



UNIVERSITI PUTRA MALAYSIA

**COST AND EARNING STRUCTURE OF LOGGING
INDUSTRY IN THE STATE OF SABAH**

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**MASTER OF SCIENCE
(TROPICAL FOREST RESOURCE MANAGEMENT)
UNIVERSITI PUTRA MALAYSIA**

2001



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By

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**A Project Report Submitted in Partial Fulfillment of the Requirements for the
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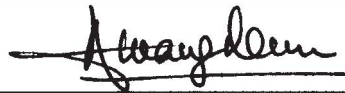
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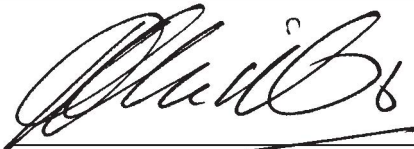
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To my beloved wife

ZAINAB ALIGHOR KHAN

Who was the source of inspiration, understanding and
encouragement throughout my study

Loving Sons

ZAINUL ARIFFIN @ ABANG ENOL
ZAINAL ABIDIN @ ENAL
ZAHIRUDDIN @ BABY
ZHRUL HILMI @ AMY

For their endless patience and understanding



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ABSTRACT

COST AND EARNING STRUCTURE OF LOGGING INDUSTRY IN THE STATE OF SABAH

By

Badrul Hisam Kumut

The logging industry in Sabah is not widely understood owing to a lack of published information concerning its activities even though it is one of the most important sectors to the state economy. Hence, this study was undertaken to provide a better understanding of the cost and earning structure of the logging business in the state of Sabah. Data used in this study were collected from logging survey of 31 logging contractors in the state. Due to lack of information provided by the respondents, only 10 questionnaires were used in the analysis. The questionnaire contains information required in this study with regards to costs, production and market prices. The results show that variable cost (direct cost) components constitute about 54 percent (RM66.66/m³) of the total logging cost. The most important cost components are the cost of logs transportation, cost of royalty and cess payment, and cost of skidding. This is due to logging activities been done further inland into the hilly and mountainous areas. Whilst the fixed cost (indirect cost) constitute about 46 percent (RM56.98/m³) of total logging cost. Subsequently, the variable cost gives a higher coefficient of variation (13.20 percent), compared to that of the fixed cost (11.73 percent). The average total production cost obtained in this study was RM123.64/m³. The average percentage of net profit over production cost and sales were estimated at 144.2 percent and 71.9 percent, respectively. This indicates that the logging industry in Sabah is highly profitable. In this study, the State Government is capable of capturing a large portion of the economic rent averaging about 93 percent of the total potential rent. Even though the State Government is capable of capturing large portion of the economic rent in the logging industry, about 80 percent the logging contractors still able to gain windfall profit averaged 7.4 percent aside from the profit margin. The policy implication of the study suggests that the existing mechanism of forest allocation system needs to be reviewed in order to ensure that the total rent collected is equated to the stumpage value.

ABSTRAK

Industri pembalakan di Sabah tidak diketahui secara meluas disebabkan kurangnya maklumat dikeluarkan berkaitan dengan aktiviti pembalakan tersebut. Dengan itu, kajian ini adalah bertujuan untuk meningkatkan kefahaman terhadap perbelanjaan dan struktur pendapatan dalam perniagaan pembalakan di negeri Sabah. Data yang digunakan dalam kajian ini diperolehi daripada tinjauan pembalakan sebanyak 31 kontraktor pembalakan dalam negeri. Disebabkan kekurangan maklumat yang telah diberikan oleh beberapa responden, hanya 10 soal selidik sahaja digunakan dalam analisis. Soal selidik mengandungi maklumat diperlukan dalam kajian ini berkaitan dengan kos, pengeluaran dan harga pasaran. Hasil kajian menunjukkan bahawa komponen kos berubah (kos langsung) menghasilkan lebih kurang 54 peratus ($\text{RM}66.66/\text{m}^3$) daripada jumlah kos pembalakan. Komponen-komponen kos yang paling penting ialah kos pengangkutan kayu balak, kos pembayaran royalti dan ses dan kos untuk menarik balak. Ini adalah kerana aktiviti pembalakan dilakukan di kawasan pedalaman ke kawasan berbukit bukau dan pergunungan. Sementara itu, kos tetap (kos tidak langsung) hanya menghasilkan lebih kurang 46 peratus ($\text{RM}56.98/\text{m}^3$) daripada jumlah kos pembalakan. Jumlah purata kos pengeluaran yang diperolehi dalam kajian ini ialah $\text{RM}123.64/\text{m}^3$. Seterusnya kos berubah memberikan variasi koefisien yang tinggi (13.20 peratus) berbanding dengan kos tetap (11.73 peratus). Peratus purata untuk keuntungan bersih berbanding kos dan jualan pengeluaran dianggarkan pada 144.2 peratus dan 71.9 peratus masing-masing. Ini menunjukkan penanda keuntungan untuk industri pembalakan di Sabah adalah sangat tinggi. Dalam kajian ini Kerajaan Negeri berupaya memperoleh sebahagian besar daripada kutipan sewa ekonomi secara purata 93 peratus daripada jumlah sewa berpotensi. Walaupun Kerajaan Negeri berupaya memperoleh bahagian yang besar daripada kutipan sewa ekonomi dalam industri pembalakan, lebih kurang 80 peratus kontraktor pembalakan masih berupaya memperoleh “windfall profit” secara purata 7.4 peratus selain daripada keuntung kasar. Implikasi polisi daripada kajian telah mencadangkan bahawa mekanisme sistem pengagihan kawasan pembalakan perlu dikaji semula untuk memastikan jumlah kutipan yang dipungut bersamaan dengan nilai “stumpage”.

CHAPTER I

INTRODUCTION

General Background

Malaysia is endowed with vast area of forest resources. Forestry is one of Malaysia's most rapidly growing economic sectors. Malaysia is the largest exporter of tropical wood in the world, accounting for 70 percent of the world's supply of raw-logs. Forest based industries make a significant contribution to Malaysia's economy contributing 4 per cent to GDP and accounting for 8 per cent of export earnings 1997. Overall the forest sector employs approximately 250,000 workers. Sabah and Sarawak, the two Malaysian states on the island of Borneo, occupy some of the oldest and the most diverse rain forest in the world. This forest provides most of Malaysia's exports of tropical logs.

The total land under natural forests in Malaysia is estimated to be 19.09 million ha, accounting for 58.1 percent of the total land area (Table 1). About 6.2 million ha are in Peninsular Malaysia, 4.4 million ha in Sabah and 8.5 million ha in Sarawak. Of the 19.1 million ha of forested land, 16.6 million ha are dipterocarp forests while the remaining 1.9 million ha are freshwater swamp and mangrove forests, respectively. The dipterocarp forest, which represent 86.7 percent of the total forested land, are characterised by the predominance of the family Dipterocarpaceae with many species of the genera Anisoptera (Mersawa),



Table 1: Distribution and Extent of Natural Forests by Major Forest Types in Malaysia, 1994 (million ha)

| Region | Land Area | Dipterocarp Forest | Swamp Forest | Mangrove Forest | Total Forested Land | Percentage Total of Forested Land |
|---------------|------------------|---------------------------|---------------------|------------------------|----------------------------|--|
| Peninsula | 13.16 | 5.41 | 0.30 | 0.11 | 5.82 | 44.2 |
| Sabah | 7.37 | 3.90 | 0.19 | 0.32 | 4.41 | 59.8 |
| Sarawak | 12.33 | 7.26 | 1.23 | 0.16 | 8.65 | 70.2 |
| Total | 32.86 | 16.57 | 1.72 | 0.59 | 18.88 | 57.5 |

Source: Malaysian Timber Council (1996)

Dipterocarpus (Keruing), Dryobalanops (Kapur), Hopea (Merawan) and Shorea (Meranti).

A total of 12.7 million ha of the country's forest has been gazetted as the Permanent Forest Estate (PFE) in accordance with the National Forestry Act, 1984 (Amended 1993). In Peninsular Malaysia the PFE covers 4.8 million ha, Sabah 3.3 million ha and in Sarawak 4.6 million ha (Table 2).

About 70 percent of the Permanent Forest Estate is productive. In Peninsular Malaysia, approximately 2.85 million ha of the Permanent Forest Estate are managed as productive forest, it has further been estimated that 0.98 million ha are still undisturbed (virgin) while 1.87 million ha have been logged-over in the past with 0.58 million ha or 31 percent of these logged-over forests being reloggable as they were harvested well before 1996.

In Sarawak, about 3.24 million ha of the PFE are estimated to be productive. The PFE in Sarawak are classified as Forest Reserves, Protected Forest and Communal Forest. Whilst in Sabah, 2.99 million ha of productive PFE are located in the 2.67 million ha of Commercial Forest Reserves (Class 2) and 316,460 ha of mangroves. The remainder of the PFE are classified as Protection

Table 2: Forest Resource of Malaysia by Management Categories, 1994

| Region | Peninsula | Sarawak | Sabah | Malaysia |
|-------------------------------------|------------------|----------------|--------------|-----------------|
| (million ha) | | | | |
| Productive | 2.85 | 3.24 | 2.99 | 9.08 |
| Protective | 1.90 | 1.40 | 0.36 | 3.66 |
| Permanent Forest Estate (PFE) | 4.75 | 4.64 | 3.35 | 12.74 |
| National Parks/Wildlife Sanctuaries | 0.77 | 0.26 | 0.25* | 1.28 |
| State Land Forests | 0.67 | 3.96 | 0.50 | 5.23 |

Source: Forestry Department of Peninsular Malaysia (1996)

Note: *An additional 141,200 ha of wildlife reserves are already included under the protective PFE.

forest (99,980 ha), Domestic forest (7,350 ha), Amenity forest (20,770 ha), Virgin Jungle Reserves (88,310 ha) and Wildlife Reserves (141,200 ha).

Malaysia has 5.2 million ha of State Land Forests, available for forestry as well as non-forestry uses. The majority (75.7%) of the State Land Forests is in Sarawak, and 12.8 and 11.5 percent are in Peninsular Malaysia and Sabah, respectively. During the period 1981-1988, annual log production from Malaysia fluctuated between 27.9 and 37.7 million cu. m. (Table 3). Each of the three regions, Peninsular Malaysia, Sabah and Sarawak, contributed approximately equal amount to the total production.

The total log production from Malaysia indicates a lower volume of 26.1 million cu. m. in 1990, decreasing further to 20.8 million cu. m. by 1995 (Table 3). It is expected to stabilize at between 18 and 19 million cu. m. after 1995. These figures do not take into account the estimated 3 to 4 million cu. m. annual production logs in Sabah.

Estimates of potential annual sustainable production from the indigenous forests, based on the extent of productive PFE and growth rates of the regenerating forests are higher, at 5.7, 4.5 and 9.8 million cu. m. for Peninsular Malaysia, Sabah and Sarawak, respectively (Wan Razali, 1990). A growth rate of 2.0 cu. m./ha/yr was assumed for Peninsular Malaysia and Sarawak, and 1.5 cu. m./ha/yr for Sabah. The respective areas of productive PFE for Peninsular Malaysia, Sabah and Sarawak are 2.85, 3.0 and 4.92 million ha. The productive PFE for Sarawak

Table 3: Log Production: Malaysia (1981-2000)

| Year | Peninsular Malaysia | Sabah[*] | Sarawak | Malaysia |
|------------------|--------------------------------|--------------------------|----------------|-----------------|
| (million cu. m.) | | | | |
| 1981 | 10.5 | 9.1 | 8.4 | 27.9 |
| 1982 | 10.3 | 11.7 | 8.4 | 30.3 |
| 1983 | 9.9 | 11.7 | 11.2 | 32.8 |
| 1984 | 11.2 | 12.0 | 10.6 | 33.7 |
| 1985 | 10.7 | 10.5 | 11.4 | 32.6 |
| 1986 | 8.4 | 10.8 | 12.3 | 31.4 |
| 1987 | 8.6 | 9.8 | 11.5 | 29.9 |
| 1988 | 10.3 | 12.2 | 13.7 | 36.2 |
| 1989 | 12.4 | 11.0 | 14.4 | 37.7 |
| 1990 | 9.1 | 5.0 | 12.0 | 26.1 |
| 1991 | 9.1 | 4.2 | 12.0 | 25.3 |
| 1992 | 9.1 | 2.3 | 12.0 | 23.4 |
| 1993 | 9.1 | 2.1 | 12.0 | 23.2 |
| 1994 | 9.1 | 1.7 | 12.0 | 22.8 |
| 1995 | 7.1 | 1.7 | 12.0 | 20.8 |
| 1996 | 6.8 | 1.7 | 10.0 | 18.5 |
| 1997 | 6.8 | 1.5 | 10.0 | 18.3 |
| 1998 | 7.0 | 1.2 | 10.0 | 18.2 |
| 1999 | 7.0 | 1.2 | 10.0 | 18.2 |
| 2000 | 7.9 | 1.2 | 10.0 | 19.1 |

Source: Forestry Department of Peninsular Malaysia (1999)

*Sabah production figures do not include the 4 million cu. m. of plantation logs.

includes the additional 1.4 million area proposed to be included in the PFE, assuming 0.98 million ha (82%, current ratio) are productive.

Logging Industry in Malaysia

The logging industry in Malaysia involves many entities. The licensee who obtained the logging compartments is most often not directly involved in the logging activity. Instead, the logging activities are contracted out to logging contractors who may in turn sub-contracting the felling, skidding and transporting of logs to different work teams. In some cases, each sub-contractor has his own felling equipment, tractors and winch lorries.

In the management of logging operation, knowledge of trend of cost and earning structure is important because both has an important information required for analyzing the efficiency and equity issues of the timber industry. The trend in cost depends on the level of inputs used in the logging operations. These inputs include labour, machines, capital and efforts. The trend of costs also varies with respect to stand characteristics, type of concession, topography, market condition and so forth. The analysis of the cost structure of the logging industry is a little more complicated than that for the timber manufacturing industries such as in saw milling (Saroni and Roslan, 1990) and furniture manufacturing (Saroni *et al.*, 1994). For earning structure, the trend largely depends on price of logs and inputs. Pricing decisions are complex and many interacting factors causing variation need to be considered. In other words, to obtain a comprehensive cost structure, both

direct and indirect logging costs have to be estimated, if the production cost information is to be of further use in applied and policy studies.

Justification

The study of trend and pattern of cost and earning structure of the logging industry in Sabah was conducted in view of the fact that the industry is not widely understood owing to a lack of published information concerning its activities. The general public view the industry as a provider of instant wealth to the logging licensees and contractors. This conclusion maybe contributed by the public ignorance of risk aspects, business practices and expertise needed in the business. Development economists view the industry in a different light and acknowledge its important role in the growth of the national economy. The tax revenue collected by the State Government contributes significantly towards funding the State administration and public projects. The remuneration that logging contractors obtain also serves as capital to fund other private economic ventures.

Thus, this study is an attempt to elucidate the behaviour of cost involves in the activities of logging industry viz-a-viz fixed cost, variable and semi-variable costs as well as earning structure of logging over a given period of time. It is anticipated that this study would provide in various cost items (fixed, variable and earning structure) based on the activities carried out by the concessionaires. How these changes happen and their magnitude on the overall profitability in the logging industry is not known. There are several factors that can influence the

variation in cost and earning structure of the logging industry. A major determinant, for example, is the change in price of labour rate and logging machineries with time. Subsequently, change in earning structure will be subjected to change in demands, prevailing market price and characteristics of log production (quality, size and species).

Objectives

The objectives of the study were to:

1. Study the pattern of cost and earning structure of logging industry in Sabah.
2. Identify and determine factors influencing the pattern of cost and earning structure of the logging industry.
3. Determine the profitability of the logging industry.
4. Estimate the distribution of resource rent among government and the concessionaires.

Definitions

Fixed Cost

A fixed cost can be defined as, “a cost which accrues in relation to the passage of time and limits, and tends to be unaffected by fluctuations in the level of activity (output or turnover)” (Lucey, 1984). Examples in this study are supervision, depreciation and insurance.

Variable Cost

A variable cost can be identified as, “a cost which tends to follow (in the short term) the level of activity.” The official definition rightly includes the qualification ‘in the short term’ because over the longer term changing prices, methods and technology made any form of cost classification subject to change (Lucey, 1984). As examples in this study are direct and indirect labour, fuel and lube, tyres and tubes, maintenance supplies and other cost.

Organization of the Report

Chapter Two of the report highlights the literature review on the forest classification, forest types, logging concession, allocation of forest concessions, log transportation, and logging cost. The research method used in this study are described in Chapter Three. Chapter Four contains the results of the analysis and a discussion of the significance of these results. A conclusion and recommendations that emerged from the empirical analysis of the study are highlighted in Chapter Five.

CHAPTER II

LITERATURE REVIEW

Introduction

Presently about 58.46% of Sabah total landmass is covered with Tropical Rainforest which is one of the world's oldest heritage. State Forestry Department has been entrusted with more than 48.8% (3.594 million hectares) of Sabah's total land area. This area is classified as Permanent Forest Estates (PFE) and administered according to their respective functions.

Forest Classification

The Permanent Forest Estates (PFE) of Sabah is divided into 7 different classes as shown in Table 4 while forest lands in Sabah are divided into five major vegetation types as shown Table 5. This practice is in line with the National Forest Policy to facilitate sustainable forest management.

The respective functions of each PFE are briefly classified as follows:

- Protection Forest Reserves (Class I): are forested areas are conserved for maintaining the stability of essential climatic, watershed and other environmental factors.

Table 4: Permanent Forest Estate (PFE) in Sabah, 1999

| Class | Forest Reserves | Area (Ha) |
|--------------|-----------------------------|------------------|
| I | Protection | 342,216 |
| II | Commercial | 2,685,119 |
| III | Domestic | 7,355 |
| IV | Amenity | 20,767 |
| V | Mangrove | 316,024 |
| VI | Virgin Jungle Reserve (VJR) | 90,382 |
| VII | Wildlife | 132,653 |
| Total | | 3,594,516 |

Source: Forestry Department, Sabah (2000)