



## Establishing a Graduate Agropreneur Business Model for Food Security: A Case Study of the Melon Manis Terengganu (MMT) Fertigation Project

<sup>1\*</sup>Fakhrul Anwar Zainol, <sup>2</sup>Norhayati Ngah, <sup>3</sup>Wan Norhayate Wan Daud, <sup>4</sup>Chua Kim Aik

<sup>1,3</sup>Faculty of Business and Management, Universiti Sultan Zainal Abidin, Terengganu, Malaysia

<sup>2</sup>Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, Terengganu, Malaysia

<sup>4</sup>Green World Genetics Sdn Bhd

\*Corresponding Author Email: [fakhrulanwar@unisza.edu.my](mailto:fakhrulanwar@unisza.edu.my)

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### Abstract

Revitalizing Malaysia's agriculture, to cater to food security issues, has become a priority, given the current economic conditions faced by the government, due to the worldwide COVID19 pandemic. There are, however, a set of complex issues, which involve human capital development, trade agreements, domestic structural problems, and the appropriateness of techniques that must be tackled. Graduate agropreneurs, though, seem to be the future of the nation; while they, continue to struggle with profitability in these difficult economic times. The agricultural industry, however, supports the view that through business model innovation, farms can increase their competitive advantage. This paper identifies and describes some of the elements needed for these graduate agropreneurs when they consider business model innovation. A qualitative approach was used in this study to interview successful graduate agropreneurs involved in Melon Manis Terengganu (MMT) fertigation farming. The paper concludes that the relevance of a business model, in agriculture, relies on the fact that global competition and technological advances urge agropreneurs to look for new business structures and new ways to interact within the business environment. On the other hand, the agropreneur projects should take into consideration the viability of the agriculture projects to encourage a new generation of farmers; the young, energetic, and knowledgeable agropreneurs, to venture into high technology farming which also has substantial income potential. All factors, however, merit attention when graduate agropreneurs develop new business models for their farms.

**Keywords:** Food security, graduate agropreneurs, business model innovation, Melon Manis Terengganu (MMT), agriculture

### OPEN ACCESS

### INTRODUCTION

Food security by definition exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs (Food and Agriculture Organization of the United Nations, 1996). Thus, when Malaysia, which logged 8.2% of its GDP from agriculture in 2017, was ranked 40th in food security among the 113 countries tracked by the 2018 Global Food Security Index (2018), it was felt that Malaysia was left behind by its neighbor, Singapore, which was at the top of the ranking. A lot of questions arose including "What are we doing"? As of August 2019, Malaysia's spending for the import of food had reached RM34.2 billion and has significantly increased this upward trend from year to year. The country's food import bill has risen by an average of 6.5% per year from RM30 billion in 2010 to RM50 billion in 2018 (The Malaysian Reserve, 2019). If this trend continues, the country's food import bill will go beyond RM60 billion per year in the coming years. Although Malaysia is not in a food security crisis currently, prompt action is needed to prevent a food crisis from happening (C.K Aik, F.A Zainol & N. Arumugam, 2015). The current COVID19 crisis

shows that this pattern of food importation is not sustainable due to restrictions in place to curb the pandemic. The Malaysia Government needs to revive new agriculture development strategies to ensure the country's survival in the long term.

The Malaysian government wants to modernize the agriculture sector, with the objective of increasing food production. Consequently, agriculture has been identified as the third engine of economic growth in Malaysia, resulting in large scale farming projects being implemented throughout the country. In order to increase productivity, various elements (seeds and planting materials, labor, fertilizer, irrigation, crop protection, and others) must be utilized effectively. The government has taken speedy action to ensure our food supply remains sufficient at all times, and at a reasonable price for consumers, by implementing an approved new Food Security Plan which is aimed at increasing food production and productivity to achieve self-sufficiency, to provide adequate incentives and income, to produce more food locally, and to ensure adequate, safe, quality food for consumers. For example, the Ministry of

Agriculture and Agro-Based Industry (MOA) implemented *Dasar Jaminan Bekalan Makanan* (DJBM) to increase the production and productivity of the agro-food sector to satisfy a level of self-sustenance and ensure adequate quality checks within the food supply for safe consumption.

Another preventive measure, to curb the food crisis in the country, is the development of a new breed of farmers that have vision, energy, and knowledge, who are known as 'agropreneurs', to replace the existing ageing farmers. The Young Entrepreneur Unit was established in 2013 by the Ministry of Agriculture and Agro-based Industry (MOA) to encourage the involvement of young people in agriculture. The main focus of this initiative was to nurture high income agropreneurs among the young generation via various support programs within the agriculture industry value chain. The involvement of the young generation in the agriculture industry is crucial to avoid our country's dependency on imports, as well as, to develop more innovative, and apply more modern, agriculture for generations.

While the government put forth a concentrated effort to develop young agropreneurs, a survey shows that less than 30% of Malaysia's population is involved in agriculture and the ones who are, on average, are more than 60 years old (The Edge Market, 2018); which shows that this industry is less preferred by the younger generation. This study thus focused on a sustainable business model for the development of agropreneurs, among the graduates, and the model's impact on business profitability. This study employed a single case study methodology and utilized a narrative approach to analyze the case of graduate agropreneurs, who are active producers of Melon Manis Terengganu (MMT), using fertigation farming technology, to verify the proposed sustainable business model and business profitability relationships.

## LITERATURE REVIEW

### Challenges of Food Security in Malaysia

Malaysia's current population is estimated at 32.7 million with an average annual population growth rate of 0.4 per cent (DOSM, 2020). This population is expected to reach approximately 43 million people in 2050 (FAO, 2020). In a nutshell, by looking at the population growth of Malaysia today, food security must become the prime focus in order to provide a continuous supply of food to fulfil the growing demand. Even though agriculture is one of the pillars of Malaysia's economic growth, this sector is still struggling to meet the country's food consumption demands. This is because the agriculture industry in Malaysia focuses on the plantation sector, which is palm oil and rubber for exportation, while the food crop sector gets far less attention. Currently, there are five million hectares of land in Malaysia being cultivated for plantation crops in comparison to just one million hectares for food crops (The Edge Markets, 2019). In 2018, only 77,845.84 hectares of agriculture land were planted with vegetables and field crops (DOA, 2018).

Malaysia is the second largest producer of palm oil (MPOB, 2020) and the fifth largest producer of natural rubber in the world (Malay Mail, 2019). In fact, the value of Malaysian palm oil exports is about RM70 billion a year (The Edge Markets, 2018). However, when it comes to food crop production, Malaysia is way behind, when compared to other countries in Southeast Asia. For example, Malaysia only produces 71% of

its local demand of rice, 66% of fruit, 40% of vegetables and 29% of ruminants (The Edge Markets, 2018). Records also show that only eleven types of fruit, with a self-sufficiency ration (SSR) of more than 100 percent, fulfil the local demand; i.e., watermelon, papaya and star fruit are a few on that list, while other types of fruit, such as mango, need to be imported from other countries since mango's import dependency ratio (IRDA) is 73.5% (DOSM, 2020).

There are many factors which influence the farmers' and other agricultural players' preferred type of crop. The main reason is their consideration of the cost of maintenance since food crops require more effort, need higher capital, and a lot of manpower, when compared to plantation crops. The food crops are a lot harder to take care of because they require more attention, especially the management of pests and diseases. The agronomy practices, to grow food crops, are also more complicated when compared to plantation crops, since they require the application of specific fertilizers, with suitable irrigation at specific times, to keep plants healthy. In addition, the lifespan of most food crops is a few months to a few years when, after harvesting, farmers need to replant their crops to continue to get profit.

Agriculture is also viewed as an unpopular industry and not attractive enough for many people for various reasons including lack of knowledge, return of investment (both time and financial), and the lack of funds or land to initiate a start-up. A survey shows that less than 30% of Malaysia's population is involved in agriculture and they are, on average, over 60 years old (The Edge Market, 2018); which shows that this industry is less preferred by the younger generations. Some of these farmers also give up on agriculture; leave the land unplanted, and even sell their agricultural land for housing development, when they do not get the profits expected. The level of education among farmers in Malaysia also influences their view and understanding of agriculture practices. Compared to other farmers in Europe or the US, who are mostly university graduates, most of the farmers in Malaysia have only passed primary or secondary school. Thus, it is quite challenging for the agriculture authorities in Malaysia to educate farmers in good agriculture practices or introduce the application of modern technology in agriculture.

### Development of Graduate Agropreneurs

The concept of agropreneurship is gradually getting attention in both agriculture and entrepreneurship areas, especially in redefining new and modern agriculture. A recent study showed that agropreneurship is not wishful thinking or a new hype; it has a profound impact on business growth and survival (Verhees, Kuipers, & Klopčic, 2011). The concept of agropreneurship has been promoted to encourage the set up of agro enterprises in an effort to modernise the agriculture sector. The term agropreneurship actually originates from entrepreneurship, which refers to the venture creation process (Saeed, Yousafzai, Yani-De- Soriano, & Muffatto, 2013). Agropreneurship is also linked to efforts to innovate and explore new ways and means of venturing into a profitable agricultural enterprise. Therefore, agropreneurship can be defined as an act of creating a venture that incorporates elements of innovation in an agricultural setting. Since the concept of agropreneurship originates from the concept of entrepreneurship, studying agropreneurship must therefore include agropreneurial intention because this intention serves

as a crucial element in the venture creation process (Saeed et al., 2013).

The idea of agropreneurship is steadily gaining focus enough to be noticed in horticulture and business venture regions, particularly in reclassifying new and current agribusiness. A new report indicates that agropreneurship is not unrealistic reasoning or just another promotion; it actually, profoundly, affects business development and endurance (Verhees, Kuipers, and Klopčic, 2011). The idea of agropreneurship is being elevated to support the creation of ventures identified within the ranch arena with an end goal to modernize the horticulture areas. The term agropreneurship really starts from business, which alludes to the endeavour creation measure (Saeed, Yousafzai, Yani-De-Soriano, and Muffatto, 2013). Agropreneurship is additionally connected to endeavours which advance and look for new available resources and continues toward productive farming techniques and projects. Along these lines, agropreneurship can be characterized as a demonstration of creating an endeavour that joins the components of advancement on a farm. Since the idea of agropreneurship begins from the idea of business, considering agropreneurship, it should thusly incorporate agropreneurial expectations since they fulfil, as an urgent component, the endeavour creation measure (Saeed et al., 2013).

In recent years, researchers have given extraordinary consideration to the idea of agropreneurship expectation, for its incredible commitment to perceiving the potential of future agropreneurs, yet in addition, in understanding how the goals to become agropreneurs are framed. Past research on agropreneurial aims, among understudies, incredibly centre around the effect of individual factors on expectation development. The studies highlight the contribution of factors, for example, mentality, self-viability, seen social control, and other individual credits (Abdullah and Naem Sulaiman, 2013; Movahedi, Latifi, and Sayyar, 2013; Zakaria, Adam, and Abujaja, 2014). The after effects of these investigations demonstrated that singular factors are basic in clarifying understudies' agropreneurial expectations. However, the fact that an individual is surrounded by an extended range of cultural, social, economic, political, demographical, and technological factors (Turker & Selcuk, 2009), along with the concept that 'entrepreneurs can be made', highlights the importance of institutional variables in shaping one's entrepreneurial intention (C.K Aik, Mingramm, G., & F.A Zainol, 2017).

### **Business Model for Sustainable Agriculture**

While defining the business model concept has been among the first tasks of early researchers (Osterwalder et al., 2005), the definitions have been subject to much debate (Pateli & Giaglis, 2004) and a generally accepted definition has not yet emerged (Al-Debei & Avison, 2010; Morris et al., 2005; Shafer et al., 2005; Zott et al., 2011). Researchers have come up with different definitions in an attempt to explain what the essence, and purpose, of a business model is (Pateli & Giaglis, 2004). Definitions have had different foci and have been more, and less, inclusive. Timmers (1998) provided one of the first business model definitions. This definition influenced the definition of Weill and Vitale (2001) and is quite similar to the definitions of Mahadevan (2000) and Tapscott (2001). These definitions see the business model as architecture, and address the business network as the different roles of the workers and their interactions and relationships. Another early

definition comes from Rappa (2000) who emphasized the monetary aspects, which was also prominent in some other definitions (Afuah & Tucci, 2001; Mullins & Komisar, 2009; Teece, 2010).

These definitions often come with a stronger emphasis on the organization and strategic aspects (Afuah & Tucci, 2001; Morris et al., 2005). Most authors do stress that a business model does not cover the full strategy (Chesbrough & Rosenbloom, 2002). Others, quite explicitly, differentiate between business models and strategy. More comprehensive definitions combine the ideas of an architectural representation of the business network and the generation of revenues for the focal organization (Dubosson-Torrey, Osterwalder, & Pigneur, 2002; Morris et al., 2005). However, others are less inclusive in their business model definition and explicitly differentiate it from other concepts (e.g. strategy) or exclude some specific elements. For example, Timmers (1998) differentiates the business model from the marketing model, which addresses the commercial viability via a competitive advantage, positioning, marketing mix, and product-market strategy. Amit and Zott (2001) see the revenue model as a distinct, yet complementary concept to the business model.

A Business Model Canvas has been proposed by Osterwalder and Pigneur (2005) to be used in business model development and evaluation. The Canvas charts the nine elements of business models: key partners, key activities, key resources, value propositions, customer relationships, channels, customer segments, cost structures, and revenue streams. Previous business model innovation studies focused on large companies or technology while less attention has been paid to micro-small companies, such as farms, that have low technology products (e.g., crops, grains, milk, and potatoes). Because farm products do not involve high technology, farmers are limited when making product innovations. Instead, they focus on the production itself—how to grow, and market, their products at lower cost. Thus, the use of a business model canvas, in this study, would give insight into creating a more sustainable business model for the agriculture industry in the future. In the hands of an agropreneur, the Business Model Canvas could be used to grow a sustainable business model that can be nurtured and shared with other young people within the community who are not fortunate enough to have a university degree. These agropreneurs can then become trainers and mentors who can show other youth how to grow the food for tomorrow.

### **METHODOLOGY**

This section discusses the method used to investigate ABC AgroFarm for farming Melon Manis Terengganu (MMT) using fertigation technology. This study employed field visits to the farm at Marang, Terengganu, Malaysia. Field visits allowed the collection of data through a survey and interviews. Observation or field work is a more approachable method since it also allows the researchers to understand the process of melon farming in detail. The direct interview method was conducted by a researcher with a single sample to develop the case. Case studies are said to be an intensive study, which is defined as an in-depth study with few units of multiple variables. The purpose of an intensive study is to get a complete picture of a situation, a phenomenon, or event (Jacobsen, 2002). In a case study, the focus is on one particular unit. These units can be of different kinds and they

can be defined by both space and time. A unit can be an individual, a group, an organization, or a local community. The use of a case study is suitable when we want to understand the interaction between a specific context and a phenomenon (Jacobsen, 2002).

The study had two main goals during the in-depth interview session. In the first section of the interview session, the study used the Business Model Canvas (BMC) to map the owner's existing business model. According to Johnson et al. (2008), mapping an existing business model has a special and important purpose, in that; it describes the business model intended for innovation. In the second section of the interview session, the study discussed how business model innovation influenced the farm's profitability in order to explore innovation's impact on enhancing the agropreneur's project.

## CASE ANALYSIS & DISCUSSIONS

### Respondent profile

Mr. M has had a great passion and interest in agriculture, where creating his own farming project has always been his dream. He is a young and energetic 24 year old agropreneur, who graduated with a Bachelor's degree in Business Administration (Islamic Finance) from one of the reputable universities in Terengganu, Malaysia, but with a view to emerge in commercial agriculture. This inspired him to start up a fertigation melon farming project, which he solely owns and runs, and which focuses on the "Melon Manis Terengganu". Now he is a successful agropreneur with, more than, a 2,000 plant capacity and with a view to widen the stream, to recruit more graduate agropreneurs from among young Malaysians. He is a true one man army running the farm unit on his own. Starting with RM25,000 in capital, provided from his family, and some initial funding from a government agency, his 1 acre of land can produce up to 2.5 tons of melon per cycle, with a maximum capacity of 4 cycles per year. The vision of his business is to be the best melon farm, which promotes Good Agriculture Practices (myGAP), in Malaysia, to provide deliberately unique and quality hybrid melons to the consumer, and to contribute significantly to the well-being of society. The mission is to support the government in its national food security agenda and to develop more young agropreneurs who can embark on commercial agriculture.

### Profile of the Product: Melon Manis Terengganu (MMT)

*Cucumis melo var inodorus* cv. Manis Terengganu 1 (locally known as Melon Manis Terengganu) is one of the melon species under the Cucurbitaceae family. The outer surface of the Melon Manis Terengganu (MMT) fruit is smooth yellow-golden flesh, without the netted beige skin of the cantaloupe, while its fruit has a sweet, crunchy flavour, bright orange colour and a musky aroma. The sweetness of MMT fruit at full maturity is 13-19° Brix (Muhamad and Nurul Adillah, 2019) which makes it craved by many who have eaten it. The Melon's fruit has good nutritional value, high antioxidant properties, and essential vitamins that the human body requires (Ismail et al., 2010; Lester, 2008; Lester et al., 2010); thus influencing its market demand (Mohd et al., 2019). This fruit is a good choice for the success of Mr. M's MMT project. Consumer demand for MMT fruit encouraged the agropreneurs to cultivate this melon cultivar since it offers high profit return. The current retail price for a grade A MMT fruit is between RM8 to RM12 per kilogram which at farm price is about RM6 to RM8 per kilogram; depending on the market supply (Tahir et al., 2020). Melon Manis Terengganu is a

short-term plant with fruit harvested 60 days after planting. In general, MMT can be planted three to five seasons per year; thus it can generate a high income for the farmers. In addition, MMT fruit can be kept for 2 weeks, depending on storage condition (Muhamad & Nurul Adillah, 2019) which gives the agropreneurs more time to market their harvest.

Melon Manis Terengganu (MMT) is exclusively planted in Terengganu and is well known as Terengganu's iconic fruit (DOA, 2017). As the MMT cultivation has potential to generate higher profits when compared to other crops, the Terengganu state government has committed to investing more money by opening up more areas to the expansion of MMT cultivation. In 2015 alone, the Terengganu government established more than 400 fertigation facilities around Terengganu state with the aim of cultivating more than 200,000 melon plants. It was estimated that these facilities could produce more than 600 metric tons of MMT fruit, worth RM2 million per season, which would account for about RM6 million in revenue per year (NST, 2015). However, the production of MMT fruit is still low and unable to fulfil the local demand. Many factors may contribute to this problem such as the cost to build the MMT farm infrastructure which is quite high, threat by pests and diseases; and lack of knowledge in agronomy practices amongst farmers.

### Fertigation Farming Technology

In agronomy, water and fertilizer are two of the critical elements needed to grow plants. Plants need water for photosynthesis, and to transport nutrients in the plant body (Gonzalez-Dugo et al., 2010), while fertilizer is needed to supply enough nutrients for plant growth (Singh et al., 2013). Nowadays, most farmers use fertigation farming technology to water and to supply fertilizer to their crops with soluble nutrient solutions which are mixed with the water to feed the crops. This fertigation system is able to supply the correct, uniform, and adequate amount of water and nutrients straight to the root zone, thus reducing water usage while improving crop nutrient uptake; thereby saving in the cost of production. In addition, fertigation farming technology helps farmers to cultivate plants on infertile land and maximizes crop yield through this efficient agronomy practice.

There are three types of fertigation system technology that are commonly used in Malaysia which are an open system, a closed system, and a semi-closed system. The preference of the type of system used by the farmer depends on the types of crops, land area, and the farmer's capital. Nowadays, many farmers have upgraded their fertigation systems to incorporate current technology, such as sensors, to detect the amount of water in the soil. Sensors are also used to measure soil acidity (pH), and electrical conductivity (EC) to determine the quality of the water and fertilizer mixture before it is supplied to the plant through the fertigation system.

In Malaysia, many food crops such as leafy vegetables, chilies, cucumbers, tomatoes, and melons have been grown using fertigation farming technology. Among these, the cultivation of melons using fertigation farming technology, was viewed as more promising since this high-valued fruit can provide a better profit to the farmers. In Terengganu Malaysia for example, melon farmers who used this technology proved that they could make a high profit even though they needed to spend more money for business start-up (Utusan Borneo, 2018).

## Business Model Innovation

This study used the Business Model Canvas blocks as its main tools in order to explore the business model innovation adopted by the respondent in this study. Our purpose in using these blocks was to help the respondent map the business model while identifying its key components. Table 1 presents comments from the respondent framed by these blocks.

As Table 1 shows, the development of business model innovation starts with the customers in mind. In this particular case, the market segment is in local communities described as urban and sub-urban communities which live in Kuala Terengganu/Marang and Kuala Nerus districts in the state of Terengganu. These communities have more purchasing power when compared to other districts in the state. Thus, selling high quality, premium, Melon Manis Terengganu

(MMT) at RM8-10 per kg is not an issue for this particular market segment. All of the strategies to capture this market then followed, starting from value proposition (high premium quality), to value chain (social media marketing), and customer relationships (money-backed guarantees).

On the production process, there were a few main areas that needed focus to ensure the success of the project, such as, the key resources (land, capital, fertigation systems, inputs), key activities (land preparation, installation of fertigation systems, melon farming/production, marketing), and key partners (mentor company, Department of Agriculture, suppliers of inputs, related government agencies). Among the interesting findings, were the use of the technology in farming; i.e., the fertigation system, and the role of the Mentor Company, in guiding the newcomer agropreneur in this agriculture industry.

Table 1: The Business Model Canvas Blocks

No.	Business Model Innovation	Respondent (Verbatim)
1.	<i>Customer Segments</i> - Local communities (within Kuala Terengganu/Marang and Kuala Nerus districts)	"Since 2,000 polybags/plants, considered as small scale, the locals urban and sub urban communities provided me enough market for my farm"
2.	<i>Value Propositions</i> - Premium quality fruit - Premium services	"My farm focus is on producing high quality premium fruit which around 1.2kg -1.5kg per fruit (average brix at 15-17) with premium personalized customer service"
3.	<i>Value Chain</i> - Use social media to connect the farm to end users - Have regular buyers - local fruits hawkers/fruit sellers/middlemen	"I sell MMT via online by promoting it using social media like Whatsapp, Facebook & Instagram and offline to existing fruit sellers and middlemen"
4.	<i>Customer Relationships</i> - Offer money-backed guarantee to end user customers - Only sell high quality fruits - Always update the farm progress at social media	"To ensure my customers know the expectation production date, I always update my farm progress at social media. I only sell high quality fruit and replace them for FREE if got any defaults"
5.	<i>Revenue Streams</i> - Selling of fruits (MMT and other melon) - Selling of vegetables (rotational crops) - Selling of inputs (fertilizers)	"I practiced rotational crops as a good agriculture practices as well as to get additional incomes since vegetables are short term crops by nature. I also repacked the fertilizers and sell it via online platform"
6.	<i>Key Resources</i> - Land - Capital - Fertigation systems - Inputs	"My major resources to start this project were land and capital where I got it from my immediate family supports. While funding for fertigation systems and inputs, I got it through government agency"
7.	<i>Key Activities</i> - Land preparation - Installation of fertigation systems - Melon farming/production - Marketing	"Main activities as a farmer of course being concentrated at farming activities that includes land preparation, system installation and melon farming. However, marketing is a big challenge that all the farmers must (be) aware in order to success in this industry"
8.	<i>Key Partners</i> - Mentor company - Department of Agriculture (DOA) - Suppliers of inputs - Related government agencies	"My key partners that help me a lot in developing this farm comes from people in mentor company, DOA, various suppliers and government agencies that promote agropreneurship"
9.	<i>Cost Structure</i> - Land preparation and fertigation systems - Equipment and maintenance - Inputs (fertilizers and pesticides) - Transportation - Marketing - Labor - Utilities	"Initial setup mostly goes to land preparation and system installations. Along the farming process, major expenses consist of equipment/maintenance, input and other costs such as transportation, marketing, labor and utilities"

Table 2: The Graduate Agropreneur Business Model

<b>Key Partners</b> - Mentor company - Department of Agriculture (DOA) - Suppliers of inputs - Related government agencies	<b>Key Activities</b> - Land preparation - Installation of fertigation systems - Melon farming/production - Marketing	<b>Value Propositions</b> - Premium quality fruit - Premium services	<b>Customer Relationships</b> - Offer money-backed guarantee to end user customers - Only sell high quality fruits - Always update the farm progress at social media	<b>Customer Segments</b> - Local communities (within Kuala Terengganu/Marang and Kuala Nerus districts)
	<b>Key Resources</b> - Land - Capital - Fertigation systems - Inputs		<b>Value Chains</b> - Use social media to connect the farm to end users - Have regular buyers - local fruits hawkers/fruit sellers/middlemen	
<b>Cost Structure</b> - Land preparation and fertigation systems - Equipment and maintenance - Inputs (fertilizers and pesticides) - Transportation - Marketing - Labor - Utilities		<b>Revenue Streams</b> - Selling of fruits (MMT and other melon) - Selling of vegetables (rotational crops) - Selling of inputs (fertilizers)		

In a nutshell, mentoring involved a long-term, focused, relationship which supported the growth and development of the mentee. The mentor became a source of wisdom, teaching, and support, as well as a buddy that provided advice on how to run the business, based on their experiences. This makes the learning curve, of the mentee, faster when compared to going through the hard knock way of making mistakes and learning from them. The benefits of the mentor-mentee relationship have been discussed by scholars about various platforms. For instance, Botha & Esterhuyzen 2012; Herrington & Kew 2015, highlighted the importance of mentoring for entrepreneurs and small business owners to develop sustainable businesses that create jobs. On the other hand, previous studies on mentoring focused on profiling mentors (Martin 2008), the effectiveness of mentoring programs (Swanepoel, Strydom & Nieuwenhuizen 2010), perceptions of mentoring on venture growth (Ayer 2010) and self-efficacy (Cline 2011). In addition, Botha and Esterhuyzen (2012) established the willingness of small business owners to act as business mentors in their research. They suggested using keen, skilled small business owners, as mentors, to increase the existing number of mentors that can help emerging entrepreneurs to grow successful businesses. In the context of developing graduate agropreneurs, the role of the mentor is very significant in terms of providing the guidance, motivation, moral support, as well as networking. Without a mentor, it might take years in order for them to get noticed in the industry.

### Business Profitability

This study revealed that the 4 cycles' returns per year for MMT planting could provide a combined gross income of RM29,405 and net profit of RM8,673 (Table 3). The pattern of gross income shows significant improvement from cycle to cycle starting with RM6,000 for season 1 to RM11,073 for season 4 which reflected the learning curve that was experienced by the agropreneur. The impact of the COVID-19 pandemic in season 2 resulted in the project's stated loss in revenue due to the Movement Control Order (MCO) that was imposed during March-June 2020. Taking season 4 as the best season,

this would mean that the project could provide an average income of RM3,691 per month (RM11,073 / 3 month per cycle) and average net profit of RM1,669 per month. However, certain conditions have to be met to achieve these results. These conditions include; a) suitable environmental conditions (e.g. favourable climate); b) appropriate technology (e.g. fertigation technology) c) available inputs (planting materials, fertilizers, pesticides, etc.); d) availability of capital or credit source; e) favourable market for farm produce, etc.

Table 3: Average Income per cycle (Capacity: 2,000 plants)

No.	Cycle/Season	Gross Income RM	Expenses RM	Net Profit RM
1.	Season 1	6,000	5,322	678
2.	Season 2	2,100	5,200	(3,100)
3.	Season 3	10,232	4,145	6,087
4.	Season 4	11,073	6,065	5,008
	Grand Total	29,405	20,732	8,673

Though profitability is crucial for any business, the business model is the key to building growth and avoiding a flat income curve. Many questions can potentially be raised to improve business profitability. Do we precisely know our customers? How can we improve our revenue with current clients? Is our company involved in the customers' results and performance? Have we experimented by implementing a recurring revenue stream? A business model (Table 2) justifies the logic, the data, and other evidence that supports a value proposition for the customer, and a viable structure of revenue and costs for the enterprise which delivers that value. In short, it's about the benefit that the enterprise will deliver to customers, how it will organize to do so, and how it will capture a portion of the value that it delivers.

A good business model will provide considerable value to the customer and collect (for the developer or implementer of the business model) a viable portion of this as revenue. This study, for example, shows how the business model innovation changed the nature of the agriculture project from its struggling

stage into a profitable venture. By positioning the farm as a premium quality fruit producer, the owner of the farm sold the melon (MMT) at a higher price which meant a higher profit margin. However, selling a premium product also comes with the strategy to tailor the market that has been served which means the customers expect premium and customised service, together with the price they pay. It also means the customer relationship needs to be maintained to ensure recurring purchases and customer loyalty. Money-back guarantees and regular updates on farm progress, on social media, are part of farm strategies nowadays. Furthermore, having multiple streams of income, such as fruit, vegetables, and farming inputs, is a good strategy to sustain cash flow for the project and ensure the survival of an agropreneur's project start-up.

## CONCLUSION

These new dynamics in food production and trade have modified the way the government attains the issue of food security. The objective of this document is to identify components to create and capture economic value, in the context of agropreneur development among graduates; the graduate agropreneur business model. The business model canvas provides a lean, dynamic, and flexible way to model a farm enterprise. Value Propositions for the farm business are formulated based on the discovery of market opportunities in the Customer Segment and a leverage of strengths in other parts of the business. Actions, in other building blocks of the business model canvas, flow from the value proposition. This approach to business modelling aids in the discovery of new opportunities and the formulation of strategies to create value by facilitating change in the building blocks of the business model. Further, the business model canvas is a tactile learning process that is particularly effective for the management of education for farmers. The relevance of business models in agriculture relies on the fact that global competition and technological advances urge agropreneurs to look for a new organizational setup and new ways to interact with their institutional environments. In this sense, business models can be seen as tools to ensure a firm's competitive advantage (Davenport et al., 2006; Teece, 2010).

Studies have shown that one of the most important considerations in undertaking an agropreneur project is the availability of a market. The assurance of a market is of prime importance especially if one considers that the produce of agriculture projects is highly perishable, and thus, has a limited marketability. Marketing contracts and other forms of marketing agreements are helpful instruments to guarantee that the farmers have a ready market. In this study, one basic reason why the agropreneur was successful in his project was his nearness to Kuala Terengganu and Kuala Nerus, a market centre with relatively unlimited demand and high purchasing power. The future prospects of MMT, to be effective, definitely depend on the availability of a market and a host of other factors. The agropreneurs' adoption of fertigation technologies will certainly be highly influenced by the economic benefit derived from using such technologies. The market-driven agropreneur projects will certainly go a long way toward transforming projects from their dependence on local demand to a bigger commercial and market-oriented farming enterprise, which should include the export market.

The profitability and sustainability of agropreneur projects have been widely discussed in various forums. It was found to differ significantly among crops, among locations given the

same crop, and even among the farms. Yield, and profitability of agropreneur projects, is affected by a number of interacting factors. These include the effects of the environment (soil, topography, climate), socioeconomic (tenure, capital), and technical (available technology and management requirements) factors that could either be within or beyond the control of the agropreneurs. However, the one crucial question is; "Does the project provide an attractive income to the graduate agropreneurs"? As a graduate from university, there are always opportunity costs in venturing into agropreneur projects as oppose to having a paid job within the government or private institutions. Thus, the agropreneur projects should be taken into consideration since the business attractiveness of agriculture projects will encourage a new generation of farmers; the young, energetic and knowledgeable agropreneurs, to venture into high technology farming that promises substantial income potential.

In view of the current scenario, of a lack of harmonization in the food value chain, without public or private collaboration, in order to attain food security in Malaysia, and to develop more graduate agropreneurs, the following is a proposal to be included in the business model: firstly, a focus on its development including human capital, product development, and market development. Secondly, to provide support to agropreneurs in order to consolidate their activities into a larger scale to enhance a better market structure (which could grow into exportation), encourage more participation, and promote public and private collaboration. The end game is to have so many farmers that Malaysia sustains its own food supply chain as well as surplus enough for the creation of revenue through exportation. Finally, to formulate a more comprehensive policy, providing support so that all components of the industry are available to both the public and private sectors, and which is tailor-made for the agriculture industry in Malaysia.

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