certificate, i.e. five years (LEI and FSC systems). Under the LEI system, the surveillance is carried out once a year whereas under FSC system it takes place twice a year.

Based on the above elements, the direct external cost of forest certification was estimated at USD 176,316 (USD 35,263/year or USD 0.62/m^3) (Table 3.2). The high figure is partly explained by double certification under the two systems and that the cost covers both forest and CoC certification. The share of forest certification is two thirds of the total costs.

The total costs of the FSC system for forest certification are lower than those of LEI but for CoC certification, they are higher in this case due to significantly higher costs of surveillance audits and possibly also involvement of expatriate assessors (

Table 3.3). The total cost estimate can be considered fairly reliable but the breakdown may not necessarily be accurate as contracts are not always detailed by item.

The direct annual unit costs of external certification services are estimated at USD 1.94/ha (total area) or USD 0.62/m^3 for double certification. If only one of the systems were to be applied, the respective costs would be in the range of USD 0.81 to 1.09/ha and USD 0.27 to 0.34/m^3.

Table 3.2 Direct External Costs of Certification

No.	Direct external costs of certification	USD
Forest certification		
1	Scoping/pre-assessment LEI: Field checking & Expert Panel I FSC: Field audit & review	 17,524 5,600
2	Main audits LEI: Field audit and Expert Panel II FSC: Field audit & review	 24,882 5,600
3	Surveillance within the 5-year period LEI: 4 times @ Rp 71 000 000 FSC: 9 times @ USD 3 500	 33,810 31,500
	Subtotal	***118,916***
	*Subtotal cost (USD/yr)**	*23,783*
	*Subtotal cost (USD/m^3)***	*0.42*
CoC certification		
4	Main audit LEI: Field audit & Expert Panel FSC: Field audit & review	 6,400 8,000
5	Surveillance within 5 years LEI: 4 times @ USD 4 000 FSC: 9 times @ USD 3 000	 16,000 27,000
	Subtotal	***57,400***
	Subtotal cost (USD/yr)*	11,480
	Subtotal cost (USD/m^3) **	0.20
	Subtotal cost (USD/m^3 round wood equivalent) ***	0.38
	Total external cost for the 5-year period	**176,316**
	Total average annual cost (USD/year)*	**35,263**
	Unit cost (USD/m^3)**	**0.62**

Notes:
Items 1,2,3,4,5 were treated as direct external (investment) costs of certification where validity period of certificate is 5 years.
* Subtotal/total cost per year = Subtotal/total cost divided by 5 years.
* * Subtotal/total cost per m^3 = subtotal/total cost per year divided by annual log production (57,177 m^3)
*** Subtotal cost per m^3 round-wood equivalent = subtotal cost per year divided by average annual volume of wood products exported. Average annual wood products exported in the last four years = 15,181 m^3, recovery rate = 50% or annual round wood equivalent exported = 30,362 m^3.
1: Scoping/pre-assessment in the LEI system is called Expert Panel I. Field visits conducted during 7-10 days. Under the LEI system, if the FMU passes Expert Panel I, the assessment will continue to Expert Panel II. Under the FSC system, there is no rule of passing intermediate stages but there are time limits for addressing the major CARs.

Table 3.3 Direct External Costs of Certification under the LEI and FSC Systems

Item	LEI	FSC
	USD	
Forest certification - scoping /pre-assessment - main audit - surveillance audits	 17,524 24,882 33,810	 5,600 5,600 31,500
Sub-total	**76,216**	***42,700***
CoC Certification - main audit - surveillance audits	 6,400 16,000	 8,000 27,000
Sub-total	**22,400**	***35,000***
Grand Total	**98,616**	***77,700***

3.2 Indirect (Compliance) Costs

3.2.1 Changes in Forest Management

In managing its forest concession, PT. Diamond Raya Timber has been complying with government regulations. Certification driven by international markets has contributed to implementing SFM. However, there have been some government regulations which are not suitable for the operating conditions in the forest. For example, tending activities of residual stands consist of liberation cutting and thinning. These activities are in fact hard to implement due to difficult conditions in the peat swamp forest. Furthermore, effectiveness of such activities in accelerating the regeneration process in peat swamp forest is still an open question. On the other hand, liberation cutting operation may reduce biodiversity and disturb ecosystem functioning in the forest.

Certification has brought three new aspects into the management of the forest concession of PT. DRT. Firstly, there is now a significant effort to improve marking of forest boundaries. Secondly, there is now a serious effort in planting of open areas such as former log-yards and railway tracks, and in shrub areas where there is no natural regeneration. Thirdly, forest inventories are carried out in more detail than in the past as part of the efforts to reduce logging damage. The respective costs are part of the compliance cost of the certification standards of the LEI and FSC systems.

3.2.2 Cost of Performance Criteria in Forest Management

There are six cost components of performance criteria in forest management which are estimated (Table 3.4):

Table 3.4 Costs of Compliance with Performance Criteria in Forest Management

No	Costs of Performance Criteria in Forest Management	Investment cost USD	Annual cost USD
1	Additional area set aside from production Establishment of production forest boundaries		
	a. Production peat swamp forest (80,000 ha)	30,476	-
	b. Conservation peat swamp forest and mangrove forest (710 ha)	879	
	c. Production mangrove forest (1 601 ha)	1,982	-
	d. Non-forest utilization (1 052 ha)	1,302	-
	Sub-total	***34,640***	**-**
2	Additional measures taken for harvesting		
	a. Evaluation of the allowable cut for ramin species (annual cost for 5 years)	-	8,036
	b. Prevention of illegal logging (annual cost for 4 years)	5,357	259,286
	Sub-total	***5,357***	***267,321***
3	Changes in regeneration and silviculture Planting and maintenance of trees at former log-yards and railway tracks and shrub land (annual cost for 5 years)	-	37,460
4	Introduction of reduced impact logging equipment and methods Establishment of better storage to prevent spreading water pollution by chemical materials (annual cost for 5 years).	-	3,571
5	Wood-yards/log-yard System for CoC (annual cost for 5years)	119,048	9,429
6	Road building The use of logging waste instead of felling trees for railroad track maintenance (annual cost for 5 years).	-	1,873
	Total	**159,545**	**319,655**
	Total cost in 5 years	**1,498,032**	
	Total average annual cost (USD/year)	**299,606**	
	Unit cost (USD/m^3)	**5.24**	

Notes: Items 2a, 3, 4, 6 = additional operational cost due to certification.
Item 2b = investment cost of security check points and additional operational cost of security workers and coordination with law enforcement institutions.
Item 5 = additional investment cost of equipment (life time 10 years) and additional operational cost of workers.
Details on each cost item:

1: Investment cost only: calculation is based on PT. DRT standard cost of forest demarcation = Rp 800,000 per km, excluding costs of participative process with local communities if there is land tenure conflict; a, b, c, d, e in ha are converted to km. It is assumed that 10,000 ha = 40 km to estimate a; 1,000 ha =13 km to estimate b, d and e; and 10 ha = 1.3 km to estimate c (in reality, it can be either shorter or longer); amortized annually within 1-year forest concession management (except point a within 5-years forest concession management).

2a: Operational cost only: conducted in every year when proposing RKT (plan annual harvesting block). Its total cost is Rp 67.5 mil. per year.

2b: Investment and operational costs: establishment of 6 security check points @ Rp 7.5 mill. with service life of 5 years; operational cost: at each check point, 2 guards with monthly salary of Rp 750,000; monthly coordination with law enforcement officers with intensity of 3 times (each coordination cost at Rp 60 mil. in a month). Operation costs occur from year 2 onwards.

3: Operational cost only: nothing changes in regeneration and silviculture as planting and maintenance are only intensified. Application of Selective Cutting and Planting System makes natural regeneration sufficiently sustainable. Planting trees at former logyards and railroad tracks by pioneer species (mahang, pulai, simpur, balam) and in shrub areas where there is no natural regeneration of pioneer species, enrichment is done by commercial species (suntai, balam, meranti batu); total cost of planting is Rp 2,533,300,000 and maintenance is Rp 3,760,000,000 within a 20-years forest concession management.

4: Investment cost only: establishment of better storage and small pond and ditches to prevent spreading water pollution by chemical materials used for preservation for ramin species; an annual harvesting block (RKT) needs 3 units; cost per unit is Rp 10 mil. with service life of one year.

5: Investment and operational costs: change in storing logs at log-pond/log-yard to grouping them according to species (ramin, suntai, and mixed species); additional costs of equipment (one new excavator @ Rp 1 billion, service life 10 years); operational cost: 1 worker @ Rp 3 mil./month; it is assumed that the need for fuel is 80 liters per day @ Rp 1,500 per liter. Operational costs occur from year 1 onwards.

6: Operational cost only: (not for new road/railway because it will be unavoidable to cut trees); but for road maintenance in which it usually needs to be replaced after 3-4 months. (Background information: the length of railway constructed per year is 20.2 km and the wood volume required is 3,934 m^3 per year of which 2,179 m^3 is gained by cutting the trees along the track and 1,755 m^3 around the track). Collecting of 1 m^3 logging waste costs of Rp 2,000. The replacement in a year is 4 times and it is assumed that the logging waste required is 7,867.m^3 per year (50% of construction need for 1 time replacement).

(1) Forest boundaries. According to FMU, the forest boundary had been completed in 1997. However, when the FMU applied for certification, the conditions of the forest boundaries had changed. For example, the FMU had established an effective area of production forest and some areas had been allocated for conservation forests, and some other areas had been left for use by local people such as mangrove forest for "panglong" utilization (local economic activities to produce charcoal/cottage charcoal industry). It is difficult to estimate the establishment cost of each forest boundary and, therefore, the cost was estimated based on the length of boundary using a standard cost per km. It is assumed that the boundaries are direct lines of squares.

(2) Additional measures taken during harvesting including adjustment of AAC for ramin species and illegal logging prevention. Ramin is included in CITES Appendix 2 and to avoid excessive cutting, there should be a quota for its production to ensure that the production potential will not gradually decrease in the long term. Illegal logging should be effectively controlled to ensure that SFM is well implemented. Table 3.4 reveals that illegal logging prevention is costly. It is due to fact that the FMU has to intensively coordinate with other stakeholders, especially law enforcement officers. Where enforcement is effective, the costs for the FMU could be lower.

(3) Planting in former logyards, railroad and tracks and shrub land as required by certification.

(4) Establishment of better storage wood area as part of the RIL harvesting.

(5) Compatibility with the CoC requirements. The additional cost is due to increased activities at the log-pond. CoC certification requires that the FMU should group its logs at log-pond according to species in order to be easily traced.

(6) Utilization of logging waste instead of felling trees. Certification audit has recommended that raw material for railway sleepers should be made of logging waste scattered in harvesting blocks.

The additional cost of fulfilling these performance criteria in forest management was estimated at USD 5.24/m^3 (USD 299,606/year). The average annual compliance costs per ha is estimated at about USD 3.30 which is calculated over the whole concession area. The largest cost item is prevention of illegal logging (72% of the total).

3.2.3 Costs Related to Social Criteria

In general, social criteria refer to the socio-economic conditions of workers and local communities and their relationship with the FMU. Costs related to social criteria may, therefore, be defined as costs spent for improving socio-economic conditions of the people impacted. Under conventional forest management, these conditions are often not always paid due attention to. Accordingly, there are additional costs due to the application of sustainable forest management criteria.

The costs related to social criteria are presented in Table 3.5. The largest cost item was work incentives followed by occupational safety and health, and the cost of participation of local communities. The last cost item is due to government regulation but it is important for SFM to ensure that the FMU is involved in developing socio-economic conditions for local communities. In turn, it is expected that local communities are aware of SFM and the benefits that it generates for them.

Table 3.5 Compliance Costs Related to Social Criteria

No.	Item	Investment cost USD	Annual cost USD
1	Occupational safety and health:		
	a. ASKES (health insurance for workers)	-	3,175
	b. JAMSOSTEK (workers social security)	-	14,286
	c. Work incentives	-	47,000
	d. Training	-	17,857
	e. Nutrition package	-	35,714
	Sub-total	**-**	***118,032***
2	Provision of social services:		
	Provision of health services	4,762	20,000
3	Participation of local communities:		
	Development of Forest Village Communities	-	23,810
4	Respect of customary rights of local people:		
	a. Land compensation for railway construction	-	2,411
	b. Security control support to mangrove forest utilization by local people	1,786	2,411
	Sub-total	***1,786***	***4,822***
	Total	**6,548**	**166,663**
	Total five-year cost (USD)	**839,861**	
	Total average annual cost (USD/year)	**167,972**	
	Unit cost (USD/m^3)	**2.94**	

Notes:
Items 1, 2, 3, 4a = additional operational costs due to certification.
Items 4b = additional investment cost of security check point (service life = 5 years) and additional operational cost of security workers.

Details on each cost item:

1a: Operational cost only: provision of ASKES for permanent workers totally Rp 80 mil. per 3 years.
1b: Operational cost only: provision of JAMSOSTEK for non-permanent workers Rp 120 mil. per year.
1c: Operational cost only: provision of incentives for permanent staff @ Rp 500,000 per month for 10 managers; @ Rp 300,000 per month for 27 supervisors; @ Rp 200,000 per month for 99 staff.
1d: Operational cost only: 30 training courses per year; cost @ Rp 5mil. per training course.
1e: Operational cost only: nutrition for 125 non-permanent workers once in two weeks; @Rp 50,000 per unit.
2: Investment and operational costs; operational cost: 1 doctor, two visits in a month @Rp 3 mil. per month; 3 assistants working daily, each @ Rp 2 mil. per month; investment cost: clinic construction and equipments @ Rp 40 mil., service life 10 years; operational cost: medicine @ Rp 5 mil. per month.
3: Operational cost only: Support to 5 villages each @ Rp 40 mil., completed within a year (government regulation is only 2 villages in a year).
4a: Operational cost only: At Labuhan Tangga Besar and Bantaian villages; land compensation at Rp 9 mil. per ha; total area 2,25 ha; completed in a year.
4b: Investment and operational costs; Investment cost: Construction of two non-permanent check points of control @ Rp 7.5 mil., service life five years; operational cost: salaries of guards each @ Rp 750,000 per month; each check point needs two guards.

Overall, the total costs related to social criteria were USD 2.94/m^3 (USD 167,972/yr), which represents 56% of those of performance criteria in forest management.

3.2.4 Costs Related to Management System Criteria

The costs related to management system criteria were estimated at USD 0.45/m^3 (USD 25,975/yr) (Table 3.6) The main reasons were that certification has made the FMU to carry out detailed inventory and intensively monitor its activities in forest production and ecological and social impacts. The cost of monitoring activities alone account for USD 10,476/yr. The other important activities included establishment of permanent sample plots (PSP). These were recommended to be implemented in addition to PUP (Permanent Measurement Plots) established under the government

regulation. PSPs were introduced because PUPs were not considered sufficiently representative to evaluate and study the condition of virgin and logged-over forest.

Table 3.6 Compliance Costs Related to Management System Criteria

No.	Type of additional cost related to management system	Investment cost USD	Annual cost USD
1	Inventory		
	a. Establishment of Permanent Sample Plots covering virgin and logged-over forests	-	7,143
	b. Tree cruising	-	5,624
	Sub-total	**-**	***12,766***
2	Management plan		
	Management plan of high conservation value forest (HCVF)	1,775	-
3	Monitoring system		
	a. Establishment of SOPs	-	2,976
	b. Monitoring activities in production, ecological and social functions	-	7,500
	Sub-total	**-**	***10,476***
4	Documentation		
	Establishment of GIS and MIS data-bases	11,905	-
	Total	**13,680**	**23,243**
	Total 5-year cost (USD)	**129,895**	
	Total average annual cost (USD/year)	**25,979**	
	Unit cost (USD/m^3)	**0.45**	

Notes:
Items 1a, 1b, 3b = additional operational costs due to certification.
Items 2, 3a, 4 = additional investment costs (5 years).
Cost per ha = total additional cost per year divided by the whole concession area (90,656 ha)
Cost per m3 = total additional cost per year divided by annual log production (57,177 m^3).
Details on cost items:
1a: Operational cost only: Started in year 2000 and in 2003. The number of PSPs was 60 units. It is therefore assumed that establishment rate of PSPs is 15 plots per year. The establishment cost is Rp 4mil. per PSP budgeted in every RKT (Rencana Karya Tahunan/Annual Working/Harvesting Plan).
1b: Operational cost only: Tree mapping and inventory are 25% for core trees and harvested trees (government regulation) as well as protected seed trees. Tree mapping is done in more detail than that of government regulation. There was a 25% additional cost compared to that of government regulation (Rp 17,500 per ha). Annual harvesting area is 1,800 ha and mapping cost is USD 0.52/ha of operational area.
2: Investment cost only: PT. DRT standard cost of making management plan is Rp 2,000 per ha for 20-year forest concession management (RKPH = Rencana Karya Pengelolaan Hutan) and Rp 650 per ha for five-year forest concession management (RKL = Rencana Karya Lima Tahunan). Cost of completing RKT (Rencana Karya Tahunan = Annual Working Plan) was Rp 19 m. The area of conservation forest (High Conservation Value Forest) is 710 ha. It is assumed that the total cost of making management plan for this forest is the cost of RKPH plus 4 times cost of RKL plus 20 times cost of RKT; amortized annually within 20 years.
3a: Operational cost only: The total cost of establishing SOP was Rp 25mil and it was assumed to be evaluated every five years (validity period of certification).
3b: Operational cost only: Monitoring activities of production, ecological and social aspects (6 activities monthly; 4 activities quarterly; 11 activities annually, 5 persons @ Rp 500,000 per day for accommodation and Rp 500,000 per day for team transportation) within a year.
4: Investment cost only: Total cost of establishing database management was Rp 100 mil. and it is assumed that it be evaluated (updated) every five years

Violating the PUP regulation would lead to penalty. For this reason, PSP is considered an additional activity to achieve SFM. The cost of establishing PSPs was USD 7,143/yr, the second biggest individual item after monitoring activities.

The other activities are less costly. Cruising of protected seed trees, trees to be harvested and core trees (trees left for the next cutting cycle) is a new activity introduced to ensure well-established

natural regeneration. HCVF was introduced by the FSC system. In fact, the FMU should also conserve some forests to comply with the government regulation which could reduce the additionality of the HCVF measures. As in the case of PSP and PUP, the different concepts on SFM components among stakeholders has actually created double costs for FMU for no additional benefit.

Another relevant cost item is the cost of developing and establishing SOPs (standard operating procedures) but it was the smallest cost item of the management system criteria. SOP is a new element for FMU since conventional forest management is usually practiced without SOP. This is also true for the GIS and MIS data-bases, although their cost is higher than that of SOP.

In summary, certification has lead to major changes in the management system but the respective total costs were not significant (USD 0.45/m^3). They were mostly due to monitoring activities.

3.2.5 Cost Related to CoC Performance Criteria

As PT. DRT is part of the PT. Uniseraya Group, the costs related to CoC certification are borne by both the FMU and MMU (mill management unit). The direct benefits are obtained by the MMU through price premium of the wood products exported. Allocation of direct benefits between business units is decided by the holding company management.

In the case of PT. Uniseraya mill, the additional costs due to CoC certification are: (1) establishment of warehouse, (2) documentation/administration and labeling of wood products, and (3) training. Training is an important element since conventional management does not apply any tracing systems. According to the MMU experience, the insertion of CoC certification requirements into the management system took about four years and extensive training was the critical factor for success. Based on the average volume of wood products exported, the cost of training at the sample MMU accounted for USD 10,000/yr. The additional cost of administration and labeling of wood products was USD 21,429/yr.

The establishment of a new warehouse was due to the need for separation of raw materials and wood products according to their types to ensure that there is no “contamination” between certified and non-certified materials and wood products. The investment cost of establishing the new warehouse (storage) accounted for USD 35,714. The total additional cost due to CoC certification was of USD 1.27/m^3 (USD 38,572/yr) (Table 3.7).

Table 3.7 Compliance Costs Related to CoC Performance Criteria

No.	Additional cost related to CoC performance criteria	Investment cost USD *	Annual cost USD
1	Establishment of 2 units of warehouse	35,714	-
2	Administration and labeling of wood products	-	21,429
3	Training	-	10,000
	Total	**35,714**	**31,429**
	Total 5-year cost (USD)	**192,859**	
	Total average annual cost (USD/year)	**38 572**	
	Unit cost (USD/m^3)*	**1.27**	

Notes:
Item 1 = annualized additional investment cost of warehouse/storage due to certification.
Item 2,3 = additional operational costs.
* = additional cost per year divided by round wood equivalent of wood products exported (30,362 m^3), which is average export volume of wood products in the last four years (15,181 m^3) divided by recovery rate (50%).
Details on each cost item:
1: Investment cost: establishment 2 units of warehouse @ Rp 150 mil., service life 10 years.
2: Operational cost: additional cost of Rp 15 mil. per month in addition to ordinary documentation/ administration.
3: Operational cost: internal training @ Rp 2 mil. per month and external training @ Rp 5 mil. per month.

4. BENEFITS OF CERTIFICATION

4.1 Economic Benefits

4.1.1 Direct Benefits (Additional Revenues)

Allocation of sales revenue benefits between the FMU and MMU is a difficult internal management decision involving judgement. The management of PT. Uniseraya estimated that the direct benefit of CoC certification was an 8% increase in wood product prices (on average) which was partly distributed to the FMU of PT. DRT.

All the logs produced by PT. DRT are sold to PT. Uniseraya mill. The increase in log prices may not be a result of CoC certification as it is also influenced by a general increase in domestic prices of the inputs used. Only part of the increase may be due to additional costs of sustainable forest management (forest certification effect).

On the other hand, the increase in sales volume may not be a result of CoC certification but it may be due to annual variation in productivity resulting from the stock density and composition of the harvesting blocks, or to a general increase in demand (non-certified and certified).

The annual harvesting blocks in natural production forest are heterogeneous and the log production potential of annual harvesting blocks tends to differ from one year to another. In addition, the actual production of logs per year is limited by the sustainability condition of harvesting, and the level of the logs annually processed depends on the volume of all the wood products sold.

Therefore, it is necessary to separate the direct benefits of CoC and forest certification. The benefits of forest certification are difficult to evaluate with price and sale volume indicators at the FMU

level. These benefits may be assessed by using other measures such as government incentives. For example, unlike other forest concession holders, PT. DRT is allowed to determine its own annual harvesting block (RKT). This brings benefits since the company is not affected by the national soft-landing policy, i.e. reduction in national log production (5.7 mil. m^3 in year 2004). Under this national policy, the annual harvesting plan of uncertified forest concession holders will be reduced according to the annual sustainable log production potential as assessed by the government.

There is actually no direct cash benefit of forest certification to FMU. The only direct benefit is the share of product price and volume increase as a result of CoC certification of which a part is distributed to the FMU to cover additional costs of sustainable forest management. Unfortunately, the FMU's share of the total revenue is always allocated with the principle of "zero balance" as otherwise the FMU would not be sustainable. This is also true for the mill management unit (MMU) since it is also treated by the holding company in the same way as the FMU.

The price premium of certified wood products sold by MMU was estimated at 10-15%. Allocation of this benefit may have consequences for the long-term management of FMU and MMU, given that the other business units within the holding company may need significant financial support, or there may be investment needs into a new business unit.

On the other hand, the MMU has recognized that CoC certification cannot be achieved if there is no forest certification of the FMU. The MMU has also recognized that CoC certification has increased the demand for its wood products. According to the MMU, the price premium and additional sales volume of wood products occurred after two years from obtaining the certificate. However, not all of the increased sales potential of wood products has been tapped as the production is limited by the annual sustainable log supply. The increase in the sales volume was realized not only in the existing markets (Europe) but also through gaining new markets (Australia).

The company's garden furniture and louvre doors contain 70% of certified material, and mouldings contain 100% of certified material. The price premium obtained was based on the certified material content of the product. In 2003, the total volume of the wood products sold was 19,269 m^3 and its composition was as follows:

	Percent
Garden furniture	12.0
Mouldings	71.6
Louvre doors	2.7
Finger-jointed	12.3
Dowel	1.4
Total	**100.0**

Based on the above information and by assuming that the price premium was 10-15% and the per m3 average price of garden furniture, mouldings and louvre doors was USD 650, USD 600 and USD 750 respectively, the total direct benefit of the wood products sold in 2003 has been estimated in Table 4.1. When the price premium received by the MMU was taken as 10% (Scenario A), the total direct benefit of certification would be USD 2.43 mil. for the five-year period and with the price premium of 15% (Scenario B), the total benefit would be USD 3.65 mil. Mouldings contributed 81% to the total amount, followed by garden furniture (15%) and louvre doors (4%). Finger-jointed and dowel had no price premium as these wood products are not yet certified.

If the entire increased sales revenue were to be accounted for the wood raw material used, it would have been about USD 42 or 64/m^3 (log volume) depending on the scenario. However, as the MMU is purchasing certified materials from the open market (New Zealand radiata pine sawnwood) such a direct comparison would be misleading.

4.1.2 Indirect Financial Benefits (Cost Savings)

Indirect benefits have occurred at both FMU and MMU levels. In the FMU, they included (a) cost reduction due to self-assessment (internal audit) and approval of RKT and (b) cost reduction due to effective application of the TPTI. The indirect benefits at MMU are a result of (i) efficiency improvement in the production and logistic chain, (ii) stock control improvement, and (iii) better use of machinery and work force. These were, however, difficult to quantify. The MMU has not yet even become aware of such CoC certification effects. On the other hand, the MMU management thinks that it can now much more easily produce and deliver the wood products sold in the right specification and within the stipulated delivery times. According to the management, the most significant effect of CoC certification is the elimination of intermediaries and the avoidance of sales volume lost or price discount due to lack of certification.

Table 4.1 Direct Financial Benefits of Wood Products Exported by MMU

No.	Type of wood products exported	Price premium	Direct benefit average/year[1)]	
		%	USD	%
Scenario A				
1	Garden furniture	10	89,837	14.8
2	Moulding	10	494,796	81.4
3	Louvre door	10	23,323	3.8
4	Finger jointed	0	0	0
5	Dowel	0	0	0
	Total		**607,957**	**100.0**
Scenario B				
	Total	**15**	**911,935**	**100.0**
Note: 1) calculated over four years				

Distribution of the estimated cost savings between the FMU and MMU and the logistic chain can be seen in Table 4.2. The highest cost reduction occurred at the MMU level, contributing 93% to the total. This was followed by the FMU, contributing 5% while the rest was observed in the logistic chain.

The FMU-level cost savings correspond to about USD 0.73/m^3 and USD 0.46/ha per year.

Table 4.2 Indirect Financial Benefits of Certification

No.	Type of cost saving	Share of cost saving	
		USD/year	%
1	**Forest Management Unit (Forest certification)**		
	a. Cost reduction due to self-RKT assessment and approval	11,905	1.42
	b. Cost reduction due to effective application of TPTI	29,811	3.55
	Sub-total	***41,716***	4.97
2	**Mill Management Unit (CoC certification)**		
	a. Cost reduction due to elimination of intermediaries	642,332	76.58
	b. Avoidance of sales volume lost or price discount	134,690	16.06
	Sub-total	***777,022***	92.64
3	**Cost reduction due to shortening logistic chains**	**20,000**	2.39
	Total	**838,738**	**100.00**

Notes:
1a: It was assumed that the cost of self assessment and approval of RKT was half of the government assessment and approval costs of Rp 200 mil., including informal fees.
1b: This occurred in harvesting blocks where natural regeneration has been sufficient for forest recovery. Open canopy has recovered in 2-5 years after felling. PT. DRT standard cost of seedling provision was Rp 120 per ha and enrichment planting was Rp 45,000 per ha. Cost of maintenance was Rp 94,000 per ha. Area of RKT (annual harvesting block) is 2,000 ha but only 1,800 ha is harvested.
2a: Elimination of 2-3 intermediaries which can reduce commission fees up to 5-10% of the selling price. Here, it was assumed that the commission fee was 5% of the average selling prices of the certified wood products (USD 666.7 per m^3).
2b: This occurred in finger-jointed and dowel as they have not been included as certified products even though the wood consumed is residues of certified raw material. In 2003 the export price of finger-jointed and dowel was USD 500 per m^3 and USD 600 per m^3, respectively, and the price premium was 10%.
3: Assuming that there was one logistic chain shortened and the cost reduction of the wood products inspection at a third in-transit country port was USD 2,000 per delivery, excluding handling cost. In 2003, the MMU exported 2-3 times of its wood products in a month. It was assumed that there were 10 export deliveries benefiting from the shorter distribution arrangement by MMU in 2003.

4.2 Environmental Benefits

Logging activities can have negative environmental impacts; such as open canopy; residual stand damage; loss of small trees and other forest biodiversity; change in microclimate; disturbance of wildlife; soil erosion; and water pollution. Further impacts of logging activities are disturbance of hydro-orological system such as decrease in water quality, increase in sedimentation and reduction in diversity/population of aquatic biota; change in forest structure and composition (especially reduction in density of commercial trees with large diameter), reduction in regeneration in open area; fragmentation of virgin forest which may disturb habitats; and reduction in food supply. Forest certification is expected to minimize such negative logging impacts. Hence, certification is assumed to have environmental benefits.

Based on the available information, the environmental benefits of certification were financially estimated only for the reduction in open canopy, residual stand damage, and small trees lost. Regarding the logging impact on biodiversity, forest ecological functions and soil and water, it is assumed that certification can significantly reduce such impacts. This is an invaluable benefit of certification which may not financially be estimated without carrying out in-depth research.

The financial estimate of the above mentioned environmental impacts, residual stand damage, and loss in small trees is presented in Table 4.3. The environmental impacts of certification can be

valued at least at about USD 240,700/year. The largest contribution comes from the reduction in residual stand damage (USD 217,000/year), followed by the reduction in open canopy (USD 16,300/year) and the reduction in loss of small trees (USD 7,500/year).

Whether the financial estimates of the environmental impacts presented can be considered benefits in the sense of public goods can be questioned as the cost have been internalized by the company.

Table 4.3 Valuation of Selected Environmental Impacts of Certification

No.	Types of Environmental Benefits*	%	USD/ha	USD/year
1	Reduction in open canopy	81	9.03	16,252
2	Reduction in residual stand damage	90	120.54	216,964
3	Reduction in lost of small trees	90	4.14	7,453
	Total*		**133.71**	**240,669**
	USD/ha of total area per year			**2.65**

Notes:

* Excluding other benefits such as prevention of biodiversity lost, ecological function damage, soil sedimentation and water pollution.

1: According to FMU, the open canopy due to conventional logging activities was 13,394 ha. As TPTI and natural regeneration and planting activities are duly implemented in a certified FMU, it may be assumed that open canopy can be reduced. Research data indicates that the open canopy recovers after 2-5 years after felling. It implies that the open canopy area occurs at two annual harvesting blocks or 2,600 ha.
Therefore, the area reduction of the open canopy due to certification accounts for 10,794 ha or 81%. In addition, it is assumed that regeneration of these 10,794 ha will be completed within 11 years and there will be no changes in input prices. By applying cost of seedlings, (Rp 120 per ha), cost of enrichment planting, (Rp 45,000 per ha), and cost of maintenance, (Rp 94,000per ha), the environmental benefit of certification per year was calculated.

2: Assuming that residual stand damage can be reduced by 90% compared to conventional logging (10 trees with diameter 20 cm damage per ha or 50% of the trees cut per ha, 20 trees). Hence, certification can prevent 9 trees per ha from damage. It is assumed that the damaged trees can be cut and sold but at lower prices. The price of damaged tree was taken as half of the normal price (Rp 450,000 per m^3) and one damaged tree was assumed to be 0.5 m^3 (according to the FMU data, an average tree harvested is 2.05 m^3, diameter above 40 cm). Annual harvesting block is 1,800 ha.

3: It was assumed that loss in small trees due to conventional logging is 20 small trees per one tree cut (minimum number). Enrichment planting and maintenance are therefore needed. RIL, introduced as part of certification can reduce loss in small trees by 90% or 18 trees per one tree cut. On average, FMU cuts 20 trees per ha and therefore reduction in trees lost is 360 trees per ha which should be replanted in annual harvesting block of 1,800 ha. The costs of seedling provision, enrichment planting and maintenance of 360 trees per ha are assumed to represent 25% of their total costs.

4.3 Social Benefits

Forest production is managed by forest concession holders and there is no share of the revenue which would accrue to local people. The rural community neither has any control over forest management. Hence, certification has no impact on revenue of the local community apart from salaries and wages paid for locally recruited employees. No local community in the pilot area is involved in community-based forest management. In general, local communities work in the agriculture sector and trade, or as casual labor in FMU and other sectors.

However, as a result of certification, FMU provided social care to local communities. This is one of the benefits of certification. As shown in Table 4.4, this benefit was valued at USD 41,667/year, the largest social benefit in economic terms. There are also other benefits such as access to FMU railway and locomotive for forest transport, nutrition package, and access to the FMU health clinic. The benefit of access to FMU railway transport was estimated at USD 7,714/year. Whereas the benefits of nutrition packet and access to FMU health clinic were valued at USD 2,717/year and USD 357/year, respectively.

The additional employment due to applying certification was estimated at USD 30,000/year, and the benefit of access to mangrove forest utilization at USD 4,464/year in gross income. In addition, the benefits of cooperative development were valued at USD 8,929/year, and the benefits of security effect and participation in illegal logging prevention at USD 30,630/year and USD 833/year, respectively. As a whole, the total social benefits due to forest certification were estimated at about USD 127,000/year (Table 4.4).

4.4 Financing

Financing of the direct costs of certification and the costs of compliance with the sustainable forest management standard was entirely derived from the own sources of the FMU and MMU, i.e. from the revenues earned from productive activities.

Table 4.4 Social Benefits of Certification

No.	Social benefits	USD/year
1	Benefits to communities: Stumpage revenue, wage and salaries of workers	 None
2	Construction of infrastructure: Access to FMU railway transport by local people	 7,714
3	Provision of social services a. FMU social care to local communities b. Nutrition package aid for local people c. Access to FMU health clinic by local people	 41,667 2,717 357
4	Employment Additional employment	 30,000
5	Support to local processors of forest products Access to mangrove production forest	 4,464
6	Community organization and management Cooperative development for local community	 8,929
7	Food supply	None
8	Security (enforcement improvement)	30,630
9	Participation	833
	Total	**127,312**
	USD/ha total area	**1.40**

Notes:

1: Forest production is managed by forest concession holders, and there is no share and control of rural community to revenue earned by forest management. Hence, there is no impact of certification to stumpage revenue, wages and salaries earned by local community. No local community develop community- based forest management. Generally local community works in the agriculture sector and trade or as labor at FMU and other sectors.

2: It was reported that local people can enter the forest in a group consisting of six persons and they usually use the FMU railway and locomotive for transport. It is assumed that the cost of transport to forest is Rp 10,000 per person and at least 3 groups daily enter in forest for gathering non-timber forest products.

3a: Aid to seven villages each @ Rp 250 mil. (construction of bridge, market, school, religious buildings), completed within 5 years of production (5 RKTs). This is not government regulation, but an PT.DRT initiative induced by to certification.

3b: It was reported that FMU distributed nutrition package for Balita (Bayi di bawah umur Lima Tahun/babies less than 5 years old) at Labuhan Tangga Besar Village. It is assumed that a package costs @ Rp 50,000 and is distributed annually for a quarter of the population of Labuhan Tangga Besar Village (of 1,826 persons).

3c: It was reported that local people at Bantaian village can access to FMU medical service clinic. It is assumed that in a month there are 5 persons using this service free of charge, and the FMU spends Rp 50,000. for the service per person

4: It was reported that SFM creates additional employment of 14 technical staff in forestry. It was also reported that the lowest salary was Rp 350,000 per month (unskilled permanent workers) and the highest was 4,700,000 per month (permanent skilled workers). It is assumed that the 14 technical workers recruited are all skilled workers and the salary is Rp 1,500,000 per month.

5: 100 ha of mangrove forest with annual production of 500 m^3 per year is within the FMU concession. Based on the regulation, it should be managed by FMU but the local people's rights should be respected. The FMU let 100 ha of mangrove forest be managed by local people as raw material for charcoal production. It was reported that the price of mangrove timber was Rp 60,000 per ton (1 ton = 0.8 m^3).

6: It was reported that FMU has promised to give Rp 15 mil. per cooperative for initial development in 5 villages if it can control timber harvesting for local people's need only (not commercial). The main objective of cooperative is to facilitate the development of commercial non-timber forest products. It is assumed that this initiative will be implemented within 5 years and the grant of Rp 15 mil. will be provided each year for 5 villages.

7: Food supply is difficult and costly to develop in peat swamp forest.

8: No illegal logging is carried out by local people. Where it is practiced, there would be a decrease in the annual log production. Assuming an annual decrease of log production by 1% and log price of Rp 450,000 per m^3, the benefits of certification may be roughly estimated.

9: It was reported that local people participate in illegal logging prevention. It is assumed that FMU spends a budget for this activity of about Rp 1 mi,l. per year in each of the 7 villages in the adjacent forest to FMU.

5. COST-BENEFIT ANALYSIS

5.1 Costs

The total costs related to certification were estimated at USD 2.9 million (Table 5.1). Direct costs accounted for only 7.5% of the total as the cost burden was mainly due to compliance costs. The most important compliance cost category was forest management where also the environmental management costs were included. These costs made up 52% of the total costs related to certification. The second most important category was social criteria with almost 30% of the total additional costs. The management system criteria and CoC had a minor role (4-7% each).

The annual average cost burden for the FMU is estimated at USD 575,000. While more than 50% of the direct costs occur during the first year, the compliance costs are relatively evenly spread over the whole five-year period.

The total unit costs are estimated at USD 31.72 per ha over the whole five-year period and USD 10.06 per m^3 of logs produced.

5.2 Benefits

The indirect economic benefits through cost savings were estimated at USD 3.4 mil. during the five-year period. Their share of the total benefits was significant accounting for 46% of the total. The direct economic benefits which were explored through estimated sales price impact were also important. The 10% price premium would generate additional revenue of USD 2.4 million during the four-year period following certification. No benefits were assumed during the first year. This price impact accounted for about a third of the total benefits generated through certification.

Most of the indirect economic benefits (77% of the total) was because of the cost reduction due to elimination of intermediaries in the distribution channels. Were DRT not an integrated company, these benefits would be reaped by clients buying certified logs from DRT. The cost reductions in forest management accounted for only 5% off the total cost savings.

The environmental and social impacts of the certified operation were valued at about USD 1.5 mil. of which the former accounted for about two thirds. The company did not receive any compensation for these benefits and therefore their impact is analyzed separately in the following.

5.3 NPV Estimates

The Net Present Value estimates were calculated with three discount rates (0, 5 and 12%). Five variants were estimated to analyze the impact of various factors. These were:

The FMU perspective

1. Benefits generated by cost savings minus total costs due to certification (basic case)
2. Benefits generated by cost savings and assumed price premium minus total costs due to certification; two scenarios (2a and 2b) were applied (A with 10% and B with 15%)

The national economy perspective

3. The basic case (option 1) added by environmental and social benefits
4. Option 2a (scenario A) added by environmental and social benefits

Table 5.1 DRT Summary of Costs and Benefits Related to Certification

	Total	1	2	3	4	5
COST			**USD**			
Direct costs						
Direct internal	45,357	45,357				
Direct external	169,814	68,006	25,452	25,452	25,452	25,452
Sub-total	***215,171***	***113,363***	***25,452***	***25,452***	***25,452***	***25,452***
Compliance costs						
Forest management	1,498,034	219,414	319,655	319,655	319,655	319,655
Social criteria	839,932	173,280	166,663	166,663	166,663	166,663
Management system	129,894	36,922	23,243	23,243	23,243	23,243
CoC	192,859	67,143	31,429	31,429	31,429	31,429
Sub-total	***2,660,719***	***496,759***	***540,990***	***540,990***	***540,990***	***540,990***
Total costs	**2,875,890**	**610,122**	**566,442**	**566,442**	**566,442**	**566,442**
BENEFITS						
Economic						
Cost savings	3,354,956		838,739	838,739	838,739	838,739
Price impact						
- Scenario A	2,431,828		478,618	529,242	711,984	711,984
- Scenario B	3,647,741		717,927	793,864	1,067,975	1,067,975
Environmental	962,676		240,669	240,669	240,669	240,669
Social	509,248		127,312	127,312	127,312	127,312
Total benefits						
Scenario A	7,258,708		1,685,338	1,735,962	1,918,704	1,918,704
Scenario B	8,474,621		1,924,647	2,000,584	2,274,695	2,274,695

The results are reported in Table 5.2 and they indicate that with all the discount rates and all the options, the NPV is positive. From the company's perspective, certification is financially feasible even if only the indirect economic benefits as a result of cost savings can be tapped. If a price premium is obtained, certification becomes a financially highly attractive option. This would also be the case if the company were at risk of losing significant sales revenue due to lack of certification. The added value of certification from the market viewpoint can be estimated at USD 8.51/m^3 (with 10% premium).

The assessment from the national economy viewpoint is also clearly positive. Opportunity costs of labor and capital were not, however, considered in the calculation. This would have likely changed the estimated figures even more positively due to high labor intensity of the additional activities. The social and environmental benefits generated through the introduction of certification are significant but the FMU is only indirectly benefiting from them. These benefits were valued at USD 10.62 and USD 5.62 per ha, respectively.

Table 5.2 Net Present Value Estimates

Option	Discount rate 0%	Discount rate 5%	Discount rate 12%
	USD 1,000		
Company perspective			
Option 1	477.5	338.3	194.8
Option 2a (Premium 10%)	2,909.3	2,373.2	1,809.5
Option 2b (Premium 1s%)	4,125.2	3,390.7	2,616.9
National economy perspective			
Option 3	1,949.4	1,581.0	1,192.7
Option 4	4,381.2	3,615.9	2,807.4

6. CONCLUSIONS

Achieving and maintaining the certified forest management has five main challenges in the case of the pilot FMU:

- social problems with the local community due to lack of government services and inconsistency of regulation and policies as well as limited attention given to rural development by local and central governments
- allocation of benefits between business units under integrated management of a holding company having also non-timber business interests
- double costs due to double assessments of the two certification systems
- the change process from conventional to sustainable operations takes time to penetrate the work culture (four years in the PT. Uniseraya case)
- unnecessary costs for FMU due to different concepts among stakeholders regarding SFM, especially in government regulations and certification systems (e.g. HCVF)
- making SFM a top management priority within a corporate structure which covers integrated operations and several sectors
- promotion of forest certification by the public sector as a voluntary soft policy instrument appears to be highly justified on economic (sector competitiveness), social and environ-mental grounds in Indonesian conditions.

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ANNEX 3

CASE STUDY ON MALAYSIA

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Exchange rate: 1 USD = 3.80 RM (Malaysian Ringgit)

1. INTRODUCTION

1.1 Progress under MTCC Scheme

Timber certification is one of the most active issues discussed in the timber industries since the beginning of 1990s in Malaysia. In order to address the need to develop its timber industries and to address demands for certification, the Government of Malaysia played a pro-active role by setting up an independent timber certifying body, the National Timber Certification Council (NTCC) in 1999. It was later renamed the Malaysia Timber Certification Council (MTCC). MTCC is mandated to take the lead in the development of timber certification activities, in particular the development Malaysian Criteria & Indicators (MC&I) and respective assessment procedures.

The current standard used for assessing FMU for the purpose of certification under the MTCC scheme is the "Malaysian Criteria & Indicators, Activities and Standard Performance for Forest Management Certification" or MC&I (2001). This C&I is based on the ITTO C&I for SFM of Natural Tropical Forests (1998).

MTCC has focused its activities to assess states in Peninsular Malaysia (Table 1.1). By October 2003, about 4.11 million ha of forests have been certified in eight states in Peninsular Malaysia. About 37 companies have been awarded CoC certificate to export timber products with the MTCC logo.

Table 1.1 MTCC Certificates by October 2003

FMU	Certificate	Period
State of Selangor	MTCC	Dec 2001
State of Perak	MTCC	Oct 2003
State of Terengganu	MTCC	Dec 2001 (Suspended and reinstated in 2003)
State of Pahang	MTCC	Dec 2001
State of Kedah	MTCC	Oct 2003
State Johor	MTCC	Oct 2003
State of Negeri Sembilan	MTCC	Oct 2003

As of September 2003, about 3,882 m^3 of MTCC labeled timber products has been exported to the Netherlands, Germany, Belgium, the UK and France. The amount is still small to have a significant impact. MTCC, however, is in the process of developing a new FSC-compatible set of MC&I to be completed by January 2005, which is expected to further increase the timber products exported under its logo.

1.2 Certification Under FSC Scheme

Parallel to the MTCC's initiatives, a few selected concessions in Malaysia have also carried out their own initiatives to get certified under the FSC scheme. This has been a response to the need of some specific markets that favor the FSC label in their products. As of April 2004, three concessions have been awarded the FSC certificate of well-managed forests. Two of them are natural forest concessions while the third one is a rubber plantation. In addition, one concession has already gone through the pre-assessment (Table 1.2).

Table 1.2 FSC Certified Concessions in Malaysia

FMU/Concession	Certification Body	Validity Period
Deramakot Model Forests - Sabah	SGS	1997-2002 2003-2008
Perak ITC - Perak	SCS	2002-2007
KPKKT - Terengganu	SCS	Preliminary Oct 2003

1.3 Case Study Concession

For the purpose of this case study, two concessions located in Peninsular Malaysia were selected: Perak ITC (PITC), and KPKKT. In addition, a review of the Deramakot Model Forest has been made due to its long experience in the certification activities. The information on the Deramakot forest, however, is entirely based on the paper by Samm Manan (2003) (Table 1.3).

Table 1.3 Case Study Concessions

Concession	Size / ha	Status of Certification
1. Kumpulan Perkayuan Kayu Kayan Terengganu, State of Terenggan	136,000	As part of forests in the state of Terengganu, the concession was certified as a well managed forest under the MTCC scheme in 2002. The certificate was suspended, and later reinstated in September 2003. Due to the needs to ensure improved access to market, the company has started initiating activities to get FSC certificate.
2. Perak Integrated Timber Complex (PITC) State of Perak, Peninsular Malaysia	9,000	The concession was targeted to achieve the status of ”well managed forest” under the FSC scheme since its establishment in 1998. The concession was awarded that status in 2002 covering the period of 2002-2006. Being part of the forests of state of Perak, the concession is also qualified certified under the MTCC scheme since 2003.
3. Deramakot Model Forest	55,000	The concession was awarded FSC certificate as a well managed forests under the SGS Qualifor programme in 1997 and was again re-certified in 2002 for the period of 2003-2008.

2. CASE 1: KUMPULAN PENGURUSAN KAYU KAYAN TERENGGANU

2.1 Introduction

Kumpulan Pengurusan Kayu Kayan Terengganu Sdn. Bhd. (KPKKT) is a subsidiary of Golden Pharos Sdn Bhd, which is known for having clients of timber retail shops in Europe and North America. KPKKT manages a long-term forest concession of approximately 136,400 hectares in the State of Terengganu on the east coast of Peninsular Malaysia. The company supplies logs to other Golden Pharos subsidiaries: Pesama Timber Corporation Sdn. Bhd, Pesaka Terengganu Berhad, and Permint Plywood Sdn. Bhd. Another Golden Pharos subsidiary, Golden Pharos Door receives raw materials for its door manufacturing from these mills (Table 2.1).

2.1.1 Forest Type

The major forest types found are the Lowland Dipterocarp, Hill Dipterocarp, Upper Hill Dipterocarp and Lower Montane Forest. The single most valuable and largest family in the concession is the *Dipterocarpaceae* family, accounting on average for 30 - 40% of the volume of all trees above 50 cm DBH in the virgin forest. The major species groups occurring are *Shorea*, and occasionally large volumes of *Dryobalanops* and *Balanocarpus hemii*. The balance of exploitable volume (60 - 70%) is non-dipterocarp species, mainly *Leguminosae*, *Sapotaceae*, *Burseraceae*, *Anacardiaceae*, *Myristicaceae* and others.

Table 2.1 KPKKT Background Data

Established	1983
Current forest Management Plan	1983-2007
Next plan	2008-2032
Concession:	136,000 ha
Annual coupe	Slightly more than 3,200 ha
Average production	42,000 – 100,000 tons
General Manager:	Mr. Wan Mutalib
Officer Responsible	Mr. Amir Abdul Nasir Bin Shaari

2.1.2 Management System

The concession area consists of both productive and protective forest. Under the current management, about 20% of the areas are set aside for protection purposes, mainly for soil and water conservation. The AAC based on the present Selective Management System for the whole of KPKKT is about 4,000 ha.

The management system as practiced in KPKKT is based on the Selective Management System. In fact, KPKKT was the first FMU to fully implement this system in Peninsular Malaysia. Under this Selective Management System, the cutting limit prescribed for the group of dipterocarp species would not be less than 50 cm DBH, except for *Neobalanocarpus hemii* (60 cm DBH) while the cutting limit prescribed for the group of non-dipterocarp species would not be less than 45 cm DBH. The difference in the cutting limits prescribed between the dipterocarp species and the non-dipterocarp species would be at least 5 cm.

The harvesting system currently being practiced by KPKKT is the ground skidding system. In this system, the most important and versatile equipment is the bulldozer, which is not only used for log skidding but also for the preparation of skid trials, secondary and main roads. The loading and unloading of logs from logging trucks are conducted with wheeled loaders. This harvesting system has a heavy reliance on bulldozer which is efficient but can be quite destructive, especially to the soil and residual stands. The current system is undergoing retooling with alternative harvesting systems being tested, including Low Impact Skyline and a locally developed Reduced Impact Logging (RIL) System.

As in other commonly practiced management systems, activities covered under annual working plan include:

- Pre - felling inventory and cutting regime

Currently using a 10% sampling intensity based on the systematic line plot design. It is carried out once a year before felling to obtain information on the stocking according to size class, topography, weeds and climber infestation. The result is then used to determine the cutting option with a minimum of 45 cm DBH for non-dipterocarp and 50 cm DBH for dipterocarp species.

- Boundary survey and marking
- Preliminary road alignment
- Verification and approval of proposed preliminary road alignment
- Tree marking, recording and tagging
- Marking of protected areas, particularly riparian buffer zones and slopes greater than 40^0.

The company is led by a General Manager and supported by nearly 100 staff.

2.2 Implementation of C&I and Certification

2.2.1 ITTO Funded Study

A study by FRIM and financed by ITTO, "A Model Project for Cost Analysis to Achieve Sustainable Forest Management" (PD31/95 Rev3(F)), was carried out in the concession area in 1996 and the report was published in 2002. The general objective of the study was to establish a model operation for estimating the resources required and the cost incurred in implementing sustainable forest management practices, based on ITTO Guidelines and Criteria and Indicators.

The study adopted the Malaysian Criteria, Indicators, Activities and Management Specifications as formulated by the National Committee on Sustainable Forest Management in 1997, which was based on the ITTO Guidelines on Sustainable Forest Management 1992. The study made a comparison between the costs of timber harvesting using two systems:

- the MC&I compliance practiced in a 43 ha research plot,
- conventional logging (CL) conducted in the rest of the compartment (364 ha).

The study identified several additional activities in the logging operation carried out by the concession to comply with MC&I. Although they were not necessarily new, these additional activities would incur additional costs to the concessionaire and the state forest department (Appendix 1.2 of the project report). The additional activities identified were as follows:

- The forest resource map (scale 1:100,000) should include 11 functional classes of PFE
- The management plan should follow the new format to meet the requirements of MC&I
- The areas identified as having been illegally exploited and encroached should be indicated in the map (scale 1:50,000). This was in addition to statistical data required at that time
- Detailed mapping including demarcation of clear boundaries of protection and production areas
- The forest management plan and annual plans should include and clearly indicate the net production areas
- Implementation of harvesting rules should be strictly enforced, particularly on directional felling, and care of protected trees in the riparian buffer zone
- Additional PSPs plots for growth and yield studies and respective data analysis
- Silvicultural treatments need to be carried out as scheduled

- The maps for operational plans, i.e. for roads, skid trail and others, should be based on scale 1:5,000 and not a 'blowing up' 1:50,000; the development of map should also involve a ground survey
- EIA should be carried out. The mitigation measures should also be formulated.

These additional activities incurred additional costs. Furthermore, other activities to implement MC&I were also identified:

- Additional training to comply with the MC&I activities
- The pre-felling activities comprise an environmental impact assessment (EIA) and mapping. Tree mapping is necessary to facilitate felling and prescribing skid trail alignment on the map to prevent excessive and unplanned skid trail construction
- Additional costs for renting hydraulic excavators and longer work time to abide with the more rigid road specification according to the MC&I. The use of excavators rather than bulldozers was aimed at reducing unnecessary road corridors and to prevent excessive blading.

Total timber production from the MC&I and CL plots was 991 m^3 and 12,086 m^3, respectively. Buffer areas around rivers and steep slopes were marked and protected from harvesting. The timber volumes not harvested in both plots were 203 m^3 and 393 m^3, respectively. As expected the result for the MC&I compliance (RM 198.54 per m^3) is higher than the CL (RM 117.05) (Table 2.2).

The result, however, was treated with caution as the study was done only in one small area and may not accurately reflect the overall situation of the concession. The company, however, took the result of the above study seriously. A lot of initiatives and changes were made to ensure that the concession could be certified as a well-managed forest.

Table 2.2 KPKKT - Average Present Value Cost of Harvesting Activities

Activity	MC&I compliance		Conventional logging	
	RM/ha	RM/m^3	RM/ha	RM/m^3
Management plan	37.92	1.17	8.10	0.24
Pre-felling activities	572.00	17.67	157.69	4.67
Road construction	1,086.54	33.57	130.24	3.86
Felling and related operations	2,545.30	78.65	1,857.42	55.48
Taxation	2,174.26	67.18	1,795.42	53.18
Additional training	9.51	0.29	0	0
Total MR	**6,425.52**	**198.54**	**3,948.88**	**117.05**
Total USD	**1,690.93**	**53.25**	**1,039.18**	**30.80**
Note: 1 USD = 3.8 MR				

Source: ITTO (2002)

2.2.2 MTCC Assessment

The National Timber Certification Council, later renamed the Malaysia Timber Certification Council (MTCC), was established in 1999. The Council formulated MC&I for certification based on the revised ITTO C&I (1998). The audit for the state of Terengganu as a forest management unit was carried out in 2000 under the MTCC scheme. KPKKT concession is part of the forests in Terengganu State and, therefore, it was included in the assessment. The assessments were carried

out by SGS in three different periods: 30 July - 9 August 2000; 11 March – 20 March 2002; and 21 - 24 April 2003.

There were ups and downs in the assessment process as follows:

14 Dec 2001 - Certificate of forest management was issued;
29 Aug 2002 - The certificate was suspended;
18 Sep 2003 - The suspension was lifted.

Based on the last assessment in April 2003, most of the Corrective Action Requests (CARs) had been addressed (Table 2.3) while a few others remained outstanding (Table 2.4). These CARs, however, were considered minor and did not prevent MTCC to award the state of Terengganu a certificate.

Table 2.3 Terengganu - Close-out CARs (MTCC Assessment April 2003)

Criterion	Indicators	Nature of CAR	Close-out Details
3. Flow of Forest produce	3.1 Estimate of level of sustainable harvest	Inconsistency in planning to limit extraction to 61m3/ha	The Terengganu state has set-up a regulation to limit extraction up to 61m3/ha
		No reliable post-felling inventory to demonstrate availability of 32 residual trees/ha	Post-F inventory verified the availability of the required residual stand.
	3.3 Existence of forest management and operational plan	Lack of measurement of slope width of feeder roads and skid trails constructed after harvest to allow adequate calculation of areas loss to demonstrate the overall compliance to the road specification	Monitoring and close-out report contain measurement of infrastructures constructed as well as calculation of area loss which was consistently below 30%
Keurhout Conditions	3.7 Availability and implementation of guidelines for RIL	Lack of finalized and formalized RIL guidelines	RIL document is in its final form waiting for official endorsement
5. Soil and Water	5.5 Availability of guideline for forest road lay-out	Inadequate compliance to road specification for the road construction for feeder roads and skid trail	Line alignment was surveyed; proper equipment was used for road construction; side drains and silt traps were evident
3. Enabling Condition. (Kerhourt condition)	Participation of local stakeholders, in particular orang asli and NGOs	Inadequate level of consultation with relevant NGOs to allow effective and acceptable decision making process	Evidence of dialogues and communication with local communities and NGOs in Terengganu

Table 2.4 Terengganu - Open Minor CARs (MTCC Assessment April 2003)

Criterion	Indicator	Nature of CAR
4. Biological Diversity	4.3 Existence and implementation of procedures for assessing changes of biological diversity of the production forests, compared with areas in the same forest type kept free from human intervention	No evaluation of changes in biological diversity before and after harvest. There is, however, a planned trial for biodiversity changes made by the state department
3. Flow of Forest Produce	3.3 Existence of operational planning	Inconsistent pre-determination of skid-trails on the ground prior to harvest
		Field inspection differs with pre-harvest planning, and variation is inconsistently recorded
5. Soil and Water	5.5 Availability and implementation of guidelines for forest road layout	Inconsistency in construction of cross-drains along feeder road to channel surface runoffs and main road stability
		Inconsistency in construction of water bars on skid trails as part of measures to mitigate soil erosion after harvest

2.2.3 Assessment for Certification under the Forest Stewardship Council

In 2003, the management of the KPKKT invited the Scientific Certification System (SCS), through SIRIM QAS International Sdn Bhd, to conduct a preliminary evaluation of its forest management operations. The main objectives were as follows:

- To assess the readiness of the concession to achieve certificate under FSC
- To assess the extent to which the established forest management program has addressed the requirements of the FSC.

The assessment was carried out from 20 - 23 October 2003 by two SCS assessors. The general findings of the assessment, as reflected in the report, are as follows:

a. KPKKT is reasonably well positioned to achieve FSC endorsed forest management certification, subject to full evaluation. There are aspects which are not fully consonant with FSC standards, but the severity of the deficiencies is not sufficient to constitute non-compliance with one of more of the 10 FSC Principles.

b. Operations were well planned and executed, particularly in the following areas:
   - The 25-year FMP, several 5-year working plans, and annual plans were formulated and implemented;
   - The security of tenure is valid with clear legal evidence of 25-year lease, which is expected to continue for a second 25-year period (to expire in 2032);
   - Concerted efforts have been taken in reducing damage through construction of skid trails that are pre-planned and the closing of skid trails with drainage and sediment traps. The use of modified long-haulage cable system could further reduce damage. Road construction and bridges generally meet the specifications of the Forest Department as required by MC&I;
   - There is a marked 20-m buffer zone from the major river where no logging is allowed;
   - Short logs and poorly formed logs are transported out of the forests for other uses;
   - Research is promoted through collaboration with FRIM, GTZ, etc;
   - The timber is further processed;
   - Joint meetings between management and staff are regularly carried out;

- Local kampong people are given their right to gather rattan and other non-timber produce;
- Local residents are given priority for services and contracts;
- GIS capability, timber inventory and resource mapping are adequate;
- There is a work plan to describe specific actions, e.g. staff training, monitoring, harvesting practices, and other activities, to implement a management system capable of maintaining biodiversity.

There are other aspects that are likely to require action in view of meeting the FSC standards:

- The FMP for the period of 2008-2032 and its subsequent 5 year working plans and annual plans;
- A public summary of the current FMP;
- The scope of the plan would have to incorporate e.g. the concept of HCVF, management of listed endangered species, mitigation measures of social and environmental impacts, etc.;
- The HCVF must include documentation, planning, formal assessment and monitoring. Currently the HCVF involves only mapping and delineating of such forests which is a good first step;
- The current AAC does not take into account the percentage of the forest that may receive total protected status;
- Need to implement a strict and consistent adherence to the MC&I requirement in road construction among KPKKT's contractors;
- The low impact logging equipment should be widely used throughout the concession;
- The growth and yield plots should be analyzed;
- Control of access to the sites that were logged and closed should be improved.

There are similarities between the assessments made by MTCC and SCS, particularly on road construction and biodiversity. Other comments are more directed to strict adherence to the FSC standard. The comment on low impact logging equipment is useful but could be considered a suggestion.

As a point of interest, similar comments, however, were not given for PITC which is still using equipment similar to the one used by KPKKT. This shows variation in the interpretation of the certification standard by assessors.

2.3 Direct Costs of Certification

2.3.1 Direct Internal Costs

Direct internal costs cover a wide range of administrative and managerial activities related to certification assessment. Table 2.5 provides an estimate of the additional cost incurred by the management related to the certification activities. In view of current status of KPKKT, most of the activities could be done by its current staff.

Table 2.5 KPKKT- Direct Internal Costs

Items	Remarks	Estimate USD
1. Documentation preparation and meetings	The additional costs include the preparation of documents, meeting and visits during the meeting. The company is currently very well equipped with the meeting facilities.	12,000
2. Internal auditing	The internal auditing is done by the deputy general manager and he is supported by a number of his staff. As such, there is no additional cost incurred due to certification	0
3. Use of consultants	Consultants are normally required to ensure that the concession is ready certification. Currently such activities are implemented using the company's own resources, as the staffs have experience and expertise in this area. Previous technical projects carried out by GTZ and FRIM have also contributed to this effort. So there is no additional cost incurred under this item.	0
4. Tender	Invitation for bidding. KPKKT invited SCS to carry out assessment. No cost incurred	0
Note: 1. - The cost is based on the following calculation: Documentation: 5 @ USD 700; meetings: 5 @ USD 500; visits-cost for transportation to the field: 5 @ USD 800; the meeting is estimated to be held twice a year in the first, and only once a year from the 2nd to 5th year.		

The total additional cost incurred as the result of certification is estimated about USD 12,000. The cost of the first year is about USD 4,000 while for the remaining period it is about USD 2,000 per year.

2.3.2 Direct External Costs

The company has already invited Scientific Certification Systems (SCS) to carry out preliminary assessment. As the company has only done the preliminary assessment, the costs of the remaining activities are just budget estimates (Table 2.6). The estimated costs of auditing are based on the rates used by another FSC accredited certifier operating in Malaysia.

Table 2.6 KPKKT – External Auditing Costs

Item	Cost/unit	Number of unit	Total USD	Remarks
Scoping/pre-assessment	5 days @ USD 800	2 consultants	8,000	Cost for two consultants – 1 week duration and reporting.
• Main audit	10 days @ USD 800	3 consultants	24,000	
• Possible follow-up audits	3 days @ USD 800	1	2,400	
• Annual surveillance audits	3 days @ USD 800, twice a year. Annual cost USD 4,800	4	19,200	
Total			**53,600**	
Note: USD 800 is based on USD 700 for daily fee, and USD 100 for DSA				

The estimated cost for certification audit is about USD 53,600. This is considered an additional cost due to certification assessments. As the estimate is taking into account all possible follow-up activities, the actual cost may be slightly lower.

In addition to the fee for assessment, the company should also conduct a stakeholder meeting. As in the case of PITC, the company should also provide additional services to contribute to local communities. In this aspect, we estimate the cost is about USD 8,000 in the first year, while for the second to fifth, it is estimated at about USD 5,000 annually.

2.4 Indirect Costs

2.4.1 Cost of Performance Criteria in Forest Management

As indicated in the series of assessments, (see Section 2.2), the company has been making a concerted effort over several years to meet the MC&I, which is considered a baseline to be met in managing a forest concession. A few such on-going activities are as listed below:

Item	Remarks
Additional area set aside from production	This is already part of the practice under the current management and operation a plan. On average, which is adjusted on case by case basis, only about 75% of the annual coupe area can be harvested.
Additional measures to be taken during harvesting	This is also part of the current operations, especially during tree marking, setting aside of the protection areas, identifying buffer zones, etc. The company has now made budget allocation for some R&D activities, particularly for growth and yield studies and maintaining the genetic resources of the area.
Changes in regeneration and silviculture	Silvicultural treatments are currently a standard practice in the concession.
Introduction of reduced impact logging equipment and methods	The company is now testing a few units of "Log Fisher", which has been claimed to be very effective to reduce environmental damage.
Woodyards (e.g. minimization of waste and environmental loads, systems for chain of custody)	This is part of the current activities
Road construction	The company has made adjustments to comply with the MTCC certification standard, which was done as part of the certification for the entire state. The company has also made some budget allocation to further address outstanding issues (CARs) under the current assessment.

2.4.2 Costs Related to Social Criteria

These costs cover, *inter alia*, the following aspects:

- Occupational safety and health
- Provision of social services for workers and local communities
- Participation of local communities (e.g. in preparation of forest management plans)
- Respect of customary rights of local population, incl. indigenous people.

Most of these costs are considered part of on-going costs of the company. KPKKT meets the applicable regulations for health and safety. The cost of many of these activities is already embedded in the overhead cost. It is difficult, therefore, to quantify the incremental cost due to achieving certification. The following examples illustrate this:

- Licensed operators are trained on the use of equipments, maintenance of tractors, trucks, soil mixing machines, etc.
- Very little hazardous chemicals are used in the nurseries and their handling is controlled
- No pesticides are used in the planted areas
- Staff and workers are automatically entitled to free medical services
- Workers engaged by private contractors in the restoration activities are covered by the Social Security Organisation (SOCSO), Labour Ordinance (Cap 76), and Employees' Social Security Act 1969. The occupational Safety and Health Act 1952 is also relevant.

As KPKKT has not yet gone through a detailed scrutiny of the certification audit for FSC, possible corrective measures required are not known. However, they may include the compliance by workers of harvesting contractors with the occupational Safety and Health Act (OSHA). These include:

- Wearing proper attire during harvesting;
- Management of fuel and oil containers.

Most of the social requirements of the concession management have been addressed by the management of KPKKT during its 20 years in operation. The company has also taken measures to include local communities in its business operations as follows:

- Many of KPKKT personnel are from local villagers,
- Local people are given priority for participation in outsourced activities.

As the result of the assessment made by SCS, the additional costs for FSC compliance with the social criteria are estimated at about USD 4,500 in five years (Table 2.7).

Table 2.7 KPKKT – Social Costs

Item	Measures	USD
1. Wearing proper attire during harvesting	Provide safety helmets to respective workers in harvesting operations.	4,000
2. Management of fuel and oil containers.	Provide additional facilities such as containers.	500
Total		**4,500**
Note: 1. - Additional 100 @ USD 40 in five years. [(2 x 4 teams @10)+20] 2. - 5 @ USD 100		

2.4.3 Costs Related to Management System Criteria and Total Costs

The concession is run as a business entity. The company has made adjustments in their operations, preferably using their own resources. It is then useful to assess the cost in terms of managing the entire concession.

Total production for an annual coupe in 2003 is estimated at 62,538 tons. Taking into account of 3,200 ha of the annual coupe, the output is estimated at 112,568 m^3/ha, which is considered appropriate in Peninsular Malaysia. Based on the data from the timber industry, we are using the conversion factor 1 ton = 1.8 m^3 in estimates.

The management system costs (overhead) account for 22% of the total (Table 2.8).

2.4.4 Additional Costs for Performance Criteria

The additional costs for the performance criteria should be based on the assessment made by MTCC and SCS. There are several outstanding CARs during the assessment under the MTCC scheme for the State of Terengganu where KPKKT concession is also included. Most of the CARs focused on the road/skid trails construction and biodiversity. The observations made by SCS assessors were to a certain extent almost identical, suggesting largely similar outcomes of the two systems. However, SCS requested that further analysis be carried out on growth and yield plots. Documentation, assessment and monitoring on the High Conservation Value Forests (HCVF) concept should also be carried out rather than just being limited to mapping and delineating of such forests.

Table 2.8 KPKKT – Estimated Total Costs of the Concession

	Total cost USD	Unit cost USD/ton
Variable production cost		
- Logging contracts (RM 153/ton)	2,517,977	40.26
- Timber royalties	526,639	8.42
- Premium	1,231,834	19.70
- Fuel	27,632	0.44
- Stacking and loading	21,579	0.34
- Road/bridge maintenance	153,421	2.45
- Repair and maintenance	39,474	0.63
- Road alignment expenses	10,826	0.17
- Demarcation of seed trees, tree for felling and protected trees	17,824	0.28
Sub-total	***4,547,202***	***72.71***
Fixed overhead		
- Pre-felling inventory	146,367	2.34
- Boundary clearing and demarcation	33,895	0.54
- Tree marking	179,447	2.87
- Post felling inventory	145,083	2.32
- Silviculture operation	11,391	0.18
- Nursery	59,474	0.95
- Information and enforcement	83,387	1.33
- Road maintenance unit	76,911	1.23
- Administration	516,477	8.26
Sub-Total	***1,252,432***	***20.02***
Total	**5,799,633**	**92.74**

In order to ensure compliance with the MC&I for the MTCC ad FSC schemes, the company is going to allocate the following additional budget to meet the certification requirements as follows:

- Road maintenance USD 132,000
- R &D including the maintenance, analysis and expansion of the 40 Permanent Sample Plots. The analysis should also include the change of forest biodiversity as the result of logging activities. USD 105,000

In addition, the company has also made allocation for the preparation of the future management plan covering the period of 2008-2038 and other related activities, in line with the observations made by SCS assessors (Table 2.9).

Table 2.9 KPKKT – Forest Management Compliance Costs

Item	[1]Budget USD	[2]Estimated cost USD	Estimated cost (Total first 5 years)
1. *Management Plan 2008-2038	23,700	51,000	51,000
2. *Landscape-level EIA	27,600	40,000	40,000
3. **Documentation, planning formal assessment and monitoring of HCFV particularly in the protected areas of the concession.		7,500	7,500
4. **Preparation of 5-Year working plan	2,600	2,600	2,600
5. Maintenance of genetic resource areas/yr.	2,600	3,000	15,000
6. Annual working plan/year	2,600	3,000	15,000
Total			**131,000**

Note:
[1]Budget – Allocated by company
[2]Estimate – Estimate by the author
1. Consultant - 4 months@7,500; Inventory – USD 20,000
2. Consultant – 4 months@7,500; Analysis – USD 10,000
* - To be carried out for every 30 years
** - To be carried out for every 5 years

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The company has budgeted about USD 59,100 for the activities as most of the above activities are to be carried out using the company's own resources, except for the preparation of management plan and EIA. However, the budgeted cost is considered low. Based on the current rate, the cost is estimated at about USD 131,100 for the first five years of certification period to comply with the certification requirement. It is also to be noted that the cost of FMP and EIA occurs only once for every 30 years.

2.5 Benefits

2.5.1 Economic Direct Benefits of Certification

In the past, most of the logs were sent to the Golden Pharos processing companies (Permint Plywood, Pesaka and Pesama Timber). However, some percentage of the production was tendered out. The average price of the timber tendered is about USD 254 per ton (USD 141,40/m^3). The high price for timber is partly due to the availability of valuable timber species in the concession, such as seraya, cengal, dark red meranti, and jelutong.

The remaining timbers are sold to the mills owned by the group. The FMU is estimated to capture a 10% lower price for its logs from the captive sales compared to the open market (Table 2.10). The assumption is made based on study carried out by GTZ during 1990s.

There is presently no price premium for certified timber for KPKKT.

Table 2.10 KPKKT - Estimated Annual Revenue from Timber Sales

Item	Volume/ton	Price/ton RM	Total RM 1000	Total USD 1000
1. Sales through tendering to open market	15,805	967.0	15,283.9	4,178
2. *Supply to Golden Pharos sister companies at similar price	46,733	870.3	40,671.7	10,703
TOTAL	**62,538**		**55,955.6**	**14,881**
Note: * Estimate based on assumption on the price and volume (1 ton = 1.8 m^3)				

2.5.2 Indirect Benefits

2.5.2.1 Incentives for Technology Development

The company has been operating for more than 20 years. It has been taking a lot of pro-active initiatives to achieve a well-managed forest status for its concession. The company is carrying out an experiment using new logging equipment called "Log Fisher" in its harvesting operations. This is a local invention by the staff to implement reduced impact logging procedures in the concession area. The use of this machine is expected to increase efficiency of logging operations as well as reducing the operational costs. As the technology is still in an experimental phase, its costs and benefits will have to be clarified later. Certification has induced this development.

2.5.2.2 Transparent Accounting

The company has already tendered some proportion of its timber in the market. The past practice of discounting and subsidizing other companies of the group is expected to be reduced in the future.

2.5.2.3 Environmental and Social Benefits

The need for preparation of forest management plan and EIA for the concession areas as well as compliance with the procedures during the implementation will ensure that the environmental benefits such as biodiversity, ecological functions of forests, soil, and water are generated.

Similarly, KPKKT is well-known for generating benefits to local communities around the concession through paid employment and contract jobs. Based on the survey under ITTO (1996), out of 269 working members in four villagers around KPKKT concessions, 41 were employed by KPKKT and its related companies, and about 32 were rattan and gaharu harvesters. This does not include 32 members who were working as contract workers. Others are getting employment in nearby oil palm plantation and its related factories. As these are currently on-going activities, the additional impacts on certification are minimal.

2.6 Cost – Benefit Analysis

Table 2.11 shows a summary of the costs and revenue of KPKKT in relation to certification. The cumulative additional costs to comply with certification are estimated at USD 375,200. About 85% of the additional cost for certification must be implemented in the first year of certification. For the second year onward, the additional cost is marginal.

The additional activities are mainly geared towards improving the operational and management aspects of KPKKT to comply with MC&I. These activities need to be carried out by the company as part of the requirement for operating a timber concession. The additional direct cost due to certification is mainly related to initial preparation of certification, and the cost for auditing itself. These costs are considered small compared to the size of the KPKKT operation.

The Net Present Value of the Without Certification case is about USD 320,000 higher than in the With Certification case. The result would suggest that it would not be financially viable for KPKKT to implement certification.

The results of the analysis should be considered in the right perspective as KPKKT is not an ordinary company. It is one of the very well-managed concessions in Peninsular Malaysia. The management has taken initiative on SFM for many years and it is obvious that the additional activities to comply with the certification are presently very few. The current situation is far different from 1996 when the gap between the current practice and SFM was wide.

Table 2.12 shows the unit cost per ha and per cubic meter. The expenditure, however, is not evenly distributed. A very large amount of the cost (81%) is needed during the first year of the certification, i.e. the activities that need to be done for complying with the certification requirements.

The data in Table 2.11 reflects the interpretation of the management on the additional costs due to certification. An adjusted cash-flow table was also prepared with the following adjustments which were deemed justified:

- the cost of Forest Management Plan and EIA were not considered additional due to certification as they are legal requirements; this is, however, subject to interpretation as in practice the regulation is not strictly enforced in terms of timing but in the case of certification the requirement has to be met before the audit.
- additional road maintenance cost was assumed to be USD 30,000 during years from 2 to 5 to account for the continued compliance with the certification standard
- additional R&D cost assumed to be USD 10,500 during years from 2 to 5 to account for the continued maintenance and measurement of PSPs
- occupational safety equipment cost of USD 4,500 was assumed to be paid every year.

Table 2.11 KPKKT – Financial Analysis

Items	Total period	1st year	2nd year	3rd year	4th year	5th year
COST						
1. Annual total operational cost of forest management cost	29,133,170	5,826,634	5,826,634	5,826,634	5,826,634	5,826,634
2. Initial Preparation	98,500	98,500	0	0	0	0
2.1 FMP	53,000	51,000				
2.2 EIA	40,000	40,000				
2.3 Monitoring and documentation of HCVF	7,500	7,500				
3. Additional cost for forest management:	274,100	250,100	6,000	6,000	6,000	6,000
3.1 Additional road maintenance	132,000	132,000				
3.2 R&D for PSP	105,000	105,000				
3.3 5-year Working Plan	2,600	2,600				
3.4 Maintenance of genetic area	15,000	3,000	3,000	3,000	3,000	3,000
3.5 Specific attire for workers and management of waste	4,500	4,500				
3.6 Annual working plan	15,000	3,000	3,000	3,000	3,000	3,000
4. Additional cost due to certification process	93,600	46,400	11,800	11,800	11,800	11,800
4.1 Internal Cost	12,000	4,000	2,000	2,000	2,000	2,000
4.2. External cost for assessment	53,600	34,400	4,800	4,800	4,800	4,800
4.3 Social criteria – Stakeholder Meeting	28,000	8,000	5,000	5,000	5,000	5,000
Total cost (with certification)	***29,599,370***	***6,221,634***	***5,844,434***	***5,844,434***	***5,844,434***	***5,844,434***
Total cost (without certification)	**29,224,170**	**5,917,634**	**5,826,634**	**5,826,634**	**5,826,634**	**5,826,634**
5. SALES REVENUE						
5.1 Sales through tendering	20,890,000	4,178,000	4,178,000	4,178,000	4,178,000	4,178,000
5.2 Sales to sister companies	53,515,000	10,703,000	10,703,000	10,703,000	10,703,000	10,703,000
5.3 Total revenue	**74,405,000**	**14,881,000**	**14,881,000**	**14,881,000**	**14,881,000**	**14,881,000**
6.1 Net cash-flow (with certification)	44,805,630	8,659,366	9,036,566	9,036,566	9,036,566	9,036,566
6.2 Net cash-flow (without certification)	45,180,830	8,963,366	9,054,366	9,054,366	9,054,366	9,054,366
7.1 NPV (with certification)	**32,238,012**					
7.2 NPV (without certification)	**32,557,713**					

Note:
1. – It is assumed that the production of timber is the same for the 5-year period.
2. – Occurs only in the first year.
3.1 & 3.2 - These are assumed only for the first year. The following years to be paid from the Company operatonal budget
4.3 - The cost is assumed to be about USD 8,000 in the first year and in the remaining years about USD 5,000. The cost is similar to PITC even though the size of concession is bigger.
5.1 & 5.2 - Species composition and prices are the same as in the first year.
7 - Discount rate 12%.

Table 2.12 KPKKT – Summary of the Unit Costs

Item	Total USD	Period covered (years)	USD/ha	USD/m^3
1. COST				
1.1 Annual cost for forest operation and management	5,826,634	1	1,820.82	51.76
1.2 Initial preparation cost (FMP, EIA, etc)	98,500	30	0.72	0.03
1.3 Total additional cost due to forest certification	375,200	5	2.76	0.67
2. REVENUE (Timber Sales)	14,881,000	1	109.42	132.19

Note:
1.1 - Cost per annual operating area of 3,200 ha and annual production of 112,568 m^3
1.2 - On the cost per ha, the total cost is divided with the total area of concession (136,000 ha). Similarly, for the cost/m^3, the total cost is divided by expected amount of log production in 30 years.
1.3 - Cost is based on 5-year effective period of the certificate.
2. - For per ha basis the annual revenue is divided by 136,000 ha and for per m^3 it is divided by annual production.

Apart from these adjustments on the cost side, an alternative NPV estimate was calculated for the Without Certification case, assuming a 5% reduction in the sales revenue due to export diversion to less remunerative markets which do not require certification, and/or a discount which may have to be given in the present markets to sell uncertified products to clients who do not require certification. The results are reported in Table 2.13 which leads to the following conclusions:

- the management interpretation and the estimated additional costs did not significantly differ from each other
- in relative terms the additional costs due to certification are relatively limited due to the large size of the operation
- if the estimated loss in sales revenue is taken into account due to lack of certification, certification becomes a clearly economic option for the company
- if the loss of sales revenue is not taken into account, the Without option appears more beneficial for the company.

Table 2.13 KPKKT – Net Present Value with/without Certification

Case	Without	With	Difference With-Without
Item	**USD 1,000**		
Company interpretation of cost implications (based on Table 2.11)	32,558	32,238	-319
Estimated additional management costs accounted for the 5-year period and with loss of 5% of sales revenue in case certification is not implemented	29,876	32,116	2,240

Note: Discount rate: 12%

The above conclusions have to be interpreted with care as the financial analysis is partial and limited to a 5-year period while the certification decision is strategic with a long-term vision on

what is needed by the company to remain competitive. In addition, the 5% loss in sales revenue is an assumption, even though it can be considered plausible.

2.7 Linkage in Benefits between Primary Production and Further Processing

The timber produced from the KPKKT concession area is supplied to Golden Pharos' subsidiaries for primary processing. Some of the primary processed products are also supplied to Golden Pharos Door factory.

The products produced by the group companies are exported to Europe, North America and Japan. Although there is a lot of pressure for certified products requirement in these markets, the companies have still been able to sustain their exports so far. This pressure for certified materials is mainly coming from their end product manufacturers.

The case in point is the Golden Pharos Door Sdn Bhd. The company produces about 20,000 doors units a year and various related items as follows:

Production capacity (doors unit)	20,000
Share of export in total sales	100%
Type of wood material used and sources:	
• Tropical timber	Golden Pharos subsidiaries and other local sources
• Radiata pine (FSC certified)	New Zealand, South Africa
Share of export to FSC markets	50%
Raw material ratio (FSC: Non FSC) in FSC products	70:30

Golden Pharos Door is exporting about 50% of its products to Europe and North America. The clients include companies like Home Depot, Home Base, etc. The price range is about USD 75 - 100 per door depending upon the specification and the market. Based on the discussion with the company officer responsible for the marketing and certification, the following information was made available:

- The company is exporting a half of its products to the FSC markets and the other half to the non-FSC markets;
- The company is using 30:70 ratio in non-FSC: FSC-sourced materials to produce doors for the FSC markets;
- There is no price difference due to certification. Certification is just a matter of access to the specific buyers that impose conditions;
- There is a clear price premium, (about 10%-15%) in materials that are sourced from FSC certified areas (radiata pine). This is due to limited availability of the supply. As the price of end products remains unchanged, the increased price of materials reduces the profit margin of the company.
- There are not yet demands for products made of 100% FSC-certified materials, but the company is preparing itself for such a situation.
- The company is also making sure that they are well prepared when their existing market that requires FSC-certified products increases to more than 50%. So, an increase in certified raw materials, particularly from the local source, is critical to ensure

2.8 Conclusion

A number of conclusions can be derived from the analysis of KPKKT:

- During the last 20 years, the company has taken many measures for achieving sustainability in the management of its concession areas. This has built up capacity for certification over a long time period and, therefore, the estimated additional costs are probably too low.
- The company participated first in the certification under the MTCC scheme. A lot of activities required for the FSC certification had, therefore, already been implemented before the FSC process started.
- The cost for additional activities to comply with certification is estimated at about USD 375,200, or 1.3% of the total cost of the 5-year operation.
- The additional cost of the first year is about 81% of the total additional cost for five years (including the cost for FMP and EIA).
- Based on the financial analysis, the company appears to be in a position to absorb the additional cost for certification.
- The current economic benefit of the MTCC certificate covering the state of Terengganu, (and thereby KPKKT) is presently not significant. However, the economic benefit could be further enhanced if the products were accepted in the FSC-certified market. An FSC certificate or MTCC – FSC certificate is, therefore, a logical next step.
- KPKKT could get more revenue in the future, if more of its timber is sold in the open market
- The potential sales price premium is likely to increase in the short run as more companies interested in certified timber could also buy from KPKKT.
- As there is still shortage of certified primary products such as plywood and sawn timber, there is a possibility for a price premium as long as demand is not satisfied. However, the premium in the end products such as doors is still elusive.

The current incentives for FSC certification are as follows:

- KPKKT could position itself as a well-managed forest in the country.
- The subsidiary companies could get greater access to markets, particularly those that need FSC certified products.

3. CASE 2: PERAK INTEGRATED TIMBER COMPLEX

3.1 Introduction

3.1.1 General

Perak Integrated Timber Complex Sdn Bhd (PITC), which was established in 1998, is a subsidiary of the Perak State Economic Development Corporation (SEDC) and was given about 9,000 ha of concession area in the Temenggor Forest Reserve in the north-east of Perak. The concession is going to be managed for a 30-year rotation period. The mission of PITC is to develop an environmentally appropriate, socially responsible and economically viable and sustainable integrated timber-based industry in the state of Perak. From the very beginning, the company established a clear target to be certified in all its operations, a target that the company achieved in 2002 with the award of FSC certificate of "well-managed forests".

The concession area is part of the Peninsular Malaysia's Main Range and the majority of the area is lying between 400 m and 1,000 m above the sea level. The major forest types found are Hill and Upper Hill Dipterocarp. The commercial species are merantis (*Shorea spp*.), kedondong (*Canarium spp*.), kempas (*Koompasia malaccensis*), merbau (*Intsia palembanica*), medang (*Lauraceae*) and perah (*Elateriaspermum tapos*).

3.1.2 Management System

The annual coupe for this concession is about 300 ha a year. As elsewhere in Peninsular Malaysia, the company is practicing the Selective Management System. The harvesting system is based on Reduced Impact Logging procedure and the main machine used is bulldozer which is being used for log skidding; preparation of skid trials, and construction of secondary and main roads.

The management system activities for annual working plan include:

- Pre-felling inventory and cutting regime
- Boundary survey and marking
- Preliminary road alignment
- Verification and approval of proposed preliminary road alignment
- Tree marking, recording and tagging
- Marking of protected areas particularly riparian buffer zones and slopes greater than 40^0.

3.1.3 Staff Strength

The total staff is 24 distributed as follows:

Position	Number
CEO	1
Forest officers	5
Forest workers	15
Clerks	1
Secretaries	1
Drivers	1

3.2 Cost of Certification

3.2.1 External Costs

The direct external cost for certification is the cost for auditing by the SGS assessors (Table 3.1). The significant share of annual surveillance audits is typical in this kind of case.

Table 3.1 PITC – Direct External Costs of Certification

Item	USD	%
1. Scoping/ pre-assessment	8,400	17.90
2. Main audit	12,900	27.45
3. Follow-up audit	10,500	22.35
4. Annual surveillance audits (4x3,800)	15,200	32.30
4. Total audit costs	**47,000**	**100**

3.2.2 Compliance Costs

Five main cost items due to certification to cover initial preparation were identified (Table 3.2). Inventory, survey and planting costs have been the main components.

Table 3.2 PITC – Initial Internal Costs Due to Certification

Item	USD
Preparation of Forest Management Plan	45,800
Annual stakeholder meeting	7,900
Environmental and biodiversity monitoring	26,300
Internal auditing	19,700
Consultancy for inventory, EIA, biodiversity survey, etc.	108,900
Total	**208,700**

Annual stakeholder meeting and internal auditing costs can be considered direct costs. In addition to the figures in Table 3.2, subsequent annual stakeholder meetings would cost about USD 5,000 each.

There are also other costs, particularly the cost of training in all aspects of operations. These were not possible to estimate reliably.

The company has benefited from the technical assistance provided by Tropical Forest Trust (TFT) during the initial phase of its establishment. The technical assistance include training and other preparations for certification, estimated at about USD 300,000.

3.2.3 Total Costs

In order to calculate the total cost of the management system, only rough estimates can be made. Total production for PITC is about 10,000 m^3 (5,555 tons).

Table 3.3 PITC – Estimated Total Costs of Forest Management

Item	Total Costs USD	Cost USD/m^3
Variable production cost		
- Logging	277,778	27.78
- Timber royalties	87,719	8.77
- Premium	59,211	5.92
- Fuel	5,263	0.53
- Stacking and loading	2,158	0.22
- Road/bridge maintenance	15,342	1.53
- Repair and maintenance	3,947	0.39
- Road alignment expenses	1,082	0.11
- Demarcation of seed trees, trees for felling and protected trees	1,782	0.18
Sub-total	***454,283***	***45.43***
Fixed overhead		
- Pre-felling inventory	14,637	1.46
- Boundary clearing and demarcation	3,389	0.34
- Tree marking	17,945	1.79
- *Post felling inventory	14,508	1.45
- *Silvicultural operation	1,139	0.11
- Nursery	5,947	0.59
- Information and enforcement	8,339	0.83
- Road maintenance unit	7,691	0.77
- Administration	51,621	5.16
Sub-Total	***125,216***	***12.50***
Total USD	**579,499**	**57.93**

The item marked with an asterisk (*) is an estimated cost to be done in one or two years after the first logging. Many other activities including the establishment of growth and yield sample plots have been executed by the permanent staff, particularly during the 'non-logging season' (normally during the rainy season).

3.3 Cost-Benefit Analysis

3.3.1 Cash-Flow

The main revenue of PITC is derived from selling logs directly to companies associated with SEDC. The average price (especially meranti) is about USD 171 to 184 which is USD 308 to 332 per ton. The company made an agreement to sell all the logs to its sister subsidiary, Maju Kayu at USD 179 per ton irrespective of the species. This can be considered a 30% discount compared to the value that PITC could get by selling the timber directly to the market.

For the purpose of estimation, we are using the value of USD 179 per ton of logs (USD 99.44/m^3) in the calculation of PITC's sales revenue. Hence, the total revenue is about USD 994,000 per year.

Table 3.4 shows that most of the additional costs (85%) need to be spent during the first year of the certification process. These incur during the initial preparation, particularly with regard to forest

management plan, EIA, and etc. About 41% of the cost is due to the certification process (direct costs).

Table 3.4 PITC – Financial Analysis

Items	Total period	1st year	2nd year	3rd year	4th year	5th year
COST			**USD**			
1. Annual total operational cost of forest management	**2,897,495**	579,499	579,499	579,499	579,499	579,499
2. Initial preparation	**181,000**	181,000				
2.1 Preparation of Forest Management Plan	45,800	45,800				
2.2 Environmental and biodiversity monitoring	26,300	26,300				
2.3 Consultancy for inventory, EIA, biodiversity survey, etc.	108,900	108,900				
3. Cost due to certification process	**94,600**	**59,400**	**8,800**	**8,800**	**8,800**	**8,800**
3.1 Internal auditing	19,700	19,700				
3.2 External auditing	47,000	31,800	3,800	3,800	3,800	3,800
3.3 Annual stakeholder meeting	27,900	7,900	5,000	5,000	5,000	5,000
4.1 Total cost (with certification)	3,173,095	819,899	588,299	588,299	588,299	588,299
4.2 Total cost (without certification)	2,943,295	625,299	579,499	579,499	579,499	579,499
5. Revenue						
5.1 Timber sales	4,970,000	994,000	994,000	994,000	994,000	994,000
5.2 External assistance for certification	300,000	300,000				
5.3 Total Revenue	**5,270,000**	**1,294,000**	**994,000**	**994,000**	**994,000**	**994,000**
6. Cash-Flow (without external assistance)						
6.1 Net revenue (with certification)	1,769,905	174,101	405,701	405,701	405,701	405,701
6.1 Net revenue (without certification)	2,026,705	368,701	414,501	414,501	414,501	414,501
7. Net Present Value (without external assistance)						
7.1 NPV (with certification)	1,255,676					
7.2 NPV (without certification)	1,453,290					

Note:
1. - Annual total operational cost is assumed to be the same for the next five years.
2.1 - Cost for initial preparation is only done once for the first 30-year cycle. FMP costs is to be paid in both cases as it is a legal requirement. This is mandatory for PITC to start its operation.
2.3 - During the first year, PITC hired foreign assessors. The follow-up audit will use local experts and the cost is expected to be lower.
3.3 – The stakeholders meeting includes some activities for the benefit of local communities particularly Orang Asli living around the PITC concession. The cost is expected to be lower in the future.
4.2 – Total cost without certification excludes cost related to certification
5.1 – Production of timber and its price are assumed to be constant during the five-year period.
5.2 – PITC received technical assistance specifically to assist certification process under FSC.
7. – 12% discount rate is used for NPV calculation.

It was not possible to estimate additional forest management costs due to the certification standard requirements as certification was built into the company's management system and practices from the beginning. However, based on the financial analysis, there appears to be a surplus for PITC to spend for activities that are geared towards sustainability even though not all costs above are necessarily taken into account. The cost of silvicultural treatments which normally are carried out by the Forestry Department could eventually be borne by the concessionaire.

Table 3.5 shows the cost per ha and per cubic meter. As in the case of KPKKT, the expenditure is not evenly distributed. A large share of the cost needs to be paid during the first year of the certification, i.e. the activities that need to be done for the purpose of complying with the certification requirement.

Table 3.5 PITC - Summary of the Units Costs and Revenues

Item	Total Cost USD	Period covered (number of year)	USD/ha	USD/m^3
1. Initial preparation cost	181,000	5	20.11	3.62
2. Cost of certification process	94,600	5	10.53	1.89
3. Total additional cost due to forest certification	229,800	5	25.53	4.60
4. Revenue (Timber sales)	994,000	1	110.44	99.40

Note:
1 - For the cost per ha, the total cost is divided with the total area of concession (9,000 ha). Similarly, for the unit cost per m^3, the total cost is divided by expected amount of log production in 5 years, i.e. 50,000 m^3. This is artificially high as the FMP (USD 45,800) is prepared only every 30 years.
2. Cost is based on 5-year effective period of the certificate. The total cost is therefore divided by 50,000 m^3.
3. Area cost is per total area.
4. Average revenue is per total area.

The data in Table 3.4 reflects the interpretation of the management on the additional costs due to certification. An adjusted cash-flow table was also worked out with the following adjustment which were deemed justified:

- internal auditing costs were deemed necessary also in years from 2 to 5 but their costs were estimated at 50% of the initial year's costs
- a 5% loss of sales revenue was assumed in the Without Certification case due to a market diversion and/or discount for uncertified products.

The results are reported in Table 3.6 indicating that:

Table 3.6 PITC – Net Present Value with/without Certification

	Without	With	Difference With-Without
Item	**USD 1,000**		
Company interpretation of cost implications	1,453	1,256	-198
Estimated additional management costs accounted for the 5-year period and with loss of 5% of revenue	1,274	1,199	-75
Note: Discount rate: 12%			

- Certification is not an economic option if the assessment is based on the company interpretation of cost implications
- Even if the estimated sales reduction of 5% is considered (due to lack of certification), certification would no become economically worthwhile.

These conclusions have to be interpreted with care as additional compliance costs were not possible to estimate in a reliable manner and the quantitative of benefits were partial.

The company received USD 300,000 from external sources (TFT) to help finance certification investment. Out of this USD 108,900 was used for outside consultancies, the largest single cost item. When this external funding is considered in the assessment, certification becomes an economic option for PITC.

3.3.2 Social Benefits

As in the KPKKT operating area, there are a lot of communities living around the concession but there are no inhabitants inside the concession. PITC gives priority for employment and contract labor for these communities. In addition, PITC has also provided several amenities to the communities. These were not included in the NPV calculations.

3.4 Linkage in Benefits Between Primary Production and Further Processing

The timber produced from the PITC concession area is supplied to the associated companies under Maju Kayu. These associated companies are small indigenous manufacturing companies producing doors and furniture for export to Europe, Japan and North America.

Although there is a lot of pressure for certification requirement in these markets, the companies have still been able to sustain their exports thus far. The preparation for certification is, however, highly desirable, as the current markets of these primary products are facing pressure for certified materials from their end product manufacturers. There were not included in the NPV calculations.

3.5 Conclusion

There are a number of conclusions that can be derived from the PITC case study:

- The company is using the MC&I as the baseline for its operation. As such, there is no additional activities needed to comply with the certification requirement.
- Based on the financial analysis, the company does not have any problem to cover the additional costs of certification.
- The company would register increased profit, were the logs are sold directly to the market.
- If the profit margin generated by increased sales revenue is not duly shared among the participating business units, some of them will find it difficult to continue their operation.

The main incentives for FSC-certification for PITC are as follows:

- The company could pride itself as the first concession to be awarded a “well-managed forest” status under the FSC scheme in Malaysia;
- The subsidiary companies could get improved access to markets, particularly those that need FSC-certified products.
- The company can protect their existing sales, when their regular clients are under pressure to import only the FSC-certified products in the future.

4. CASE 3: THE DERAMAKOT MODEL FOREST

4.1 Introduction

The Deramakot Forest Reserve covers about 55,083 ha of mixed dipterocarp forest. The forest is part of the Permanent Forest Estate (PFE) in Sabah for commercial activities. The area was chosen as the site for Sustainable Forest Management Project funded by Germany and technical assistance

was provided by GTZ. A lot of studies and research activities have been carried out to support the project, which include the preparation of forest management plan.

In 1997, Sabah Forest Department (SFD) engaged SGS to audit the management of Deramakot under the QUALIFOR standard (FSC) and the Malaysian C&I. The certification was successfully obtained covering the period of 5 years (July 1997 to July 2002).

A major reassessment was carried out in Deramakot by SGS upon the expiration of certificate in July 2002. In April 2003, Deramakot was re-certified for a period of another five years (2003-2008).

4.2 Direct Costs of Certification

Based on the records, the Sabah Forest Department paid about USD 27,600 for the first phase of certification, and for the second one, the contract sum is USD 54,700. The respective unit costs are:

- per ha: USD 0.99
- per m^3: USD 4.38

4.3 Cost and Revenue of the Operations

Based on the simulation model developed for the Deramakot forests, the ACC is about 20,000 m^3/year for 1995-1999 period and 15,000 m^3/year for the period of 2000 to 2004. However, the average production in the last five-year period has been 12,487 m^3 per year.

The timber produced is sold through auction which means that market prices are obtained.

The harvesting cost and the revenue from the sale of timber in some of compartments are summarized in Table 4.1.

Table 4.1 Deramakot - Variable Costs and Revenue

Year	Production	Variable costs (RM)	Timber sales (RM)	Average Price RM/m^3
1998	12,235	3,337,701	4,841,866	396
2000	12,928	3,952,687	5,820,059	468
2001	10,741	2,910,789	3,610,665	339
2002	17,196	3,442,616	7,901,208	468
2003	9,333	2,821,879	5,385,043	577

At the compartment level, there is a surplus in terms of harvesting operation. However, there are other operations such as silvicultural treatments and rehabilitation activities that need to be carried out and are not included. In addition, the above costs do not include fixed costs such as staff salaries and other overheads.

The overall cash-flow for managing the Deramakot forest is reported in Table 4.2.

Table 4.2 Deramakot - Total Costs and Revenue

Year	Total costs (RM)	Revenue (RM)	Balance (RM)
1998	6,600,000	4,841,866	-1,758,134
2000	8,393,828	5,820,059	-2,573,769
2001	5,768,100	3,610,665	-2,157,435
2002	5,115,000	7,901,208	+2,786,208
2003e	5,916,040	5,385,043	-530,997

The result indicates that the revenue has always been negative except for the year 2002. However, the data are unlikely to be reliable for a number of reasons:

- variable costs are not duly correlated with the production volume
- annual fixed costs (difference between total costs and compartment-level costs) vary erratically between years which is unlikely in practice.

The financial deficit for managing the areas could, nevertheless, be based on the following reasons:

- The forest is managed by the SFD and the issue of efficiency and cost-effectiveness may not be given a high priority as the expenditures of the operations are funded through the government budget;
- The activities as proposed in the management plan may not be carefully reviewed and planned taking economic viability into account.

Although the Deramakot Forest has been awarded an FSC certificate, the economic sustainability does not appear to be achieved. Similar situations may also be found in other state-owned forests in different parts of the world. In the case of Deramakot, the FMU has received a significant input of technical assistance, which means that compliance costs could in fact have been higher than appear in the FMU accounts. The management of the forest appears to require a lot of improvement to be a model for sustainably managed forests covering economic, environmental and social aspects.

5. MAIN FINDINGS AND LESSONS LEARNED

5.1 Motivation for Certification

5.1.1 States

Most states in Malaysia are required or encouraged to be audited on their forest management performance against the MC&I. Previously, the assessment of management was done internally by the forest department. The use of external assessors adds credibility to the result of the assessment. Under the MTCC scheme, each state is regarded as an FMU. A forest certificate, therefore, provides a testimony and recognition on how the forest departments are managing forests in their respective states.

5.1.2 Concessions

There are several reasons among the concessions for pursuing their certification activities, particularly for the FSC certification (Table 5.1). This motivation has been associated with the situation in the period when these initiatives were started.

Table 5.1 Motivation and Characteristics of Concessions

Concession	Motivation	Characteristics
PITC	To be certified and used as a model "well-managed forest" right from the beginning of its operation. It is run as a profit oriented company, emphasizing efficiency and cost-effectiveness in all its operations.	As a newcomer, the company has spent considerable time and resources for training, planning and networking.
KPKKT	To protect their existing overseas markets.	As follow-up to MTCC certification the company initiated a process to be certified under FSC to ensure access to their current and future markets.
Deramakot	To serve as model for the manage-ment of forests in Sabah.	Significant external technical assistance. Problem of economic viability of SFM.

When the certification process in Deramakot was started in 1996/97, it was considered a new initiative which would greatly contribute to the achievement of SFM in the state. Deramakot has been used as a model for well-managed forests in Sabah.

The certification of KPKKT was purely for business reasons. The existing MTCC certificate is not considered sufficient by KPKKT and its other sister Golden Pharos subsidiaries to enhance market access of their products in Europe, North America and Japan. These outlets are considered premium markets for their products. In the case of doors, 50% of production is currently being exported to markets which require FSC certification. The FSC certificate for KPKKT will, therefore, produce certified material for the group's subsidiaries to address the current and future problems of fluctuations in the supply and prices of the FSC certified raw material which is now being imported.

PITC is a new player in the industry. Doing it right from beginning, the concession could be used as a good example for timber industries in the State of Perak. In addition, marketing of FSC timber products suits the company as it could access certain markets directly, thus reducing the cost of middlemen.

5.2 Are There Additional Costs for Certification

Based on the current assessment of two concessions, there are difficulties to identify the incremental cost for forest certification. The only clear additional cost is the cost for assessment by the independent assessor itself, which is considered small in relation to the overall cost for managing the forest. The observations on the two concessions can be summarized as follows:

- The present set of MC&I should be considered as a baseline standard for the sustainable management of forests in Malaysia. This standard was formulated based on experience and common understanding of good management practices in the country.
- "Conventional logging" does not necessarily represent the logging practice that complies with the standard. During the assessment under MTCC scheme, a lot of gaps and additional activities were identified that need to be carried out to the meet the standard requirements. Various CARs clearly show that even the state departments themselves are also required to improve various activities to meet the MTCC standard.

- Additional costs to meet various gaps of non-compliance with the baseline standard were not considered as incremental costs due to certification in the analysis as they were not possible to estimate.

5.3 Can the Industries Pay for the Additional Costs

One of the critical questions to be addressed is whether the required activities of forest certification will result in a financial burden to the company, thus jeopardizing the economic viability of the business. The brief analysis of the expenditures and revenues in the concessions led to the following findings:

1. PITC has targeted to get the status of "well-managed forest" for its operations right from its establishment in 1998. As a result, it has spent a considerable time for training, planning and networking. It is a company-run business and cost-effectiveness is one of its main goals:
   - Timber and timber products of PITC and its sister companies are marketed directly through a good network of companies and collaborators in Europe and North America, thus reducing the cost of middlemen in the distribution chain.
   - Additional activities such as setting up permanent sample plots are done by in-house resources through good scheduling of company activities.
   - Collaboration with R&D institutions covers the additional costs for R&D.

The financial analysis of the company shows that they have a surplus for business operations, and that trend is expected to continue in the future. The company is, therefore, not having financial problems in its business operations, being able to cover the costs of the certification activities.

2. KPKKT is a mature company, after having involved in the business since 1983. The company is also active in pursuing improvements in the management of its resources. Several joint activities such as collaborative studies with local institutions (e.g. FRIM) have saved a lot of costs for the company in R&D.

The company has allocated some funds to be used to cover the anticipated costs for certification requirements, particularly those of FSC which are concession-related. The company is in a sufficiently solid financial position to absorb the certification related costs, estimated at about USD 375,200.

3. Deramakot Model Forest has been run as a model forest for the state of Sabah. Most of the permanent staff are civil servants and the budget is also from the allocation of the government. The financial status has shown significant improvement but a permanent positive balance has not been reached at yet. Nevertheless, the FMU will not find difficulties to continue its operations due to its governmental status.

The analysis of the concessions indicates that they do not have problems to finance certification costs mainly from their own resources. However, the analysis is based on the current production of timber from primary forests, which always produce a higher yield compared to secondary forests. A major challenge will be faced when the primary forests are no more available and the production entirely relies on secondary forests. While the fixed costs will remain unchanged, the FMUs will have to manage their financing and production efficiency adequately to ensure that the economic viability could be sustained. PITC has still about 28 years to go while KPKKT will exhaust its primary forests by 2007.

5.4 Are There Additional Economic Benefits from Certification?

Expected market benefits have been the driving force of certification in the case of the three concessions.

- While the selected concessions are business entities on their own right and have to pay for achieving certification, they are not, however, duly benefiting from possible price premium. They could benefit more, if allowed to sell directly to the open market. KPKKT and PITC would get a higher value for their timber, perhaps even higher than the premium of certification, if allowed to sell directly.
- The Deramakot Forest reported that there is no clear increase in the price of its logs as a result of certification. The premium is still elusive for their timber sales.
- Even though there are some cases where differentiated prices are obtained for certified forest products, the price premium is in general uncertain. As an example, furniture sold by RNE Consortium shows that the Japanese market may offer a higher price than the FSC certified market elsewhere. However, the volume exported to the Japanese market is too small to have a significant impact on profitability. For Golden Pharos Door, there is no price difference between the certified and non-certified markets. The main incentive is to further enhance the company's access to the certified markets.

There are also other concerns that need to be addressed, particularly regarding how much benefits can be generated by the investment made to achieve compliance with the requirements of the certification standards:

- The current emphasis on biodiversity protection and conservation in the certification standard should be seen in the right perspective. Even though there are a lot of 'right' environmental activities being carried out, the respective economic benefits have not been duly considered. At present, there are no defined activities that can generate economic benefits for the concessionaires as a result of improved environmental conservation.
- Many states and concessionaires have to improve the construction of roads and other infrastructure. The road investment is one of the main costs of logging operations but the road is only used during the logging period. It will be revisited only 30 years later.
- Certification focuses on timber production which is, however, done once in 30 years in a site. There are no economic activities proposed for the land area in the meantime.

5.5 Enhancing Net Benefits from Certification

Malaysia is known for her tradition in the management of forest resources and the country is also a main player in the tropical timber trade. There is, therefore, a genuine desire to get recognition for the quality of forest management. This is clearly demonstrated by the required activities under the MTCC certification scheme. Many activities required for good forest management have already been in place for years.

The main objective of the market recognition is to facilitate and sustain access to the market. The market for the MTCC certified forest products is still small. The step taken by PITC and KPKKT to get FSC certification is a clear indication of the wish to continue having preferential access to the market. However, the adjusted FSC-compatible MC&I to be launched in 2005 in Malaysia may further enhance market access with the MTCC certification.

An increased price is expected for certified products. However, the premium is not obtained by the companies as yet. This is partly due to the fact that the price increase entirely relies on the

willingness of buyer/consumer. Such increases are reported by some companies that are importing certified products but in the long term the improved quality and design of end products would continue to be the main factors that determine the price.

The companies that manage forest resources would benefit more through certification if they allowed to sell their timber directly to the market. At the moment, the benefits of certification are not distributed fairly to FMUs and the internal transfer price of integrated companies tends to be below the market price.

There are still many issues to be addressed to further increase the benefits of certification:

- The MC&I made a lot of emphasis on biodiversity conservation. Many activities such as documentation and protection have been imposed. However, few of these activities generate economic value, particularly for the concessionaires. The economic benefit from biodiversity conservation is not yet realized.
- Appropriate construction of infrastructure, particularly roads, has been emphasized and the respective requirements are very tight as shown by the audit reports. However, after the heavy investment in the infrastructure, many parts of the road system are used only during the logging operation. They are left idle and will only be used again after 30 years.
- The MC&I emphasizes aspects related to log production. There are no activities to generate revenue from the logged-over area in the next 30 years.

In conclusion, further research and activities to increase the commercial value of forest land in terms of products and services should be given a high priority in future development efforts.

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