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The Challenges and Future Prospects of Date Palm Farming in Malaysia: A Review

A. Mohd Ismail[1] and F.Z. Mohd Yusof[2*]

[1]*Faculty of Applied Sciences, Universiti Teknologi Mara, 40450 Shah Alam Selangor, Malaysia*

[2]*Integrative Pharmacogenomics Institute (iPROMISE), Level 7, FF3 Building, UiTM Puncak Alam Campus, 42300 Bandar Puncak Alam Selangor, Malaysia*

Malaysia is an agricultural country with a rich growth of agricultural cash crops. Date palm cultivation is still rare in Malaysia and is only practiced on small farms. The increased popularity of date palm cultivation in Malaysia due to the rich sources of balanced nutrition has increased awareness about its health benefits. Hence, there is an opportunity for commercialisation and several projects have been carried out, including those in Terengganu, Johor and Kelantan. However, there are issues and challenges that the farmers have to deal with in the development and improvement of the date palm farming industry. This review aims to discuss date palm plantation in Malaysia, focusing on the major issues and challenges of date palm cultivation and its future prospects. This study will enhance readers' knowledge about the current status of date palm in Malaysia and their promising business potential, especially in export markets that will benefit the economy.

Keywords: current challenges; date palm; dates; future prospects

I. INTRODUCTION

Dates fruit (*Phoenix dactylifera* L.) belongs to the genus Phoenix which consists of 12 species and is a member of the Arecaceae (*syn. Palmaceae*) family. Dactylifera is known to have significant economic importance in terms of commercial value and human food use. The fruit is called "*tamr*" and the date palm tree is "*nakhl*" in Arabic. Date palm is the most important fruit crop in the Middle East and North Africa (Asmaddy *et al.*, 2017; Chao & Krueger, 2007). It has been grown since ancient times and become a staple food for thousands of years (El-Juhany, 2010; Sulieman *et al.*, 2012). It can be found now in both the old world and the new world where date production has increased commercially (Zabar & Borowy, 2012). The Food and Agriculture Organization of the United Nations (FAO, 2013) reported that about 120 million date palm trees in the world are spread across 30 countries and the production of almost 7.5 million tonnes of fruit annually. Meanwhile, in 2021, the global date harvesting increased to 9.6 million metric tons, of which Egypt produced almost 20% of the total dates.

Malaysia mainly cultivated around one to ten acres of agricultural cash crops (Aimi *et al.*, 2019). A study reveals that Malaysia is still known as an agricultural country while rapidly developing into an industrial one (Salleh *et al.*, 2007). The agricultural land is estimated about 4.06 million hectares distributed throughout 13 states. Industrial crops such as rubber, oil palm, rice, coconut, cocoa, and pepper occupied almost 80% of the land. In 2016, agriculture continued to play a significant role in Malaysia's economy, contributing 8.1% or RM89.5 billion (US$19.5 billion) to the Malaysian Gross Domestic Product (GDP) and employing 16% of the workforce (DOS, 2017). Today, fruits are gradually becoming a significant part of Malaysia's agricultural production.

Malaysia is a major importer of dates from Pakistan and the Middle East, both fresh and dried (Abul-Soad, 2011). As a result, the Malaysian government has geared up the

*Corresponding author's e-mail: fzuraina@uitm.edu.my

agricultural sectors in response to the high demand for date palm products. The potential for commercialisation also has increased with the popularity of date palm plantations (Aimi & Asmaddy, 2020). Several initiatives have been carried out in Malaysia in which date palm trees are grown in Kelantan, Johor and Terengganu since there are chances to develop a new economic supply chain through date palm (Hosnam, 2011). Research has shown that date palm can be planted in Malaysia and has been used for individual consumption and as ornamental trees. By focusing on high-value European markets, local production of dates can expand export markets. It also helps to support sustainable economic growth in Malaysia through the production of a new value chain (Haris *et al*., 2019). North Africa served as a good example, accounting for 26% of the market's value but only 8% of its volume (Zaid *et al*., 2002a). Re-exports of dates from North Africa have given Europe, primarily France - a non-producing region - 5% of the market. On the other hand, Asia exports dates mostly to India at significantly lower costs and of lesser quality. The average prices for export gained by various nations differ significantly. Israel, Algeria, Tunisia, and the United States are able to obtain greater export prices since they have devised a specific exporting plan to cultivate superior cultivars and target the more expensive European markets.

Date fruits are known to have many functional nutritive values that promote human health. They are rich in various vitamins and minerals, dietary fibre, phytosterols, carotenoids, and polyphenols (Al-Farsi & Lee, 2012). Date fruits have been analysed by several authors as a promising new healthy food (Al-Farsi *et al*., 2007; Vayalil, 2012). Preclinical studies show that the fruit has many therapeutic advantages, such as having antioxidant and anti-inflammatory properties and protecting the liver, stomach, and kidneys (Al-Orf *et al*., 2012). Hence, this fruit can act as an additional nutritious supplement to meet the daily nutrient intake goals set by the Malaysian Ministry of Health. Dates also provide the majority of a person's nutritional and energy requirements, especially for the Muslim diet during the month of Ramadhan. Due to its ability to grow in Malaysia's environment, the date palm tree has gained favour among Muslims. Thus, the local production of dates is crucial to satisfy the increasing demand and consequently promote Malaysia's economic growth.

Date palm may thrive in a variety of soil types, but the best conditions are deep sandy soils with an adequate moisture supply (Abul-Soad, 2011). The essential soil conditions for optimum production are good drainage and aeration. As date palm can be grown in heavier soils, extra care needs to be taken to avoid waterlogging these soils. High levels of alkali and salt content in the soil may affect the growth and productivity of the date palm. Since fertilisers are more quickly leached off by irrigation, more fertilisation is necessary for sandy soils with excellent drainage (Kamarubahrin *et al*., 2018). According to the Federal Agricultural Marketing Authority (FAMA, 2014), Malaysia imports between 19,000 and 20,000 tonnes of date palm annually, with Iranian dates accounting for roughly 75% of the total and locally grown dates contributing for the remaining. From 2010 to 2013, Malaysia exported 12,258 tonnes of date palm (DOS, 2014; FAO, 2015). The imported dates are further processed to produce additional value for commercial gains to enhance the development of Malaysia's date industry by-products. This paper begins with an introduction and continues with a detailed discussion on the current challenges of date palm planting in Malaysia and the prospective outcomes. The article ends with the conclusion of the study.

II. DATE PALM PROBLEMS AND CHALLENGES IN MALAYSIA

The first entry of date palm plantation into Malaysia was in late 2010 (Hosnam, 2011). The first privately owned farms were established in three states: Terengganu, Kelantan, and Johor (Hazrol, 2016). However, the date farming industry in Malaysia is still in its early phases. According to the observations and previous literature studies, a commercial date palm farm in Malaysia has not been reported yet (Aimi & Asmaddy, 2020). Majority of the farmers are still in the early stages of date palm seed cultivation. However, many researchers stated that the date palm plantation has a lot of potential in the farming industry and might be a profitable business (Kamarubahrin *et al*., 2018). Thus, the Malaysian government initiated the introduction of this plant as a new economic source for local

farmers to promote the commercial potential of dates. The first project was established in Limbongan, Pasir Puteh, Kelantan on an 8000 m² plot of land (Aimi *et al*., 2019). The date palm seeds were obtained from Thailand. According to an interview with a date palm farmer (Mr. Zain): "In 2010, I began planting date palms in Kelantan. A total of 50 date palm plants were planted and discovered to have produced fruit". Despite this, several concerns and issues have arisen for the farmers.

Among common issues experienced by all dates-producing countries are the cultivation methods, low-quality cultivars, soil and water conditions, pests and diseases, poor farm management, harvest and postharvest techniques, processing equipment, workforce, technical support and extension, domestic and international marketing, as well as lack of research and development activities (Abul-Soad, 2011; Shri & Dennis, 2015). The current specific issues and challenges of date palm in the Malaysian context are discussed below.

DOS (2014) reported that between 2010 and 2013, there are 61,773 tonnes gap between date import and date export in Malaysia (Table 1). Additionally, the imported dates exceeded exported dates by RM140.11 million (US$30.76 million) in 2013 (FAMA, 2014). In September 2020, Malaysia's exports of fresh or dried dates totalled up to RM943,000, while imports totalled up to RM6.85 million, leaving a negative trade balance of RM5.91 million. The exports of fresh or dried dates from Malaysia increased by RM175,000 (22.7%) from RM769,000 to RM943,000 between September 2019 and September 2020, while imports rose by RM3.36 million (96.3%) from RM3.49 million to RM6.85 million (OEC, 2020). Hence, it shows that there is a significant demand for dates among Malaysians. However, consumers still need to rely on imports, even for secondary date products, due to the limited to no local date production. Prolonged dependency on imported dates may seriously affect the food industry, particularly the agriculture sector. For information, Malaysia has suffered a large amount from the importation of food, with a value of about US$3.5 billion each year. The current agricultural deficit, particularly in food, is approximately US$1.35 billion. The Malaysian government is trying to balance the trade by expanding production in the fruit sector for export as the demand side offers good prospects for Malaysian agriculture (ETP, 2010). Analysts also predicted that food needs will increase at remarkable rates due to fast population growth, rising levels of nutrition as income levels rise, and changes in consumption (Tengku Ahmad & Suntharalingam, 2009).

Table 1. Malaysia's total import and export of dates

Import and export (unit in thousand tonnes	2010	2011	2012	2013	2014
Import	17,980	16,236	20,394	19,421	74,031
Export	4,268	3,906	2,430	1,654	12,258

Insect pest attacks are one of the major constraints to the date palm, in which the type and severity of the problems differ depending on cultivar, region, weather, and cultural techniques (Carpenter & Elmer, 1978; Zaid *et al*., 2002b). Fungi are the most commonly reported pathogens in date palm illnesses. The Bayoud disease, caused by *Fusarium oxysporum* f. sp. *albedinis*, is one of the most devastating fungal infections in North Africa and has resulted in the significant loss of date palms. Since then, the Bayoud research has been important in date palm studies. The types of insect pests attack differ depending on geographic area. In Malaysia, the red palm weevil (*Rhynchophorus Ferrugineus Olivier*) and the dubas bug (*Ommatissus Lybicus Bergevin*) are often to be found attacking the date palms (Aimi *et al*., 2018). They target the stem and can kill the tree if left untreated. Unfortunately, the red palm weevil is native to tropical South Asia. Thus, Malaysian date palms are at a high risk of getting infected when compared to other countries. However, this insect has been known to have attacked various nations, including Pakistan, the Arabian Peninsula, Northern Africa, Spain, Italy, the United States, France, Iran, Greece, India and the Caribbean (Abul-Soad, 2011). The red palm weevil is also harmful to coconut (*Cocos nucifera*) and oil palm (*Elaeis guineensis*), as well as ornamental palms such as ribbon fan palm and Chinese fan palm (Azmi *et al*., 2017). The infestation is usually concentrated around the offshoot's base, where it joins the mother tree. Brown sap with a bad odour is secreting from the infection site. Biological control, chemicals, quarantine,

pheromone trapping, and sanitation practices are applied to control date palm insect pests (Howard *et al*., 2001).

The date palm is a temperate climate plant. Because it can be grown in Malaysia's environment, the date palm tree is gaining favour among Malaysian Muslims. Malaysia's climate is classified as equatorial (*khatulistiwa*), with hot and humid weather all year. According to Hock (2007), the average temperature is 27°C (80.6°F), and the average annual rainfall is 250 cm. Furthermore, Malaysia experiences two monsoon wind seasons: the Southwest Monsoon from April to September and the Northeast Monsoon from October to March. The Northeast Monsoon, which originates in China and the North Pacific, brings substantially more rainfall than the Southwest Monsoon. Meanwhile, the southwest monsoon comes from the deserts of Australia. Transition months between the two monsoons are March and October (Marshall, 2007). Constant rainfall during the fruit maturation season will impact date growth, although Malaysia's environment has enough days with suitable high temperatures to properly mature dates. Thus, the date growers in South Asian date-growing countries such as Indonesia and Thailand, as well as Pakistan and India, choose to cultivate early-bearing varieties that ripen before the annual monsoon rains or cooler temperatures. Moreover, the fruits are collected at *khalal* or *rutab* stages and artificially ripened; the latter incurs additional labour costs (Kamarubahrin *et al*., 2018). Artificial ripening agents are commonly used by farmers and vendors to regulate the rate at which fruit ripens. It has been claimed that substances like calcium carbide, ethephon, and ethylene are utilised as artificial ripening agents (Islam *et al*., 2016). However, artificial fruit ripening is controversial all over the world due to the potential health risks associated with the ripening chemicals. As a result, the climate is another serious issue or concern that may affect the date palm plantation in Malaysia.

It is claimed that date palm planting lacks experience in both date palm research and practice as the date palm is grown on a small scale and with minimal study on date palm in Malaysia. As a result, date palm farming on a wide scale has yet to be developed in Malaysia. Moreover, the slow progress of Malaysia's date industry is due to a lack of competent and trained national workers and labour. Extensive research is needed to improve date quality and yield so that it can meet international sanitary and phytosanitary (SPS) conditions such as pre-and post-harvest management of bad cultivars, disease-free plant cultivation, processing, packing, worker training for their role in the system, marketing, and export of dates and date products (Abul-Soad, 2007). Making good marketing decisions will depend on having an extensive knowledge of prices, pricing trends, and the ability to analyse the economic factors that influence and affect those prices. It is noteworthy to look at the price that France receives for its re-exports, which are primarily to other European nations. The technique employed by France is to import high-quality fruit in bulk, which is subsequently repackaged in Marseilles into "glove boxes" for the market with higher incomes (Zaid *et al*., 2002a). Significant steps must be taken to modernise date production, processing, and storage in order to make date palm cultivation more beneficial to Malaysian growers, processors, and exporters.

III. THE FUTURE PROSPECTS

Recently, the government has been trying to encourage the use of date palms as a source of medicine, food, and waste management. The import-export data on dates in Malaysia proves that the country is heavily reliant on imported dates. Furthermore, date producers are urgently required to expand the primary or secondary date products as the supply chain is already established in Malaysia. Muslims in Malaysia consume date fruit throughout the year, especially during the fasting month of Ramadhan (Asmaddy *et al*., 2019). In addition to the fruit's health benefits, the Prophet Muhammad advocated eating dates, which led to the fruit's popularity. The nutritional value and health advantages of eating dates are now widely known. Additionally, there has been a substantial growth in the market for dessert dates, specifically those made using pitted dried dates that are either fresh, chilled, or frozen. Thus, large-scale date palm plantations must be established to fulfil especially the growing local demand. Effective marketing of the local production of date fruits is important to reduce the dependency on importation. The supply and distribution systems need to be optimised so that accessibility is increased, especially for local consumers (World Health Organization, 2005). This goal can be achieved through the

involvement of many stakeholders in the supply chain, including in production, processing, safety, quality control, and marketing. The government supports direct marketing by farmers to reduce the need for middlemen and consequently increase the returns to farmers in the fruit industry. Farmers can market their produce with minimum marketing costs as the Federal Agricultural Marketing Authority (FAMA) has set up marketing infrastructure, such as farmers' markets and fresh fruit outlets. The variety, quality, season, kind of packaging, and market location all had a significant impact on price. Growing cultivars like Medjool, Deglet Noor, and Barhee could result in high pricing (Zaid *et al.*, 2002a). Based on a farm gate price of US$3 500 per tonne and an expandable quantity of 10.8 tonnes/ha, an Israeli farmer claimed that 1 ha of dates of the Medjool variety generated an average annual income of US$37 800 in 1996.

Malaysia is recognised for its high level of soil fertility. According to the Department of Agriculture Malaysia's land cover statistics, about 53% (7 million hectares) of the total land area in West Malaysia (Peninsular) is suitable for agriculture, whereas the part of land in East Malaysia that is unsuitable for agriculture is reported to be higher at 15 million hectares (DOA, 2020). Most fertile soils tend to be deep, dark, with a rich mineral and nutrient basis, a high organic content, and an appropriate ratio of the correct soil particles, which enable for the flow or storage of nutrients, water, and air (Faridah *et al.*, 2022). It is also preferable to have beneficial microbes. Firstly, it is important to note that soils can be fertile or productive, depending on their use. Some soils may be fertile and effective for agriculture, whereas others may be more suitable and productive for forestry (such as hardwood forestry). Some soils are more fertile by nature than others; nevertheless, some soils that are not the most fertile by nature may become more fertile for certain purposes (such as agriculture) than they are by human modification. In order to promote the growth of various crops, including the date palm, some agricultural techniques have been established under sandy-textured soils. The application of soil organic matter, liming, and fertiliser control are the main agronomic practices advised to increase soil fertility levels during the cropping season (Soo *et al.*, 2019). Additionally, it has been proven that applying organic matter, particularly Palm Oil Mill Sludge (POMS) and oil palm Empty Fruit Bunch (EFB), is more promising for enhancing sandy soil productivity compared to chemical fertiliser (Vimala *et al.*, 2008).

According to statistics, Malaysia is one of the countries with large-scale crop plantations, such as palm oil and rubber. These commercial plantations are typically mass-produced, and the main objective is to satisfy the global markets. Furthermore, Malaysian rubber and palm oil are of exceptional quality, owing to superior cultivars grown by Malaysian farmers. As a result, expansion in date palm cultivation is believed to improve date quality. This is because superior cultivars possess higher resistance to biotic and abiotic stresses. Further scientific analysis needs to be carried out as they may contain valuable genetic resources for plant breeders (Johnson *et al.*, 2013). The government needs to gear up the role of the National Seed Council (NSC). This council's primary goals are to manage the growth of the local seed industry and reduce Malaysia's reliance on imported seeds (including seeds, seed clones, vegetative propagation, and tissue culture) and breeding supplies (including semen and embryos). The development of high-quality date seeds locally will enhance the seed industry and, most importantly, support the economy of Malaysia's agriculture sector.

Date palm producers should be urged to implement good biosecurity standards by using Good Agricultural Practices (GAP) to maintain the sustainability of date palm plantation operational processes since date palm is mainly threatened by insect pests. This is due to the fact that applying GAP would raise competency and utilise better agricultural practices such as land and water management, biodiversity, integrated pest control, and quality standards, which will aid in the production of excellent date cultivars (Ben-Amor *et al.*, 2019). Motivation is essential for the date producers or farmers to build date palm plantations by establishing research centres with agricultural practice assistance. The centre could be a training centre, particularly for the farmers, by improving their technical skills in pest control methods and increasing awareness of detecting disease, managing pests, and effective preventive measures (including eliminating the potential for spread to other pest-free areas).

Shri and Dennis (2015) listed various benefits of the centres on a national or international level, including:

A. Create international industry benchmarks and descriptors for fruit quality, as well as packaging and marketing guidelines.

B. Prevent costly duplication of work while dealing with serious pest and disease issues.

C. Conserve the world date palm cultivars database and their conservation status.

D. High potential for bilateral and international collaboration in research.

E. Keep records on date palm genetic diversity, genetic erosion, germplasm conservation, and application.

F. Develop informative programs focusing on the nutritional benefits of dates and other commercial food products.

G. Build an interactive website that will be able to generate and spread knowledge on best practices in date cultivation, harvesting, postharvest techniques, and marketing. the coconut timeline provides a great date palm model (http://cocos.arecaceae.com/).

H. Enhance the genetic analysis study of valuable genes, which will lead to genetic improvements in fruit quality, date palm cultivation under climatic change, and industrial products.

Besides that, there are several government agencies (Table 2) that provide specific financing or soft loan for young entrepreneurs in the agriculture sector in order to produce progressive, competitive, creative, and high-income young agropreneurs (Ministry of Agriculture, 2011). Hence, there is a prospect for "the graduates of the training centre" to establish a date farm or to open a date farming consultation firm. The Malaysian government also proposes to establish contract farms with price control, guaranteed and easier market access.

Table 2. List of loan schemes

Loan Schemes	Agencies
Modal Usahawan 1Malaysia (MUS1M-i)	Bank Pertanian Malaysia Berhad (Agrobank)
Program Agropreneur Muda	Bank Pertanian Malaysia Berhad (Agrobank)
Skim Perusahaan Kecil Sederhana	Bank Pertanian Malaysia Berhad (Agrobank)
New Entrepreneur Fund 2	Bank Negara Malaysia (BNM)
Micro Enterprise Fund	Bank Negara Malaysia (BNM)
Fund for Small and Medium Industry 2	Bank Negara Malaysia (BNM)
Fund for Food	Bank Pertanian Malaysia Berhad (Agrobank)
Skim Pembiayaan Ekonomi Desa-i	Bank Kerjasama Rakyat Malaysia Berhad (BKR)

Date palm trees can also be used as waqf trees. Waqf date palm trees can help support the achievement of the Sustainable Development Goals (SDGs). Based on the SDGs scheme, trees are capable of providing income for the population (supporting SDG number 1), as well as food and medical supplies (supporting SDGs number 2 and 3). The earth's temperature can be maintained by trees, which supports SDG number 13 (Seymour & Busch, 2017). Besides contributing to the people's needs (through trees, fruit, and oxygen), the waqf tree also supports the ecosystem by balancing the food chain among flora and fauna (Aimi *et al.*, 2018). Furthermore, for the Muslim people, this act is considered an ibadah and will be rewarded by Allah. A study reported that Umar ibn Khattab (one of Rasulullah SAW's friends) made the first waqf of the date palm plantation in Khaibar (Awang *et al.*, 2018). The first project on date palm waqf trees in Malaysia is being carried out in Ipoh, Perak by Mr. Syful (Syful Tamar), an agriculture entrepreneur. The waqf tree scheme started in 2011. The types of date palm currently available as waqf trees are honey date palm and ajwa date palm. Firstly, the waqif will purchase date palms from Syful Tamar (the nazir), then name the recipients of those waqf trees. The nazir will manage the waqf trees into a productive waqf. Following that, Syful Tamar will plant the waqf trees in the recipient locations (Syful Tamar, 2018). Nazir is the party that carries the most responsibility for the waqf assets, including their benefits and development (Ali *et al.*, 2018). They are also responsible for educating and providing the waqf tree recipients with the basic knowledge

of how to manage the date palm trees (so that the trees will grow well and be productive), so that the recipients can enjoy the profits. The profits can be used to cover management and development costs, including acquiring new date palm trees. Waqf date palm trees will benefit not only the recipients but also the surrounding ecosystem and environment (Abad-ur-Rahman & Ayaz, 2015). Carbon dioxide is absorbed by trees, which reduces air pollution. The three categories of waqf tree beneficiaries according to current customs are:

A. Society for charitable and welfare purposes (such as old folks' homes, orphanage homes, and disabled centres)

B. Mosque and *musolla*

C. Academic institutions

To summarise, having a waqf tree can indirectly boost the expansion of Malaysia's date palm industry. Also, it is stated that this good conduct may earn numerous "barakah" or rewards from Allah due to its diverse and significant impacts (on individuals, the environment, and charitable reasons).

IV. CONCLUSION

The date industry in Malaysia faces various challenges with the most significant factors include higher import costs, pest and disease issues, especially the red palm weevil and fungus attack, climatic constraints that lead to the use of artificial ripening agents or ripening chemicals, and lack of local expertise on date farming. However, the industry has a prospect to be the backbone of the country's economy by modernising the date farming industry, such as streamlining the date export process to meet the international date quality requirement, effective marketing strategies, cultivating dates that have high market values, expanding the date plantation, development and regulation of the national seed industry, practising the MyGAP, establishing a date research and training centre, government agencies provide soft loans for young entrepreneurs, and systematising the waqf program. In conclusion, the high productivity of date palm plantations has the potential to expand Malaysia's agricultural industry. Furthermore, Entry Point Project (EPP) number seven, which refers to the Economic Transformation Programme (ETP), emphasises the importance of increasing fruit production to meet the high demand of domestic and international markets. Production is estimated to rise as cultivation areas spread and productivity per unit area of cultivation increases.

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