UNIVERSITI PUTRA MALAYSIA

AN ECONOMIC ANALYSIS OF JOINT PRODUCTION BETWEEN LATEX AND WOOD AMONG RUBBER SMALLHOLDERS IN MELAKA

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AN ECONOMIC ANALYSIS OF JOINT PRODUCTION BETWEEN LATEX AND WOOD AMONG RUBBER SMALLHOLDERS IN MELAKA

By

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Dissertation Submitted in Fulfilment of the Requirements for the Degree of Doctor of Philosophy in the Faculty of Economics and Management Universiti Putra Malaysia

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UPM

Dedicating the Fruits of this Study to my
Beloved Daughter

KHANSA NAUREEN

who missed me sorely
during this stay away from her.

ACKNOWLEDGEMENTS

All the praises and thanks are for Almighty Allah (Subhanahu Wa Taala) Whose countless bounties enabled me to accomplish this study, and invoke His blessings on the Holy Prophet Muhammad (Sallallaho alaihe wasallam) for whom He created this universe.

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GLOSSARY

ANRPC	=	Association of Natural Rubber Producing Countries
DOS	=	Department of Statistics
DRC	=	dry rubber content
FELDA	=	Federal Land Development Authority
FELCRA	=	Federal Land Consolidation and Rehabilitation Authority
FRIM	=	Forest Research Institute of Malaysia
MARDEC	=	Malaysian Rubber Development Corporation
MDF	=	medium density fibreboard
ME	=	mini estate replanting scheme
MMS	=	Malaysian Meteorological Service
MPI	=	Ministry of Primary Industries
MRB	=	Malaysian Rubber Bureau
MRELB	=	Malaysian Rubber Exporters and Licence Board
MRPRA	=	Malaysian Rubber Producers Research Association
MRRDB	=	Malaysian Rubber Research and Development Board
MTIB	=	Malaysian Timber Industry Board
NR	=	natural rubber
RISDA	=	Rubber Industry Smallholders Development Authority
RM	=	Ringgit Malaysia
RRIM	=	Rubber Research Institute of Malaysia
SR	=	synthetic rubber
TSB	=	group replanting scheme

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December 1998

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The total land devoted to rubber crop (*Hevea brasiliensis*) in 1995 was estimated to be around 1.7 million hectares, which were about 31 percent of the total land under agricultural crops in Malaysia. The increasing demand in the furniture market and the projected shortage of general utility timber from natural forests has made rubberwood a major source of timber. Malaysian Furniture Industry Council estimated about 80 percent of furniture exports were made up of rubberwood, amounting around RM 1.7 billion of total 1996 furniture exports from Malaysia. The global demand for natural rubber is also projected to increase from the present figure of approximately 5.9 million tonnes to around 7.5 million tonnes by the early years of the next century.

Latex and rubberwood production can be increased significantly by improving the productivity per unit area, which is very low. The present study was therefore

conducted with the objective to find out the extent of increase in latex and rubberwood production through reallocation of resources optimally. The study was conducted in Melaka State, confined to the district of Alor Gajah. All the group-replanting (TSB) and mini-estate (ME) schemes yielding latex were sampled. The data were collected by the survey method. Personal interview was used. A sample of 31 holdings comprising 18 TSBs and 13 MEs was selected for this study. Thirty-four sample plots were established for tree measurements to estimate rubberwood yield. The study was confined only to smallholders as about 84 percent of the total area planted with rubber in Malaysia come under smallholdings.

Data obtained were subjected to statistical analysis. The frontier production function was built by imposing a Cobb-Douglas type specification on the frontier and an output-based measure of efficiency was evolved. The maximum revenue combination of latex and rubberwood was determined on the production possibility frontier. A comparison of marginal value products of the variable inputs with their corresponding per unit costs exhibited a potential of 24 percent increase in latex and rubberwood production through optimal resource allocation. It was concluded from the study that optimum combination of latex and rubberwood outputs in conjunction with optimal resource allocation and technically efficient management could increase smallholder's income up to 39 percent.

It is suggested that Rubber Industry Smallholders Development Authority should declare latex a by-product, tapped only when it could fetch a good price. In

developing rubber smallholding sector, the Authority should focus on the mini-estate programme rather than any other scheme. Furthermore, it is also suggested that the Authority should launch a programme for the logging of rubber plantations above 19 years, which are uneconomical to maintain.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah.

ANALISIS EKONOMI PENGELUARAN BERSAMA DI ANTARA SUSU GETAH DAN KAYU DI KALANGAN PEKEBUN KECIL GETAH DI MELAKA

Oleh

MUHAMMAD AFZAL

Disember 1998

Pengerusi: **Profesor Mohd. Ghazali Mohayidin, Ph.D.**

Fakulti: **Ekonomi dan Pengurusan**

Jumlah keseluruhan tanah yang digunakan untuk tanaman getah (*Hevea brasiliensis*) dalam tahun 1995 adalah dalam sekitar 1.7 juta hektar di mana ini adalah kira-kira 31 peratus daripada jumlah tanah yang digunakan untuk pertanian di Malaysia. Pertambahan permintaan dalam pasaran perabot dan kekurangan kayu balak pelbagai guna dari hutan-hutan semulajadi telah menjadikan kayu getah sebagai sumber utama kayu balak. Lembaga Industri Perabot Malaysia menganggarkan lebih kurang 80 peratus daripada perabot yang dieksport adalah dibuat daripada kayu getah yang bernilai sekitar RM 1.7 bilion untuk eksport perabot dari Malaysia dalam tahun 1996. Permintaan global untuk getah asli dianggarkan akan meningkat daripada nilai kini yang berjumlah hampir 5.9 juta tan kepada sekitar 7.5 juta tan menjelang tahun-tahun awal abad akan datang.

Pengeluaran susu getah dan kayu getah boleh ditingkatkan secara signifikan dengan meningkatkan produktiviti bagi setiap unit kawasan tanaman yang kini amat rendah. Kajian ini dijalankan dengan objektif untuk mengetahui setakat mana pengeluaran susu dan kayu getah boleh ditingkatkan melalui pengagihan semula sumber-sumber secara optima. Kajian ini dijalankan di Melaka, iaitu di daerah Alor Gajah. Sampel-sampel telah diambil daripada semua TSB dan ME yang menghasilkan susu getah. Data telah dikumpulkan melalui kaedah peninjauan. Temuramah dengan individu telah dilakukan. Satu sampel 31 tapak tanaman yang terdiri daripada 18 TSB dan 13 ME telah dipilih untuk kajian ini. Sebanyak 34 plot sampel telah ditentukan untuk pengukuran pokok untuk menganggarkan hasil kayu getah. Kajian ini hanya terhad kepada pekebun kecil memandangkan 84 peratus daripada keseluruhan kawasan tanaman getah di Malaysia diusahakan oleh pekebun kecil.

Data yang diperolehi diolah dengan menggunakan analisis statistik. Fungsi pengeluaran "frontier" dianggar dengan menggunakan fungsi Cobb-Douglas. Daripada penganggaran ini, satu pengukuran kecekapan berdasarkan output telah dihasilkan. Kombinasi hasil maksima susu getah dan kayu getah telah ditentukan dengan menggunakan keluk kemungkinan pengeluaran. Satu perbandingan hasil-hasil nilai marginal daripada input pembolehubah bersama dengan kos-kos per unit yang sepadan menunjukkan potensi yang baik iaitu 24 peratus peningkatan pengeluaran susu getah dan kayu getah melalui pengedaran sumber secara optima. Daripada kajian ini, dapat disimpulkan bahawa kombinasi optima output susu dan

kayu getah dengan pengagihan sumber secara optima dan pengurusan teknikal yang cekap, dapat meningkatkan pendapatan pekebun kecil sehingga 39 peratus.

Adalah disarankan agar RISDA mesti mengisytiharkan susu getah sebagai hasil sampingan, dan pokok getah hanya ditoreh bila harga susu getah adalah baik. Dalam membangunkan sektor kebun kecil getah, pihak berkuasa perlu memberi tumpuan terhadap program kebun kecil berbanding skim-skim yang lain. Tambahan lagi, adalah juga disarankan supaya pihak berkuasa melancarkan program menebang ladang getah yang melebihi 19 tahun, yang tidak lagi ekonomik untuk diselenggarakan.

CHAPTER I

INTRODUCTION

The Demand for Latex and Rubberwood

The changing trends in the international front have influenced the position of the natural rubber industry. With the modernization of nations and the rapid increase in vehicle sales, it can be envisaged that the global prospect of natural rubber remains to be bright. The forecast by Smith and Burger (1994) has indicated that the demand for natural rubber will soar from 5.29 million tonnes in 1990 to 7.48 million tonnes in 2000 and 11.67 million tonnes by the year 2020. However, the supply is estimated to be lagging behind the demand. The production was 5.3 million tonnes in 1990 and is predicted to be only 6.7 million tonnes and 7.8 million tonnes in the year 2000 and 2020, respectively (Long, 1994).

Research and development to utilise rubberwood has continuously ventured into new territories. Rubberwood has been increasingly used to produce particleboard, plywood and medium density fibreboard. These panel products are major raw material for the furniture industry. The supply of rubberwood, which is more reliable than other wood species, has prompted the setting up of new mills to produce panel products from rubberwood. The utilisation of rubberwood has created a distinct subsector in the wood-based industries, the rubberwood industry, built upon a by-product of another industry, viz., latex (Nor, 1993).

Rubberwood Demand

Two decades ago, rubber trees (*Hevea brasiliensis*) which were cut after their economic life for latex production, were burnt to clear the land for replanting and only an insignificant amount was used as a timber resource. Recognising the potential of rubberwood, the Ministry of Primary Industries (MPI), Malaysia established a Rubberwood Research Committee in 1978 to coordinate research in the utilization of this timber.

Most of the current commercially planted rubber originated from seedlings collected by Sir Henry Wickham from Brazil in 1876. Twenty-two seedlings from this collection were brought to Malaysia in the same year. The total area now planted with rubber trees in Malaysia is estimated to be 1.73 million hectares (1.42 million hectares in Peninsular Malaysia) with 1.46 million hectares under smallholdings and the remainder under estates (MPI, 1996). Rubberwood from these agricultural plantations constitutes the major non-forest timber resource of commercial importance for Malaysia's wood-based industry. The increasing demand in the furniture market and the projected shortage of general utility timber from natural forests have made rubberwood a major source of timber. Rubberwood is the popular choice for the manufacture of particleboard and medium density fibreboard (MDF). It is a well-established and widely distributed source of timber in the world market. Salleh (1984) gives a list of 61 different articles manufactured from rubberwood (Appendix B). Its major use is for wooden furniture. Features such as light colour, uniform structure, naturally good strength and easy processing of rubberwood have unavoidable attraction for manufacturers. Rubberwood can be finished with light to medium dark hues and stained to look like

walnut, cherry or oak according to consumer preference. The results of an inquiry carried out by the Malaysian Furniture Industry Council estimate about 70 percent of furniture exports are made from rubberwood since the late eighties (Kollert and Zana, 1994). However, due to rapid increase in demand, this share increased up to 80 percent amounting RM 1.67 billion of the 1996 furniture exports from Malaysia (Figure 1.1).

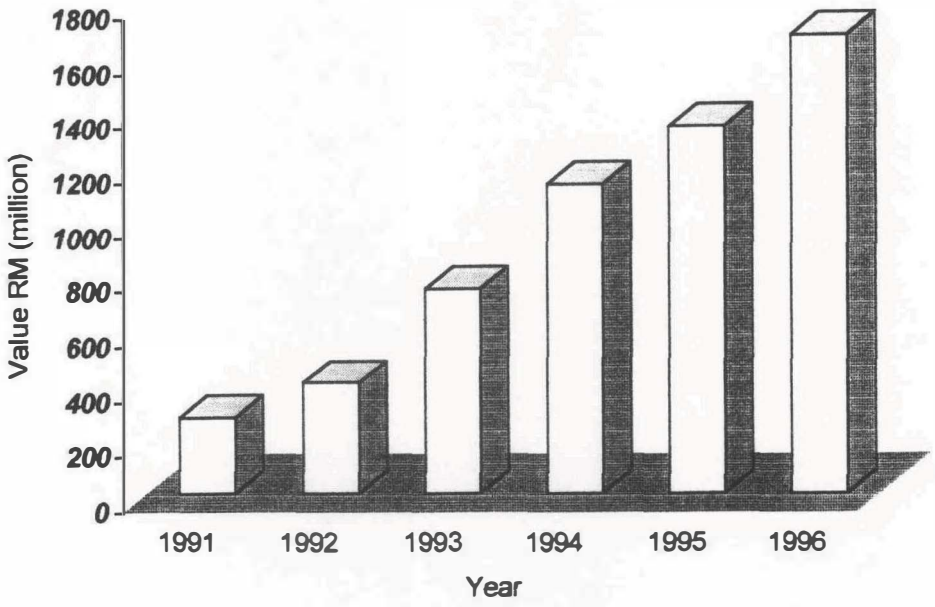

Figure 1.1: Export of Rubberwood Furniture (Source: MTIB, 1997)

In 1990, out of the total world trade in furniture, 55 percent were accounted for by wooden furniture (Idrus, 1995). The major world markets for furniture are the USA, European Union (EU) and Japan. Major markets for Malaysia's rubberwood furniture are the USA, Japan, Singapore, UK, Australia and Taiwan (Table 1.1, Figure 1.2).

Table 1.1: Export of Rubberwood Furniture by Destination - 1996

Destination	Value RM (million)
USA	667
Japan	375
Singapore	201
Australia	112
UK	61
Taiwan	37
Others	218
Total	1,671

(Source: MTIB, 1997)

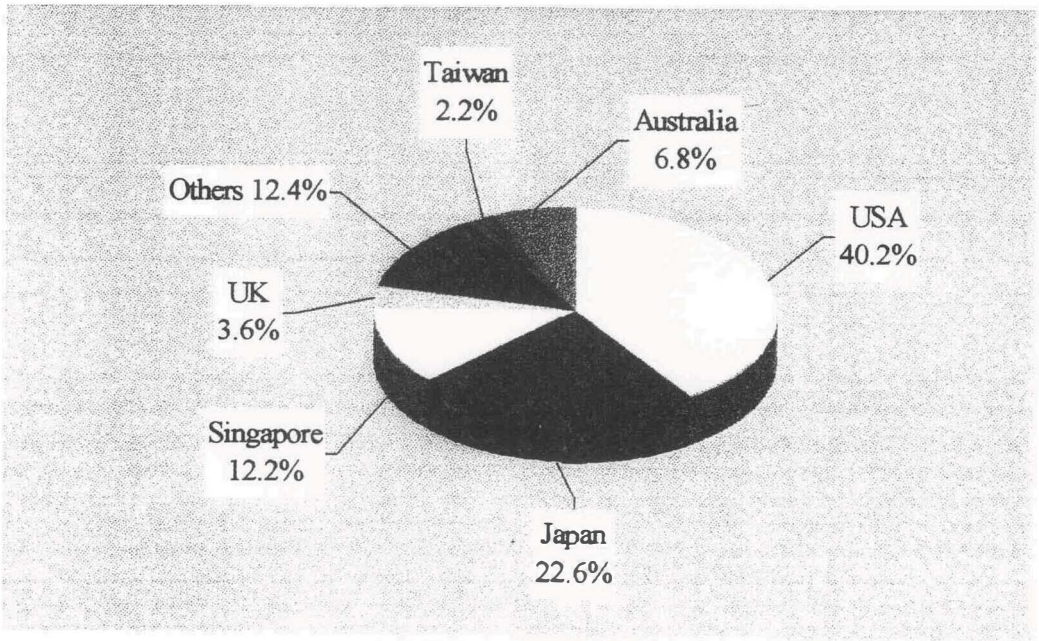

Figure 1.2: Export of Rubberwood Furniture by Destination - 1996

Rubberwood furniture exported to these markets was either fully assembled, semi assembled, semi-knock-down or RTA (ready-to-assemble). In addition to furniture and furniture components, Malaysia also earned RM 418 million on export of the rubberwood products including sawn timber, moulding and MDF during the year 1996 (MTIB, 1997).

The size of the furniture world trade is expected to grow at around 2 percent annually. US being the largest single furniture market in the world; assuming its spending pattern remains the same, its furniture consumption is expected to increase about 16 percent by 2000 (Idrus, 1995). According to the recent FAO report, world trade in furniture and furniture parts which totals US$ 25 billion in 1995 is predicted to increase to US$ 29 billon by the year 2000 and wooden furniture and parts which make up 75 percent of the trade are thus expected to increase commensurately to US $ 22 billion (Ayeru, 1995).

Rubberwood sawn timber is used extensively in the furniture and moulding/joinery sectors. Ayeru (1995) estimated that 60 percent of the rubberwood sawn timber goes into furniture plants and the rest is consumed by moulding/joinery factories or exported. In 1995, the total number of sawmills registered with MTIB (Malaysian Timber Industry Board) as reported by Ayeru were 106 and they are estimated to have utilised 2.1 million m^3 of rubberwood logs with diameter (more than 15 cm). Meanwhile, the consumption of rubberwood from plywood mills, and medium density chip and cement board factories according to Ayeru, is estimated to have utilised 120,000 m^3 of rubberwood logs and 505,000 m^3 of fibre (below 7.5 cm diameter), respectively in 1995. The demand for logs and fibre is projected to increase substantially to 3.84 million m^3 and 965,000 m^3 by the year 2000 (Ayeru 1995). In a nutshell, the present consumption of rubberwood logs and

fibre, i.e., 2.73 million m^3 is projected to increase to 4.81 million m^3 by the year 2000 in Peninsular Malaysia.

The rapid growth of the rubberwood-based industry has resulted in the dramatic rise in the demand of rubber timber both in the form of sawlogs and woodchips. Owing to this rapid increase coupled with declining rubber area being converted to other agricultural crops, recreation, housing and industries, there could be a shortfall in the supply of rubberwood in the coming future. To ensure long term adequate supply, measures must be taken for sustained yield of this raw material. Rubberwood which is currently available, mainly comes from rubber smallholders sector accounting for about 75 percent of the total supply in the country (Ghani, 1995).

Major Rubberwood Producing Countries

The rubberwood industry is experiencing rapid development in Thailand. The material is still in abundance in the southern region (about 1.60 million hectares), and its wood processing industries are making efficient use of this material. Thailand is a major exporter of rubberwood furniture and has made inroads into the US market (Seabright, 1994). Indonesia has the largest area of rubber plantations (about 3 million hectares) among the major world producers. However, about 80 percent of this cultivation is in smallholdings; the majority of which are less than one hectare in size and geographically dispersed. The rubberwood industry has not been developed to any great extent because of the country's trade in traditional indigenous species of timber (ANRPC, 1993). Taiwan is the largest exporter of furniture in Asia and the number one supplier of wooden furniture to the US.