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Market potential of *Garcinia atroviridis* Griff. (*asam gelugur*)

[Prospek pasaran bagi *Garcinia atroviridis* Griff. (asam gelugur)**]**

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Abstract

Garcinia atroviridis (*asam gelugur*) is usually grown in the Peninsular Malaysia, Thailand and India. *Asam gelugur* is categorised as spices because of its aesthetic value, which is widely used for culinary and medicinal purposes. This study was carried out to assess the socioeconomic status of the community involved in the cultivation and marketing of *asam gelugur*, to identify the value chain and the economic production of *asam gelugur* cultivation, and to determine the marketing potential of this fruit species. *asam gelugur* can be very viable if it is commercially exploited. The selection of plant accessions and cultivation techniques has the potential to produce low trees and high production in a short time. This will encourage villagers and farmers to expand their *asam gelugur* plants. The competitive market price of *asam gelugur* products also contributes to high returns to farmers. Asam gelugur-based products are beginning to be given attention by new entrepreneurs to meet the demand for health care products market. High demand for the pharmaceutical and medical sector assures the entrepreneurs of the demand for *asam gelugur*.

Introduction

Asam gelugur or its scientific name *Garcinia atroviridis* Griff., is a fruit of the Clusiaceae family, a kind of rare plant that is believed to have originated in Peninsular Malaysia especially from Perak, Kelantan, Terengganu, Negeri Sembilan, Kedah and Pahang. This plant is also abundant in other Asian countries, including Thailand, Indonesia, the Philippines and India. In addition to its contribution to the food industry, *asam gelugur* also has a high economic value, especially in the medical industry as folkloric medicine and has now begun to be commercialised, especially in the northern side of peninsular Malaysia. Technically, the *asam gelugur* tree reaches a maximum height exceeding 20 m, single leafy, large, elongated oval, and dark green with a shiny top surface. The young shoots of the *asam gelugur* are reddish and will turn dark green when they mature. The bearded fruit is bright green and will be yellowish yellow when the fruit ripens. The shape of the *asam gelugur* somewhat varies according to the varieties, whether round, oval or oblong. Its fruits weigh between 100 – 700 g each, and has 12 – 16 fruit curves (Rukayah 2016).

Asam gelugur contains many active elements that can become a source of treatment to various diseases. Although the plants are derived from the genus of Garcinia; it is the target of hydro citric acid (HCA); as an agent for weight management, other nutrient potentials contained therein

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cannot be ignored. In general, *asam gelugur* is rich in various nutrients such as HCA, which is capable of overcoming obesity. HCA helps curb and regulate appetite and decompose fat cells from accumulating in the body. HCA is categorised as non-toxic (Hanisuhana 2017).

The production and acreage of *asam gelugur* in Malaysia from 2010 to 2016 showed an upward and downward trend with a slight difference in that period. In 2016, the planted areas were 88.32 ha with a total of harvested area of 77.47 ha and has a total production of 205.02 tonnes. Perak is the largest producer of *asam gelugur* with 89.66 tonnes, compared to Kedah (58.8 tonnes), followed by Kelantan, Pahang and Johor (DOA 2017).

In general, the exploration and exploitation of rare fruits are very important for the improvement of the economy and the production of new products. This study was carried out to assess the socioeconomic status, value chain and market potential of conservation of these fruit species. The study focuses on the community of *asam gelugur* growers; to determine the potential of cultivating this rare fruit. Specifically, the objective of this study is to assess the socioeconomic status of the community involved in the cultivation and marketing of *asam gelugur*, to identify the value chain and the economic production of *asam gelugur* cultivation, and to determine the marketing potential of this fruit species.

Methodology

The study of rare fruits concentrates on the genus of *Garcinia* through the selection of *asam gelugur* species. This is due to the increase in demand and the use of this fruit either fresh or processed. The diversity of content and usage also has the potential to assist the growing community in increasing income and living standards. This study was conducted in Peninsular Malaysia, and has been implemented in selected districts (*Table 2*). Selection of survey sites is based

Table 1. Production and planted area of asam gelugur (Malaysia), 2016

Asam gelugur	2010	2011	2012	2013	2014	2015	2016
Planted Area (Ha)	79.90	79.00	84.27	69.08	92.57	81.14	88.32
Production (Mt)	225.10	275.91	580.13	570.62	480.44	524.67	205.02

Source: DOA 2017

Table 2. Respondents of *asam gelugur* growers by state (n = 88)

State	District	Respondents
Perak	Kuala Kangsar, Sayong, Pengkalan Hulu, Grik, Kampung Gajah, Bota, Bukit Gantang, Changkat Jering, Batu Kurau, Kampar, Malim Nawar, Sungkai, Parit	21
Kedah	Guar Chempedak, Yan, Pokok Sena, Pendang, Baling	14
Negeri Sembilan	Terachi, Kuala Klawang, Ulu Branang, Semenyih, Rembau, Gadong	10
Selangor	Beranang, Dengkil, Sepang	9
Pulau Pinang	Bukit Mertajam, Sungai Petani Utara, Sungai Petani Selatan, Bayan Lepas, Tasek Gelugur, Nibong Tebal	8
Kelantan	Manik Urai, Kuala Krai, Machang	7
Terengganu	Jerteh, Setiu, Kuala Terengganu, Bukit Payung	7
Pahang	Kuala Lipis, Merapoh	6
Johor	Kluang	3
Melaka	Tanjung Bidara, Alor Gajah	3
Total		88

Source: Survey among *asam gelugur* growers in Malaysia (2017).

on secondary data from the Department of Agriculture Malaysia (DOA) and data from the Agrobiodiversity Information System (AgrobIS) developed by MARDI as an information system providing direct access to genetic resources data. The primary data collection method was conducted through a face-to-face interview for the growing community and consumers. For the surveys of the planting community, the data were collected using a structured questionnaire involving 88 households (*Table 2*). The sampling method is through snowball sampling, because it involves the selection of unidentified samples and is based on certain characteristics or referring to those who know the information of the growers. Primary data were analysed using descriptive analysis, cross-tab, frequency and economic evaluation of costs.

Findings and discussion

Farmers' socioeconomic status

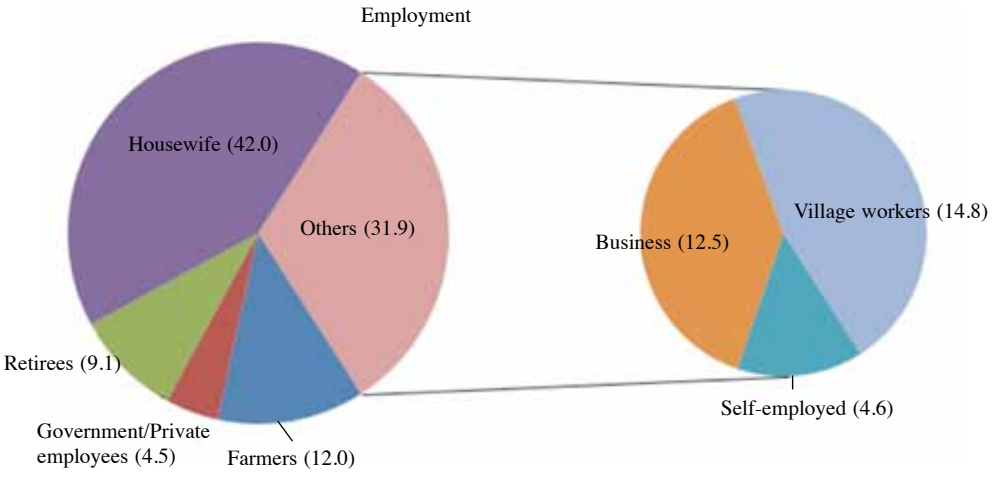
Demographics

The study showed that the majority (96.6%) of *asam gelugur* cultivation is abundant in rural areas. Growers of *asam gelugur* comprise 53.4% males and 46.6% females (*Table 3*). In terms of socio-economic aspects, most of them are housewives (42%), followed by full time farmers (12.5%), those with permanent jobs as government or private employees (4.2%) and retirees (9.1%). In addition, 31.9% are those who perform various jobs like village workers (14.8%), business owners (12.5%) and some are self-employed (4.6%) (*Figure 1*).

Household income

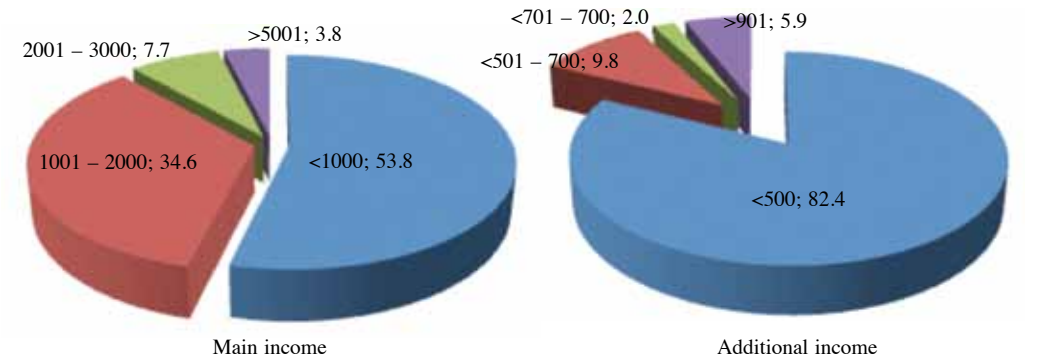
The main income is defined as the income earned by the growers from their main job. Most of the *asam gelugur* growers have income below RM1,000 (53.8%), followed by those earning between RM1,001 – RM2,000 (34.6%), RM2,001 – RM3,000 (7.7%) and above RM5,000 (3.8%). However, 82.4% growers have an additional income below RM500, followed by income between RM501 – RM700 (9.8%), 2.0% earning between RM701 – RM900 and 5.9% more than RM900 (*Figure 2*).

Most growers (58.6%) have only one *asam gelugur* tree, 29.7% (2 – 5 trees) and 11.5% have more than 6 trees. Additionally, the study shows that most of the *asam gelugur* trees have been planted for more than 20 years (57.9%), followed by trees between 11 – 20 and only 14.8% of them are new trees under 10 years old. The total



Source: Survey among *asam gelugur* growers in Malaysia (2017)

Figure 1. Main employment of asam gelugur growers



Source: Surveys among *asam gelugur* growers in Malaysia (2017)

Figure 2. Source of income distribution and purpose of cultivation

yield of crop production found almost 42.4% of the trees produces less than 50 kg per year, followed by 33.3% (yield between 51 – 100 kg) and 24.2% with a yield exceeding 100 kg. The main purpose of *asam gelugur* cultivation is to generate income of the respondents (48.7%), 23.7% for the purpose of conservation whereby the main *asam gelugur* tree is a heritage tree and was conserved, 21.1% for own use and 6.6% of them planted the trees as a hobby. The cultivation of *asam gelugur* within the community can indeed help generate the economy and household income as well as helping the community to increase their living conditions.

Value chain and economic evaluation

Market-based approaches are a business valuation method that can be used to calculate the value of a property or as part of a valuation process for a closed-ended business. In addition, this method is also used to determine the value of the business, securities or intangible assets of a business. To evaluate the viability of *asam gelugur* cultivation, this study uses market approach method to determine the value along the chain. Growers and sellers were asked regarding their farm selling price and their retail prices.

Asam gelugur are usually sold after being processed into pieces known as *asam keping*. Determination of the market price for *asam gelugur* or *asam keping* varies greatly depending on the area as well as the quality of the *asam keping*. The average price of whole farms for fresh *asam gelugur* can reach up to RM1.60 per 1,500 g of weight, while for the price of *asam keping*, the average can reach up to RM19.50/kg. The price for consumers can achieve an average price of RM33.00/kg.

Technically, for the cultivation of *asam gelugur*, it is estimated that about 123 trees can be planted in a 1 ha area with a density of planting spacing determined. In particular, one *asam gelugur* plant can produce 58.8 kg of fresh fruit (117 pieces of fruit), with an average estimated weight of 500 grams each. A total of 7.5 kg of fresh fruit is used to produce 1 kg *asam keping*. Economic analysis of production carried out on *asam gelugur,* growers within Peninsular Malaysia; an area of 2 ha showed a positive net present value (NPV) of RM73 thousand. This shows that the cultivation of *asam gelugur* is very viable to be cultivated by farmers.

Recommendations

Asam gelugur is a potential crop that can be cultivated by farmers as a major and additional source of income. However, the constraints or challenges faced by farmers, such as the aging trees, physical height of the plant (over 20 m) and long-term cultivation, which takes up to seven years

in yield production; make farmers less encouraged to cultivate these rare plants commercially. Therefore, MARDI under the Gene Bank and Seed Centre (GB) has developed several studies through the selection of crop accession that has the advantage, through appropriate planting methods to assist farmers. However, the lack of promotion for plants produced by MARDI is one of the factors that makes MARDI's preferred fruit trees less known. Replanting with the selection of MARDI crop accession can also assist farmers to overcome the challenge of *asam gelugur* cultivation. Technology to lower *asam gelugur* plant to an acceptable height, or decreasing its yield period can encourage more farmers. Additionally, MARDI accession crops can reduce the use of mechanisation as well as its current maintenance costs. The technique of producing female plants also needs to be seriously explored because the cultivation of *asam gelugur* seedlings will produce 70% of male trees that cannot produce fruit (Shafie (2016).

For value-added entrepreneurs, a complete package involving 3P (packaging, labelling and grading) is very important to be introduced and practiced by producers of *asam gelugur* products as well as other rare fruit products. This is because it helps to improve product quality through grading, packaging and labelling. The 3P method ensures that agricultural products are graded, packaged and labelled before the product is marketed. In addition, this method is able to improve the efficiency and effectiveness of marketing, especially at the consumer level to evaluate the advantages of market products and make it more competitive. It also seeks to maintain the product in the existing market and open up new market space both locally and abroad in line with changes in world trade demand.

Assistance services through training; the use of modules and production hands-on, product care and marketing techniques can inspire and help entrepreneurs to stay in the manufacturing industry of the *asam gelugur* processing product. Additionally, these products can provide farmers with the assurance that cultivation of *asam gelugur* can be exploited as there is also demand from industrial users.

Conclusion

Garcinia atroviridis or known as *asam gelugur* among locals is widely used as a sour flavoring agent in food. In addition to being used as foodstuffs, *G. atroviridis* is also used to promote traditional medicine. The *asam gelugur* is very viable if it is commercially exploited. The selection of plant accessions and cultivation techniques has the potential to produce low trees and production in a short time. This will encourage farmers to expand their *asam gelugur* production. The competitive market price of *asam gelugur* products also contributes to high returns for farmers.

Basically, the product of *asam gelugur* has a very high market demand (Buhari 2012). Production of *asam gelugur* -based products is beginning to be given attention by new entrepreneurs to meet the demand for healthcare products market. High demand for the pharmaceutical and medical sectors assures the entrepreneur of the demand for *asam gelugur* among entrepreneurs. Assistance services from agencies can encourage entrepreneurs to stay in the downstream manufacturing industry.

Other than *asam gelugur*, 10 different types of rare fruits show similar potential to be promoted and commercialised due to the high consumption among consumers. However, these fruits should receive support from the research stage. Exposure for exploration and exploitation purposes to consumers is very important to provide awareness on the importance and advantages of rare fruits found in Malaysia.

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Abstrak

Garcinia atroviridis (asam gelugur) biasanya ditanam di semenanjung Malaysia, Thailand dan India. Pokok asam gelugur dikategori sebagai tanaman rempah ratus kerana nilai estetika yang banyak digunakan dalam kulinari dan perubatan. Kajian ini dijalankan untuk menilai status sosioekonomi masyarakat yang terlibat dalam penanaman dan pemasaran asam gelugur untuk mengenal pasti rantaian nilai dan pengeluaran ekonomi penanaman asam gelugur, serta untuk menentukan potensi pemasaran spesies buah ini. Asam gelugur sangat berdaya maju jika ia diusahakan secara komersil. Pemilihan aksesi tanaman dan teknik penanaman berpotensi menghasilkan pokok yang rendah dan mengeluarkan hasil yang cepat. Ini menggalakkan petani untuk meluaskan tanaman asam gelugur. Harga pasaran produk asam gelugur yang kompetitif juga menyumbang kepada pulangan yang tinggi kepada petani. Pengeluaran produk berasaskan asam gelugur mula di beri perhatian oleh usahawan baru bagi memenuhi permintaan pasaran produk kesihatan. Permintaan yang tinggi bagi sektor farmaseutikal dan perubatan memberi jaminan kepada pengusaha terhadap permintaan asam gelugur di kalangan usahawan.