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THE CROP CALENDAR OF THE CROP CULTURE IN THE MALAY LANDSCAPE

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ABSTRACT

Local farmers in the Malay landscape face income challenges due to rising farming costs and insufficient land size, leading to a reliance on subsistence living. Plants are used by people in various ways, and human reliance on nature appears to be changing in response to current lifestyles and future self-sufficiency. Therefore, this study aims to produce a crop calendar focusing on local plant species in the Malay landscape to address these challenges. Hence, the objective of this study is to identify suitable local plant species and overcome obstacles in subsistence living. The crop schedule in the Malay landscape is an important tool for farmers to plan and manage their crops effectively throughout the year. However, the level of awareness and acceptance among Malay farmers regarding the best agronomic practices for sustainable livelihood initiatives remains unknown. This paper investigates and identifies plant species in the crop calendar for Malay farmers to use as their initiative for subsistence living. The study uses qualitative data collection through face-to-face structured interviews with local farmers and agriculture experts from the Department of Agriculture Perak Tengah District. The findings of this paper emphasize the importance of plants in the Malay landscape and the need for a systematic approach to crop management. Consequently, identifying plant species in crop calendars aids in the preservation of plant culture in the Malay landscape while also providing knowledge for future research.

Keywords: *crop calendar, crop culture, Malay landscape*

1.0 INTRODUCTION

Plants play an important role in all aspects of human life, particularly within the Malay world, where they are extensively utilized for food consumption, building materials, medicine, rituals, dyes, and cosmetics. The connection between plants and humans in this region has been well-documented (Adnan and Othman, 2012; Zakaria and Rashid, 2014). However, human reliance on the environment is subject to change based on needs, technology, aspirations, and resource availability (Hussain et al, 2022). For instance, the decline in rubber and palm oil prices has prompted Malay farmers to shift towards cultivating cash crops like bananas, pineapples, cassava, or coconuts, which offer quicker yields and higher returns (Bernama, 2023). According to Ahmad et al, (2020), this situation is the result of rising production costs and weak exports, as well as stiff competition from neighboring Indonesia. The situation also demonstrates that local farmers are experiencing a drop-in earnings as crude palm oil prices fall. Indeed, the downward trend in oil palm prices has a significant impact on farmers (Ahmad et al, 2020).

To address this changing landscape, this study aims to develop a crop calendar focusing on local plant species in the Malay landscape. The objective of this study is to identify the plant species in the crop calendar and to analyze crop management by local farmers to form a systematic crop management schedule for the Malay landscape. By documenting the crop calendar selection through qualitative data studies conducted with local farmers and agriculture experts from the Department of Agriculture Perak Tengah District, this study seeks to understand traditional crop management practices and identify potential gaps and challenges. Emphasizing the importance of local plant sustainability and the need for their preservation, this study aligns with the Sustainable Development Goals Strategy (SDGS), (2021), particularly Goal 15: Life on Land, which aims to promote sustainability and preserve ecosystems and biodiversity.

The significance of this issue extends beyond the Malay landscape and holds relevance for global efforts toward sustainable development. UN-Habitat, (2022) recognizes the importance of addressing crop-related challenges in ensuring economic activity and cost of living within a region. The study's findings will contribute to the development of a crop calendar that includes suitable local plant species according to respective seasons assisted with an appropriate crop management plan to ensure sustainable production. This approach would not only enhance the livelihoods of local farmers but also contributes to conserve the rich biodiversity of the Malay landscape.

The implications of this study reach beyond the local area because it can serve as a guide for other communities facing similar challenges. By protecting the relationship between plants and humans, this strategy visioned to achieve future self-sufficiency in the Malay landscape and promote sustainable agriculture practices. Overall, this research highlights the importance of preserving the intricate connection between plants and humans, not only for the well-being of the Malay landscape but also for global sustainability efforts.

2.0 LITERATURE REVIEW

2. 1 The Malay Landscape

Referring to Zakaria et al. (2014), the Malay landscape is a mix of metaphysical and physical elements associated with high cultural values, but they emphasize function and roles over aesthetics. In the Malay landscape, the majority of plants are used for healing and medicinal purposes, consumption, rituals, utilities, and beautification. Adnan and Othman, (2012) discusses a complex relationship between traditional and cultural circumstances in Malay culture. They emphasizes that herbs and plants cultivated in house gardens serve a purpose beyond their medical and healing properties. Through Zakaria and Rashid's (2014) writing, there are nine types of plants that are commonly found in the Malay civilization, which researchers have divided into three categories which are ornamental plants, fruit plants, and medicine (herbs). This categorization provides insights into the diverse uses and significance of plants within the Malay landscape.

Table 1: Common plants species in the local of the Malay landscape

Species	Local Name
Ornamental plants	
Aloe barbadensis	*Lidah buaya*
Bambusa spp	*Buluh*
Bixa Orellana	*Kesumba*
Cocos nucifera	*Kelapa*
Hibiscus rosa sinensis	*Bunga raya*
Herbs and edible plants	
Areca catechu	*Pokok Pinang*
Centella asiatica	*Pengaga*
Cinnamomum verum	*Kayu manis*
Citrus x Gurantiitolia	*Limau Nipis*
Cosmos caudatus	*Ulam Raja*
Curcuma longa	*Kunyit*

Cymbopogon nardus	*Serai Wangi*
Eurycoma longifolia	*Tongkat Ali*
Garcinia atroviridis	*Asam Gelugur*
Labisia pumila	*Kacip Fatimah*
Piper betle	*Sireh*
Polygonum minus	*Kesum*
Fruit plants	
Ananas comosus	Pineapple / *Nenas*
Artocarpus heterophyluss	*Nangka*
Cucurbita moschata	*Labu Manis*
Cucumis melo var. cantalupensis	Rock melon / *Tembikai melon*
Durio zibethinus	*Durian*
Garcinia mangostana	*Manggis*
Lagenaria siceraria	*Labu Air*
Lansium parasiticum	*Dokong*
Musa sapientum	*Pisang*
Passiflora edulis	*Markisa*
Psidium guajava	*Jambu Batu*
Cash crop	
Amaranthus tricolor	*Bayam Hijau*
Arachis hypoge	*Kacang Tanah*
Capsicum annum	Chilli / *Chili*
Cymbopogon citratus	*Serai*
Cucumis sativus	*Timun*
Ipomoea aquatica	*Kangkung*
Pleurotus ostreatus	*Cendawan Tiram*
Solanum melongena	*Terung*
Colocasia esculenta	*Ubi Keladi*
Ipomoea batatas	*Ubi Keledek*
Manihot esculenta	*Ubi Kayu*
Oryza sativa	*Padi*
Pachyrhizus erosus	*Sengkuang*
Saccharum offinarum	*Tebu Kuning*
Solanum melongena	Brinjal / *Terung*
Vigna unguiculata ssp. sesquipedalis	*Kacang Panjang*
Zea mays	Corn / *Jagung manis*

Sources: Adnan & Othman, (2012); Buku_edible_landskap_01, (2019).; Department of Agriculture Malaysia, (2021)

Particularly, common plant species in the local Malay landscape are listed in Table 1. People rely on plants, either directly or indirectly (Adnan and Othman, 2012). In the Malay world, plants and humans are so intimately linked because plants are used primarily for food, medicine, cosmetics, decoration, and as shade. Nevertheless, the use and importance of these plants depend on the insight and awareness of Malay society nowadays in preserving crops and culture.

2.2 Crop culture

Crop culture in the Malay landscape refers to the traditional farming practices and crop types found in Malaysia's agricultural sector. According to Lukmanulhakim et al. (2022), a landscape is an environment that is processed and designed by the human culture that inhabits an area, whether on land, mountains, estuaries, or water. Moreover, Hussain et al., (2022) defines landscaping as a site that includes the topography, social, economic, and cultural activities of man. In Malaysia, crop culture has its roots in the practices of the indigenous people, known as Orang Asli, who possess profound knowledge and reverence for plant life, as well as the natural environment inherited from their ancestors (Adnan and Othman, 2012). These practices and beliefs have shaped the agricultural landscape of Malaysia, with an emphasis on sustainable and harmonious interactions with nature. By understanding the cultural and historical context of crop culture in the Malay landscape, researchers and practitioners can appreciate the deep connection between the people, plants, and environment in Malaysia's agricultural sector. This knowledge can contribute to the preservation and sustainable development of crop culture, ensuring its continued relevance and benefits for future generations.

In the Malay culture, plants are grown for subsistence living and edible purposes. For example, the traditional Malay landscape was reported to be predominantly agricultural, supporting basic human needs such as rice fields, tapioca bushes, and coconut groves (Zakaria et al., 2014). Rice is a staple crop in the Malay landscape, and it is grown in flooded paddy fields during the growing season. Tropical fruits are also an important part of Malay crop culture. These fruits are grown in abundance throughout the country and are known for their distinct flavor and aroma. These crops are often deeply entwined with Malay culture and customs, making them an important part of the country's agricultural heritage. Palm oil is another important crop grown in Malaysia and used in a variety of food and non-food products. Rubber is also an important cash crop that is grown for its latex, which is used in the production of various rubber products. However, volatile commodity prices have an impact on the

agriculture landscape in the Malay landscapes. In fact, the trend of falling oil palm prices has a severe impact on the farmers (Ahmad et al., n.d.). The local newspaper *Sinar Harian,* (2019), reported that the trend of declining palm oil prices had caused unrest among people in FELDA settlements and farmers, with some of them claiming to earn only RM280 (USD68) per month. It was also due to the small size of their land, which was only 3.9 hectares per family. Bernama (2023) seems to agree with this statement, as he points out rubber farmers expected the price of rubber to rise above RM3 per kilogram, but instead, the price dropped sharply between RM2 and RM2.40 per kilogram. As a result of the drop-in prices for some crops, farmers were forced to switch to other types of cultivation as a livelihood initiative.

Table 2: Analysis of crop yield achievement (Jan – Dis 2022) in Perak Tengah

Species	Local Name	Successful Area (CHE)	Production (Kg)	No of Successful Participants	Average Yield Achicement (Kg/Ha)	Potential Revenue (Kg/Ha)	Achievement (%)
Ornamental plant							
Cocos nucifera	*Kelapa*	1.97	14,816.00	2	7,520.81	25,000.00	30.08
Herb and edible plants							
Citrus x Gurantiitolia	*Limau nipis*	1.60	27,367.00	5	17,104.38	0.00	0.00
Garcinia atroviridis	*Asam Gelugur*	1.20	17,250.00	1	14,375.00	0.00	0.00
Fruit plants							
Ananas comosus	Pineapple / *Nenas*	9.60	312,138.00	4	32,514.38	55,000.00	59.12
Artocarpus heterophyluss	*Nangka*	0.70	14,000.00	3	20,000.00	33,210.00	60.22
Cucurbita moschata	*Labu Manis*	3.60	10,000.00	1	2,777.78	25,000.00	11.11
Cucumis melo var. cantalupensis	Rock melon / *Tembikai melon*	2.01	15,800.00	4	7,860.70	30,000.00	26.20
Durio zibethinus	*Durian*	92.04	849,600.00	146	9,230.77	14,700.00	62.79
Garcinia mangostana	*Manggis*	0.40	8,000.00	1	20,000.00	28,000.00	71.43
Lagenaria siceraria	*Labu Air*	0.00	13,000.00	1	0.00	25,000.00	0.00
Lansium parasiticum	*Dokong*	0.20	900.00	1	4,500.00	11,900.00	37.82
Musa acuminata	*Pisang*	113.30	2,317,000.00	115	20,450.13	28,600.00	71.50
Passiflora edulis	*Markisa*	0.40	19,500.00	1	48,750.00	0.00	0.00

Psidium guajava	*Jambu Batu*	0.000	54,000.00	1	0.00	50,000.00	0.00
Cash crop							
Amaranthus tricolor	*Bayam Hijau*	10.80	64,707.00	1	5,991.39	15,000.00	39.94
Capsicum annum	Chilli / *Cili*	5.91	21,950.00	9	3,714.04	14,000.00	26.53
Cymbopogon citratus	*Serai*	10.40	51,301.50	3	4,932.84	18,000.00	27.40
Cucumis sativus	*Timun*	3.20	22,550.00	6	7,046.88	28,000.00	25.17
Ipomoea aquatica	*Kangkung*	7.00	75,277.00	1	10,753.86	12,000.00	89.62
Pleurotus ostreatus	*Cendawan Tiram*	0.58	1,403.74	1	2,420.24	80,000.00	3.03
Solanum melongena	Brinjal/ *Terung*	2.50	9,770.00	5	3,908.00	25,000.00	15.63
Oryza sativa	*Padi*	1,102.16	5,268,624.00	594	4,780.27	5,000.00	95.61
Vigna unguiculata ssp. sesquipedalis	*Kacang Panjang*	0.00	3,200.00	1	0.00	20,000.00	0.00
Zea mays	Corn/ *Jagung Manis*	223.10	1,238,170.00	13	5,549.84	10,000.00	55.50
TOTAL		**1,602.67**	**10,430,324.20**	**920**	**254,181.31**		

Source: Department of Agriculture Perak Tengah District (2022)

According to Table 2, there are crop achievement in Perak Tengah. Perak Tengah was chosen as the location for this research. Therefore, the purpose of this study is to fill gap in the paper by identifying the best crops for local plant species in the Perak Tengah District crop calendar.

2.3 Crop calendar

The crop calendar is commonly defined as the strategic cultivation of different crop varieties in a specific order on the same fields over a designated period, as opposed to solely cultivating a single crop (Igberi et al., 2022). Yulianti and Dewi, (2021) further characterize the crop calendar as a schedule that encompasses the various stages of rice or other crop growth, including fallow periods, land preparation, crop establishment and maintenance, and harvest and storage. Studies by Wang et al., (2022) suggest that adjusting the crop calendar can serve as a viable and effective solution for mitigating the adverse impacts of climate change on crop yield potentials. Shifting planting dates based on the calendar allows crops to grow in more favorable weather conditions. Additionally, (Adnan, 2019) highlights that crops with shorter growth cycles enable farmers to generate daily returns, ensuring a consistent income stream. Apart from income generation, the crop calendar is an indispensable tool for farmers as it aids in the efficient planning of planting and harvesting activities. It contributes to minimizing crop losses and enhancing

overall yield (Yulianti and Dewi, 2021). Implementing a cropping calendar or planting calendar facilitates better organization of farm activities and optimizes production costs. Therefore, this study investigates the selection of plant types for the crop calendar, which can significantly represent crop culture and improve the economy of the Malay landscape.

3.0 METHODOLOGY

This study primarily employs qualitative data gathered through direct interviews with two respondents. A structured interview was used as part of the research method in the context of structured and formal face-to-face interviews. To answer the research questions, data was gathered through interviews with Perak Tengah local farmers and agricultural experts from the Perak Tengah District Department. They were chosen as respondents because they have over ten years of experience in this field. Local farmers were interviewed at TPKM Titi Gantong, Bota, and field experts from the agricultural department in Perak Tengah District were interviewed at the Perak Tengah District office, Seri Iskandar. Figure 1 describes boundary analysis for Perak Tengah District.

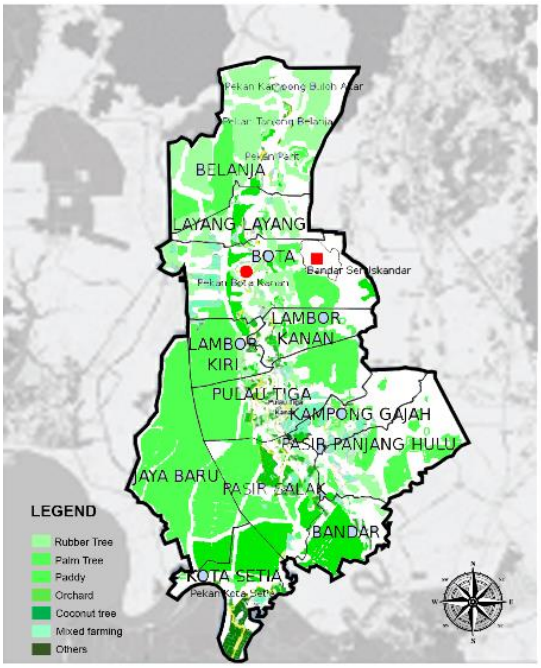

Figure 1. Study area of crops plantation in Perak Tengah District
Source: Rancangan Tempatan Daerah Perak Tengah 2030, (2022)

The study area was chosen because it has been designated by a government agency as an agricultural area where farmers can cultivate their crops and there are contacts that make this research possible. Specific crops are chosen on the farm based on the farmer's availability and the suitability of the soil in the region. Individual and group interviews were carried out. Two interviews were conducted, one with the assistant agricultural officer and the other with a local farmer. Assistant agricultural officer of the Perak Tengah district. also participated in the local farmer interviews and discussions to provide additional information. For both respondents, the interview took place on the same day and for about 5 hours together with a site visit.

Interviews and discussions were used to collect information about the crop calendar such as plant name, plant statistics and harvesting timeline, planting period, and crop production. To structure the qualitative interview, interview questions were developed. The ten-question structured interview was divided into three thematic sections: Section A is about the personal data of interviewers; Section B is about identifying local plant species that are suitable for crop calendar and Section C is about identifying plant species that can help a local farmer in the Malay landscape. The questions are involving (1) personal data, (2) general information about the Malay landscape, (3) crop period, (4) crop production, (5) crop name, (6) crop calendar as a sustainable income strategy, (7) crop statistic and harvesting, (8) crop management. (9) crop calendar and its limitations; (10) crop calendar implementation in other regions. The two of the interviews took 50 minutes. The interview situation was recorded on audio carriers and transcribed, allowing for an accurate representation of the conversations. The interviews were then qualitatively analyzed and evaluated using Microsoft Excel and Atlas.ti software.

Thus, to create the overall crop calendar character, this data set was analyzed to compare the similarity of plants in the Malay Landscape and crop culture in the Perak Tengah district. The plant species used, the common plant species planted, crop production and period, and any other similarities discovered during the interview session have been considered for this study. All plants identified and listed are tabulated so that the species, as well as their plant period and quality results, can be structurized clearly.

4.0 RESULT & DISCUSSION

4.1 Potential plant for crop calendar

The analysis shows the similarity of plants in the Malay landscape and crop culture in the Perak Tengah district for the crop calendar in terms of plant

availability. Nevertheless, the intent to get the plants related to the crop calendar was attainable (see table 3) below.

Table 3: Analysis of potential plant for crop calendar duration

Types of plants	Local Name	Malay Landscape	Crop culture in Perak Tengah	Potential plant for crop calendar duration
Ornamental plants				
Aloe barbadensis	*Lidah buaya*	✓		
Bambusa spp	*Buluh*	✓		
Bixa Orellana	*Kesumba*	✓		
Cocos nucifera	*Kelapa*	✓	✓	
Hibiscus rosa sinensis	*Bunga raya*	✓		
Herbs and edible plants				
Areca catechu	*Pokok Pinang*	✓		
Centella asiatica	*Pengaga*	✓		
Cinnamomum verum	*Kayu manis*	✓		
Citrus x Gurantiitolia	*Limau Nipis*	✓	✓	
Cosmos caudatus	*Ulam Raja*	✓		
Curcuma longa	*Kunyit*	✓		
Cymbopogon nardus	*Serai Wangi*	✓		
Eurycoma longifolia	*Tongkat Ali*	✓		
Garcinia atroviridis	*Asam Gelugur*	✓	✓	
Labisia pumila	*Kacip Fatimah*	✓		
Piper betle	*Sireh*	✓		
Polygonum minus	*Kesum*	✓		
Fruit plants				
Ananas comosus	Pineapple / *Nenas*	✓	✓	✓
Artocarpus heterophyluss	*Nangka*	✓	✓	
Cucurbita moschata	*Labu Manis*	✓	✓	

Cucumis melo var. cantalupensis	Rock melon / *Tembikai melon*	✓	✓	✓
Durio zibethinus	*Durian*	✓	✓	
Garcinia mangostana	*Manggis*	✓	✓	
Lagenaria siceraria	*Labu Air*	✓	✓	
Lansium parasiticum	*Dokong*	✓	✓	
Musa sapientum	*Pisang*	✓	✓	
Passiflora edulis	*Markisa*	✓	✓	
Psidium guajava	*Jambu Batu*	✓	✓	
Cash crop				
Amaranthus tricolor	*Bayam Hijau*	✓	✓	
Arachis hypoge	*Kacang Tanah*	✓		
Capsicum annum	Chilli / *Cili*	✓	✓	✓
Cymbopogon citratus	*Serai*	✓	✓	
Cucumis sativus	*Timun*	✓	✓	
Colocasia esculenta	*Ubi Keladi*	✓		
Ipomoea aquatica	*Kangkung*	✓	✓	
Ipomoea batatas	*Ubi Keledek*	✓		
Manihot esculenta	*Ubi Kayu*	✓		
Oryza sativa	*Padi*	✓	✓	
Pachyrhizus erosus	*Sengkuang*	✓		
Pleurotus ostreatus	*Cendawan Tiram*	✓		
Saccharum offinarum	*Tebu Kuning*	✓		
Solanum melongena	Brinjal / *Terung*	✓	✓	✓
Vigna unguiculata ssp. sesquipedalis	*Kacang Panjang*	✓	✓	
Zea mays	Corn / *Jagung manis*	✓	✓	✓

Table 3 shows the similarity of plants in the Malay landscape and crop culture in the Perak Tengah district in determining the suitable plants for crop calendar cultivation. Potential plants in the crop calendar period are chosen based on

(1) site location (2) soil suitability (3) duration and amount of yield for each plant (4) expected demand and market (Interview 1) (Interview 2). By considering these factors and aligning them with the suitability of plants in the Malay landscape and the crop culture in the Perak Tengah district, farmers can effectively plan their crop calendar.

4.2 Crop calendar duration

Agriculture forms the foundation of Malay landscape development (Interview 1). Agriculture is business or profit (Interview 1), (Interview 2). Farmers need to be disciplined in growing a crop to make a profit (Interview 2). The crop period is determined by the maturity period of each crop (Interview 1). Cash crops produce long-term results and are simple to manage (Interview 2). Fertigation vegetables also produce good results as well, despite the high initial investment (Interview 1).

- Crop timeline for chilli cultivation

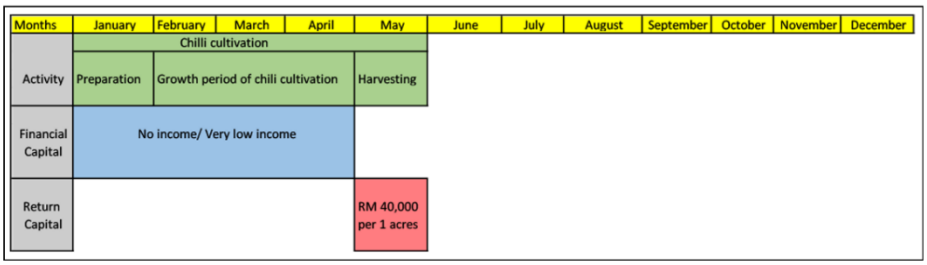

Figure 1. Analysis between crop activities and income for chilli cultivation.

Chilli plants typically take about five months to mature (Interview 2). Chilli cultivation takes place from early January to May (Interview 2). In January soil preparation for sowing begins and harvesting takes place in May (Interview 2). For chilies, averaging two to three kilogrammes per tree per season over the course of five months, or one acre in 4,000 trees (Interview 2). Chilli can be obtained once a year with an area of 1 acre for RM 40,000.00 in those five months (Interview 2). With one acre accommodating 4,000 trees, farmers can expect a substantial yield of chillies. This can contribute to their income and potentially improve their subsistence living. Chilli cultivation offers a promising opportunity for farmers, with the potential to obtain a significant yield and generate income. By aligning their crop calendar with the five-month cultivation period, farmers can effectively plan their planting and harvesting schedule to maximize their yield and financial returns from chilli cultivation.

- Crop timeline for rock melon cultivation

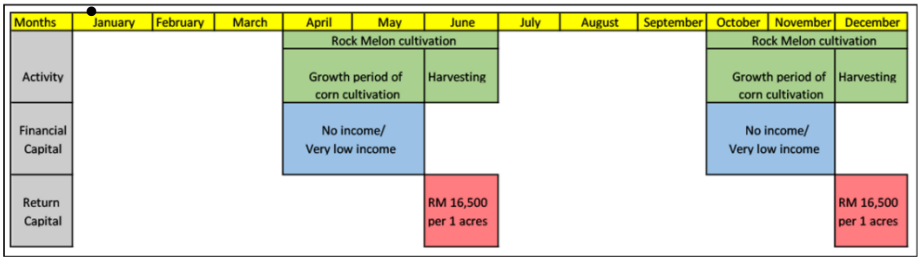

Figure 2. Analysis between crop activities and income for rock melon cultivation.

Rock melon plants typically take about three months to mature (Interview 2). Rock melon can be planted twice a year (Interview 2). In early two-month soil preparation for sowing and growth period begins and harvesting takes place in the third month (Interview 2). For rock melon, with the same area, and in three months, it can harvest 12 tonnes worth RM 16,500.00 for RM3.00 each (Interview 2). Rock melon can be obtained twice a year with an area of 1 acre for RM 33,000.00 (Interview 2). The three-month maturity period allows farmers to plan their crop calendar accordingly, ensuring that they can harvest and sell the produce within the desired timeframe. Therefore, the ability to plant rock melon twice a year also provides flexibility in crop calendar and allows for a more consistent income stream.

- Crop timeline for Brinjal cultivation

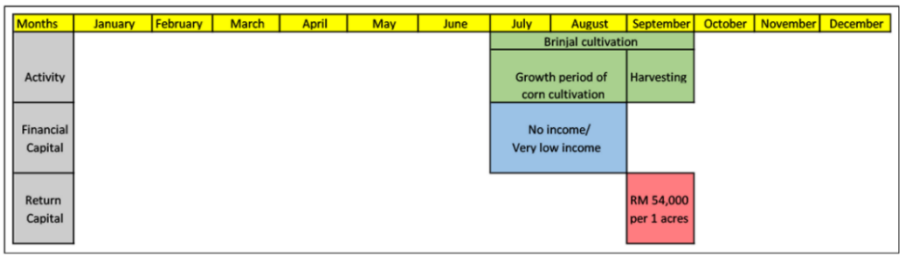

Figure 3. Analysis between crop activities and income for brinjal cultivation.

Brinjal plants typically take about three months to mature (Interview 2). Brinjal cultivation takes place in the middle month or late month after rock melon cultivation (Interview 2). In early two-month soil preparation for sowing and growth period begins and harvesting takes place in the third month (Interview 2). Brinjal can be obtained once a year with an area of 1 acre for RM

54,000.00 (Interview 2). The profitability of brinjal cultivation indicates its potential to improve farmers' subsistence living. By planning their brinjal cultivation after rock melon cultivation, farmers can efficiently utilize their land and maximize crop production throughout the year.

- Crop timeline for pineapple cultivation

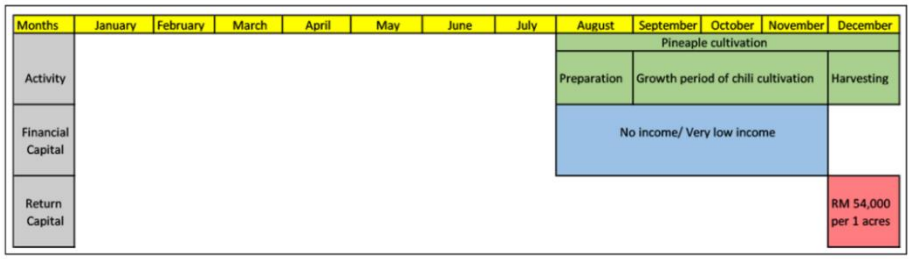

Figure 4. Analysis between crop activities and income for pineapple cultivation.

Pineapple plants typically take about five months to mature (Interview 2). Pineapple cultivation takes place in the late month (Interview 2). In the early first month soil preparation for sowing begins and harvesting takes place in the fifth month (Interview 2). For pineapple, averaging after one year of planting for 1 acre in 5 months is expected to produce 40,000 pineapples (Interview 2). Pineapple can be obtained once a year with an area of 1 acre for RM 54,000.00 in those five months (Interview 2). The mentioned yield of 40,000 pineapples per acre indicates the potential productivity of pineapple cultivation. Pineapple cultivation offers an opportunity for farmers to improve their livelihoods. By aligning their crop calendar with the late month cultivation period, farmers can effectively plan their planting and harvesting schedule to optimize their crop production and sales.

- Crop timeline for Corn cultivation

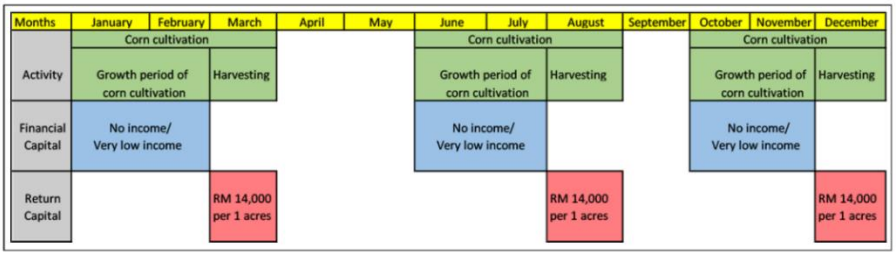

Figure 5. Analysis between crop activities and income for corn cultivation.

Corn plants typically take about three months to mature (Interview 2). Corn cultivation can be planted three times in a year (Interview 2). In early two-month soil preparation for sowing and growth period begins and harvesting takes place in the third month (Interview 2). For corn, if we plant 10,000 trees on one acre at a time, we will get 10,000 cobs (Interview 2). The result of three plantings is approximately RM 42,000.00 because one lot can be planted three times. (Interview 2). The quick maturity period of corn allows for efficient planning of the crop calendar and a continuous supply throughout the year. The flexibility of planting three times in a year enables farmers to align their schedule with market demand and optimize profitability. This flexibility provides a consistent income stream and enhances farmers' sustainability.

- Synthesis of crop timeline

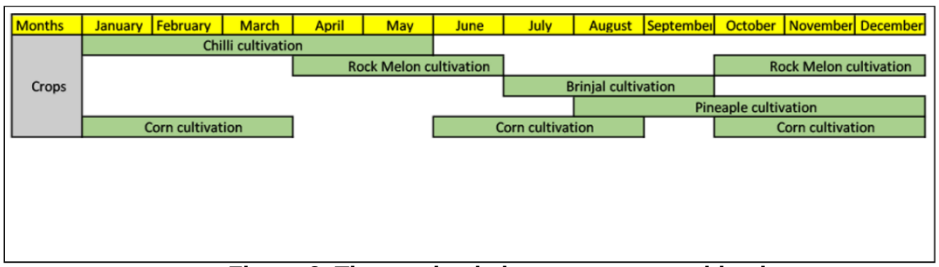

Figure 6. The synthesis between crops cultivation.

The crop calendar schedule should be planned in accordance with the weather and market conditions (Interview 1). According to Figure 6, vegetable and fruit cultivation took three to five months in a year to harvest. Vegetables and fruit cultivation are easy to maintain because it does not require many laborers (Interview 2). This can be beneficial for subsistence living, as it reduces the need for extensive labor and associated costs. However, the cultivation of these plants also depends on the latest market demand (Interview 1) (Interview 2). Farmers need to stay informed about the latest market trends and consumer preferences to make informed decisions about what crops to cultivate and when. By aligning their crop calendar with the expected harvest periods, farmers can maximize their income potential and ensure a consistent supply of vegetables and fruits throughout the year. This timeline can serve as a valuable guideline for farmers to plan their planting and harvesting schedule. By considering weather conditions, market demand, and the expected harvest periods, farmers can optimize their cultivation practices and enhance their chances of success in the vegetable and fruit market.

4.3 Method of crop cultivation

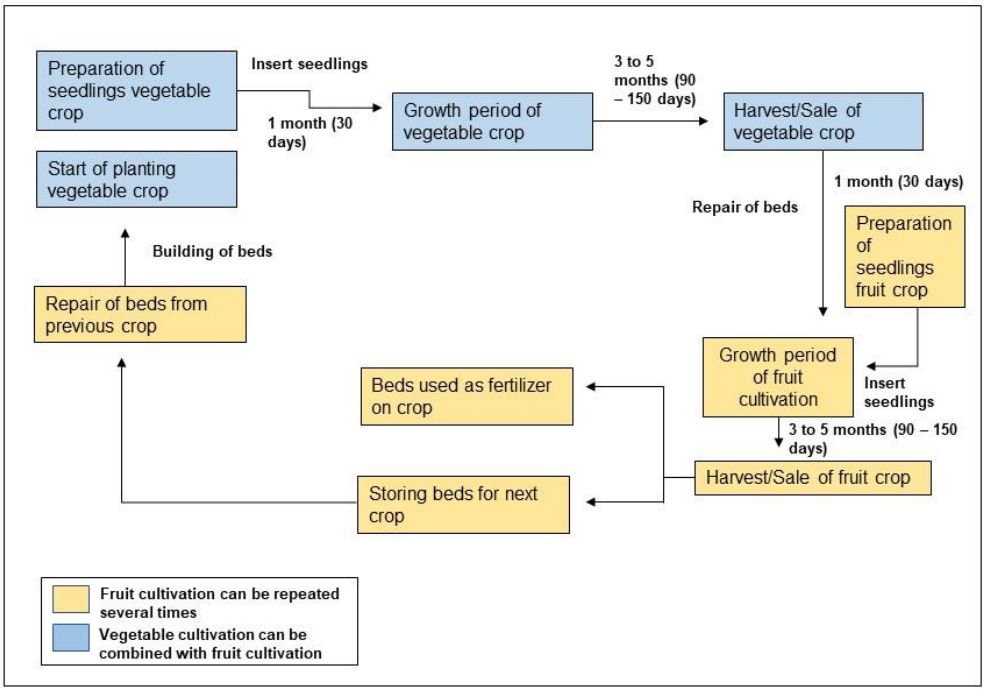

Figure 7. Cycle of crop cultivation based on analysis.

Figure 7 shows the cycle of crop cultivation in the crop calendar to achieve perfect plant management that can ensure maximum output and yield quality. Fruit cultivation can be repeated several times while vegetable cultivation can be combined with fruit cultivation. Utilization of planting time information combined with other information, such as pest attacks, fertilizer recommendations, seedlings preparation and the growth period can be used as a reference for policymakers in preparing a crop calendar management.

4.4 Discussion

Crop calendar is a long-term income source (Apriyana et al., 2021). The crop calendar offers a systematic solution to subsistence living and aids in farm management efficiency. The natural resource base is unaffected because the cultivation method is resource-saving and uses locally available natural materials. They also offer long-term income plans for future generations. The crop calendar includes a variety of crops, it contributes to other income strategies for the local market. The crop calendar benefits are not only for farmers, but also residents throughout the Perak Tengah District. The crop calendar is also an income strategy that influences and strengthens the assets

of the Malay Landscape. Most importantly, the cultivation method improves financial capital. The cultivation method generates more profit, which can cover their monthly expenses. Crop calendar use would strengthen natural capital and make cultivation more sustainable.

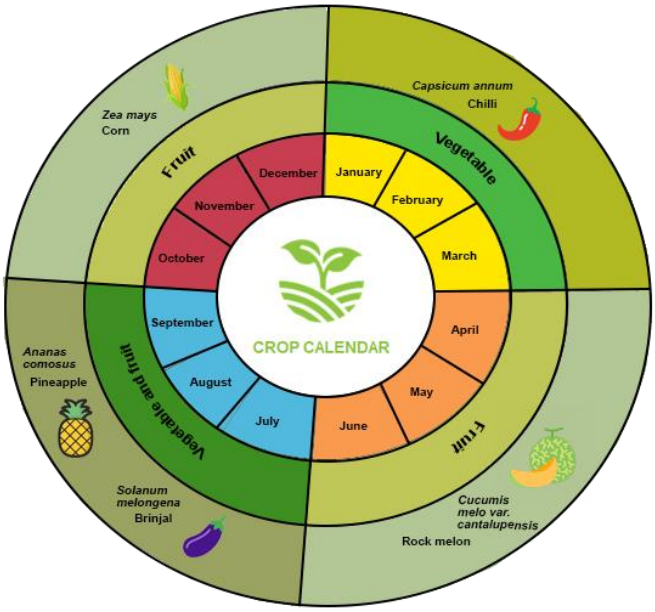

Figure 8. The Crop calendar of the crop culture in Malay landscape.

From early January to March, *Capsicum annum (*Chilli) are grown. Soil preparation for *Cucumis melo var. cantalupensis* (Rock melon) begins in April, and harvesting occurs in June. From July to September, depending on the crop cultivation prior, *Solanum melongena* (Brinjal) begins, and *Ananas* comosus begins in the middle of August to September. From October to December, the cultivation of *Zea mays (Corn)* takes place. Fruit production occurs in the early and late months of the crop calendar while vegetable production occurs in the middle of the months. Consequently, this cycle completes year-plan crop cultivation for food supply, income generation, and subsistence farming.

Figure 8 depicts the crop duration from this study's findings; excluding those produced by the on-crop calendar. This calendar shows a clear cash crops suitability for the planting calendar in each month starting from the early month until the end of the month. Therefore, this crop calendar initiative can improve subsistence living in the Malay landscape towards a better quality of life.

5.0 CONCLUSIONS

The crop calendar represents a sustainable and lucrative income strategy for the Malay landscape in Perak Tengah District. This study has established a comprehensive understanding of the plant species that are most suitable for crop production in the Malay landscape, as well as the most efficient crop management methods, based on the literature review and findings. This study will undoubtedly contribute to a better understanding of crop calendar conservation in the Malay landscape of Daerah Perak Tengah. Furthermore, it can help other people and researchers to conduct more in-depth research in this field. These findings can be used to create a crop calendar, which will advise farmers on the best times to plant and harvest various crops, resulting in more efficient and profitable farming practices. This would also help farmers to network with each other in order to exchange knowledge and support each other. Sharing this investigation with interested professionals may contribute to a growing body of knowledge that has the potential to change and improve plant and culture conservation. Thus, the research has the potential to be a catalyst for transformation within the Malay landscape, thus serving the aspirations of future generations. Plants are remarkable species for their values, and as study and research continue, knowledge and culture will always be preserved. Furthermore, the crop calendar has the potential to improve the livelihoods of farmers in the Malay landscape by providing them with the knowledge and tools needed to sustainably manage their land and crops, as well as the foundation for preserving and conserving cultural and plant diversity, as well as utilizing and effectively using knowledge to sustain the Malay culture and its identity.

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