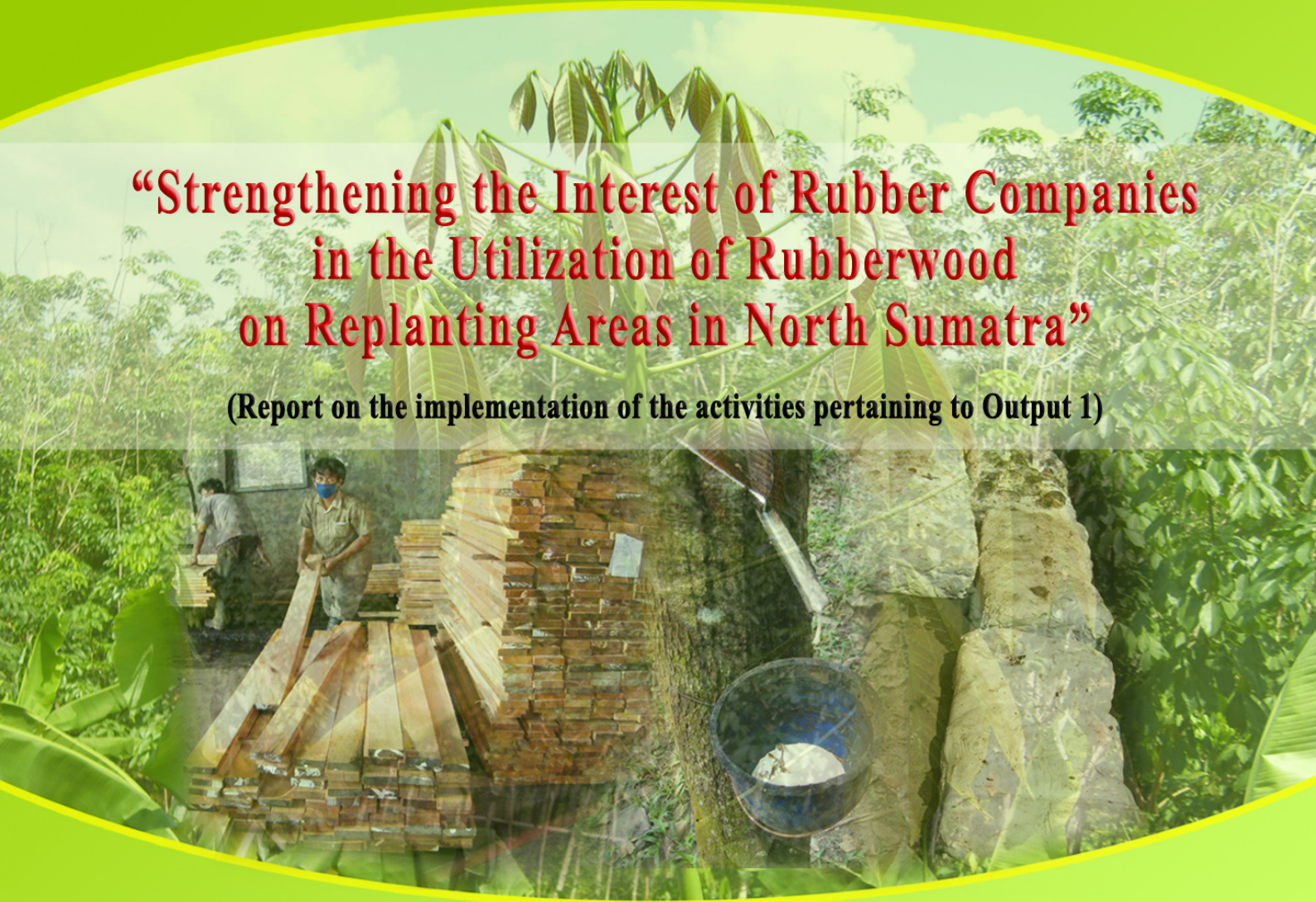


# Project ITTO PD 523/08 Rev. 1 (I)

## Operational Strategies for the Promotion of Efficient Utilization of Rubberwood from Sustainable Sources in Indonesia

### “Strengthening the Interest of Rubber Companies in the Utilization of Rubberwood on Replanting Areas in North Sumatra”

(Report on the implementation of the activities pertaining to Output 1)



Executed by:  
Directorate General of Forestry Enterprise Development (BUK),  
The Ministry of Forestry of Indonesia



In collaboration with:  
Indonesian Sawmill and Woodworking Association (ISWA)



With the assistance of:  
The International Tropical Timber Organization (ITTO)

**Jakarta, May 2013**



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of Rubberwood from Sustainable Sources in Indonesia”**

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of Rubberwood on Replanting Areas in North Sumatra”**

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The Ministry of Forestry of Indonesia

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## List of abbreviation

BCR	: Benefit-Cost Ratio
BUK	: Bina Usaha Kehutanan/Forestry Enterprise Development
DG	: Directorate General
GOI	: Government of Indonesia
HTI	: Industrial Forest Plantations
HTR	: Community Forest Plantations
IRR	: Internal Rate of Return
ISWA	: Indonesian Sawmill & Woodworking Association
ITTO	: International Tropical Timber Association
LFM	: Logical Framework Matrix
M <sup>3</sup>	: Cubic Meter
MDF	: Medium Density Fibreboard
MOU	: Memorandum of Understanding
NGO	: Non-government Organization
NPV	: Net Present Value
PBSN	: Perkebunan Besar Swasta Nasional/Large Private Company
PSC	: Project Steering Committee
PTPN	: Perkebunan Nusantara Co.Ltd.
PT SUWI	: PT Samawood Utama Wood Industry
R & D	: Research and Development
RST	: Rough Sawn Timber
USD	: United State Dollar; 1 USD = 9,500 IDR

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## Summary

The specific objective of project PD 523/08 Rev. 1 (I) was to promote the utilization of rubberwood from sustainable sources; it was planned to be achieved through delivery of five outputs one of which was “interest in the utilization of rubberwood owned by big companies increased.” In order to deliver this output, four activities were planned to be implemented, namely: 1) to provide reliable information on potential benefits of utilizing rubberwood owned by big companies, 2) to facilitate intensive dialogue between large-scale rubber tree growers and the wood industry for adjustment of replanting schedule by big companies to ensure steady supply of wood to processing mills, 3) to organize one national workshop on rubberwood utilization involving main stakeholders, and 4) to facilitate establishment of joint investment between rubber growers and wood processors in rubberwood utilization. These activities had been fully executed in a collaborative manner with the national consultant, project beneficiaries and partners.

The results of Activity 1 indicated that the primary requirement for making investment in sawmilling and woodworking industry of an economic scale is availability of around 30,000 m<sup>3</sup> of rubber logs per annum for which around 1,000 ha of old rubber plantations have to be harvested every year. As most rubber companies can not meet this requirement, except PTPN III, they are advisable to cooperate with existing wood industries in the utilization of their rubberwood under a mutually benefiting fashion. The consultations conducted with selected rubber companies indicated their reluctance to make adjustments to their established replanting strategy for corporate policy, technical and administrative reasons. The national workshop organized under Activity 3 identified the institutional as well as technical problems facing the utilization of rubberwood from old plantations and made concomitant recommendations for follow-up actions. The results of consultations with selected rubber companies under Activity 4 revealed that establishment of joint investment by rubber companies with the wood industries is not feasible for corporate policy reason; the feasible and flexible form of cooperation identified is a log supply contract under agreed upon terms and conditions.

Using the pre-defined indicators as the tool of assessment, it has been concluded that Output 1 of the project has been achieved only partially due mainly to the unsatisfactory outcomes of Activities 2 and 4.

# 1. INTRODUCTION

## 1.1 Background information

ITTO Project PD 523/08 Rev. 1 (I) “Operational Strategies for the Promotion of Efficient Utilization of Rubberwood from Sustainable Sources in Indonesia” was implemented by the Directorate General of Forestry Enterprise Development (BUK) of the Ministry of Forestry of Indonesia in collaboration with the Indonesian Sawmill and Woodworking Association (ISWA) based on the project agreement signed by the Government of Indonesia on 25 March 2010 and by the International Tropical Timber Organization (ITTO) on 6 April 2010. The project operations commenced in May 2010 and lasted for thirty-six months.

The project was aimed at promoting the utilization of rubberwood from sustainable sources in Indonesia, i.e. the rubberwood harvested by rubber companies and farmers from their respective replanting areas. Its development objective was to contribute to lessening of wood raw material supply problem facing the national forest industry by utilizing the vast rubberwood available from sustainable sources. The expected outputs of the project were: i) interest in the utilization of rubberwood owned by big companies increased; ii) incentives for and capacity in the utilization of rubberwood from smallholding plantations improved; iii) government policy governing rubberwood resource utilization revised and enhanced; iv) investment in rubberwood utilization increased; and v) appropriate technologies are available for the utilization of rubberwood from smallholding plantations.

The total project budget was USD 907,794 comprising contributions of ITTO and Government of Indonesia (GOI) in the amounts of USD 605,094 and USD 302,700, respectively. The project funds actually disbursed to GOI by ITTO was USD 449,040 as USD 156,054 was retained and administered by ITTO for purpose of project monitoring and evaluation. The ITTO project funds were contributed by the Governments of Japan and Korea and Japan Lumber Importers Association.

This technical report documents achievement of the first output as well as data and information gathered through execution of four pertinent activities namely:

Activity 1.1: To provide reliable information on potential benefits of utilizing rubberwood owned by big companies

Activity 1.2: To facilitate intensive dialogue between large-scale rubber tree growers and the wood industry for adjustment of replanting schedule by big companies to ensure steady supply of wood to processing mills

Activity 1.3: To organize one national workshop on rubberwood utilization involving main stakeholders

Activity 1.4: To facilitate establishment of joint investment between rubber growers and wood processors in rubberwood utilization

This project was a follow-up to completed pre-project PPD 80/03 Rev. 2 (I) entitled "Promoting the utilization of rubberwood from sustainable sources in Indonesia". The main findings of the pre-project are outlined below:

1. The total area of rubber plantation in Indonesia in 2005 was around 3.37 million ha, distributed in Sumatra Island 2.38 million ha (71 %), Kalimantan Island 0.83 million ha (25 %) and other Islands 0.16 million ha (4 %). In terms of ownership, bulk of plantations, 2.88 million ha or 86%, were owned by smallholders or farmers and 0.49 million ha or 14% by state-owned and private big companies.
2. The smallholding plantations were normally not well managed, highly fragmented with area less than 5 ha per owner, poor accessibility, low production of latex and limited replacement of old trees thus harvesting of wood. In contrast, the large scale plantations owned by big companies were well managed with high accessibility, area of individual blocks averaging well above 500 ha, with high yield of latex and well scheduled replacement of old plantations.
3. The big companies commonly replace plantations at 25 years of age; therefore, the rate of replacement or replanting nation-wide would be around 134,892 ha per year, 116,000 ha by smallholders and 18,892 ha by big companies.
4. Based on the measurement of 30 sample plots in Sumatra and Kalimantan, it was found that the average volume of wood biomass in Sumatra and Kalimantan was 240 m<sup>3</sup> and 200 m<sup>3</sup> per hectare, respectively. Therefore, around 30.81 million m<sup>3</sup> of wood biomass is harvestable per year in Indonesia of which around 13.5 million m<sup>3</sup> were saw logs having diameter of 20 cm and up and the balance is in the form of small sized wood.
5. Out of the 13.5 million m<sup>3</sup> of saw logs, only 2.96 million m<sup>3</sup> or 22 % has been utilized so far, mostly originating from large scale plantation, for sawn wood and veneer and only a tiny amount of biomass has been used in Medium Density Fibreboard (MDF) making in Sumatra Island.
6. The extremely low rate of utilization were caused mainly by: i) lack of interest in the utilization of rubberwood owned by big companies; ii) lack of incentive and capacity in the replacement and utilization of old trees by smallholders; iii) weak government policy on rubberwood utilization; iv) lack of investment in rubberwood utilization mainly due to poor accessibility and unavailability of reliable information in terms of quantity, quality and distribution of resource; and v) unavailability of appropriate technology for commercial utilization of rubberwood on smallholding plantations.

This project was also consistent with the recommendation made by the ITTO Technical Mission to Indonesia in 2001 saying that to restructure the forest industry, the government has to take action towards adoption of appropriate technology for utilizing raw material of differing quality and properties such as timber from non-traditional/non-forest sources including rubber and palm oil plantations.



## **1.2 Organization of the report**

This report concerns only with the first output of the project and it is organized in accordance with the existing ITTO Manual. The first part of the report outlines the background information on the project particularly findings of completed pre-project PPD 80/03 Rev. 2 (I) on which the project was built on. The second part elaborates on the methodologies applied in data collection and analysis. Data and information collected are presented by activity in Part 3 while analysis and interpretation of findings are described in Part 4. Conclusions and recommendations are presented in Part 5 while implications for practice are highlighted in Part 6 of the report.

## 2. APPLIED METHODOLOGIES

The first output target of the project was “increased interest of rubber companies in utilizing the rubberwood they harvested from the land areas to be replanted”. In order to deliver the target output, four activities had been identified and executed, namely:

- Activity 1.1 : To provide reliable information on potential benefits of utilizing rubberwood owned by big companies
- Activity 1.2 : To facilitate intensive dialogue between large-scale rubber tree growers and the wood industry for adjustment of replanting schedule by big companies to ensure steady supply of wood to processing mills
- Activity 1.3 : To organize one national workshop on rubberwood utilization involving main stakeholders
- Activity 1.4 : To facilitate establishment of joint investment between rubber growers and wood processors in rubberwood utilization

The hypothesis made was that by executing Activities 1 through 4, the output target will be fully achieved. Concomitant with this hypothesis, following are the propositions made relating to the output:

- i. That utilization of rubberwood harvested from replanting areas by rubber companies is financially feasible;
- ii. That old rubber trees with low latex productivity are to be replaced by rubber companies through establishment of young rubber plantations in order to ensure steady and high yield of latex in the long-run, regardless of the volume and price of rubberwood removed;
- iii. That rubber companies are ready to adjust replanting schedule in order to maximize monetary income from sales of rubberwood; and
- iv. That rubber companies are interested in making the necessary capital investment for rubberwood utilization.

It is evident from above defined activities that the strategy for intervention to be pursued was basically to produce relevant and updated information on potential benefits that are accruable to rubber companies by utilizing the rubberwood harvested by the companies during the process of replacing old rubber trees or establishment of new rubber plantations. Such information was sourced mainly through Activities 1.1 and 1.2 which was then elaborated and discussed under Activity 1.3, the national workshop. Activity 1.4 was accomplished by utilizing the information generated under Activities 1.1 through 1.3.

PTPN II is a state-owned company administering around 120,000 ha of land in North Sumatra of which 15,232 ha were rubber plantation. Activity 1.1 was accomplished in cooperation with this company. The company was purposively chosen as the object of feasibility study for reasons of its

positive response to the proposal made by the project on conduct of the study and for easy access to the rubber plantation sites.

Activity 1.2 was accomplished through informal as well as formal consultation with selected rubber companies. The informal consultation was held in Medan involving a number of companies including PTPN II, PT Bridgestone Sumatra Rubber Estate and PT London Sumatera. The head of North Sumatra Provincial Crop-estates Agency and project consultant were also present at the consultative meeting. The formal consultation was accomplished through visit to selected companies namely PTPN II, PTPN III, PT Bridgestone Sumatra Rubber Estate and PT London Sumatera and through direct contact during the occasion of the national workshop.

Activity 1.3 was an important source of information. The national workshop was organized on 20-21 January 2011 in Medan where the information generated under Activities 1.1 and 1.2 was presented and thoroughly discussed by the participants. In addition, professional papers prepared by the Sei Putih Rubber Research Center, PT Bridgestone Sumatra Rubber Estate and PT Samawood Utama Works Industries (PT SUWI) were also presented to the workshop and had enriched information on rubberwood utilization.

Activity 1.4 was accomplished by utilizing the information generated under Activities 1.1 through 1.3. In addition, a focused discussion forum involving rubber companies and wood industries as well as officers of Directorate Generals of Crop-states and Forestry Enterprise Development (BUK) was also organized in Jakarta on 6 June 2012. The main purpose of this forum was to, again, identify opportunities for joint investment between rubber companies and wood industries in the utilization of rubberwood owned by the farmer. This forum was organized based on the decision of the second meeting of the Project Steering Committee (PSC) held in Jakarta on 22 December 2011.

The information produced through Activities 1.1 and 1.3 was disseminated and also discussed at this forum. It was then expected that through such information sharing and comprehension, rubber companies in North Sumatra would appreciate the potential benefits of utilizing rubberwood they own; this better understanding was expected to increase their interest in the utilization of rubberwood which is indicated through willingness to invest, establish joint venture (s) or cooperate in one form or another with existing forest industries.

### 3. PRESENTATION OF FINDINGS

#### 3.1 Potential benefits of utilizing rubberwood by rubber companies

The study on feasibility of utilizing rubberwood by rubber companies sourced from replanting areas was conducted at PTPN II in mid 2010; the main findings of the study are summarized below:

- The economic scale of a sawmill converting rubber logs into sawn timber is around 36,000 m<sup>3</sup> of intake per annum. This level of economic scale determined the levels of needed capital investment, production cost and selling price of rubber products. Assuming a recovery rate of 30%, the projected yearly production volume of rough sawn timber (RST) is around 10,800 m<sup>3</sup>.
- To construct a sawmill of economic scale the amount of capital investment needed was approximately USD 754,000 while the average production cost of kiln-dried sawn timber was USD 114/m<sup>3</sup>. The average unit selling price at local market was, conservatively estimated at USD 200/m<sup>3</sup>. Therefore, the calculated Net Present Value (NPV), Benefit-Cost Ratio (BCR) and Internal Rate of Return (IRR) were USD 1.95 million, 1.54 and 120.37%, respectively.
- Using NPV, BCR and IRR as the criteria, construction and operation of a sawmill with an intake capacity of 36,000 m<sup>3</sup> logs per annum was obviously financially feasible. Therefore, the first proposition made is valid. The primary requirement that has to be met is that rubber logs is available at 36,000 m<sup>3</sup> per year on a continual basis.
- In order to steadily supply 36,000 m<sup>3</sup> of logs, around 1,000 ha of old rubber trees need to be harvested every year under the assumption that the average yield of logs with diameter 20 cm and up is about 35 m<sup>3</sup>/ha as is the case with PTPN II. The area will be less if the yield of logs is larger. In other words, investment on sawmilling by a company owning rubber plantation is financially feasible only if the company is capable of providing around 36,000 m<sup>3</sup> of rubber logs per annum for which around 1,000 ha of old plantations is available for harvest.
- PTPN II cannot support the operation of a sawmill of economic scale because of insufficient raw material on a continual basis. Its working area was only around 15,000 ha capable of producing around 21,000 m<sup>3</sup> of rubber logs per year. The working area tends to decline in extent as the company is contemplating to convert rubber to palm oil for economic reason. Therefore, it was recommended that PTPN II sells rubberwood from replanting/conversion areas to existing wood industries under a mutually benefiting form of cooperation.

### 3.2 Adjustment of the replanting schedule by rubber companies

Feasibility of cooperation between rubber companies with wood industries in rubberwood utilization is affected by several forces; the most critical one is the replanting strategy pursued by rubber companies in general and how it fits with the strategy for supplying wood raw material favored by the wood industries as highlighted below:

i. The interest of the rubber companies

- The rubber companies met with did appreciate the potential benefits of rubberwood utilization accruable to the companies. Indeed, they have enjoyed such benefits in various forms for years now including some monetary income from selling harvested old rubber trees, creation of job opportunities for local people, etc. However, the income so derived is not essential for the companies; instead, they treat such income only as miscellaneous income, not as income to be relied on to finance management operations thus is treated somewhat external to the financing structure of the companies.
- The core business of rubber companies is the production and processing of latex and in the selling of latex products. Therefore, the essential source of income is from selling latex products, not from selling rubberwood.
- The rubber companies, therefore must be striving to maximize proceeds from selling of latex products. Consequently, the primary aim is to maximize latex production in terms of quantity and quality. One of the ways of doing this is to ensure high latex yield overtime. Unproductive old rubber trees must be timely replaced with young trees that produce latex in larger quantity and better quality in the long-run. This is the basic rule to follow as a matter of business policy. This fact leads to the affirmation of the proposition made as regards replacement of old rubber plantation; that it is a matter of long-run latex business survival regardless of state of demand for wood by the wood industries; that regardless of the volume and price of rubberwood contained in a particular replanting area, old rubber trees with low latex productivity are to be replaced by rubber companies through establishment of young plantation in order to ensure steady and high yield of latex in the long run.
- Replacement of old trees to young trees is not linked with the volume of rubberwood harvested and its selling price but based on latex productivity and the need to steadily produce high yield latex. Therefore, replacement strategy for old trees pursued is the one that ensures success rate of replacement in view of steady supply of latex in the long-run.
- The replacement strategy pursued by the rubber companies can be outlined as follows:
  - First, a company identifies the area of old rubber trees to be replanted whose size varies between individual companies
  - The primary criterion used is latex productivity. As latex productivity normally begins decreasing at 25 years of age, replacement of old plantation is undertaken at this age

keeping in mind that latex productivity does not always correlate directly with age but is also influenced by such other factors as health, growth, management intensity of stands as well as tapping techniques.

- In general, the trees at 25 years of age are to be replaced because such trees are experiencing diminishing latex yield. An exception may occur in the case when current price of latex is attractive that delaying replacement is worth doing.
  - The area of rubber trees identified for replacement is then intensively surveyed to find out the number of existing trees along with their average size and conditions as well as the exact size of the area.
  - A contractor is then identified and assigned to do the replanting activities. Cost of replanting is negotiated based on size of the area, conditions of the existing rubber trees on the land as well as the technical specifications of rubber plantations to be delivered by the contractor.
- Cost of replanting is calculated based on the cost of establishment of plantation in accordance with the agreed upon technical specifications less the assessed monetary value of marketable rubberwood contained in the replanting area.
  - The contractor appointed is normally that one that has already had proved experience in rubber plantation development with good track record particularly as regards success rate of rubber plantation. This policy is adopted by the companies in order to minimize risk of failure. The risk involved is regarded as very expensive because of the time involved in plantation development process which is valued dearly by the company due mainly to its implications on future income stream; therefore, risk has to be minimized to the extent possible.
  - The old trees on target block are to be harvested entirely during the current long dry season which normally lasts for around six months depending on the climate characteristics of the location regardless of the block size. If the block of replanting is 500 ha for example, the entire trees on the area must be harvested within the six months period. In addition, the roots must be completely removed in order to avoid fungae attack on young rubber trees in future time.
  - Land preparation is to be completed during the current dry season for reason of operational efficiency; this must be so because planting activities must be completed during the ensuing rainy season.
  - If the block to be harvested for replanting is 500 ha, the logs produced may reach 20,000 m<sup>3</sup>. These logs are now fully owned by the contractor whom may sell or utilize the logs as he or she wishes. The rubber company has no more responsibility for usage of the logs. If the contractor is not a wood processor, he or she may sell the logs to any buyer; if he or she happens to be a wood processor, he or she will use the logs as the raw material.
  - The immediate consequence of above replacement strategy is that rubber logs are accumulated in high total volume during dry season. If, the total replacement area in particular year is 5,000 ha for instance, the total volume of logs may reach 200,000 m<sup>3</sup> within six months or around 33,000 m<sup>3</sup> per month. During the rainy season of that very year, however, practically

no logs will be produced. This pattern of logs flow surely is not in the interest of any wood processor.

ii. The interest of wood industries

A typical wood processor is in favor of steady flow of raw material; sufficient volume of logs is delivered to the mill continuously from time to time, on a weekly or even daily basis. Steady supply of logs is preferable for the following reasons:

- Rubber logs are prone to blue stain attack; blue stained logs yield inferior quality of processed wood products thus low selling price. Therefore, it is best for a wood industry to store rubber logs within the shortest time possible;
- Inventory cost is expensive and so is logs caring cost especially preservative treatment; and
- Hedging a huge volume of logs is also problematic in terms of space for storage.

Above information clearly indicates the prevailing conflict of interest between a typical rubber company with a typical wood processor. A rubber company employs a replanting strategy that produces high volume of rubber logs during the dry period for reason of efficient land preparation regardless of log market conditions; a typical wood processor on the other hand requires supply of logs year round on a steady, weekly or daily, basis for reasons of fixed processing capacity as well as costs of inventory and maintenance of logs. The conflict of interest needs to be resolved under a win-win solution to the extent possible.

### **3.3 Conduct of the national workshop on promotion of rubberwood utilization**

The national workshop on “Promoting the Utilization of Rubberwood from Replanting Areas of Rubber Companies and Farmers” was held in Medan on 20-21 January 2011 with 64 participants. The expected outputs of the workshop were:

- Deep understanding on the actual problems facing efficient utilization of rubberwood originating from replanting areas through exchange of information and experience, and
- Effective operational strategy for utilization of rubberwood identified.

In order to deliver the expected outputs, the main stakeholders were invited to take part in the workshop. Researchers and practitioners were also requested to present relevant and up dated information on various aspects of rubberwood utilization to the workshop to serve as materials for discussion among the participants. The workshop was attended by some sixty-four people representing rubber companies and farmers, wood processors and traders, practitioners, decision makers, experts, academes, researchers, and NGOs.





*Reps. of DGs of BUK, Crop-estates and ITTO addressed the national workshop in Medan*



*Presentation sessions of the workshop moderated by Dr. Hiras of the Project and Dr. Tetra of ITTO, respectively*

The problems facing rubberwood utilization identified by the workshop were:

- Existing wood processing plants are few in number, limited in product lines and situated at quite a distance from rubber plantation centers that efficient utilization of rubberwood is difficult to realize;
- The average hauling distance from harvest sites to processing plants is too far causing costly transportation of logs;
- The average recovery rate of sawmilling is low, ranges between 20 to 30 percent, due mainly to the smallness of log diameter and inferior log quality brought about by improper latex tapping techniques;

- Rubberwood is prone to blue stain attack particularly three days after felling time, that it requires preliminary treatment thus additional unnecessary production cost; also, rough sawn rubberwood should undergo vacuum pressure treatment at the earliest time possible to avoid blue stain attack which also entails additional cost;
- The harvest of old trees by rubber companies are undertaken by contractors during the short period of dry season, preferably in large land area for reason of operational efficiency, that volume of logs during harvest season is very abundant but scarce during rainy season;
- Relying solely on rubberwood as the raw material, a wood processing plant would have to operate only during harvest season that lasts only around six months per year because storage for an extended period of time requires special but costly treatments;
- A typical rubber company does not use age of trees as the sole criterion in the selection of trees for replacement but also other such factors as rubber stand overall growth and health, sufficiency of existing tapping plane, latex productivity and current selling price of latex products;
- For far distance hauling, sawn rubberwood should have received pre-treatment prior to loading with simple methods utilizing locally available preservative materials;
- Scattering farmers' plantations with poor accessibility causes low economic value of rubberwood; and
- Existing government policy does not facilitate creation of timber value-added by the wood industry needed for increasing income of the forest sector as well as rubberwood owners.



*Representatives of wood industry and exporter raised the issue on weak government policy*

Identified problems were thoroughly discussed by the participants and the main conclusions and recommendations made by the workshop are summarized below:

- i. At present, the national wood industry is experiencing raw material supply problem; wood production from plantations and natural forests can not meet the raw material requirement for the installed capacity, estimated at around 60 million Cum per annum, that alternative supply sources like rubber, coconut and other crop estates must be sought for. The total area of rubber plantation in Indonesia today is around 3.4 million ha of which 85% are owned by farmers; the other 15% are owned by state-owned and private companies. Assuming a

replanting rate of 4% per annum i.e. 25 years of replacement age, and timber volume with diameter 20 cm and up averaging 100 m<sup>3</sup>/ha, potential annual supply of rubber logs is around 13.5 million m<sup>3</sup>. Assuming that the above supply potential is continuously available year round, there is an opportunity for the forest industries of different scales to utilize the wood for making sawn wood, plywood, chip wood, and other products.

- ii. However, the rubberwood produced under replanting program, while potentially huge in volume, cannot be optimally utilized by the wood industry due to the different problems. To increase the rate of utilization, it is necessary to remove the problems on the utilization of rubberwood on replanting areas through i) improvement of infrastructure to increase accessibility of rubber plantations, ii) development of processing mills nearby plantations, iii) promotion of applied R & D on efficient processing of rubberwood, iv) adjustment of replanting schedule to ensure sufficiency of supply year round, v) adoption of government policy that facilitates simplicity in issuance of different permits and encourages cooperation between wood industry and rubber growers, and vi) promotion of rubber logs supply contract for different time frames which appears to be the most flexible and beneficial form of cooperation between rubber growers and wood processors.
- iii. The different stakeholders may contribute to promotion of rubberwood utilization in various ways as follows:
  - The Ministry of Forestry can simplify the licensing process for new rubberwood processing mills and paper work of rubberwood distribution and at the same time prevent high transaction costs from occurring in order to avoid escalating production cost;
  - The Ministries of Agriculture and Forestry may consider harmonizing the established replanting strategy for rubber plantations with the supply strategy for continuous and sufficient supply of wood favoured by the wood industry for which intensive dialogue and exchanging of information need to be organized;
  - The Ministry of Forestry is to promote establishment of industrial and community forest plantations (HTI & HTR) using the rubber clones suitable for producing both latex and timber;
  - The Ministry of Cooperative and Small-medium Enterprises may contribute by awarding credit or revolving funds to farmers for establishing rubberwood processing facilities;
  - The Ministry of Forestry and Finance should consider to increase availability of funds for rubberwood processing at reasonable rate of interest in order to promote forestry real sector while abolishing local sale taxes for rubberwood products;
  - The Ministry of Industry may contribute through technical and managerial training of professionals on rubberwood processing by small and medium enterprises and deregulation of investment procedures for erecting new rubber processing plants; and

- Crop-estate Agencies shall promote training on latex tapping in order to avoid poor quality of rubber tree boles which causes low recovery of processing.

The expected outputs of the national workshop were generally achieved; deep understanding on the problems facing rubberwood utilization had been gained by the participants through review of the information available from different sources and through the discussions. Applicable and efficient strategies for increasing the rate of utilization of rubberwood were also identified as summarized in the conclusions and recommendations of the workshop.

### **3.4 Establishment of joint investment between rubber companies and the wood industries**

Resolving the existing conflict of interest between the rubber companies and wood industries proved not an easy undertaking; it requires intensive and continuous consultation through the various events including the formal and informal ones as well as involvement of high-rank officers of the Ministries of Forestry and Agriculture. One of the fora proved useful for consultation was the national workshop on “promoting the utilization of rubberwood from replanting areas of rubber companies and farmers” which was held in Medan, North Sumatra on 20-21 January 2011. In addition to this workshop, the forum on cooperation in rubberwood utilization organized by the Project on 6 June 2012 in Jakarta also provided meaningful and useful conclusions. The conclusions drawn by this consultative meeting were:

- Road net work plays crucial role in rubberwood utilization; availability and sufficiency of road network in Java Island for instance have encouraged investment in the efficient utilization of albizia wood in the island that albizia wood products have become the prime forest commodity for both domestic and export market in recent years;
- The national wood industry acknowledges the wood raw material supply problem facing the industry in recent years; there is a big gap between the quantity of wood raw material available in North Sumatra and the quantity actually needed by the industry operating in the region. The industry stakeholders also appreciated the fact that a huge volume of rubberwood from replanting areas is available on a sustainable basis but has not been utilized by the wood industry in a proper and efficient manner;
- Total volume of rubber logs from the replanting areas of rubber companies in North Sumatra province has been estimated at around one million cubic meters per annum but the volume that has been utilized by the primary wood industry is less than thirty percent as to date; the balance is used only as fuel wood mainly in brick and tile making and as MDF raw material;
- Utilization of rubber logs from replanting areas has been for decades now controlled by the contractors of rubber plantation development; the contractors, that are practically fixed by the companies owning rubber plantations for risk minimizing reason are generally not wood processors but act as the log traders;

- Wood processors in North Sumatra and Jambi informed the meeting that utilizing rubber logs from replanting areas of rubber companies proves not easy; the time schedule for harvesting of old rubber trees and for planting of rubber seedlings set by the rubber companies is truly difficult to follow and comply with by any wood processors. The replanting time schedule is oriented towards plantation development target wherein harvesting of old trees is only part of site preparation process;
- The wood industry from South Sumatra confirmed that the primary problem on performing efficient utilization of rubberwood is on how to synchronize the short period of harvesting (supply of rubber logs) with the long period of processing (demand for rubber logs); while the supply lasts only for about six months in a year, the demand occurs year round;
- A win-win solution by synchronizing the time schedule of harvesting by rubber companies and of processing by wood industry needs to be identified wherein participation of Directorate Generals of Crop-estates and Forestry Enterprise Development (BUK) as well as flexibility of rubber companies and wood industries is highly desirable; and
- PT Perkebunan Nusantara III (PTPN III) is the largest rubber company in North Sumatra; in total, it owns around 55,716 ha of rubber plantation. This company is inviting interested wood processors to take part in rubberwood utilization. To this end, PTPN III is encouraging wood processors to formally indicate their interest in collaborating and exploring opportunities for a mutually benefiting cooperation. Towards completion of the Project, two wood processing companies had formally indicated their interest in utilizing rubberwood in cooperation with PTPN III.

## 4. ANALYSIS AND INTERPRETATION OF THE DATA AND RESULTS

### 4.1 Feasibility of investment in rubberwood utilization by rubber companies

Available data indicated that the average size of rubber plantations owned by big companies in North Sumatra in 2010 was smaller than 25,000 ha, the minimum size of plantation required to support operations of an economic scale of sawmill on a sustainable basis. The company owning rubber plantations at the extent of over 25,000 ha or larger was only PTPN III which currently owns around 55,716 ha of rubber plantation in North Sumatra. It should be noted however, that these rubber plantations are located in different localities and districts that transporting rubberwood from harvest areas to mill site may not be economical.

The study on feasibility of investment in rubberwood utilization indicated that the primary requirement for making investment in sawmilling of rubberwood at economic scale on a sustainable basis is steady supply of around 36,000 m<sup>3</sup> of rubber logs per annum. Steady supply means that required rubber logs must be available uninterruptedly year round on weekly or monthly basis, preferably on a daily basis. Depending on the growing stock condition, this volume of logs requires harvesting of around 1,000 ha every year or existence of rubber plantation of around 25,000 ha in total.

Based on this primary requirement, PTPN II is not in a position to build and operate an economic-scale of sawmill; while the company's total working area was approximately 121,000 ha, the extent of rubber plantation then was only around 15,232 ha with an average volume of standing stock of old trees at around 48,72 m<sup>3</sup>/ha. Therefore, the supply potential of logs was only around 21,000 m<sup>3</sup> per annum, less than the level of steady supply of raw material i.e. 36,000 m<sup>3</sup> per annum, to support an economic scale of sawmill. Therefore, for reason of sufficiency of raw material, PTPN II was not in a position to invest in sawmilling project; only PTPN III has the capacity to construct and operate an economic scale of sawmill on ground of sufficiency and continuity of wood raw material supply.

Consequently, the proposition made that "utilization of rubberwood harvested from replanting areas by rubber companies is financially feasible" is applicable only to those companies having the ability to steadily supply logs in the amount of around 36,000 m<sup>3</sup> per year. The rubber companies having smaller area of plantation are recommended to utilize their rubberwood from replanting areas in cooperation with existing wood processors. A mutually benefiting form of cooperation will have to be identified by interested rubber growers and wood processors. The most flexible form of cooperation is log supply contract under agreed upon terms and conditions.

## 4.2 Possible modification of the established strategy for replanting

The proposition made as regards strategy for replanting is that “rubber companies are ready to adjust replanting schedule in order to maximize monetary income from sales of rubberwood harvested from replanting areas” appears to be not favorably responded to by the companies consulted. The companies are resistant to change or modify the strategy outlined in the previous section for the following reasons:

- i. Preparation of planting site is to be completed during dry season

The companies consulted argued that preparation of planting site during a rainy season will increase cost of planting because productivity in general, of heavy equipment in particular, is reduced due to sluggish mobility brought about by sticky soil and heavier wood biomass. Beside, skidding of logs from harvest sites to logs landing sites is more difficult during rainy season while hauling may be problematic as road quality is not entirely of all weather construction. Therefore, it is best to carry out and complete land preparation including harvest of old trees during a dry season.

- ii. Extended period of land preparation is risky

If land preparation goes beyond the current dry season and is completed during the immediate rainy season, cost of land preparation will rise for the reasons elaborated above. Beside, there may be insufficient time left for planting of rubber seedlings. If this is the case, planting activities can only be completed during the next rainy season that occurs only in the next year. It is therefore risky to extend preparation of planting site beyond the current dry season.

- iii. The target is to establish new plantation

The primary aim of the rubber companies is to timely establish new rubber plantations of high quality in an efficient manner. Planting of new seedlings is best completed during the immediate rainy season. To this end, site preparation will have to be completed during the current preceding dry season independent of the volume of wood biomass that has to be removed, how harvested logs are to be utilized as well as selling price of rubberwood. This is so because the companies do not rely on income from selling harvested wood to finance their replanting program but on funds received from selling of latex products. Indeed, the companies have enjoyed and appreciated the proceeds from rubberwood selling but implementation of replanting program is independent of the monetary income from selling rubberwood. That is to say that replanting program must be accomplished regardless of the monetary value of the rubberwood harvested from replanting areas.

- iv. Contractor of replanting

The companies argued that the contractors to be involved in replanting program are those ones that have proved their capacity to deliver rubber plantations timely in accordance with



the pre-specified and agreed upon technical specifications and sanctioned budget. Therefore, it is too risky to engage new comers, inexperienced contractors to carry out replanting program. Failing to deliver new plantation timely in terms of quantity and quality under the sanctioned budget will have for reaching implications including interference on long-term latex production schedule, procrastination of planting for one year due to the natural occurrence of rainy and dry seasons as well as unsatisfactory rating of operational management performance. Therefore, risk has to be avoided to the extent possible by hiring experienced contractors to carry out replanting program.

v. Core business of rubber companies

The companies consulted argued that their core business is to produce and sell latex products. This core business has been defined by shareholders of the companies thus is not easy to change or modify. It appears that this core business definition has strongly affected mentality and conduct of operations of the rubber companies which is well reflected in the replanting strategy pursued.

The Project has come to conclude that to change the established replanting strategy will be achievable only by first redefining the business definition and then by convincing shareholders of rubber companies that rubberwood utilization may become an essential source of income if it is efficiently performed. Convincing shareholders is surely a long, time consuming process that beyond the reach of the project. In conclusion, the proposition made as regards adjustment of replanting schedule is not acceptable. In addition, the proposition on the interest of rubber companies to invest in rubberwood utilization is refutable at this stage for the reasons discussed above.

#### **4.3 Exploring the opportunities for cooperation between rubber companies and wood Industries**

Through end of the project, the conflict of interest between rubber companies and wood industries had not been truly harmonized. Results of the consultations and meetings on the subject were not encouraging. The rubber companies were resistant to make change to the established strategy for replacement of old rubber trees for various reasons, including:

- The establishment strategy has proved successful in meeting the objectives of replacement program which is to produce young rubber trees on a timely basis at high success rate. The target area for planting has always been completed in accordance with the technical criteria set by the companies and within the sanctioned budget;
- Employing a contractor that has already involved in the execution of replacement program for years minimizes risk of failure; and
- The companies are focusing on the output of replacement program in terms of quality rubber plantations; the consequences of harvesting of old trees within a short period of time to the market of rubber logs and to the wood industry are not the concern of the rubber companies.

By the very nature of their business and rubberwood attributes, the replanting strategy pursued by the rubber companies is not in conformity to the need of wood industries. Therefore, the wood processors must adapt themselves to the replacement strategy by utilizing rubber logs, to the extent possible, available from replanting areas during the dry season and obtaining wood raw material from other sources during rainy season. The option therefore, is not for the rubber companies to invest in rubberwood processing but to cooperate with existing local wood processors in the utilization of rubberwood obtained from replanting areas. The exchange of information and experience amongst the participants of the national workshop and focused discussion forum on cooperation alike indicated that:

- Cooperation between rubber companies and wood industries is possible only in the form of logs supply contract; joint investment in the utilization of rubberwood is practically infeasible as rubber companies are, by business definition and investment policy, not to make investment in non-latex products development;
- The replacement strategy currently pursued by rubber companies is not easy to change because of the risk involved; engaging a new contractor in replanting program is viewed as a too risky decision and with far reaching adverse implications; and
- Sales from rubberwood is not defined by the rubber companies as the primary source of income but miscellaneous income; the replacement strategy is to be implemented regardless of the proceeds from selling the rubberwood harvested from replanting areas.

#### **4.4 Achievement of Output 1**

The output to be delivered by the Project is “interest in the utilization of rubberwood owned by big companies increased”. The indicators of output achievement as defined in the LFM are:

- Feasibility study on rubberwood utilization by rubber companies completed in year 1
- Consultation with rubber companies on feasibility of adjusting replanting schedule conducted
- One national workshop organized in year 1 in Medan, North Sumatra
- At least one rubber company indicates interest in cooperating with the wood industries in the utilization of rubberwood from replanting areas in year 3

The hypothesis made regarding Output 1 was that it will be fully achieved through the full execution of four pertaining project activities. Activity 1.1 had been executed and its findings presented to the national workshop for discussion and dissemination. Activity 1.2 had been implemented through formal as well as informal consultations with selected rubber companies and wood processors. It was evidenced from the consultations that the strategy for replacement of old plantations need to be modified in order to meet the requirements for steady, year round supply of rubber logs; the modification that rubber companies are resistant to undertaking primarily for business policy, technical and administrative reasons. As the result, no rubber company has indicated interest in adjusting schedule of replanting towards end of the project. Indeed, this result is discouraging and was not

expected by the project. Activity 1.3 had been successfully implemented and achieved its expected outputs. Activity 1.4 had been fully executed but without encouraging results as no memorandum of understanding on joint investment for rubberwood utilization has been signed by any rubber company with wood industry.

The full execution of pertaining activities had led the Project to conclude that the hypothesis regarding achievement of Output 1 is accepted. That is to say that Output 1 has been achieved but only to a certain degree. The project activities since its inception in mid 2010 are basically to make information available on potential benefits of rubberwood utilization and disseminate the information to the main stakeholders, to rubber companies in particular. The information on potential benefits had been produced through conduct of feasibility study on rubberwood utilization (Activity 1.1) and through the technical documents prepared by practitioners and professionals that were presented to the national workshop (Activity 1.3). Relevant information had also been gathered through consultation and dialogue under Activities 1.2 and 1.4. Besides, the national workshop implemented in January 2010 in Medan and the focused discussion forum held in Jakarta on 6 June 2012 had generated a myriad of relevant information on rubberwood utilization and made available to rubber companies as well as wood processors. This vast information should logically have raised interest of rubber companies in utilizing rubberwood they own.

The question therefore, is on the degree of achievement considering the discouraging results of Activities 1.2 and 1.4. Therefore, it can best be concluded that Output 1 has been achieved only partially. This is particularly true when reference is made to the indicators of achievement presented in the logical framework namely: that at least one rubber company indicated interest in adjusting schedule of replanting; and at least one rubber company signed MOU on rubber logs supply with wood industry. These indicators were obviously not fully satisfied by the Project because no rubber company was willing to change replanting strategy as well as time schedule and no rubber company had already signed MOU on rubber logs supply with wood industry during the project duration. Indeed, there are existing MOUs of the like and are under implementation, e.g. PTPN II with PT SUWI and with PT Sumber Karindo Sakti. However, these MOUs are not attributable to the project intervention as they had been signed prior to commencement of project operations. In addition, two wood processing companies have indicated their interest towards end of the project in working with PTPN III in rubberwood utilization. However, this indicated interest surely needs follow-up actions to become a reality.

Available data indicated that rubberwood utilization had increased during the project duration. The status of rubberwood utilization during the 2007-2012 period is exhibited in Table 1. The project commenced in May 2010 with the primary aim to promote utilization of rubberwood from sustainable sources.

Table 1. Volume of rubberwood sold by rubber companies to wood industries in North Sumatra

<b>Year</b>	<b>PTPN</b>	<b>PBSN</b>	<b>Total</b>
2012	193.700	40.020	233.720
2011	185.318	35.342	220.660
2010	116.476	18.913	135.388
2009	147.646	26.058	173.704
2008	157.820	-	157.820
2007	110.160	28.232	138.392
<b>Total</b>	<b>911.120</b>	<b>148.564</b>	<b>1.059.684</b>

The total volume of rubberwood with diameter 10 cm or larger sold by rubber plantation developers to the wood industry in North Sumatra in 2010 was 135,388 m<sup>3</sup>; the rubberwood was used by the primary and secondary industries namely in the production of sawn timber, finger joints, furniture and medium density fibreboard (MDF). The total volume used in the subsequent years were 220,660 m<sup>3</sup> and 233,720 m<sup>3</sup>, respectively. It is therefore evident that the quantity of rubberwood utilized by the forest industry was increasing. The question is that whether this increase is attributable or not to the project intervention.

The increase in the sales of rubberwood as reported by the rubber companies could have been caused by different forces including:

- Increase in the area planted;
- Increase in average volume of rubber tree harvested per hectare; and
- Increased efficiency in harvesting and hauling of rubberwood from replanting areas induced by improved understanding of rubber companies on the benefits of rubberwood utilization.

The third force is surely attributable to project intervention while the first and second one are external to the project; they relate closely to the characteristics of the old trees harvested from replanting areas, they are not elements of the project intervention. Increased efficiency of harvesting could have been the result of improved understanding of rubber companies and their replanting contractors on the potential benefits of rubberwood utilization. The companies might have assigned larger monetary value to rubberwood and passed it to planting contractors; the latter was then forced to increase efficiency in order to cover the higher monetary value of rubberwood imposed by the companies.

Based on the above assessment it should be reasonable to conclude that Output 1 has been partially achieved in practice; there is a gap between hypothetical and practical achievements which is attributable to the indicators used, how they have been selected and defined.

## 5. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

- i. Investment in an economic scale of sawmill for the utilization of rubberwood from replanting areas by rubber companies is financially feasible. The primary requirement for investment of the kind is availability of rubber logs in the order of 36,000 m<sup>3</sup> per annum on a continual basis.
- ii. Based on average harvestable volume of logs at 40 m<sup>3</sup>/ha, the annual average replanting areas needed to support operation of an economic-scale of sawmill is around 1,000 ha or 25,000 ha of rubber plantation in total assuming an average replacement age of 25 years.
- iii. Most of rubber companies in North Sumatra own less than 25,000 ha of rubber plantation thus are not in a position to invest in an economic scale of sawmill for utilization of rubberwood sourced solely from replanting areas.
- iv. Rubber companies have been pursuing a replanting strategy wherein land preparation thus harvesting of old trees is to be completed during current dry season to allow planting of seedlings during the immediate rainy season which has resulted in overly abundant rubber logs during dry seasons but extremely scarce during rainy seasons.
- v. Changing the time schedule of replanting is not in the interest of rubber companies as it may procrastinate establishment of plantations, increase cost of plantation and adversely affect quantity and continuity of latex production in future time.
- vi. Execution of the replanting program has been accomplished by experienced contractors having years of proved satisfactory performance with the appointing companies; the idea of changing the role of these contractors to wood processors appeared not to be in the interest of rubber companies primarily for risk aversion reason.
- vii. The national workshop conducted in Medan was proved useful as a forum for effectively exchanging information and experience amongst the participants and successfully identifying the institutional as well as operational problems on rubberwood utilization.
- viii. Investment in rubberwood utilization is not in the interest of the rubber companies due primarily to core business definition i.e. to produce and sell latex products, that joint investment with wood processors is not feasible without redefining the core business.
- ix. As all its pertaining activities had been fully executed, Output 1 “interest in the utilization of rubberwood owned by big companies increased” has hypothetically been achieved. In fact, this output has been only partially achieved due mainly to the discouraging results of Activities 1.2 and 1.4.
- x. In terms of volume of rubber logs harvested and sold by the rubber plantation contractors to wood industries in North Sumatra, it was increased from 173,704 m<sup>3</sup> in 2009, pre-project situation, to 233,720 m<sup>3</sup> in 2012 but the increase is not fully attributable to the project intervention; at best that can be said is that the dialogues with rubber companies through the

consultations and workshop as well as discussion forum may have increased their interest in utilizing the rubberwood obtained from replanting areas and brought about increased volume of harvest and sales.

## 5.2 Recommendations

- i. To efficiently utilize rubberwood available at the replanting areas of rubber companies, logs supply contract is probably the most flexible and mutually benefiting form of cooperation between rubber companies and local wood processors; this form of cooperation is strongly advisable to be followed-up by both parties.
- ii. The operational management of rubber companies in general, the replanting strategy in particular, is strongly shaped by the core business definition adopted. To change the established replanting strategy will be possible only by first redefining the business definition for which involvement and support of shareholders are indispensable.
- iii. The qualifications of contractors for replanting set by the rubber companies are specific and strict that engagement of a typical wood processor appears not easy. It is highly recommended that rubber companies engage selected wood processors in the replanting program subject to their ability in providing needed resources and complying with the technical specifications of rubber plantation to be established; this engagement of inexperienced contractors can be implemented in stage, to be continued conditional upon actual performance.
- iv. The rubber companies are strongly recommended to experiment on relaxing the time schedule for harvesting of old trees on replanting areas without jeopardizing completion of planting in the immediate rainy season in view of maximizing income from rubberwood selling; additional income from such experiments may more than off-set the marginal cost of planting and brings about net gain.
- v. The wood processors in North Sumatra have to strive utilizing the rubberwood harvested from replanting areas during dry season by signing supply contracts with individual replanting contractors and defining efficient operational arrangements that volume of rubberwood harvested and hauled is maximized. Wood raw materials during rainy season will have to be secured from other, non-rubber plantation sources.

## 6. IMPLICATIONS FOR PRACTICE

- i. The resistant to changing the established replanting strategy indicated by rubber companies will result in availability of rubber logs in abundant volume during dry seasons but scarce during rainy seasons which is very difficult for the wood industries to adapt to.
- ii. The local wood industries will have to pursue a raw material supply strategy that concentrates on using rubberwood during dry seasons and other wood species during rainy seasons.
- iii. The contractors of replanting hired by rubber companies are practically and legally the owners of harvested rubberwood from replanting areas; interested wood processors should strive to cooperate with these people in defining efficient operational strategies for tapping maximum volume of rubberwood available in replanting areas.
- iv. Hedging of rubberwood at mill sites during dry seasons appears to be inevitable; the wood industries will therefore have to equip themselves with least costly wood preserving measures and at the same time maximize intake capacity of mills in order to minimize log waste at log yards and shorten duration of hedging.



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