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THE AVAILABILITY OF *METROXYLON SAGO ROTTB.* (SAGO RUMBIA) AND THEIR INDUSTRIAL STATUS IN SABAH

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ABSTRACT. The distribution of Metroxylon sagu Rottb. (sago rumbia) in Sabah is described. The crop is mainly distributed in the west coast of Sabah along the riverine and in peat swamp areas. The concentration of the species in Sabah is located in Beaufort, Kuala Penyu, Papar and Tenom areas. Sago cultivation, its industrial status and problems encountered relating to the development of the industry are highlighted and discussed.

KEYWORDS. Availability, M*etroxylon sago rottb*, industrial status

INTRODUCTION

Metroxylon sago (Rumbia) (Figure 1) is the true sago palm belonging to the family Palmae Jussieu, subfamily Calamaoideae Griffith, tribe Calameae Drude, subtribe Metroxylinae Blume and genus *Metroxylon* Rottboell (Uhl and Dransfield, 1987). The sago plant is a pinnate-leaved palm occurring in the hot humid tropics of South-East Asia and Oceania. The biggest sago area in Malaysia is in the state of Sarawak, the world's biggest exporter of sago. The major markets are Japan, Taiwan, and Singapore.

Very little is known on the distribution of sago palm in the state of Sabah. The dearth of information reflects that this species requires urgent attention for effective sago domestication. This paper aims to provide some information on the distribution of the species in Sabah and to provide information on the development activities of the industry.

Figure 1. *Metroxylon sago* along Papar-Beaufort, Sabah.

DISTRIBUTION OF *METROXYLON SAGO* IN SABAH

The distribution of Sago in Sabah is shown in Table 1 indicating that most of the species are concentrated in the southwest of Sabah in areas near Beaufort, Kuala Penyu, Papar and Tenom (Figure 2). There are about 2200 hectares of cultivated sago areas in Sabah. The species is planted in the forest and swampy areas. Most of the area suitable for planting is now converted to planting of rubber, coconut and fruit trees. Some of the areas were destroyed in the continuous dry weather in 1997.

Table 1. Areas of sago cultivated by smallholders in Sabah

DISTRICT / DIVISION	AREAS PLANTED BY SMALL -HOLDERS (HECTARES)
Papar	212
West Coast Division	212
Beaufort	1,725
Kuala Penyu	285
Tenom	5
Interior Division	2,015
SABAH	**2,227**

Source: Report on crop hectarages in Sabah, 1999. Dept of Agriculture Sabah.

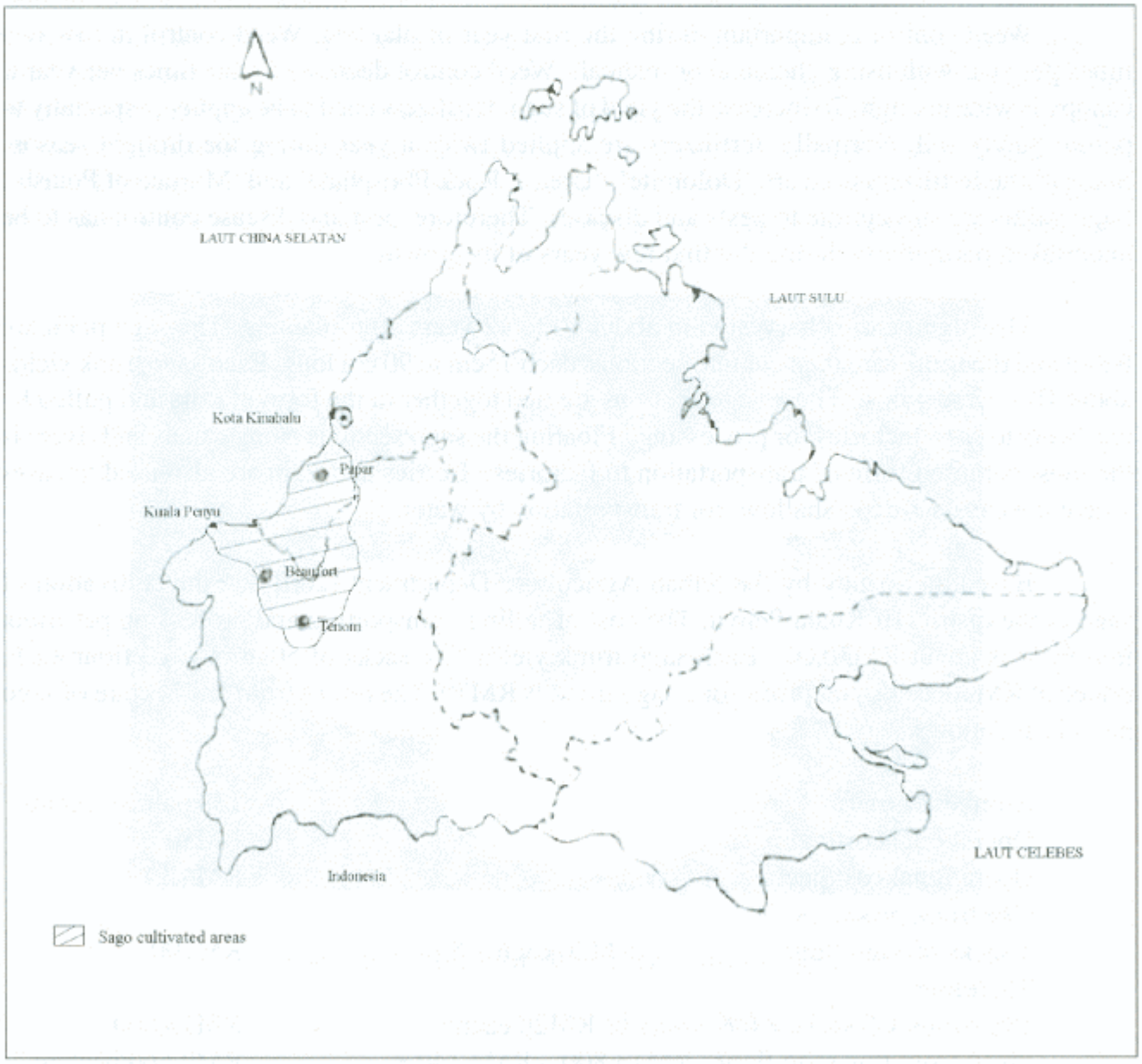

Figure 2. Location of areas of sago cultivated in Sabah

SAGO CULTIVATION

Sago palms can be grown from suckers or seedlings. However, planting from suckers are more suitable due to faster growth. The suckers, preferably, have to be planted within three days after obtaining them; otherwise they have to be preserved in a cool and damp place until they are ready for planting.

Spacing required for planting sago is 8.5x8.5 m which can yield 138 sago palm trees per hectare. The square planting system is recommended since sago palms can produce many small suckers which will eventually cover the open area. Sago palms continually produce suckers which in turn grow into adult palm. Therefore, there is no necessity for replanting and this eliminates recurring establishment costs after every harvest of the adult palms (Chew, Abu Hassan and Mohd. Ghazali, 2001).

Weed control is important during the first year of planting. Weed control in row two times per year with using chemical or manual. Weed control decrease to one times per year if canopy is wide enough. To increase the yield of sago, fertilizers need to be applied, especially to porous sandy soil. Normally, fertilizers are applied twice a year during the drought season. Some of the fertilizers used are 'Dolomite', 'Urea', 'Rock Phosphate' and 'Muriate of Potash'. Sago palms are susceptible to pests and diseases. Therefore, pest and disease control has to be undertaken particularly during the first few years of its growth.

The sago palm is harvested in about 10 to 12 years after planting. The sago palm are felled and the trunks are then cut into sections, each 75cm to 90 cm long. Each sago trunk yields about 10 – 12 sections. These sago sections are tied together in the form of rafts and pulled by tug-boats to sago factories for processing. Floating the sago sections along canals and rivers is the most common form of transportation to factories. Lorries and train are also used in cases where the canals are too shallow for transportation by water.

Based on a study by the Sabah Agriculture Department (2001) on the cultivation of sago in the district of Kuala Penyu, The cost of felling, transporting and processing per trunk into flour is about RM30.00. Each sago trunk yields five sacks of 50kg of sago flour each, priced at RM20/sack. Net profit for a sago trunk is RM70. The return from one hectare of sago palm is as follows:

Number of trees		138 palms/hectare
Operational cost/palm		RM30
Operational cost/hectare		RM4,140
One trunk produces		
5 sacks of sago flour	RM20 each x 5 =	RM100
Therefore,		
138 palms x 5 sacks = 690 sacks @ RM20 each =		RM13,800
Profit from raw sago flour RM13,800 – RM4,140 =		RM9,660/hectare
Profit per sago trunk for sago flour is		RM170
Profit for 1 hectare or 138 trunks = RM170 x 138 =		RM23,460/hectare

The potential for expansion of sago cultivation in Sabah appears lucrative. It may be a possible cultivation that can help to elevate the socio-economy of the rural people. Profitability of sago cultivation can be further increased by increasing its starch yield, reducing the gestation period from the present 10 – 12 years to a shorter period, and reducing the cost of sago production. Therefore, further study on the economic implications vis-à-vis other agricultural cultivation and research in plant selection and breeding work need to be carried out.

UTILISATION OF SAGO

The plant is an important species that produces sago starch for the consumption by the rural people (Kaliwon and Kalitu, 1992). It is the source of starch for the daily diet of the rural population. The refined sago starch is used in the production of noodles, vermicelli (beehoon), kuah tiau, biscuits and many other foods (Figure 3). It is also utilised industrially in the processing of mono-sodium glutamate, glucose and other food products. New uses for sago include its use in the manufacture of biodegradable plastics, alcohol, ethanol and citric acid (Chew, *et al.*, 2001). The sago fibre provides the bulk for rumen fermentation while the sago pith is used as feed for animals and livestocks. The sago fronds can be used for pulp and paper industries.

Figure 3. Some of the utilization of sago

DISTRIBUTION OF MANUFACTURING INDUSTRY IN SABAH

In Sabah, most of the sago industries are based in rural areas. The cottage industry associated with sago is rather old fashioned and starch the end product is highly demanded in the international market. In addition to its traditional use as food and in industry, sago utilization is expected to increase with the discovery that sago is a row material in the production of high fructose syrup.

PROBLEMS FACED BY THE SAGO INDUSTRY IN SABAH

Over the past 10 years, the area cultivated with sago steadily decreased to land conversion to other agriculture crops. Other problems faced by the farmers lack of institutional and financial support that can help to build the industry. Government agencies must help in providing training, research and development aspects and marketing. Without its support, the industry is unable to expand.

Lack of capital often deprives the farmers the opportunity to obtain credit facilities which retards expansion programmes and machine acquisition. Stringent lending regulations imposed by most commercial banking institutions such as the requirement to present well-prepared working proposal and strong recommendations worsen this situation. This results in slow growth of the sago industry. Lack of skilled workers and poor management of the planting materials also contribute to the poor development of the industry.

Securing raw materials is another major problem. Currently, there is strong competition with other starch producing crops such as tapioca. Tapioca has shorter juvenile period as compared with sago. The demand for the sago flour in the local market is still low. The various problems encountered and lack of sufficient capital contributes to the low technology being used in the production of sago flour.

CONCLUSION

The distribution of sago planting by smallholders in the state is located mainly in the southwest of Sabah. The current method of cultivation of sago palm is still primitive, producing low yields with minimal maintenance. The industry associated with sago is located predominantly around these growing areas. Even though sago starch is a very versatile multiple-use product, the demand for sago in the local market is still relatively small. The problems faced by the industry, however, need immediate attention for it to develop further.

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