

UNIVERSITI PUTRA MALAYSIA

PRODUCTION ECONOMICS OF WILD HONEY COLLECTION INDUSTRY IN KEDAH, MALAYSIA

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PRODUCTION ECONOMICS OF WILD HONEY COLLECTION INDUSTRY IN KEDAH, MALAYSIA

By MARIANI BINTI JOHNNY

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

June 2015

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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Wild honey is an important Non – Timber Forest Product for communities residing near the tropical forests in Malaysia, contributing lucrative additional household incomes. Yet spotting trees with honey bee hives is getting scarcer and climbing these trees extremely dangerous to the novice. This led the interest of investigating the socioeconomic and the production economics of this small scale honey gathering industry, covering Pedu and Ulu Muda forests and villages surrounding them in Kedah. The objectives of this study are i) to obtain the socioeconomic profile of the collection team and marketing chain of wild honey in Kedah and ii) to estimate the production functions of wild honey collection. For the first objective, statistical tests have been used to differentiate the socioeconomic profile and marketing chains of the wild honey collections from trees in the natural forest versus trees in surrounding villages. While for the second objective, two models have been specified which are the Cobb Douglas and Translog production functions.

The study found that there were statistical differences in collection processes, yield and sales between the two sources. The production functions showed that the number of labordays and number of trees were statistically significant factors in influencing honey yield. The industry shows increasing returns to scale for the Cobb Douglas production function while it was decreasing returns to scale for the Translog function. Comparing the value marginal products of inputs with their marginal factor costs suggests that raising the inputs could raise greater returns to the collection team. Hence given the potential lucrative returns, raising forest conservation could ensure the sustainability of the wild honey collection industry. As for marketing, the role of government agencies

such as the Federal Agricultural Marketing Authority could ensure collectors of a ready market for the industry.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

EKONOMI PENGELUARAN BAGI INDUSTRI PENGUMPULAN MADU LEBAH LIAR DI KEDAH, MALAYSIA

Oleh

MARIANI BINTI JOHNNY

June 2015

Pengerusi: Professor Mohd Shahwahid Haji Othman, PhD Fakulti : Ekonomi dan Pengurusan

Madu liar merupakan produk hutan bukan berasaskan kayu yang penting kepada kehidupan masyarakat yang tinggal berhampiran kawasan hutan tropika di Malaysia kerana peluang menjana pulangan yang lumayan. Namun demikian, peluang menjumpai pokok hutan bersarang lebah madu amat sukar dan risiko memanjat pokok untuk mengutip madu amat tinggi. Oleh itu, adalah penting untuk mengkaji sosio-ekonomi dan ekonomi pengeluaran bagi industri pengumpulan madu lebah liar melalui pengumpulan maklumat daripada sebilangan pengumpul - pengumpul madu yang memungut madu lebah di hutan Pedu dan Ulu Muda di Kedah dan perkampungan di sekitarnya. Objektif kajian ini adalah i) untuk mendapatkan profil sosioekonomi dan rangkaian pemasaran bagi pengumpulan madu hutan di Kedah dan ii) untuk menganggarkan fungsi pengeluaran bagi pungutan hasil madu lebah liar. Bagi objektif pertama, ujian statistik telah digunakan untuk mengenal pasti profil sosioekonomi dan rangkaian pemasaran bagi pengumpul madu liar. Manakala bagi objektif kedua, dua jenis model telah digunakan iaitu fungsi pengeluaran Cobb Douglas dan fungsi pengeluaran Translog.

Dapatan kajian mendapati wujud perbezaan signifikan ke atas proses pengeluaran, produktiviti dan jualan di antara dua punca madu liar dari hutan dan di perkampungan berdekatan. Fungsi-fungsi pengeluaran menunjukkan bilangan buruh-hari dan bilangan pokok adalah faktor yang signifikan mempengaruhi pengeluaran madu liar. Berdasarkan fungsi pengeluaran Cobb Douglas, industri ini mempunyai ciri skel pulangan semakin meningkat. Manakala berdasarkan fungsi pengeluaran Translog menunjukkan skel pulangan semakin menurun. Bila mana membandingkan anggaran nilai produk marginal dengan kos faktor marginal ke atas input-input menunjukkan bahawa meningkatkan faktor-faktor input boleh menambahkan pulangan kepada pengumpul madu liar. Maka dengan potensi pulangan yang lumayan, peningkatan konservasi hutan boleh memastikan kelestarian industri pengumpulan madu liar. Peranan agensi kerajaan seperti Federal Agricultural Marketing Authority (FAMA) boleh memastikan jaminan saluran untuk industri ini.



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I certify that a Thesis Examination Committee has met on 18th June 2015 to conduct the final examination of Mariani binti Johnny or her thesis entitled "Production Economics of Wild Honey Collection Industry in Kedah, Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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LIST OF ABBREVIATIONS

FAMA	Federal Agriculture and Marketing Authority
NFTP	Non – Forest Timber Product
CIF	Cost, Insurance and Freight
FOB	Free on Board
C – D	Cobb - Douglas
PFR	Pedu Forest Reserve
UMFR	Ulu Muda Forest Reserve
MP	Marginal Product
MRTS	Marginal Return of Technical Substitution
VMP	Value of Marginal Product
AES	Allen Partial of Elasticity of Substitution

CHAPTER 1

INTRODUCTION

1.1 Introduction

Since the pre-historic era and due to the diversity of forest, humans especially the community that resides near the forest has been collecting not only timber products but also non-timber forest products. The general term for "non-timber forest product (NTFP)" includes all the biological materials other than timber which are extracted from natural forests for human use such as food, medicine, spices, essential oils, resins, latexes, gums, tannins, dyes, ornamental plants, wildlife products and live animals, raw materials and fuel wood such as bamboo, rattan and fibers (de Beer and McDermott, 1989).

A standard classification for NTFP does not exist yet, but they can be classified in many different ways according to their end use such as medicine, drinks, utensils, plant-parts used such as roots and barks (EC-FAO, 2002). For further information see Chandrashekaran (1994), Cook (1995), and Shiva and Mathur (1996) who have used other classification for NFTP. For instance, classification of NTFP has been made in accordance with major international classification systems such as Harmonized Commodity Description and Coding System, the Standard International Trade Classification Rev. 3 and the Provisional Central Product Classifications (Chandrashekaran, 1994).

In Malaysia, among important NTFPs are bamboo, rattan, medicinal plants and wild fruits. Others include resin, palm, ferns, tannin, barks, wood-oil and vegetables. EC – FAO also use the term minor forest products which are defined as all forest products other than logs because of their relatively small contribution to revenue generation.

Overtime, this term "minor forest product" has been changed into the term of NTFP as due to the existence of the market and the non-market value of these products (EC-FAO, 2002). NTFP includes rattan, bamboo, charcoal, palm, wood-oil, gums, resins, medicinal plants and others (Poh Lye Yong, 1994). EC-FAO (2002) and Abdul Razak Mohd Ali and Abd Latif Mohmod (1998) includes further details on the inventories and profiles for the non-timber forest products in Malaysia.

1.2 Problem Statement

NTFP has become more important to the lives of communities residing near to the tropical forests in Malaysia, as these products have their economic values and returns. Although rattan and bamboo are among the more popular NTFPs in Malaysia, one emerging NTFP product that is beginning to gain importance in economic value is honey. In the old days, honey had no economic value and honey-hunting (honey collecting) was a form of entertainment. The harvest of honey will be shared with everyone. But as honey becomes more valuable, more people wanted to become honey hunters and modern methods are being implemented to the process (Mardan, 2007).

In Malaysia, wild honey is obtained mainly from the honey bee species known as *Apis Dorsata* or Malaysian wild honey bees. Wild honey is a potential source of supplementary income for rural farmers. Although the reward is encouraging, high risks will follow suit where in this case involves the risking of the honey bee collector's life. Honey hunting also has the effect of increasing the supply of local honey. The production of wild honey can reduce the excess demand for honey in the future and also provide income to the villagers (Mardan, 2007).

Cultured honey is produced by Apis Mellifera and Apis Cerana. The honey collection activity brings lucrative returns, however it is also a risky and dangerous business. The price of a bottle of natural honey sells at RM35 to RM80 a bottle, depending on the size. Despite the risks, the returns of honey collecting are good as during the harvesting month of March to May in Baling, Kedah, a honey collector assisted by two workers can earn up to more than RM6, 000 per month (Che Saad, 2006). While, for wild honey collectors in Pahang receive an average monthly income of RM417 per month. Wild honey collectors are seasonal as it depends on the flowering season of the host and the surrounding trees. The economic values of bees are also higher in natural forest than in forest plantations (Poh and Mohd Syahwahid, 2007). The apparent disparity in earnings from honey collecting requires further investigations to determine the actual contribution to the rural household income. It is also interesting to know whether or not different types of forest would influence the quantum of honeybee's value. Honey that has been produced by domesticated honeybees can potentially meet the much needed local market demand. However in Malaysia, wild honey is the highest in price as it contains medicinal properties, and higher nutritional values. These factors began to contribute widely to honey's recognition for its known health benefits and nutritional value (Arlan, 2004).

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Table 1.1 below shows the import and export of natural honey in Malaysia from 2004 until 2013 according to Malaysia's Department of Statistics.

Year	Import (RM)*	Export (RM)*	
2004	17,658,644.00	2,426,305.00	
2005	15,366,289.00	807,334.00	
2006	15,609,087.00	1,870,044.00	
2007	23,292,357.00	11,632,368.00	
2008	26,733,737.00	24,102,353 .00	
2009	32,824,759.00	38,097,694.00	
2010	30,460,788.00	46,464,282.00	
2011	41,830,018.00	21,218,672.00	
2012	4,425,723.00	15,279,306.00	
2013	36,417,925.00	7,198,933.00	

* CIF and FOB value

Source: Department of Statistics, 2014.

Table 1.1: Import export of natural honey in Malaysia from 2003 - 2013.

Table 1.1 shows Malaysia's natural trade of honey from 2004 to 2013. For the past ten years, the import of natural honey in Malaysia has increased in general from RM17.6 million in 2004 to RM44.2 million in 2012 and then decreased to RM36.4 million in 2013. According to Mohd Shahwahid, et.al (2009), the decreasing import value from 2004 to 2005 was affected by the volume import from China exceeding the volume from Australia and might also be influenced by the quality of natural honey from China which is lower in term of price. The next two years shows a decline in honey import in Malaysia which is RM15, 366,289 in 2005 and RM15, 609,087 in 2006. The wild honey import to Malaysia slowly increased in 2007 which is RM23, 292,357 and continued to grow progressively in 2008 amounting to RM26, 733,737 while at 2009 to RM32, 824,759. In 2010, the import of natural honey rose to the amount of RM30, 460,788 and increased to RM41, 830,018 on 2011. The import in 2012 was still increasing and reach RM44, 257,231 the highest amount of natural honey import to Malaysia within 10 years (2004 - 2013). The import value in 2012 that almost triple the amount in 2004 was contributed by big players such as China which provided 31.89%, Australia (17.55%), New Zealand (22.07%) and Thailand (6.88%). The import then decrease in 2013 to RM36, 417,925. The trend for the natural honey export shows fluctuations, which from RM2, 426,305 in 2004 increase to RM46, 464,282 in 2010 before decreasing to RM7, 198,933 in 2013. The increase in 2010 was resulted by the largest export to United States of America of 95% amounting to RM44, 072, 416 and Singapore (1%) which is RM523, 339.

Experiments conducted by S. D. Roberts and A. Al – Safi Ismail (2009) in Universiti Sains Malaysia (USM) on two varieties of Malaysian and Australian

honey towards eight healthy people found that both type of honey had intermediate glycemic index (GI) fell in range of 32% to 87%. Furthermore, they suggest that both honeys can be substitute towards table sugar in moderate amounts within a balance diet when tested with person with type 2 diabetic.

M. I. Khalil et. al (2010) in their reviews suggests that the antioxidants property of honey is due to the rich content of phenolic acids, flavanoids, glucose oxidase, catalese, ascorbic acids and proteins. These antioxidant properties have several preventative effects against different diseases like cancer, cardiovascular diseases, inflamontary disorders, wound healing, infectious diseases and aging.

In recent review by S. Marshall, et. al (2015) on the health benefits and medicinal values of honey stated that the presence of hydrogen peroxide in honey are useful as antimicrobial properties that can induce wound healing. Other than that, the anti – inflammatory properties in honey helps to reduce the number of inflammatory cells in wound and also help to ease common environmental allergies such as pollen, dust and grass allergies.

Apart from generating income for collectors, the traditional wild honey collection activity is also an eco-tourism attraction. It could be promoted as an item in the ecotourism package for promotion to both domestic and international tourists. The maximum willingness to pay (WTP) to participate in a traditional wild honey collection adventure by foreign visitors is higher than the WTP by local communities for traditional wild honey collection. The maximum WTP for visitors to the Bee Museum in Malacca and the traditional wild honey collection package in the forest are RM1.67 and RM51.40, indicating that traditional honey collection has more value (Poh Lye Yong and Mohd Syahwahid, 2007). These estimates of the potential economic values of traditional honey collecting adventure were obtained from tourists to Malacca, where most international tourists were mainly from Singapore.

Hence, this study tries to further look into the economics of this small scale honey gathering industry, as it is not well understood which possibly could explain the lack of growth in the industry. Very few studies have been made so far on wild honey collecting production. Lack of knowledge on optimal production contributes problems to the industry.

In depth for understanding economic structure of wild honey collecting can be done by assessing the production function of wild honey collecting. The importance of this production function assessment is that it could determine the factors that could maximize production through efficient utilization of the inputs. Product decision in determining the type and amount of inputs such as labor, land (in this case trees where the wild honey hives reside), and fuel to be used could enhance the achievement of the desired optimal quantity of output.

1.3 Objectives of Study.

The main objectives of this study are to assess the economic returns of honey gathering all along the value chain to the local community, and to investigate the optimum utilization of inputs in honey gathering operations. This study specifically will focus on the following aspects;

1) To obtain the socioeconomic profile and marketing chain of wild honey collection.

2) To estimate the production functions of wild honey collection and analyze the efficiency of input utilization.

1.4 Significance of Study

This study will show the importance of forest to society and also the importance of forest conservation. Forest conservation is another important way to ensure the sustainable flow of non-forest timber products (NTFPs), and in this case, wild honey. Also, the analysis of production functions will give some indication of the profitability entrepreneurs. This information will not only benefit the potential entrepreneurs, but also assist the existing wild honey collectors to determine which factor inputs of production that is efficient for output maximization.

1.5 Organization of Study.

This study will be divided into several chapters. Chapter 1 shows introduction, problem statement, objectives and significance of the study. In chapter 2, reviews on studies related to honey and its collection, and production functions will be discussed. Methods for the study will be shown in Chapter 3. Chapter 4 will show on the result and finally conclusion and discussion in chapter 5.

1.6 Limitation of Study.

This study will only focus on several villages in Kedah which are in the district of Sik and Padang Terap. The honey collectors surveyed in this study are mainly focus on gathering wild honey in Pedu and Ulu Muda Forest Reserve and trees with hives surrounding the village area. Further investigations at other locations throughout Malaysia would provide a more holistic perspective of the economics of the wild honey collection industry.

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