



# **COMPLETION REPORT**

## **SAWN TIMBER AND PLYWOOD RECOVERY STUDY OF RAMIN (*Gonystylus bancanus*) IN PENINSULAR MALAYSIA**

### **ITTO-CITES PROJECT MALAYSIA'S WORK PROGRAMME FOR 2010**

**Ensuring International Trade in CITES-listed timber Species is Consistent  
with their Sustainable Management and Conservation.**

#### **IMPLEMENTING AGENCY**

Forestry Department Peninsular Malaysia, Jalan Sultan Salahuddin,  
50660 Kuala Lumpur, Malaysia.  
Tel: 03-26164488, Fax: 03-26925657

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## PROJECT IDENTIFICATION

**Title** : Sawn Timber and Plywood Recovery Study of Ramin (*Gonystylus bancanus*) in Peninsular Malaysia

**Executing Agency** : Ministry of Natural Resources and Environment Malaysia

**Implementing Agency** : Forestry Department Peninsular Malaysia

**Host Government** : Government of Malaysia

**Starting Date** : January 2010

**Actual Duration** : 12 months (extended to 20 months)

**Actual Activity Costs** : ITTO = US\$ 8,478.00  
GoM (in-kind) = US\$ 847.80  
Total = US\$ 9,325.80

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## **EXECUTIVE SUMMARY**

### **Activity Context, Origin and Problem to be Address**

The high demand for timber in the export market has led to over exploration of nature to get the wood resources to fulfill the customer requirements. Ramin (*Gonystylus bancanus*) is currently a species that have been subjected into illegal logging and over-exploitation. In 2004, Ramin have been proposed to be listed in Appendix II in Convention International Endangered Species of Wild Flora and Fauna (CITES). As Ramin has been part of CITES listing, the trade must be controlled in order to avoid utilization incompatible with their survival. This has been proved when the production of Ramin log annually in Sarawak had decrease to about 59 percent in Sarawak. Today's scenario need import and re-export of Ramin to be certified by the Management Authority of the State of export and re-export. However, the action taken by CITES alone, may not be strong enough to conserve the Ramin specie in forest. Hence, wood processing sector in Malaysia should be seen as an inductor to prevent the detrimental exploitation of the Ramin species. One factor that contributes enormously to the rapid depletion of the country's timber resources is wastage of wood during log processing. If wood waste is minimized in the country's sawmills, the number of trees cut of annum for lumber will be reduced. As resource scarcity become more and more severe, primary processing mills such as sawmills and plywood mills should undergo restructuring to compete with the others composite board plant such as MDF and chipboard where the utilization of residue become a major part of raw material. The proposed activity is important to determine the recovery rate of Ramin logs for the manufacture of sawn timber and plywood, which in turn will promote sustainable utilization towards the conservation of Ramin in production forests of Malaysia.

### **Activity Objectives**

#### **Overall Objective**

The overall objective is to ensure the international trade of ramin in Malaysia is consistent with its sustainable management and conservation as part of global concern on ensuring sustainable management and conservation of CITES-listed timber species, especially for ramin (*Gonystylus* spp.) in Malaysia. The objectives of the Activity are also important to determine the recovery rate of Ramin logs for the manufacture of sawn timber and plywood as well as to promote sustainable utilization towards the conservation of Ramin in production forests of Malaysia.

## **Specific Objective**

The specific objectives of the Activity are to determine the recovery rate of Ramin logs for the manufacture of sawn timber and plywood and to develop a technique for quantifying wood waste from sawmilling and in plywood production.

## **Most Critical Differences between Planned and Realized Activity Implementation**

- i. Activity Personnel - There were no major changes in personnel in implementing this activity.
- ii. Time Schedule - Due to unforeseen circumstances, this project has been extended for another 3 months.
- iii. Budget amendment - No budget amendment for this activity.

## **Lesson Learned**

- i. There is a better understanding of the Ramin sawmilling process in Peninsular Malaysia.
- ii. This report provides benchmark data on the recovery of Ramin saw-milling activity, both in terms of processing recovery and wastage rates.

## **Recommendations**

- i. It is recommended that, the processing of Ramin should be approached from the concept of full utilization, whereby mixed products are produced to ensure the highest possible recovery. Sawn timber production alone, will not provide high recovery rates, but the production of small dimension parts and component stocks will significantly improve the recovery of Ramin processing.

- ii. It is also recommended that the processing of Ramin is best done using fully or semi-mechanized machines, as it will minimize the excessive sawing variations currently observed. It must be stated that the mills involved in this study, has machines and technologies which were manually operated and out-dated.

## **1.0 ACTIVITY IDENTIFICATION**

### **1.1 Context**

The Malaysian timber industry is one of the major contributors to the Malaysian economy. Timber and timber products makes significant contributions to Malaysia are foreign exchange earnings. The sector provides employment to about 187,000 workers. Malaysia is one of the world's largest exporters of tropical timber and timber products and 10th largest exporter of furniture (second in Asia). Malaysia has also established itself as a major producer and exporter of sawn timber, panel products (plywood, MDF and particleboard) flooring, doors and other joinery products.

In 2004, Ramin have been proposed to be listed in Appendix II in Convention International Endangered Species of Wild Flora and Fauna (CITES). As Ramin has been part of CITES listing, the trade must be controlled in order to avoid utilization incompatible with their survival. This has been proved when the production of Ramin log annually in Sarawak had decrease to about 59% in Sarawak. Today's scenario needs import and re-export of Ramin to be certified by the Management Authority of the State of export and re-export. However, the action taken by CITES alone, may not be strong enough to conserve the Ramin specie in forest. Hence, wood processing sector in Malaysia should be seen as an inductor to prevent the detrimental exploitation of the Ramin species.

One factor that contributes enormously to the rapid depletion of the country's timber resources is wastage of wood during log processing. If wood waste is minimized in the country's sawmills, the number of trees cut of annum for lumber will be reduced. As resource scarcity become more and more severe, primary processing mills such as sawmills and plywood mills should undergo restructuring to compete with the others composite board plant such as MDF and chipboard where the utilization of residue become a major part of raw material. There is the need for sawmill and plywood mills to maximize their processing recovery rate as the size of timber for the next decade also will reduce as being expected.

## **1.2 Activity Location**

Data collection was done in four states; Johor, Negeri Sembilan, Pahang and Terengganu. Nevertheless, due to low supply in the others mills during the project period only two (2) mills were selected as follows:

- i. Chye Hin Sawmill Sdn. Bhd., Kemaman, Terengganu; and
- ii. Kilang Papan Pahang Timur Sdn. Bhd., Gambang, Pahang.

## **1.3 Relevant National and Regional Policies and Programs**

In 2004, the Parties to CITES had agreed unanimously to up-list Ramin to Appendix II as a result of the continued threats to the species. It means more requirements have to be complied for harvesting and trade. To further protect Ramin, Malaysia has successfully introduced the use of rubber wood as substitute for the endangered species in the furniture industries, and hence reduce the over reliance on Ramin.

## **1.4 Problems to be addressed**

The wood-based industries require a regular and easy access to raw materials, especially forest logs. However, there is a rising concern on the long term availability of this resource. To sustain the development of the industries, knowledge regarding important species, such as Ramin (*Gonystylus bancanus*) need to be carried out. General observations have indicated that processing of logs has left a high degree of waste. The waste comprises small, short-sized residual, and sawdust. It is necessary to reduce this waste through having higher recovery during log processing. Furthermore, inefficiencies in wood processing have led to large economic losses, which could be linked to the unwise use of natural forest. Improving the efficiency of sawmilling and plywood milling could contribute to more efficient management of the natural forest.

## **2.0 ACTIVITY OBJECTIVES AND IMPLEMENTATION STRATEGY**

The objectives of the Activity are important to determine the recovery rate of Ramin logs for the manufacture of sawn timber and plywood as well as to promote sustainable utilization towards the conservation of Ramin in production forests of Malaysia.



## 2.1 Specific objective

The specific objectives of the Activity are to determine the recovery rate of Ramin logs for the manufacture of sawn timber and plywood and to develop a technique for quantifying wood waste from sawmilling and in plywood production.

## 2.2 Implementation Strategy

In this study, data was collected by two ways as follows:-

- i. The first step was through the review of historical Ramin sawn timber and plywood production data archived at the Forest Department of Peninsular Malaysia (FDPM).
- ii. The second step involved a field survey of selected mills where processing of Ramin was taking place, which provided hand-on data for the yield and wastage estimation.

Forest Department of Peninsular Malaysia (FDPM) recorded that no Ramin plywood production activities since 2007, while the sawn timber production was confined to only two (2) sawmills. Nevertheless, as the supply of Ramin saw logs was sparse, the processing at these mills was limited, and the FDPM were in close contact with the millers to ensure that data collection could be carried out during the processing stages.

## 3.0 RISKS

The only risk in implementing the Activity is the unwillingness of the selected sawmill and plywood operators to be involved in the study. However, this is only a perceived risk as all sawmill and plywood mills in Peninsular Malaysia are licensed by the respective State Forestry Departments.

## 4.0 ACTIVITY PERFORMANCE

### 4.1 Performance of each activity

Outputs and Operational Activities	Schedule	Applied Inputs
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	(Duration)	
<b>Output 1.1 - Improvement of the recovery rate and maximize the utilization of Ramin timber.</b>		
Activity 1.1.1 - Documentation and procedure to appoint consultant(s).	Jan 2010 – Feb 2010	Faculty of Forestry, UPM has been appointed as consultant.
Activity 1.1.2 - Acquisition of equipment, such as vernier calipers, tapes, diameter tapes, paints, data logger and other related hardware.	Feb 2010	Acquisition of vernier calipers, tapes, diameter tapes, paints and data logger.
Activity 1.1.3 Inventory work in the field.	Feb 2010 – Aug 2011	Started in October 2010.
<b>Output 2.1 - Calculation of the quantum of wood waste for estimating the recovery rate of Ramin log in the production of sawn timber and plywood.</b>		
2.1.1 Activity Documentation and reports.	Jan 2010 – Aug 2011	2 reports produced.

## 4.2 Outputs Achieved

### Output 1.1 - Improvement of the recovery rate and maximize the utilization of Ramin timber.

The mean data presented shows that the average recovery of Ramin sawn timber was in the range of 73%, although this will depend largely on the diameter of the input saw logs as well as its quality. As mentioned previously, no part of this report involves plywood processing recovery as no Ramin plywood processing has been recorded in Peninsular Malaysia over the last few years. On the other hand, the wastage rate in Ramin saw milling operations was in the range of 27% from which 9% was made up of saw-dust, while 18% was made up of unusable off-cuts and wane. It must be emphasized that the sawmilling process flow, which involves the production of fliches which is dried prior to final sawing to dimensions, allows the highest possible recovery of the Ramin wood. From the field survey, it was found that Ramin saw logs were predominantly sound with minimal defects, hence, the input volume of saw logs were more or less converted wholesome into fliches during the prior to final sawing. The slow drying process adopted by the saw mills, using thermal oil as the heating medium also improves the drying of Ramin.

## **Output 2.1 - Calculation of the quantum of wood waste for estimating the recovery rate of Ramin log in the production of sawn timber and plywood.**

As mention above, the wastage rate in Ramin saw milling operations was in the range of 27% from which 9% was made up of saw-dust, while 18% was made up of unusable off-cuts and wane. Besides that, two reports were produced from this project as follow:

- i. Technical Report – Sawn Timber and Plywood Recovery Study of Ramin (*Gonystylus bancanus*) in Peninsular Malaysia.
- ii. Completion Report – Sawn Timber and Plywood Recovery Study of Ramin (*Gonystylus bancanus*) in Peninsular Malaysia.

### **4.3 Total Amount of Expenditures and Analysis**

From the ITTO contribution of USD 8,478.00, a total of USD 8,478.00 (or 100%) was spent as reflected in the Activity Cash Flow Statement – ITTO contribution and the Activity Financial Statement – ITTO contribution in Annex I. In this regard from the in-kind contribution of USD 847.80 from Malaysia, a total of USD 847.80 (or 100%) also was spent as shown in the Activity Cash Flow Statement – Government of Malaysia contribution and the Activity Financial Statement – Government of Malaysia contribution in Annex II.

## **5.0 ACTIVITY OUTCOME, TARGET BENEFICIARIES**

### **5.1 Activity Outcome**

Based on the preliminary desk-top research on historical data as well as the field survey undertaken, it was apparent that the sawmilling recovery of Ramin in Peninsular Malaysia was higher than previously thought. The mean data presented shows that the average recovery of Ramin sawn timber was in the range of 73%. Although, this will depend largely on the diameter of the input saw logs as well as its quality. As mentioned previously in this report, no part of this report involves plywood processing recovery as no Ramin plywood processing has been recorded in Peninsular Malaysia over the last few years.

Figure 1: Ramin logs at mill's log yard.



On the other hand, the wastage rate in Ramin saw milling operations was in the range of 27% from which 9% was made up of saw-dust, while 18% was made up of unusable off-cuts and wane. It must be emphasized that the sawmilling process-flow, which involves the production of fitches which is dried prior to final sawing to dimensions, allows the highest possible recovery of the Ramin wood.

From the field survey, it was found that Ramin saw logs were predominantly sound with minimal defects, hence, the input volume of saw logs were more or less converted wholesome into fitches during the prior to final sawing. The slow drying process adopted by the saw mills, using thermal oil as the heating medium also improves the drying of Ramin.

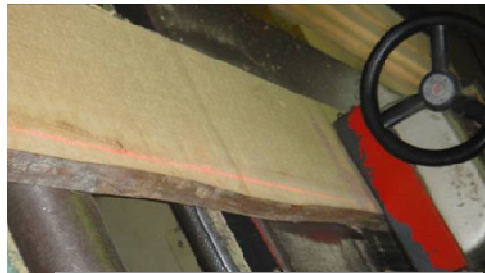
Figure 2: Debarking operation.



Figure 3: Timber drying section.



Figure 4: Laser guided sawn timber processing measurement.



## 5.2 Target Beneficiaries

The results will assist the various sawmill and plywood operators, as well as the relevant agencies to address the issue of low supply and high wastage of Ramin timber incurred during sawmilling and in plywood production. This report provides benchmark data on the recovery of Ramin saw-milling activity, both in terms of processing recovery and wastage rates. It must be recognized that these data would serve as the reference for future deliberation on the future of Ramin as a protected species, as it is the point of contention of the FDPM.

## **6.0 ASSESSMENT AND ANALYSIS**

The following points reveal the major assessment and analysis of the activity undertaken:

- i. The quality of the Ramin saw log is good, with minimal defects.
- ii. The sawing of Ramin, using the modified saw-dry-rip (SDR) method improves the recovery of Ramin sawmilling activities significantly. Further, the slow drying processes employed to dry the material also minimizes the chances of drying defects on the wood material.
- iii. The wastage in Ramin sawn timber production is minimal, as the saw mills maximize their recovery by producing stills, poles, dowels and small dimension components that have application in other value-added products. Large off-cuts and slabs are also sold to the nearby particleboard mills, to be used as material stock.

Despite these assessments, it must be emphasized that the study was grossly limited by the extent of Ramin sawmilling activities in Peninsular Malaysia. The inconsistent supply of Ramin saw logs and the rapid turn-around in processing to avoid biodegradation of the wood, somewhat affected the data collection and the ensuing analysis. Nevertheless, the activity undertaken has been able to achieve the specific objectives, by providing the necessary benchmark values for recovery and wastage in Ramin sawmilling operations.

## **7.0 LESSON LEARNED**

It is apparent that there is a better understanding of the Ramin sawmilling process in Peninsular Malaysia. The activity undertaken shows that recovery rate for Ramin sawn timber is in the range of 73%, while the wastage is relatively low at 27%. It must also be noted that the demand for Ramin wood, a light coloured material in the international market is very high, especially from Japan and Europe.

## **8.0 CONCLUSIONS AND RECOMMENDATIONS**

Based on the activities undertaken, it can be concluded that Ramin recovery in the sawmilling operation is in the range of 73%, while the wastage is in the range of 27%. It is recommended that, the processing of Ramin should be approached from the concept of full utilization, whereby mixed products are produced to ensure the highest possible recovery. Sawn timber production alone, will not provide high recovery rates, but the production of small dimension parts and component stocks will significantly improve the recovery of Ramin processing. It is also recommended that the processing of Ramin is best done using fully or semi-mechanized machines, as it will minimize the excessive sawing variations currently observed. It must be stated that the mills involved in this study, has machines and technologies which were manually operated and out-dated.