

# ASSESSMENT OF CHAIN-OF-CUSTODY CERTIFICATION COSTS FOR SAWNWOOD MANUFACTURERS IN PENINSULAR MALAYSIA

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In response to environmental concerns, over the past two decades, many environmental organisations, government entities, wood product manufacturers and other companies in wood products supply chains have developed standards to encourage consumers to purchase wood originating from certified sustainable forests. This paper focuses on the chain-of-custody (CoC) component of certification. A study involving sawnwood manufacturers in Malaysia was conducted to determine an accurate cost of obtaining a Malaysian Timber Certification Council (MTCC) CoC certificate. There are three types of costs to obtain a MTCC–CoC certificate: (1) cost to meet CoC standard or requirement (an indirect cost), (2) auditing cost (a direct cost) and (3) surveillance visit cost (a direct cost). Results indicated that the cost to meet CoC standard is the major component involving 96% of the total cost of certification, whereas the auditing and surveillance visit each only involved 2% of the total certification cost. None of the three CoC costs were statistically correlated with company size (as measured by annual sales) but there was a statistically significant relationship between cost of surveillance visit and company size when measured by annual production.

Keywords: Malaysian Timber Certification Council, sawmilling, forest sector, cost component, direct cost, indirect cost

**NOR SURYANI AG & MOHD SHAHWAHID HO, AHMAD FAUZIP, ALIAS R & VLOSKY RP. 2011. Penilaian kos persijilan *Chain-of-Custody* bagi syarikat-syarikat kayu gergaji di Semenanjung Malaysia.** Sebagai menangani isu alam sekitar, sepanjang dua dekad yang lalu, banyak organisasi bukan kerajaan, agensi kerajaan, pengeluar keluaran kayu dan syarikat-syarikat dalam rantaian penawaran industri keluaran kayu telah membentuk piawai untuk menggalak pengguna membeli kayu berasal daripada hutan mampan yang bersijil. Kajian ini dijalankan ke atas syarikat-syarikat kayu gergaji yang memperoleh sijil *Chain-of-Custody* (CoC) daripada Majlis Persijilan Kayu Negara (MTCC) bagi menentukan kos untuk mendapatkan sijil CoC. Keputusan daripada analisis data menunjukkan bahawa terdapat tiga jenis kos untuk memperoleh sijil MTCC–CoC iaitu: (i) kos untuk memenuhi piawaian atau keperluan CoC, (ii) kos audit dan (iii) kos lawatan pemerhatian. Kos untuk memenuhi piawai CoC dikategorikan sebagai kos tidak langsung dan kos utama, manakala kos untuk audit dan kos lawatan pemerhatian merupakan kos langsung syarikat. Analisis hubungan ekonometrik menunjukkan bahawa kos keperluan dan penilaian syarikat kayu gergaji tidak berkait dengan saiz syarikat yang diukur melalui hasil jualan tahunan. Bagaimanapun analisis menunjukkan terdapat hubungan yang signifikan antara kos lawatan pemerhatian dengan saiz syarikat.

## INTRODUCTION

### Overview of certification

Forest sector is a segment of society that has been most impacted by environmentally-related pressures (Bowyer 2008). This has been exemplified by the birth and growth of forest certification. In 1992, forest certification was

launched at the United Nations Conference on the Environment and Development (UNCED) in Rio de Janeiro, Brazil as a response to rapid tropical deforestation and the subsequent boycotting of some tropical timbers by the United States and European countries (Merry & Carter 1996). Forest certification has since grown to

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encompass large forest areas worldwide. Although there are a number of certification programmes, certification is dominated by the Program for the Endorsement of Forest Certification (PEFC), the largest certification programme with 223 million ha (PEFC 2010), the Forest Stewardship Council (FSC) with 125 million ha (FSC 2010) and the Sustainable Forestry Initiative (SFI) with 80 million ha (SFI 2010). Regardless of programme, certification has been recognised as a vehicle to promote Sustainable Forest Management (SFM) (Purbawiyatna & Simula 2008). In addition, from a marketing perspective, certification is intended to provide consumers with an assurance that the wood products they purchase originate from sustainably-managed forests.

Wood product manufacturers are interested in certification due to potential benefits related to improved public perception, larger market share and more efficient infrastructure management (Hansen & Juslin 1999, Hubbard & Bowe 2005, Jayasinghe et al. 2007). Forest certification can also provide exporters of forest products access to key markets such as the United States and the European Union (Eba'a & Simula 2002). Forest Management Certification (FMC) and Chain-of-Custody (CoC) certification are the two components of all certification programmes.

Overall, with rapidly growing concerns over environment and natural forest resources, the global timber market is evolving to accommodate new market conditions, and forest certification is increasingly becoming a market requirement (Ratnasingam et al. 2008). Forest product suppliers often participate in the certification process with hopes of creating or retaining markets (Vidal et al. 2005). Price premiums exist for certified wood products relative to the non-certified alternative (Humphries et al. 2001, Aguilar & Vlosky 2007).

Certification continues to be an important issue for the value-added wood products sector in the USA. A study of furniture manufactures showed that certification awareness and participation have increased significantly from 2002–2008 (Vlosky et al. 2009). The percentage of respondents receiving premiums for certified products has increased significantly during this period while the percentage of respondents incurring non-raw material costs for certified wood raw materials declined. This study in particular has important implications for tropical wood product exporters selling into value-added markets in the United States.

Conversely, consumers in Europe are not very willing to pay more for forest products from certified forests (Solberg 2003, Thang 2003). This is also true for USA where 81% of companies that own and manage forest lands and 70% of companies that manufacture and sell certified products play no role in the management of forest lands and are sceptical that any premium will emerge (Auld et al. 2003). There is very little recognition or demand from private end-consumers in the USA who are generally unwilling to pay more for certified forest products except for certain niche products such as high value furniture and musical instruments (Anderson & Hansen 2004). Hence, increased production costs may not be readily passed to the consumer without a reduction in consumption, although there are some market segments where willingness to pay a price premium could be observed and exploited by the trade.

### CoC certification

Perhaps the most complex aspect of certification is CoC. Tracking the CoC for wood product in the USA is very complex due to the large number of timber buyers, harvesting contractors, log yards, manufacturing sites, wood dealers and traders (Goetzl et al. 2008). This complexity is increased dramatically if tropical and non-tropical wood product imports are included (Hansen & Juslin 1999, Hubbard & Bowe 2005, Jayasinghe et al. 2007). CoC certification is a critical element in that it is intended to provide the unbroken traceable linkage for certified wood products from the forest to the end-consumer. It is often required for companies to have a CoC certificate in order to sell or export their certified products to customers in environmentally sensitive markets. While there is a growing supply and demand for certified wood products in a number of international markets, there is no evidence that the full range of market opportunities have been developed in order for certified wood products to move effectively through distribution channels at different scales (Aguilar & Vlosky 2007).

Since 1998, the number of CoC certificates worldwide has increased tremendously. Between 2005 and 2006, the number of CoC certificates worldwide increased about 26.8% compared with 18.3% between 2004 and 2005. In May 2008, there were about 12 600 of CoC certificates globally; growth in CoC certificates issued is expected to

increase steadily in the future (Purbawiyatna & Simula 2008).

While CoC certification is influencing increased trade of certified wood products, acquiring CoC certification is often costly. Costs for achieving certification standards, as well as audits and site visits over the life of the CoC certificate are often viewed as a barrier for companies to become certified. The direct and indirect costs of certification are difficult to quantify with accuracy (Dunne 2000). Forest product manufacturing profits often decline due to higher prices paid for certified raw materials and costs to become CoC certified (Schwarzbauer & Rametsteiner 2001). This suggests that manufacturers are not passing higher prices on to downstream customers.

### *Certification in Malaysia*

Certification in Malaysia is dominated by the Malaysian Timber Certification Council (MTCC) closely followed by the PEFC. Certification receives support from various stakeholders including the government and the private sectors. Support from the local community is growing in strength particularly for the FSC (Mohd Shahwahid 2006). The MTCC is an independent organisation established in 2001 to develop and implement the Malaysian Timber Certification Scheme (MTCS) for independent third-party assessments of forest management practices and CoC as well as to meet the demand for certified timber products. The MTCC standard has evolved over time. Forest Management Units (FMUs) were evaluated using the Malaysian Criteria, Indicators, Activities and Standards of Performance for Forest Management Certification which is based on the FSC Principle and Criteria (MTCC 2010). As of July 2010, 10 certificates for forest management have been issued to FMUs covering 4.94 million ha or 34% of total permanent reserved forests (PRFs) in Malaysia (MTCC 2010). In addition, six FMUs have been awarded PEFC certificates for forest management. A total of 154 companies have been awarded certificates for CoC. Of these, 128 have also been awarded the PEFC certificate for CoC, making them eligible to use the PEFC logo on their products. Most of these companies are sawnwood manufacturers and exporters and some also manufacture and export S4S

sawnwood, finger-jointed sawnwood, moulding and plywood.

Forest product exports are an important part of Malaysia's economy. The Malaysian timber industry is recovering after two years of recession with exports of Malaysian wood and timber products reaching RM6.9 billion in the first four months of 2010, up 22% from the same period in 2009. The Malaysian Timber Industry Board (MTIB) targets RM53 billion in wood and timber product exports by 2020 (ITTO 2010). As such, certification is important for long-term access to key markets in Europe, USA and Japan.

The estimated cost to meet forest management certification standards in Malaysia is USD65 ha<sup>-1</sup> (Fauzi et al. 2002). However, there are no estimates for CoC certification costs for companies. Nevertheless, it has been reported that over three-quarter of Malaysian furniture manufacturers have not adopted CoC certification because there are no price premiums and implementation is too expensive (Ratnasingam et al. 2008)

This study analysed the costs for the sawmilling sector in Malaysia to adopt CoC certification or to meet the requirements for CoC certification (RCOC) used by MTCC. In addition to identifying costs, we examined the factors that affect these costs. Results of this study can be used by the relevant agencies to minimise costs involved in the certification and can provide companies with adequate information for making decision in investing in CoC certification.

## **METHODOLOGY**

### **Data collection, response rate and analysis**

Both secondary and primary data were used in this study which was conducted in November 2006 and March 2007. Secondary data and information were collected through literature searches and a review of government statistics. According to MTCC, there were 57 sawnwood producers and traders with CoC certification in Peninsular Malaysia. Of the 57 companies, 31 were sawnwood producers which became the adjusted population frame. Of these, 23 (74%) companies agreed to participate in this study. A mixed-mode technique of personal and telephone interviews was used to administer the questionnaire.

SPSS version 16 (2007) was used in the statistical analyses. Descriptive statistics analysis was conducted for data related to company demographics including annual production before and after obtaining CoC and costs of CoC certification. The costs were categorised as cost of meeting certification requirements, auditing cost and surveillance visit cost. Regression analysis was also conducted to identify factors that influence CoC certification costs. The simple regression models based on log-linear functions that are used to analyse factors that influence the three types of CoC certification costs are

$$LCOR = C + \beta_1LSOC + \beta_2LYOE + e_t$$

$$LCOA = C + \beta_1LSOC + \beta_2LYOE + e_t$$

$$LCOS = C + \beta_1LSOC + \beta_2LYOE + e_t$$

where

LCOR = natural logarithm of cost of compliance

LCOA = natural logarithm of cost of assessment

LCOS = natural logarithm of cost of surveillance visit

C = constant

LYOE = natural logarithm of number of years the sawmill has been operating

LSOC = natural logarithm of size of the company (annual sales, annual production)

$e_t$  = error term

$\beta_1, \beta_2$  = coefficient for every variable

## RESULTS AND DISCUSSION

### Cost structure of CoC certification

The mean cost to fulfil requirements to attain CoC certification standards in Peninsular Malaysia accounted for 96% (RM5.46 m<sup>-3</sup>) of the total cost (Table 1). Every year, respondents paid an estimated RM0.12 m<sup>-3</sup> or 2% of the total cost of certification per mill each for auditing fees and surveillance visits for four years. In aggregate, the companies spent an average of RM5.70 m<sup>-3</sup> to obtain and maintain CoC certificates from MTCC. The component of each cost type is discussed below.

**Table 1** Range and average cost of Chain-of-Custody (CoC) certification in Peninsular Malaysia

Activities	Costs per mill (RM m <sup>-3</sup> )		
	Min	Max	Mean
Requirement cost			
Training	0.01	0.15	0.07 (1%)
Documentation	0	0.20	0.09 (2%)
Storage	0.06	2.11	0.47 (8%)
Packaging and labelling	0.11	14.54	4.83 (85%)
Subtotal	0.18	17.00	5.46 (96%)
Auditing cost	0.05	0.26	0.12 (2%)
Surveillance visit cost	0.06	0.26	0.12 (2%)
Total	0.29	17.52	5.70

Values in parentheses are percentages of cost; RM1 = USD0.35; n = 23

### Cost to fulfil requirements to attain CoC certification standards

Costs in this category included document preparation, record keeping and report generation. Additional compliance costs were examined, namely, training, documentation, product identification and traceability, and storage. However, salaries for employees directly involved in CoC were not included.

Respondent companies provided training for staff that performed tasks related to CoC certification. Table 1 shows that the mean cost for training per m<sup>3</sup> is about RM0.07 (minimum RM0.01, maximum RM0.15). Companies also had to incur costs for generating documentation to identify certified and non-certified raw material sources. The mean cost for documentation per m<sup>3</sup> was about RM0.09 (RM0.003, RM0.20). In addition, there was a requirement to establish and maintain inventory and storage procedures to segregate certified and non-certified raw materials and products. The mean cost for storage was about RM0.47 m<sup>-3</sup> (RM0.06, RM2.11). Product identification and traceability included purchasing and shipping documents, bills of lading, and labelling. A majority of sawmills used tag and colour as identifications to distinguish between certified and non-certified materials. The mean cost for product identification and traceability per m<sup>3</sup> was about RM4.83 (RM0.11, RM14.54).

### Assessment cost

The main purpose for the assessment was to evaluate company compliance with CoC operation and documentation standards. The procedures for CoC and forest management assessments are similar. Generally, the cost for auditing was based on a per day basis and depended on the time taken by the assessor. The site visits typically focused on incoming materials, processing and outgoing materials.

The primary costs for CoC assessment consisted of professional fees for the assessors, charged on a daily rate, and expenses incurred for travel, meals and accommodations. Assessment cost varied with assessing firm. In addition to the fees for assessment, the company also incurred a cost for Corrective Action Requests (CARs). CARs are written requests by the certifying body to the clients to address all non-compliances in the system with respect to the standard used in the assessment. However, almost all of the surveyed companies did not receive any CAR during the assessment. In this study, average total assessment cost per mill was RM0.12. The average cost for assessment fees per m<sup>3</sup> was about RM0.12 per mill with the minimum and maximum range around RM0.05 and RM0.26 per mill respectively.

### Surveillance visit cost

The typical CoC certification is valid for a five-year period. Surveillance visits by the assessor to ensure company compliance are made at least once every six months for two years and then once a year if there are no major CARs in the second year. For study respondents, the average cost of a surveillance visit was RM0.12 m<sup>-3</sup> with the minimum of RM0.06 and maximum RM0.26 per mill.

### Regression analysis

Regression analysis results are shown in Table 2. Based on compliance cost, neither annual sales nor number of years in operation were statistically significant at  $\alpha = 0.05$ . Only 9% ( $R^2 = 0.094$ ) of the variation in compliance cost is explained by the model. Neither annual sales nor number of years in operation were statistically significant at  $\alpha = 0.05$ .  $R^2$  for assessment cost was 0.078 which meant that only 8% of the variation in assessment cost was explained by the model. However, the

regression analysis for surveillance visit cost showed that annual sales was not statistically significant at  $\alpha = 0.05$  but company size when measured by annual production was statistically significant ( $p = 0.021$ ). Finally for surveillance visit cost,  $R^2$  was 0.264 which meant that 26% of the variation was explained by the model.

### POLICY IMPLICATION AND CONCLUSIONS

CoC certification has increasingly influenced worldwide markets for forest product and is indirectly recognised as a tool to promote sustainable forest management. This study is a preliminary attempt to understand the costs of CoC certification in Peninsular Malaysia. A limited sample size may have a distortion in the cost analysis affecting the generalisations of the result and conclusions of this study. Due to time and cost constraints, the survey of this study was limited to sawmills in Peninsular Malaysia precluding expansion of generalisations and conclusions to Sabah and Sarawak. Thus, further research is needed to have a more accurate estimate of the costs of CoC and forest management certification in Peninsular Malaysia as well as in Sabah and Sarawak. In fact, it is suggested that the study be expanded to make a comparison with the cost structure of CoC certification in neighboring countries such as Indonesia as a means of gauging the level of competitiveness between countries in the South-East Asian region.

The study did not find any correlation between length of years operating and the cost of CoC certification. This may imply that it is not the length of operation of the company that determines willingness to invest in certification. There could be other factors such as awareness and willingness to participate in certification, as well as the size of the CoC sawnwood trade that could have more important influences. This opens up further room for investigation.

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**Table 2** Regression models of the relationship between length of time in business (LYOE) and company size (LSOC) and cost of CoC

## (a) Compliance cost

Variable	Coefficient	Standard error	t-statistic	Probability
C	16.347	7.229	2.261	0.037*
LYOE	0.211	1.165	0.181	0.858
LSOC	-0.637	0.509	-1.252	0.227

$R^2 = 0.094$ , F-statistics = 0.878, Durbin-Watson statistics = 2.403, probability (F-statistic) = 0.434; \*statistically significant at 5% level

## (b) Assessment cost

Variable	Coefficient	Standard error	t-statistic	Probability
C	9.609	1.345	7.145	0.000**
LYOE	0.182	0.264	0.688	0.500
LSOC	-0.146	0.118	-1.236	0.232

$R^2 = 0.078$ , F-statistics = 0.764, Durbin-Watson statistics = 1.837, probability (F-statistic) = 0.480; \*\*statistically significant at 1% level

## (c) Surveillance visit cost

Variable	Coefficient	Standard error	t-statistic	Probability
C	11.085	1.470	7.539	0.000**
LYOE	0.027	0.226	0.118	0.908
LSOC	-0.299	-0.512	-2.528	0.021*

$R^2 = 0.264$ , F-statistics = 3.220, Durbin-Watson statistics = 1.994, probability (F-statistic) = 0.064; \*statistically significant at 5% level, \*\* statistically significant at 1% level

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