Ex-post Evaluation Report

CFC/ITTO/62 PD 40/00 Rev. 4 (I)
"UTILIZATION OF SMALL-DIAMETER LOGS FROM SUSTAINABLE SOURCES FOR BIO-COMPOSITE PRODUCTS"

Prepared for the ITTO

By

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Table of Contents

List of abbreviations

CA:	Collaborating Agency
CFC:	Common Fund for Commodities
EA:	Executing Agency of project
FPRDI:	Forest Products Research and Development Institute, the Philippines
FRI:	Forest Research Institute, Papua New Guinea
GOI:	Government of Indonesia
IPB:	Faculty of Forestry, Bogor Agricultural University
ITTA:	International Tropical Timber Agreement
ITTC:	International Tropical Timber Council
ITTO:	International Tropical Timber Organization
LDL:	Large Diameter Log
LFM:	Logical Framework Matrix
LVL:	Laminated Veneer Lumber
MDF:	Medium Density Fiberboard
OSB:	Oriented Strand Board
PSC:	Project Steering Committee
R&D:	Research & Development
SDL:	Small Diameter Log
UPM:	University Putra Malaysia
USDL:	Utilization of Small Diameter Log
WWCB:	Wood Wool Cement Board
YPO:	Yearly Plan of Operation

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The Consultant

Executive Summary

1. Introduction

The Committee on Economics, Statistics and Markets and the Committee on Forest Industry (CEM-CFI), at their Forty-sixth Session in November 2012 decided that an ex-post evaluation for CFC/ITTO/62 PD 40/00 Rev. 4 (I) - should be carried out to establish how well the project served its purpose and to draw up recommendations for future action.

The project CFC/ITTO/62 PD 40/00 Rev. 4 (I) had been implemented by the Government of Indonesia (GOI) with Faculty of Forestry, Bogor Agricultural University (IPB) as the executing agency and University Putra Malaysia (UPM), Forest Product Research and Development Institute, Philippines (FPRDI), and Forest Research Institute (FRI), Papua New Guinea as the collaborating agencies; for forty-nine months starting November 2007 with a total sanctioned budget of US$ 865,163 comprising contributions of ITTO and GOI in the amounts of US$ 600,000, US$ 265,163, respectively.

The specific objectives of the project were: a) To asses market needs of bio-composite products made from SDL from the tropical rain forest, and b) to determine the wood properties and utilization technology of SDL and transfer this technology for manufacturing of value-added bio-composite products.

2. Evaluation scope, focus and approach

The primary purpose of the ex-post evaluation is to learn lessons from the project and to draw conclusion for future project that all aspects of the project, from its inception to its completion regarding administrative and financial matters, organizations, communication, consultation and cooperation need to be assessed.

The ex-post evaluation was carried out in August 2014, thirty two months after the project completion, and involved review of existing project documents and files, meetings with the executing agency and its collaborators, the project key personnels, the main stakeholders, and visits to relevant institutions and forest industries in Indonesia, Malaysia, and the Philippines.

The key stages of the evaluation included in-depth analysis of the project design using the ITTO Manual for project formulation (3rd edition) and the ITTO Manual for project monitoring, review, reporting and evaluation, as the framework with special attention to the problem tree and definition of the project elements, and assessment of project performance covering appropriateness of implementation process, achieved outputs and objectives, and impact as well as sustainability of the project.

3. Project facts

The project, stemmed from a few studies conducted in Indonesia, was urgently needed to help sustain wood-based industry which was experiencing the continuing shortfall in supply of Large Diameter Logs resources.

The SDL resources from natural forest or plantation forest is one of the solutions to the continuing bicomposite products, but the market and technology for bio-composite products should be learnt to find out which products are prospectously for future market, and the appropriate applied technology should be investigated for producing marketable products.

The specific objectives of the project were achieved through delivery of seven outputs for which 18 activities had been fully implemented within the sanctioned financial and time budget i.e.

US$ 865,163 and 49 months, including 13 months of extension without additional funding, respectively.

4. Findings, Lessons Learned

4.1 Findings

1) The problems addressed by the project were inadequately analyzed and the problem tree was not clearly identified leading to a weak project design.

2) Seven defined outputs had been delivered through the full execution of 18 activities identified and achieved the specific objectives which have contributed to achievement of the development objective.

3) The visits made to and discussions held with the primary beneficiaries in three countries indicated that the project has generated significant positive impacts to the development of SDL utilization technologies in bio-composite products;

4) Transfer of technology had been performed effectively through dissemination of the technical reports produced, conduct of the seminar and workshop attended by 124 participants, technical training of operators in UPM, and participated students' contributions.

5) The overall post-project situation that prevails is encouraging in terms of raised awareness of target beneficiaries on potential economic benefits of SDL in bio-composite products' utilization, strengthened policies and programme on forest plantation development and enhanced capacity of research institutions in bio-composite technologies developed under the project.

6) Some major unexpected effects and impacts of the project found were more SDL utilized in practice is from plantation forest or community forest instead of natural forest as targeted in original project document; and more wood industries participated in the project.

7) The project had been effectively implemented in compliance with the project agreement and ITTO rules and procedures and in a collaborative manner involving a multi-disciplinary group of research institutions and the primary beneficiaries with support of CFC/ITTO and Project Steering Committee (PSC).

8) Sustainability of the project is determined by its actual and potential contribution to intended primary beneficiaries, the forest industries and governments. Applicability of the technologies identified and introduced by the institutions is a strong incentive for the beneficiaries to technically, financially and politically support continuation and expansion of the activities from the project. The continued studies on wood properties and manufacturing technologies of bio-composite products from SDL resources, and improved communication between the primary beneficiaries could also enhance the sustainability of the project.

9) Overall, the project can be rated as successful in delivering its planned outputs and achieving its intended objectives judged using the indicators defined in the logical framework of the project and the impacts that have been generated by the project.

4.2 Lessons learned

a. Project identification and design

1) Diminishing logs supply from natural forest, logs diameter with 50 cm and up, resulting activied plantation forest by government and private as well. The research on physical and mechanical properties of some wood species with SDL from natural and plantation forests should be investigated to find out the appropriate tree species for biocomposite products. These wood species were intended for biocomposite products, but with some discussion

with other stakeholders, the research of bicomposites products was focused on wood from plantation forest only, because SDL from natural forest has some restriction in regulation and also high cost of transportation.

2) The key problem to be identified is the most important in project identification. It needs to be addressed precisely through detailed analysis and to build coherence between project objectives, outcomes, outputs and activities, so as to formulate the logical framework. Some more outputs should be defined to cover all of the project research content.

3) In order to minimize adjustments to planned project activities in the course of project implementation, the participation of project beneficiaries in project identification and problem analysis is indispensable.

4) The difference of expertise and facilities of research institutions from different countries should have been identified during the project development stage, so as to arrange proper research contents, otherwise putting institutional safeguards in place to ensure equivalent roles involved in project implementation. The complicated situation should be foreseen about collaboration of research from different countries and government.

b. Project implementation

5) Four countries (Indonesia, Malaysia, Philippines, and Papua New Guinea) were involved in the project; the contingency plan should be prepared for any complicated situations, such as coordination, research execution, administrative, and financial.

6) In order to assure the project's smooth implementation by collaborating agencies. The participated government or research institutions should endorse the project in the course of project implementation, to avoid any delay in project executing from the high variation of capabilities among different institutions.

7) Frequent communications and contacts should be kept among collaborating agencies. The rate of project progress should be informed timely in accordance with the term of reference by collaborating agencies to avoid any delay of project implementation.

5. Conclusions and recommendations

5.1 Conclusions

1) This evaluation found that the Executing Agency satisfactorily completed all outputs in 49 months through CFC/ITTO approved extension without additional funding. The project was implemented in an effective manner in full compliance with the project agreement and established ITTO rules and procedures; the required documents had been prepared in accordance with existing ITTO manuals and timely submitted to ITTO; and adequate management and monitoring of activities were critical to the success of this project.

2) The delays encountered by the project were due to reasons beyond the Executing Agency's control resulted from frequent and drastic organizational structural changes in a collaborating agency (PNG) which often involve shifting of the project personnel.

3) Technology transfer had been performed effectively through dissemination of the project outputs and publications, conduct of the workshop and seminar on SDL management and utilization for biocomposite products.

4) Several post project developments showed positive indications of sustained project outcomes in the longer term. Some positive policies issued in West Java Province (Indonesia) to ease the procedure of transportation of logs from plantation forest, and state-owned forest farm provided planting technologies to local communities. These developments encourage the progress of local plantation forest and wood industries. There is a new plywood enterprise constructed in west Java in which the project member

directly participated with the production line design and in charge of manufacturing technology of plywood from local plantation forest.

5) Project implementation has strengthened the capacity of collaborating institutions through provision of basic facilities and competent professionals to carry out future studies in SDL utilization; and network between research institutions and wood industries had been well constructed through project activities.

5.2 Recommendations

For the Executing Agency

1) Recommendations to the Ministry of Forestry of Indonesia. Policies and regulations should be considered and developed for the collection and utilization of SDL from natural forest in bio-composite products, such as lowering timber taxation.

2) In formulating future similar projects, strict adherence by proponent to existing ITTO Manual on project formulation and full participation of the primary beneficiaries and policy makers must be assured in order to arrive at a sound and workable project design. The background and related policies should be analyzed and clearly understood, and it is better for the policy makers to participate.

3) In convincing the forest industries on the commercialization of SDL utilization, the cost analysis of bio-composite products from SDL resources should be conducted in close consultation with industries.

4) Maintain and strengthen communication with collaborating agencies should be enhanced across the network to promote the sustainability of the established SDL utilization technologies in each participating country.

5) Sharing achievement of project in a convenient way, such as put related technical reports, proceedings of workshop, publications etc. on the website of EA, and linked to ITTO website.

6) A follow-up project is recommended to continue the studies of bio-composite products' technology from SDL resources, covering: the analysis of chemical properties of related wood species; bonding quality of bio-composite products; optimization of manufacturing technologies of bio-composite products; and demonstration of optimized technology in production line for large scale enterprises.

7) Speed up the R&D of bio-composite product from SDL resources, it is advised to make use of successful experience of other countries.

For ITTO

8) Support the executing agency to dissemination the project results and related informations through ITTO website, such as technical reports, publications, and proceedings of international workshops, etc., so as to let more people or organizations benefited from the achievement of project.

9) Improve the management of complex multi-country projects. It is suggested that project steering committee meetings should be held in different participated countries in turn, so the related government or research institutions would emphasize the project's implementation.

Main Text

1. Introduction

1.1. Background and rationale of the ex-post evaluation

Between 2007 and 2011 the Common Fund for Commodities provided financing for the project CFC/ITTO/62 PD 40/00 Rev. 4 (I), supervised by the ITTO, and implemented by the Faculty of Forestry, Bogor Agricultural University, Indonesia. The project was completed on 15 December 2011.

The Committee on Economics, Statistics and Markets and the Committee on Forest Industry (CEM-CFI), at their Forty-sixth Session in November 2012 decided that an ex-post evaluation for CFC/ITTO/62 PD 40/00 Rev. 4 (I) should be carried out to establish how well the project served its purpose and to draw up recommendations for future action.

The primary purpose of the evaluation is to provide an in-depth assessment and analysis of the impact of the project so as to point out the successful and unsuccessful outcomes, the reasons for successes and failures, and the contribution of the project towards the achievement of its stated goals reflecting ITTO's Objective 2000 and financing priorities of the CFC. The ex-post evaluation will be further used to draw lessons that can be used to improve similar projects in the future.

1.2. Project identification

Project serial number	:	CFC/ITTO/62 PD 40/00 Rev. 4 (I)	
Project title	:	Utilization of Small-Diameter Logs from sustainable source for Bio-Composite Products	
Host Government	:	Government of Indonesia	
Executing Agency	:	Faculty of Forestry, Bogor Agricultural University (IPB)	
Collaborating Agencies	:	Universiti Putra Malaysia (UPM)	
		Forest Product Research and Development Institute, Philippines (FPRDI)	
		Forest Research Institute, Papua New Guinea (FRI)	
Budget	:	Total	US$ 865,163
		ITTO	US$ 600,000
		GOI	US$ 265,163
Duration	:	36 months, extended for 13 months without additional funding	

1.3. Project context

The specific objectives of CFC/ITTO/62 PD 40/00 Rev. 4 (I) were to i) To asses market needs of bio-composite products made from SDL from the tropical rain forest, ii) To determine the wood properties and utilization technology of SDL and transfer this technology for manufacturing of value added bio-composite products. Its development objective was to contribute to the continuity of timber production, forest resource security, socio-benefit from sustainable sources, determination of SDL wood properties, and technology transfer of utilization of SDL for value-added bio-composite products.

The Project's objectives were consistent with ITTA 2006, ITTO Action plan 2008 -2011 as outlined below:

ITTA 2006

Objective (c): Contributing to sustainable development and to poverty alleviation;

Objective (d): Enhancing the capacity of members to implement strategies for achieving exports of tropical timber and timber products from sustainably managed sources;

Objective (f): Promoting and supporting research and development with a view to improving forest management and efficiency of wood utilization and the competitiveness of wood products relative to other materials, as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests;

Objective (i): Promoting increased and further processing of tropical timber from sustainable sources in producer member countries, with a view to promoting their industrialization and thereby increasing their employment opportunities and export earnings;

Objective (m): Encouraging members to develop national policies aimed at sustainable utilization and conservation of timber producing forests, and maintaining ecological balance, in the context of the tropical timber trade;

ITTO Action Plan 2008-2011

Based on the activities outlined in the proposal, this project is in compliance with the "thematic programmes" areas in the "Action Plan 2008 -2011" as "Industry Development and Efficiency" in the field of Forest industry, especially:

Expected outcome 1: Increased production and further processing of tropical timber and other forest products from sustainably managed and legally harvested sources.

Action D. Commission and publish analytical studies in the field of tropical timber processing to identify and quantify the final use of processed wood products and to identify critical knowledge and information gaps, and disseminate the information generated through, inter alia, regional and national workshops.

d1. Formulate research and development proposals that assist the piloting and commercialization of new products and new processing and manufacturing technologies.

d2. Organize workshops/seminars on the use of new and/or improved techniques and technology, including increased further processing.

Expected outcome 2: Increased efficiency in harvesting, processing and utilization of tropical timber from sustainably managed and legally harvested sources.

Action C. Conduct and publish analytical studies that identify new knowledge and information gaps as a precursor to research and development activities on improved processing efficiency.

c1. Encourage and promote research and knowledge transfer on improved utilization efficiency.

Compliance with Cross-cutting actions of ITTO action plan 2008 - 2011:

a. Support research and development studies and projects to improve understanding of the marketplace, efficient product processing, industrial and community utilization, the valuation and trade of forest goods and services, and better forest management in general.

f. Disseminate information on the outputs, outcomes, impacts and lessons learned from ITTO's policy and project work and its contribution to SFM and sustainable development.

k. Assist human resource development by conducting national, regional and international training activities, the provision of fellowships, and by supporting institutional/legal strengthening.

n. Actively cooperate and coordinate with other international organizations and with international forums and regional initiatives that undertake activities relevant to ITTO's objectives, with a view to sharing expertise, reducing duplication, enhancing complementarities and harmonizing activities.

2. Evaluation Scope, Focus and Approach

2.1. Scope and focus

The primary purpose of the ex-post evaluation is to provide an in-depth assessment and analysis of the impact of the project so as to point out the successful and unsuccessful outcomes, the reasons for successes and failures, and the contribution of the project towards the achievement of its stated goals reflecting ITTO's Objective 2000 and financing priorities of the CFC. The ex-post evaluation will be further used to draw lessons that can be used to improve similar projects in the future. Therefore, the evaluation is collection of information, the on-the-spot assessment and in-depth analysis of the performance and impact of the Project after its completion, with the intent to establish how well it served its purposes, its degree of effectiveness and efficiency, and its sustainability.

The evaluator is to assess all aspects of Project CFC/ITTO/62 PD 40/00 Rev. 4 (I), from its inception to its completion regarding administrative and financial matters, organizations, communication, consultation and cooperation. The specific terms of reference for the ex-post evaluation are presented in Annex 1.

2.2. Approach of evaluation

This ex-post evaluation was carried out 32 months after project completion, signified by the submission date of the project completion report. The evaluation involved:

- A review of the project document, minutes of the Project Steering Committee (PSC) meetings, progress reports, completion report, technical reports, project audit reports and other available documents.
- An entry meeting with Center of International Cooperation, Ministry of Forestry of Indonesia and the Executing Agency, Collaborating Agencies, main stakeholders, Project Key Personnel to discuss on the various aspects of project implementation.
- Visits to institutions and forest industries:

  - ✓ PT BRIK Quality Services in Jakarta, Indonesia
  - ✓ PT PERHUTANI in west JAVA, Indonesia
  - ✓ PT Rimba Albazia in west JAVA, Indonesia
  - ✓ PT J-Cool (new plywood mill site) in west JAVA, Indonesia
  - ✓ Bogor Agriculture University (IPB) in Bogor, Indonesia
  - ✓ Forest Products Research Centre, Ministry of Forestry (FPRC MoF) in Bogor, Indonesia
  - ✓ Universiti Putra Malaysia (UPM) in Malaysia
  - ✓ Forest Product Research and Development Institute (FPRDI) in the Philippines
  - ✓ Mount Banahaw Wood Industries, Quezon, Philippines
  - ✓ EARN Corporation Wood Wool Cement Board, Laguna, Philippines

Annex 2 shows the institutions and industries visited (visiting itinerary) during the ex-post evaluation mission.

The key stages of the evaluation included:

i) In depth analysis of the project design

- The analysis was carried out with the former project key personnel in order to learn weaknesses and strengths of the design.
- The project design was assessed using the ITTO Manual for project formulation, 3rd edition, as the framework with special attention to the problem tree and definition of the project elements and interventions.

ii) Assessment of project performance

- Appropriateness of implementation process was assessed by studying the project operational plans against actual implementation, inputs applied, outputs and outcomes produced as well as compliance with the project agreement and established rules and procedures applying to ITTO Projects.
- Achieved outputs and objectives were assessed in light of the logical framework matrix (LFM) or its revision, as appropriate.
- Impact and sustainability were evaluated using the information obtained through the discussions with representatives of the intended project beneficiaries namely government institutions particularly the forestry research centers, universities and forest industries.

3. Project Facts

3.1. Project origin

The project was origined based on the following situations, Indonesian Selective Cutting and Replanting System implemented in Natural Production Forest in Indonesia in 1972. Its minimum diameter cutting is 50 cm. In fact, genetically and environmentally there are some tree species that never reach the minimum diameter cutting of 50 cm. Most of Indonesian bio-composite industries, especially plywood and sawmill industries need large diameter and high quality of wood, but SDL of 10-49 cm represent 70 % of natural forest biomasa and 90% of community forest. These SDL resources could be used for bio-composite industries. From the economic standpoint, these composite products are highly marketable. Through substitution and better forest use, the utilization of small-diameter logs will help conserve the remaining natural forests.

The project stemmed from a few studies conducted in Indonesia including:

- "Development of high quality composite boards made of wood waste and plastics" supported by Ministry of National Education of Indonesia in 1998-2001;
- The study on bio-composite from fast growing tree species for oriented strand board (OSB), Medium density fiberboard (MDF), and Laminated Veneer Lumber (LVL) in 1997-2001.
- The study on manufacturing of particleboard, wood cement board from SDL by Forestry and Estate Crops of the republic of Indonesia.

The project was judged as urgently needed by the EA to help sustain its wood-based industries sector which was experiencing the continuing shortfall in supply of LDL resources.

- ✓ Declining natural forest areas and dwindling supply of LDL from natural forest;
- ✓ Continuing shortfall in the supply of LDL, the demand for wood resources by wood-based industries could not be met.

The project proponent argued that the SDL resources from natural forest or plantation forest is one of the solutions to the continuing bicomposite products, but the market and technology for bio-composite products should be learnt to find out which products are prospectously for future market, and the appropriate applied technology should be investigated for producing marketable products in Indonesia and collaborating countries. Project CFC/ITTO/62 PD 40/00 Rev. 4 (I) was a right response to the issues about market and technologies of bio-composite from SDL resources.

3.2. Development objective

As defined in the project proposal, the development objective of the Project was to contribute to the continuity of timber production, forest resource security, socio-benefit from sustainable sources, determination of SDL wood properties, and technology transfer of utilization of SDL for value-added bio-composite products.

3.3. The problems addressed

The key problems addressed by the project was that the utilization of SDL for bio-composite industries is not implemented yet, for the following reason: i) Insufficient data / information on SDL potency in tropical rain forest, ii) Insufficient knowledge on appropriate logging systems of small-diameter logs, iii) Insufficient technical data on wood properties of SDL, and iv) Insufficient transfer of technology on utilization of SDL.

It was argued by the project proponent that the key problems would impede development of sustainable supply of raw material to wood industries in Indonesian and related countries, and the immediate removal was imperative under the situation.

3.4. Specific objectives and outputs

The specific objectives of the project were: a) To asses market needs of bio-composite products made from SDL from the tropical rain forest, b) To Determine the wood properties and utilization technology of SDL and transfer this technology for manufacturing of value-added bio-composite products.

The expected outputs, as defined in the project document, were:

Specific objective 1. To assess market needs of SDL from the tropical rain forest.

Output 1.1: Assess market needs.

Specific objective 2. Determine the wood properties and utilization technology of SDL and transfer this technology for manufacturing of value-added bio-composite products.

Output 2.1: Address technical gaps in producing bio-composite products.

Output 2.2: Determine equipment needs for production and manufacturing constraints.

Output 2.3: Address production coordination issues.

Output 2.4: Mitigate potential trade barriers.

Output 2.5: Comply with relevant standards.

Output 2.6: Conduct regional workshop.

3.5. Starting date and duration

The project officially commenced in December 2007, originally planned for 36 months. All originally planned activities and the additional ones tasked by the PSC were actually implemented in 49 months through CFC/ITTO approved extension without additional funding. Financial closure of the project was made by ITTO by end of April 2012 based on the final financial audit report submitted by the Executing Agency and acceptable to ITTO.

3.6. Budget

Source	Approved, USD	Actual, USD
ITTO	600,000	595,994.72
GOI	265,163	296,968.83
Total	865,163	892,963.55

4. Findings and Lessons Learned

4.1. Findings

4.1.1 Project design and contribution to achievements

As presented in the project document, the background and policies were not understand correctly, and key problems addressed were incompletely analyzed. Weaknesses of the project design can be outlined as follows:

- The problem tree should consist of causes, key problem and effects in according to the principle listed in the ITTO manual for project formulation, but the project document just listed the causes and key problem (fig.1 in project document), the effects from the key problem was lost; and the fig.2 seems the problem tree, but the effects were also not directly results from the key problem;
- Main causes and sub-causes of the key problems addressed were not fully diagnosed and identified that the cause-effect relationship was not so clear, such as there is a shortage of technology development section in the solution, this is the key point between wood properties and technology transfering;
- The project interventions were not fully relevant to solve the problems in the document; correspondence between the outputs defined to main causes and between the activities to sub-causes of the key problems was not clear;
- project design could be constructed by performing a thorough problem analysis to identify the logical consequence of the key problems addressed as well as main causes and sub-causes of the key problems.

Despite the weaknesses of the project design, however, it still contributed to achievement of the intended project objectives as they were defined in the project document attached to the project agreement.

4.1.2 Achievement of the outputs and objectives

a. The Outputs

Achievement of defined outputs was assessed using the indicators defined in the logical framework matrix presented in the project document or its revision thereof as follows:

- Output 1.1: Assess market needs.

  This output had been achieved: technical report were produced on marketing of bio-composite were finished for current marketing and potential for future market. The report contains detailed trends in exports and domestic consumption of bio-composite products in Indonesia, Malaysia, Philippines and PNG.

- Output 2.1: Address technical gaps in producing bio-composite products.

  This output had been well completed: 4 technical reports were produced on (1) Identify suitable wood species and evaluate physical and mechanical properties. The physical-mechanical properties of timber species were analyzed in order to determine whether SDL are suitable for production of bio-composites for Indonesia, Malaysia, the Philippines, and Papua New Genea. 24 timber species for Indonesia, 9 timber species for Malaysia, 3 timber species for the Philippines, and 6 timber species from PNG, the bio-composite products include LVL, plywood, particle board, medium density board, and wood wool cement board (WWCB). (2) Identify milling issues. (3) Quality control of bio-composite products. (4) Evaluation of the appropriate properties of products manufactured from SDL in Indonesia.

- Output 2.2: Determine equipment needs for production and manufacturing constraints.

  This output had been achieved: technical report was produced in review the availability of equipment for the production of bio-composites and identifies source and costs of suitable machinery to be incorporated into the production line for the manufacturing of bio-composites from SDL.

- Output 2.3: Address production coordination issues.

  This output had been achieved by working with mills to identify the critical issues for incorporating SDL into the production line and provides respective recommendations. It is important to highlight that to achieve this output the Executing Agency worked in close cooperation with several industries.

- Output 2.4: Mitigate potential trade barriers.

  This output had been finished by (1) Identifying Standards for Selected Products and Markets to Ensure Compliance, (2) Establishing Quality Control Procedures for related bio-composite products. And related technical reports was produced.

- Output 2.5: Comply with relevant standards.

  The output had been completed by coordinating with international standards bodies. The compliance of the bio-composites manufactured from SDL was compared to the international technical standards, such as JAS, ANSI/AITC, ASTM and ISO.

- Output 2.6: Conduct regional workshop.

  This output had been achieved by conducting international workshop in December 2010, where the results of the project, including the prototypes using SDL, were presented. The workshop was attended by 124 participants (84 were industry representatives) and a representative from CFC.

b. Specific objectives

By definition, delivery of the outputs for each specific objective means that that particular specific objective has been achieved. The achievement is also verifiable using the indicators defined in the logical framework matrix as illustrated below:

Specific objective 1: To assess market needs of SDL from the tropical rain forest.

Indicators: i) Database on potential for sale and trade of various bio-composites products using SDL.

This objective had been achieved by end of the project by reviewing market data from participating countries and ITTO, and report on potential for future market growth for bio-composite products was finished.

Specific objective 2: Determine the wood properties and utilization technology of SDL and transfer this technology for manufacturing of value-added bio-composite products.

Indicators: i) Database on SDL wood properties is established, ii) equipment for production, transportation, situation are identified, and iii) relevant market standards of bio-composite products are determined.

This objective had been realized by end of the project: Database on SDL wood properties was established through systematically experiments for wood from plantation and natural forest SDL. equipment for production, transportation, situation were identified through establishing of equipments for manufacturing bio-composite products, identifing issues for incorporating SDL into the production stream, and identifying and mitigating potential trade barriers by producing products

in compliance with international standards, and one international workshop/seminar was organized and conducted.

c. Development objective

As the specific objectives had been achieved, they must have contributed to achieving the development objective. This contribution is evident by increasing plantation forest area and plantation logs' utilization in related bio-composite products' manufacturers. For example, most of the bio-composite products' manufacturer had transferred the raw materials from natural forest to plantation forest. Expansion of planted forest area in participated countries has also been reported. All these contribute to the continuity of fimber production, forest resource security, socio-benefit from sustainable sources, determination of SDL wood properties, and technology transfer of utilization of SDL for value-added bio-composite products.

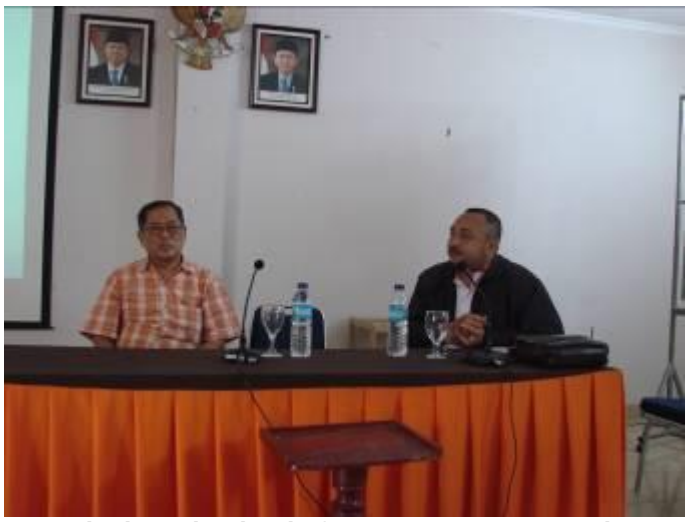
Progress in forest plantation program is influenced by political, institutional and technical forces. the information on processing technologies and end uses of planted timbers under the project has affected attitude of the main stakeholders towards development of forest plantations in exuctuing and collaborating countries.

4.1.3 Impact and relevance of the project

Below is the highlight of project impacts based on the information gathered during the visits to selected beneficiaries in the executing and collaborating countries:

- **Visited to PT BRIK Quality Services, Jakarta, Indonesia**
  - It is a company engaged in Forest Certification and consultancy in related field.
  - The forest resources changed around the year of 2000, originally LDL used for plywood manufacturing, but after 2000, only furniture manufacturers use LDL for high value-added furniture. In general, the proportion of plantation forest resources for exporting furniture is about 60%, the main species include Rubberwood etc..
  - Currently, only one company manufacture plywood with LDL resources in Indonesia. The traditional plywood enterprises goes in two way, one is to transfer LDL resources to SDL or plantation forest resources, the other is close-down for exhausted of LDL resources.
  - There is enough market space for plywood products, but the main problem is shortage of available forest resources, the enterprises were pushed to transfer to plantation forest resources, and this resulted in expanding planted forest area by farmers, which were encouraged by the market.

- **Visited to Perum Perhutani, KPH Cianjur, West Java, Indonesia**
  - Perum Perhutani KPH Cianjur is located in Cianjur Regency, west Java Province, Indonesia, its main work focused on forest management.
  - It knows the CFC/ITTO project and its aim, and want to get knowledge about SDL utilization technology from this project. The forest stock had been changed before and after the project executing period. The community forests has increased significantly.
  - The main species include Teak, pine, Mahongny, oak etc.. the teak plantations were thinned in the year 10, and clear cutting in the year 30, the diameter range of teak logs is between 10 to 80 cm, its annual productivity is about 5000 cubic meters, mainly for products of furniture and decoration veneer etc. the annual log productivity of other hardwood species, such as Mahongny, oak etc., is about 9000 cubic meters.
  - Under state forest farm's nurturing, and increasing price of plantation forest resources, the development of forest plantation was significantly enhanced by providing seedling, fertilizer and management techniques from state forest farm.



The introduction in forest management unit

Plantation forest in west Java

- **Visited to PT. Rimba Albazia, West Java, Indonesia**
  - PT. Rimba Albazia is a typical plywood enterprises, its daily productivity is about 50 cubic meters plywood.
  - All the materials are from plantation forest, the high quality veneer for face layer of plywood was produced from LDL (diameter is larger than 40 cm), and the veneer for core layer of plywood was produced from SDL (diameter around 20 cm).
  - More labors needed in repairing and jointing of veneer from SDL resources. 100 labors works two shifts daily, the utilization of plantation forest resources provided more job opportunities to the local people and regional growth income.

The plantation LDL for face layer veneer of plywood

The plantation SDL for core layer veneer of plywood

Repairing and jointing of veneer from SDL plantation resources

Labor intensive works in plywood layup section

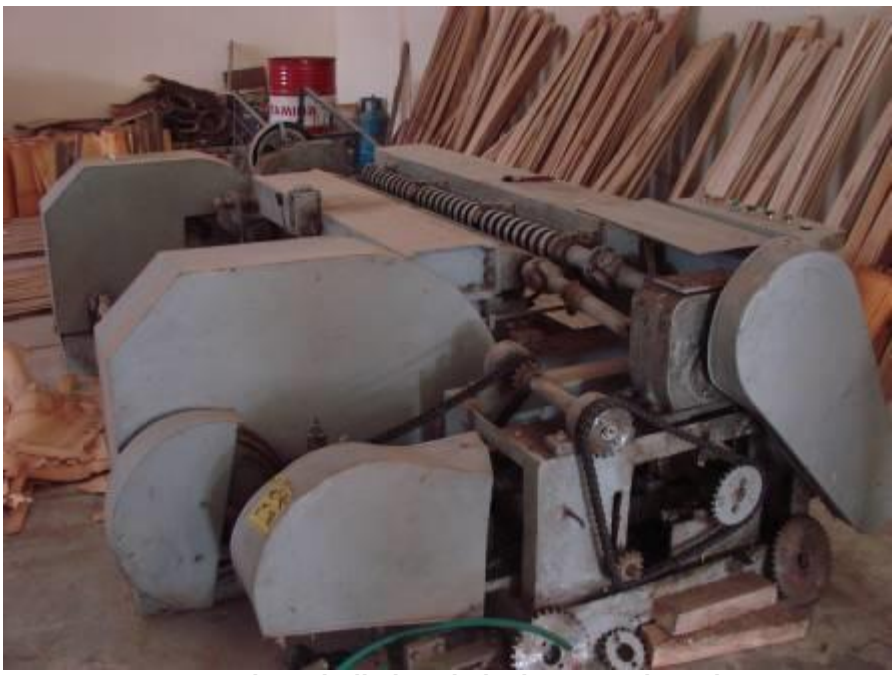
The SDL veneer is the major proportion of the plywood (Central part)

- **Visit to PT. J-Cool, West Java, Indonesia**
  - PT. J-Cool is a new plywood enterprises, which is invested by Japanese businessman, the factory buildings were completed, but the equipments were not in place yet. This company include two sites, it is about several kilometers between the two sites, the factory area is about 10 ha and 3 ha respectively.
  - This new plywood mill is the direct output of current CFC/ITTO project, the project members are in charge of the technology of plywood manufacturing from plantation forest resources.
  - The production line was designed in cooperated with main CFC/ITTO project member. And all materials will be from local plantation forest resources in west Java, such as the community forest.

Newly constructed plywood mill (PT. J-Cool) in west Java

- **Visit to faculty of forestry, Bogor Agriculture University, Indonesia**
  - Implementation of project CFC/ITTO/62 PD 40/00 Rev. 4 (I) has enhanced the ability of research team from IPB;
  - Several equipment and apparatus were bought with ITTO budget, these experimental facilities can be used for following research works, and training of students;
  - Implementation of project CFC/ITTO/62 PD 40/00 Rev. 4 (I) has strengthened networking of researchers from IPB, UPM, FPRDI, FRI, and wood industries.

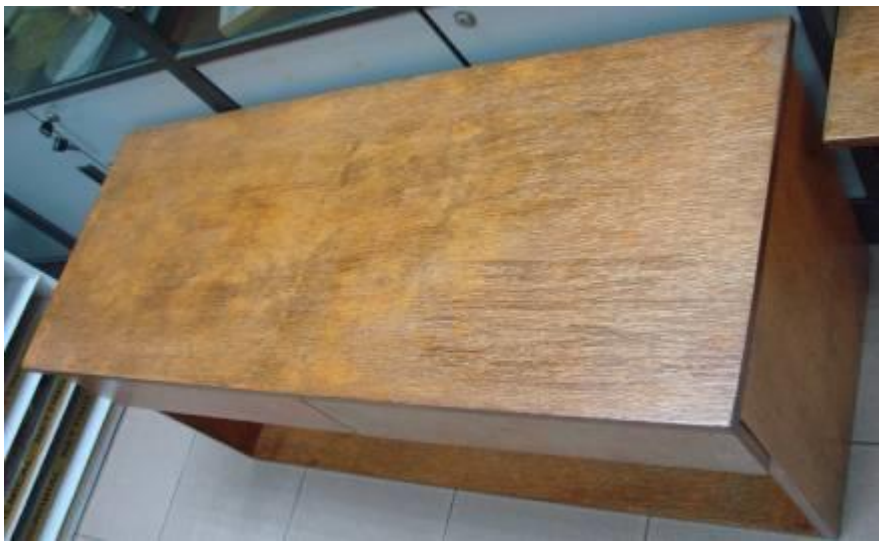
Discussion with project members in IPB, Indonesia



The spindle-less lathe in IPB, Indonesia

- **Visit to University Putra Malaysia, Malaysia**
  - Implementation of project CFC/ITTO/62 PD 40/00 Rev. 4 (I) has enhanced the ability of research team from UPM;
  - Implementation of project CFC/ITTO/62 PD 40/00 Rev.4 (I) has strengthened networking of researchers from IPB, UPM, FPRDI, and wood industries;
  - Besides the traditional forest resources, the oil palm is available resources for forest product's manufacturing, there is 5.1 Mha oil palm planted in Malaysia currently, it should be replanted after 25 years, the utilization of oil palm trunk can substitute part of materials from forest resources.

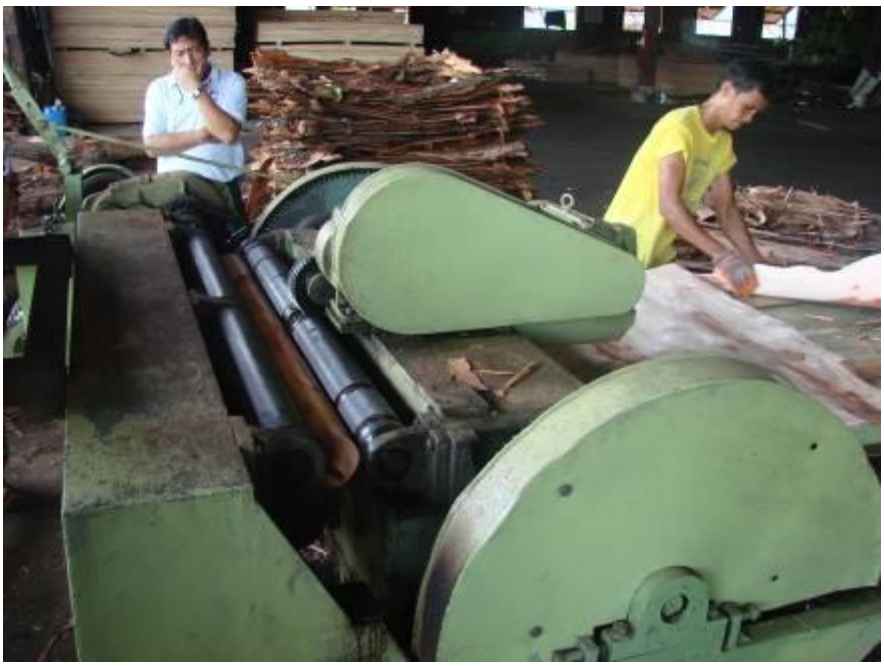
Discussion with project members in UPM, Malaysia



The products manufactured from oil palm materials

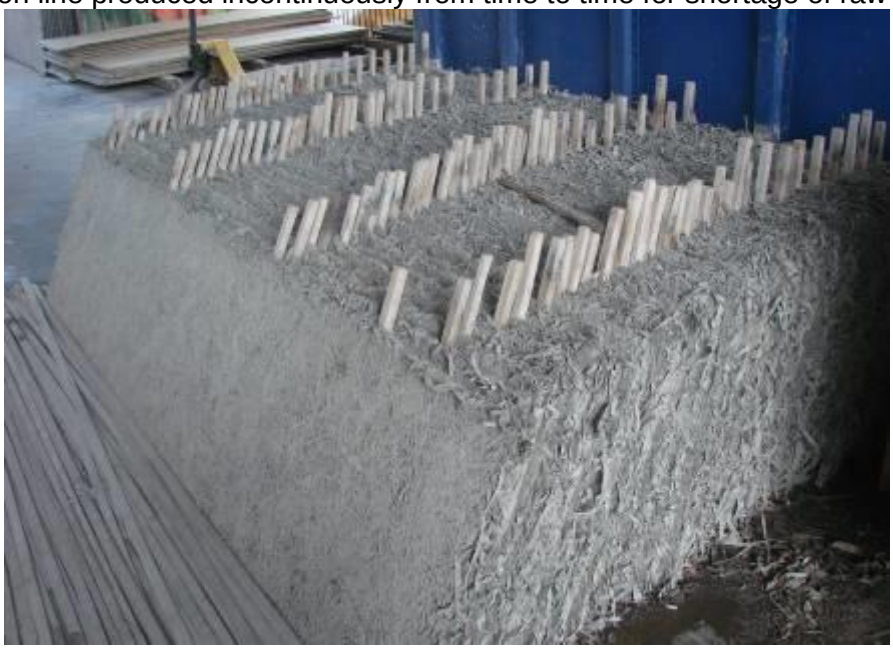
- **Visit to Mount Banahaw Wood Industries, Quezon, Philippines**
  - Mount Banahaw Co. was established in 1988, Plywood is the main product, daily productivity is 1000 pieces of plywood with 5mm thickness.
  - It has several units of rotary lathe originally, but later all rotary lathe were sold out for shortage of LDL resources. They have experienced materials transferred from natural forest to plantation forest after the natural forest logging ban in 2011. Before 2011, all veneers were bought from other suppliers, which most were produced from LDL; but after 2011, along with the shortage of raw materials, veneers were not enough for them to collect, so they bought a spindle-less lathe for peeling veneer by themselves, logs were from local plantation forest, main species is Mahogany. The thick Mahogany veneer used as core layer of plywood, and face veneer was imported from China.

Discussion with Ms. Jasmin L. Garcia and related persons



The newly spindle-less lathe for veneering SDL

- **Visit to EARN Corporation Wood Wool Cement Board, Laguna, Philippines**
  - EARN Corporation is a manufacturer of wood wool cement board. At present, it is the only remaining Wood Wool Cement Board (WWCB) manufacturer among the more than five plants established in the 1990s. it is equipped with a complete production facilities, and it produces WWCB of various thicknesses and densities depending on the end-user requirement.
  - This company directly benefited from CFC/ITTO project, the products were developed in cooperation with FPRDI under DOST of the Philippines, which is main collaborator of CFC/ITTO project.
  - The company started using 100% G. arborea as raw material, but after 2011, the raw materials were difficult to get, most of materials are from community plantation forest, the production line produced incontinuously from time to time for shortage of raw materials.



The WWCB products in EARN

4.1.4 Effectiveness of technology transfer

Technology transfer has been performed through different means as follows:

i) Dissemination of the acheviement produced under the project, namely:

Proceedings of international workshop and seminar on SDL management and utilization for biocomposite products.

ii) Publications in domestic/international seminars or journals

Twelve scientific papers presented in three international forums, two of them published in “Insects”, an international scientific journal.

iii) Conduct of the workshop and seminar on SDL management and utilization for bio-composite products

The workshop was attended by 124 participants (84 were industry representatives) in December 2010 in Bogor, Indonesia. The participants included Scientists, students, researchers, related industries, decision makers, experts, related association or society, and Non-Governmental Groups from Indonesia, Malaysia, Philippines, and Papua New Guinea. The information and technology of bio-composite products from SDL sources developed under the project was introduced and discussed, the field visiting about plantation forest management, and wood industries were arranged in the workshop.

iv) Student participants’ contribution

Undergraduate and graduate students participated in the project’s implementation, who know well about related technology, can help to disseminate related technologies and informations to industries and society in employment after graduating from university.

v) Technical trainings

The knowledge has been transferred to the industries through interaction with the mills, and by receiving operators for research or training in the UPM labs, Malaysia.

4.1.5 Overall post-project situation

The general situation after project completion can be summarized as follows:

i) Raised awareness of target beneficiaries

The target beneficiaries are now better aware of the economic benefits of SDL from plantation forest resources; There was a huge change in raw material of the bio-composite industry, especially from natural forest LDL to SDL harvested from timber estate, community forest, and logging waste in natural forest. Communities in Indonesia, particularly in Java island are interesting in plantation forest, community forest and utilization of small diameter logs for bio-composite products. The SDL resources is the only solution for the wood industries especially in manufacturing bio-composite products, for them to survive from the forest resources changing. Most of enerprises improved their human resource capability, production technique, providing new machines such as spindle-less rotary and hot press dryer to adapt SDL resources.

ii) Strengthened policies and programmes on forest plantation development

Some new policies have been formulated during the course of project implementation and are effected as to date.

In Indonesia, policies made natural forest resources became uneconomical for bio-composite industries, such as high forest fund from natural forest resources, strict management of transportation of logs from natural forest, etc.. Some positive policies have been issued in plantation forest district (West Java) to encourage local plantation forest related industries’ development, such as decreasing forest fund for plantation logs, easy pass of trucks loaded with plantation logs, etc.

In Malaysia, Under the Third Industrial Master Plan (IMP3, 2006-2020), the annual exports of the timber industry have been targeted to reach RM 53 billion by 2020. Among the strategies outlined were the need to address the current and future shortage in the supply of wood raw materials from plantation forest.

In the Philippines, The Executive Order 23 (EO 23) on Total Log Ban was issued on 3 February 2011. Declaring a moratorium on the cutting and harvesting of timber in the national and residual forests and creating the anti-illegal logging task force. However the total log ban does not cover plantation species. In the same time, the Executive Order No. 26 on the implementation of the National Greening Program as a government priority was issued on 26 February 2011, The program plan to plant 1.5 billion trees covering about 1.5 million hectares from 2011 to 2016. The two policies could significantly stimulate the expansion of plantation forest area in the near future.

Although all regions are proactively promoting and implementing their respective plantation policies, the economic viability of the plantations has always been concerned by beneficiaries. Therefore, there is a need to strategize and strengthen the activities on wood species identification and utilization technologies of SDL plantation resources to make future bio-composite industries as local economic driving force.

iii) Physical environment

All the implementing and collaborating agencies have equipped themselves with the basic facilities and personnel to carry out the wood properties' testing and bio-composite products' experiments required.

The results obtained, to a certain extent, has also created a positive environment for the development of viable forest plantations and biocomposite industries. The project helped to create more job opportunities to local communities, especially on forest plantation, logging, wood processing, marketing and distribution activities. Various bio-composite products have being produced, therefore, industry will used the raw material efficiently. Societal value to the raw material affected the economic role of wood-based industry in Indonesia, Malaysia, Philippines, and Papua New Guinea.

4.1.6 Unexpected effects and impacts

Some major unexpected effects and impacts of the project are presented below:

- SDL from natural forest was main forest resources for bio-composite products in project designment. But the resources was transferred to plantation forest in project implentation, for the industries couldn't get SDL resources economically from the following reasons, such as the high forest fund (tax) to logs from natural forest for indutrial usage, and high transportation cost to wood industries. Except the basic physical and mechnical properties were studied in the project, all of other research contents were focused on wood species from plantation forest.
- The number of companies actively involved to support the execution of project is beyond the expectations, especially in addressing technical gaps and determining equipment needs for production and manufacturing constraints.
- During the execution of the project, utilization of SDL in all project collaborating countries increased sharply. In case of Indonesia, some small scale plywood industries have been established in Java island using SDL for plywood production.
- Students involed in this project is also beyond the expectation of the project executing in collaborating agencies. Favorable impact of the project is spreading out to younger generation which will motivate young people to get involved in development activities in utilization of plantation forest, and help to disseminate related technologies and informations to industries.

4.1.7 Effectiveness of the project implementation

Seven progress reports had been timely submitted to ITTO by the executing agency; four PSC meetings were organized with proper documentation; four yearly financial audit reports and one final audited report were produced with the assistance of independent, certified public accountant and the reports were duly endorsed by ITTO; a completion report was timely submitted to ITTO, and ten technical reports had been drafted and submitted to ITTO, one international workshop proceeding had been published and send to intended beneficiaries.

In the implementation of the overall project, besides IPB from Indonesia, the UPM from Malaysia, FPRDI from the Philippines, and FRI from PNG, as collaborating agencies participated related research content, while IPB played an organizer of the project. Different levels of meetings were held to address both technical and strategic issues faced from time to time. The multi-level meetings such as PSC meetings were hold to assure the studies are in accordance with project document.

All the project documents examined were prepared in conformity to the existing relevant ITTO manuals, both in terms of format and content, with distinct consecutive time coverage, and in compliance with the project agreement and procedures applying to ITTO projects.

The approach used in the project implementation was employment of a multi-disciplinary group of experts, agencies and stakeholders directly involved in the project execution; the approach is briefly described below:

- The Faculty of Foresty of the Bogor Agricultural University (IPB) acted as the coordinating agency and project executing agency, it carried out the study of potential future market of wood composite products, physical and mechanical properties testing, product development on the SDL from natural or plantation species identified for Indonesia, addressing technical gaps and determining equipments' needs, mitigating potential trade barriers, complying with relevant standards, and conducting international workshop.
- The Facultyof Forestry of the university Putra Malaysia (UPM) acted as collaborating agency in Malaysia. It conducted studies in Identifying suitable wood species and evaluating physical and mechanical properties, addressing technical gaps in producing biocomposite products in Malaysia.
- The Forest Products Research and Development Institute of the Philippines (FPRDI) acted as collaborating agency in the Philippines. It conducted studies in assessing market needs, Identifying suitable wood species and evaluating physical and mechanical properties, addressing technical gaps in producing biocomposite products in the Philippines.
- The Forest Research Institute Papua New Guinea (FRI-PNG) acted as collaborating agency in PNG. It conducted studies in assessing market needs, Identifying suitable wood species and evaluating physical and mechanical properties in PNG.

To guide the project implementation in a collaborative manner, Terms of Reference of each institution involved was made in accordance with project document and project agreement. The tasks and responsibilities of each collaborator with respect to management, technical and financial aspects were confirmed prior to commencing on project operations.

Above information on project operational management clearly indicates that, despite the 13 months extension in time without additional funding, the project was implemented effectively. More importantly, the project was implemented in compliance with the project agreement and procedures applying to ITTO projects.

Extension of the project implementation for 13 months without additional ITTO funding was due to communication and administrative barrier among the project collaborators. The project consists of 4 countries (Indonesia, Malaysia, Philippines, and Papua New Guinea) was more difficult in coordination, research execution, administrative, and financial. Furthermore the variation of capability among the institutions was very high. Collaboration research activities among the supporting countries were more complicated in comparison with collaborations in one country. ITTO and CFC agreed to extent the project execution without additional funds to complete the remaining activities. The extension therefore was only justifiable.

4.1.8 Overall sustainability

There are several project elements that are conducive to sustaining contribution of the project to a successful program on SDL resources utilization, and future viability of the wood-based industries in collaborating countries;

- IPB has its project members participated with a new plywood enterpriese construction in west Java, Indonesia. The project's achievement can directly utilized in the mill, it will be a demonstration point for the project technology from SDL resources to manufacturing bio-composite products.
- IPB in Indonesia and collaborating agencies in Malaysia, the Philippines, and PNG, will continue conducting studies on planted wood properties with related methods and apparatus from this project, and technologies development of bio-composite products from SDL resources.
- The longer-term objective of the project is to promote a sustainable forest industry by ensuring the economic supplying SDL resources to the bio-composite industries. The completed project had constructed a strong foundation needed; Further up-scaling of the results obtained is required, and the feedback from beneficiaries should be taken into consideration. Some activities of future project should be continuation and expansion of selected activities initiated under completed project.

Sustainability of the project is very much determined by its actual and potential contribution to intended primary beneficiaries, the forest industries and state governments. Applicability of the technologies identified and introduced by the institutions is a strong incentive for the beneficiaries to technically, financially and politically support continuation and expansion of the activities from the project.

4.1.9 Overall success/failure of the project

Overall, the project can be rated as successful in delivering its planned outputs and achieving its intended objectives. Judged using the indicators defined in the LFM, Seven planned outputs had been fully delivered and the specific objectives achieved. Aside from the success, the project is unsuccessful in executing process from the view of time duration; the project was completed later than the originally sanctioned time budget for administrative reasons that were justifiable.

Judged by the impacts the project has created, the project is implemented very well. The project is successful in raising awareness of beneficiaries on manufacturing technologies of bio-composite products from SDL resources. The project has also favorably affected policies and programs on forest plantation development in related countries. In addition, coordination among the four countries' research institutions has also been significantly improved through project implementation.

Another success of the project is its sustainability. Project implementation has strengthened the capacity of collaborating institutions through provision of basic facilities and competent professionals to carry out future studies in utilization of plantation forest resources; and network between research institutions and wood industries had been well constructed through project activities. In this manner, positive impacts of the project can be expected to be occurring in the long-run, thus the project can be classified as a successful investment with sustainable positive impacts.

4.1.10 The overall cost of the project

The approved total amount of project budget was US $ 865,163 comprising contributions of ITTO, GOI in the amounts of US$ 600,000, US$ 265,163, respectively. And the total amount of actual expenditure was US$ 892,963.55, the contributions from ITTO and GOI is 595,994.72, and US$ 296,968.83 respectively.

The actual contribution of GOI was higher than the amount originally planned. The main reason is that the project's executing is 13 months later behind the schedule without additional funding by

ITTO; the extension was justifiable due to the external constrain of the EA, such as difficult in communication, personal changes in collaborator staffs, and other administrative problems. The extension unavoidably entailed additional costs, which mainly for payment of key personnel, office space, utilities, etc., had to be shouldered by GOI. These exhibited the strong support to the project from GOI, and its convincing commitment to successful project operations.

4.2. Lessons learned

Project identification and design.

- Diminishing logs supply from natural forest, logs diameter with 50 cm and up, resulting activated plantation forest by government and private as well. The research on physical and mechanical properties of some wood species with SDL from natural and plantation forests should be investigated to find out the appropriate tree species for bio-composite products. These wood species were intended for bio-composite products, but with some discussion with other stakeholders, the research of bio-composites products was focused on wood from plantation forest only, because SDL from natural forest has some restriction in regulation and also high cost of transportation.
- The key problem to be identified is the most important in project identification. It needs to be addressed precisely through detailed analysis and to build coherence between project objectives, outcomes, outputs and activities, so as to formulate the logical framework. Some more outputs should be defined to cover all of the project research content.
- In order to minimize adjustments to planned project activities during the course of project implementation, the participation of project beneficiaries in project identification and problem analysis is indispensable;
- The difference of expertise and facilities of research institutions from different countries should have been identified during the project development stage, so as to arrange proper research contents, otherwise putting institutional safeguards in place to ensure equivalent roles involved in project implementation. The complicated situation should be foreseen about collaboration of research from different countries and government.

Project implementation

- Four countries (Indonesia, Malaysia, Philippines, and Papua New Guinea) were involved in the project; the contingency plan should be prepared for any complicated situations, such as coordination, research execution, administrative, and financial.
- In order to assure the project's smooth implementation by collaborating agencies. The participated government or research institutions should endorse the project in the course of project implementation, to avoid any delay in project executing from the high variation of capabilities among different institutions.
- Frequent communications and contacts should be kept among collaborating agencies. The rate of project progress should be informed timely in accordance with the term of reference by collaborating agencies to avoid any delay of project implementation.

5. Conclusions and Recommendations

5.1. Conclusions

Following are the conclusions drawn from the whole evaluation process of the project:

This evaluation found that the Executing Agency satisfactorily completed all outputs in 49 months through CFC/ITTO approved extension without additional funding. The project was implemented in an effective manner in full compliance with the project agreement and established ITTO rules and procedures; the required documents had been prepared in accordance with existing ITTO manuals and timely submitted to ITTO; and adequate management and monitoring of activities were critical to the success of this project.

The delays encountered by the project were due to reasons beyond the Executing Agency's control resulted from frequent and drastic organizational structural changes in a collaborating agency (PNG) which often involve shifting of the project personnel.

Technology transfer had been performed effectively through dissemination of the project outputs and publications, conduct of the workshop and seminar on SDL management and utilization for biocomposite products.

Several post project developments showed positive indications of sustained project outcomes in the longer term. Some positive policies issued in West Java Province (Indonesia) to ease the procedure of transportation of logs from plantation forest, and state-owned forest farm provided planting technologies to local communities. These developments encourage the progress of local plantation forest and wood industries. There is a new plywood enterprise constructed in west Java in which the project member directly participated with the production line design and in charge of manufacturing technology of plywood from local plantation forest.

Project implementation has strengthened the capacity of collaborating institutions through provision of basic facilities and competent professionals to carry out future studies in SDL utilization; and network between research institutions and wood industries had been well constructed through project activities.

Overall, the project can be recognized as successful undertaking in terms of the positive impacts on the environment of SDL resources utilization and the promising sustainability of the project.

5.2. Recommendations

For the Executing Agency

- Recommendations to the Ministry of Forestry of Indonesia. Policies and regulations should be considered and developed for the collection and utilization of SDL from natural forest in bio-composite products, such as lowering timber taxation.
- In formulating future similar projects, strict adherence by proponent to existing ITTO Manual on project formulation and full participation of the primary beneficiaries must be assured in order to arrive at a sound and workable project design. The background and related policies should be analyzed and clearly understood, and it is better for the policy makers to participate.
- In convincing the forest industries on the commercialization of SDL utilization, the cost analysis of bio-composite products from SDL resources should be conducted in close consultation with industries.
- Maintain and strengthen communication with collaborating agencies should be enhanced across the network to promote the sustainability of the established SDL utilization technologies in each participating country.
- Sharing achievement of project in a convenient way, such as put related technical reports, proceedings of workshop, publications etc. in the website of EA, and linked to ITTO website.
- A follow-up project is recommended to continue the studies of bio-composite products' technology from SDL resources, covering: the analysis of chemical properties of related wood species; bonding quality of bio-composite products; optimization of manufacturing technologies of bio-composite products; and demonstration of optimized technology in production line for large scale enterprises.
- Speed up the R&D of bio-composite product from SDL resources, it is advised to make use of successful experience of other countries.

For ITTO

- Support the executing agency to dissemination the project results and related information through ITTO website, such as technical reports, publications, and proceedings of international workshops, etc., so as to let more people or organizations benefited from the achievement of project.
- Improve the management of complex multi-country projects. It is suggested that project steering committee meetings should be held in different participated countries in turn, so the related government or research institutions would emphasize the project's implementation.

ANNEX 1
Terms of Reference for the Ex-Post Evaluation of Project CFC/ITTO/62 PD 40/00 Rev. 4 (I) "Utilization of Small Diameter Logs from Sustainable Sources for Bio-Composite Products"

The primary purpose of the evaluation is to provide an in-depth assessment and analysis of the impact of the project so as to point out the successful and unsuccessful outcomes, the reasons for successes and failures, and the contribution of the project towards the achievement of its stated goals reflecting ITTO's Objective 2000 and financing priorities of the CFC. The ex-post evaluation will be further used to draw lessons that can be used to improve similar projects in the future.

i. To assess the project's design in terms of activities corresponding to the achievement of its respective objectives.

ii. To evaluate the achievement of the project's outputs and specific objectives.

iii. To quantify the impact of the project in terms of its specific objectives contributing to development, and to make an ex-post assessment of the relevance of project results to the needs of the sector;

iv. To determine the effectiveness of technology transfer to target groups if applicable.

v. To assess the overall post-project situation for the project, including the conditions of its intended direct or indirect beneficiaries.

vi. To define and assess unexpected effects and impacts, either harmful or beneficial, and present the reasons for their occurrences.

vii. To analyze and assess implementation efficiency, including the technical, financial and managerial aspects.

viii. To assess the overall sustainability of the project after completion, and include appropriate recommendations to safeguard the continuing of its positive impacts, and enhance utilization of the technologies (if applicable) and other results developed by the project.

ix. Taking into account the results of the evaluation, make an overall assessment of the project's relative success or failure, to summarize the key lessons learnt; and identify any issues or problems which should be taken into account in designing and implementing similar projects in future.

x. To assess the overall cost of the project with original budget provisions, and their respective linkage with the overall results.

xi. To prepare the evaluation report in accordance with the references for the Project Evaluation Report, as contained in the ITTO Manual for Project Monitoring, Review and Evaluation, third edition and the ITTO Manual on Standard Operating Procedures 2009; and in conformity with the structure of the Project Evaluation Report as contained in the "Manual for the preparation and management of projects by the Common Fund for Commodities", 5th Edition Rev.2 (May 2004).

xii. To assess the project's contribution to the relevant ITTA objectives (1994 and 2006) and relevant ITTO Strategic Action Plan.

xiii. To assess the project conformity with the Five Year Action Plan of the Common Fund for Commodities (Second FYAP 2003-2007) and to prepare an article on the project outcomes and lessons learnt for the Annual Report of the CFC.

xiii. To prepare one or more articles, for possible publication in the ITTO Tropical Forest Update (TFU) magazine, in consultation with the editor, containing an overview of the project and summarizing the lessons learned from the evaluation work. Appropriate photographs should be provided.

ANNEX 2
Visiting itinerary of Ex-Post Evaluation for Project CFC/ITTO/62 PD 40/00 Rev. 4 (I)

Date	Time	Activities	Remarks
17 August 2014	15:55 pm	Arrive in Jakarta	Stay at Hotel Santika, Bogor
18 August 2014	10.00 am – 12.00 am	Entry Meeting with Ministry of Forestry and IPB	Venue: Center for International Cooperation Meeting Room Manggala Wanabhakti Building Blok VII 6th Floor
	13.00 pm– 15.00 pm	Meeting with Forest Industry Revitalization Agency (BRIK)	Venue: BRIK Office Manggala Wanabhakti Building Blok IV 7th Floor
19 August 2014	07.00 am– 14.00 pm	1. Visit Forest Enterprises Sub Unit Cianjur (Perhutani KPH Cianjur) 2. Visit Plywood Factory 3. Visit PT J-Cool	Field Visit to Cianjur, West Java
20 August 2014	08.00 am – 12.00 pm	Visit Forest Research and Development Agency (FORDA) Bogor	Discussion and visit laboratory
	13.00 pm -15.00 pm	Visit Faculty of Forestry, Bogor Agricultural University	Discussion with researcher
21 August 2014	09.00 am -11 am	Exit Meeting Ex Post Evaluation PD 40	Venue: Center for International Cooperation Meeting Room Manggala Wanabhakti Building Blok VII 6th Floor
21 August 2014	01.00 pm -	Flight to Kuala Lumpur	Stay in Park Royal Hotel
22 August 2014	9:00 am -11:30am	Meet with UPM	Project discussion
	2:00 pm-4:00pm	Visit Lab of UPM	
23 August 2014		-	Saturday
24 August 2014		Flight to Manila	Stay in SEARCA hotel of University of the Philippines (Los banos)
25 August 2014		-	holiday of the Philippines
26 August 2014	9:00 am -11:30am	Meeting with FPRDI	Los banos, Philippines
27 August 2014	9:00 am -11:30am	Visit Mount Banahaw Wood Industries	Quezon, Philippines
	2:00 pm – 4:00 pm	Visit EARN Corporation (WWCB)	Laguna, Philippines
28 August 2014	8:30 am	Go to Manila	Stay in Siayan Hotel, Manila
29 August 2014	6:30 am	Departure from Manila to Beijing	

ANNEX 3
The Management Response on the Ex-Post Evaluation Report on Project CFC/ITTO/62 PD 40/00 Rev. 4 (I) "Utilization of small diameter logs from sustainable sources for bio-composite products"

On behalf of the project management, we would like to express our sincere gratitutes to Mr. Emmanuel Ze Meka, the Executive Director of ITTO, Dr. Steven Johnson and Dr. Tetra Yanuariadi, the Assistant Director and the Projects Manager of Trade and Industry Division, Prof. Dr. Zhou Yongdong, Roger Bymolt, Staffs of Ministry of Forestry Republic of Indonesia, Prof. Edi Suhaimi Bakar, Dr. Dwigth Eusebio, all resource persons for the excellent contribution and support during the execution of the ex-post evaluation of the project CFC/ITTO/62 PD 40/00 Rev. 4 (I).

We have been thoroughly reviewed the ex-post evaluation report prepared by Prof. Zhou Yongdong. Our opinion regarding the report are as follows:

1. The report is classified as a well-written document, an excellent piece of professional work; it presents the findings in a clear, balanced and objective manner, draws meaningful conclusions consistent with the findings and makes realistic, useful and fruitfull recommendations.

2. We agree with all the conclusions presented. According to our opinion, they are fully in agreement with our notes during the execution of the project.

3. We agree to Prof. Zhou recommendation to the Ministry of Forestry of Indonesia, that policies and regulations should be developed to support high efficient utilization of SDL from natural forest in bio-composite products instead of just leaving in site, such as reduce the forest fund (tax) etc. to decrease the cost for collecting SDL from natural forest by wood industries.

4. In formulating future similar projects, we are agree that policy makers and the primary beneficiaries should participate in proposal development and full participation in the project execution.

5. In convincing the related stakeholders on the commercialization of SDL utilization, the cost analysis of bio-composite products from SDL resources should be conducted in close consultation with industries and other related stakeholders. Therefore, further research on cost analysis of SDL utilization is required.

6. We agree to maintain and to strengthen communication with collaborating agencies and stakeholders to promote the sustainability of the established SDL utilization technologies in each participating country.

7. We agree to share the achievements of the project to all stakeholders, such as put related technical reports, proceedings of workshop, publications etc. in the ITTO website if ITTO agree to do so.

8. Technology transfer had been performed effectively through dissemination of the project outputs and publications, conduct of the workshop and seminar on SDL management and utilization for biocomposite products. However, we should not stop in this stage. We do hope ITTO would like to continue sponsoring USDL technology transfer activities through intensive publication, training, workshop, etc.

9. Project implementation has strengthened the capacity of collaborating institutions through provision of basic facilities and competent professionals to carry out future studies in plantation forest utilization; and network between research institutions and wood industries had been well constructed through project activities. There is a new plywood enterprise constructed in

Cianjur Regency, West Java Province, Indonesia, which the project member master minded the production line design and in charge of manufacturing technology of plywood from local plantation forest.

10. We agree with Prof. Zhou Yongdong recommendation to continue the studies of bio-composite products' technology especially in optimization of manufacturing technologies, optimized technology should be demonstrated in production line (large scale) in enterprise level and cost analysis. To speed up the R&D of bio-composite product from SDL resources, it is advised to make use of successful experience of other countries, e.g. to conduct some study tours in project activities in the following projects.

In conclusion, we have no objection to the information presented in the Ex-Post Evaluation Report on ITTO Project CFC/ITTO/62 PD 40/00 Rev. 4 (I) "Utilization of small diameter logs from sustainable sources for bio-composite products".

Bogor, September 15, 2014

Prof. Yusuf Sudo Hadi

Project Coordinator