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Constraining factors influencing the production of coconut among smallholders in Batu Pahat, Johor, Malaysia

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Abstract

Malaysia is one of the top ten coconut-producing nations in the world, and coconut is the country's fourth-most significant industrial crop after oil palm, rice, and rubber. Coconut production is an important source of income and employment for over 100,000 households that rely entirely or partially on coconut, particularly among smallholders. The sector has given smallholder farmers the option to diversify their resources for coconut farming while also meeting local demand for fresh consumption and the coconut processing industry. Coconut smallholders were experiencing a productivity gap as a result of differences in agricultural techniques, socioeconomic situations, and economic factors such as demand and supply, which resulted in price volatility and varying profitability of coconut. The current study looked into topics such as socioeconomic status as well as factors and constraints that affected coconut production profitability and technical efficiency among smallholders in Batu Pahat, Johor, Malaysia. A random selection procedure was used to pick a sample of 152 smallholders. The Kaiser-Meyer-Olkin (KMO) for exploratory factor analysis (EFA), was 0.716, indicating that all items were of excellent quality and reliability. A higher EFA score indicates that the government factor, followed by knowledge and agronomic methods, was the most important factor influencing smallholders' profitability and technical efficiency in their coconut production in Batu Pahat, Johor. The major constraints were a lack of expertise, the volatility of the coconut price, and a lack of technology.

1. Introduction

The coconut (*Cocos nucifera* L.*)* is an important Arecaceae family member (palm family). Coconut palms may reach a height of 30 meters and have six long pinnate leaves that are 60 to 90 cm long. Because of its various uses and high usefulness, the coconut palm is known as the 'Tree of Life' (Green, 1991; Naik, 2017). The coconut palm is a perennial crop grown mostly in the tropics and subtropics, such as India, the Philippines, Malaysia, Sri Lanka, and the Indian Ocean. To date, the coconut palm has been planted in 90 countries, most of which are in Asia and the Pacific (Pham, 2016). The 1960s Green Revolution resulted in a significant rise in the production of food crops and cereals such as wheat, rice, maize, and other grains. In industrial crop cultivation, such as coconut, tea, sugarcane, palm oil, and cotton, comparable attempts have been made to reach similar importance. The coconut palm is the tree that provides a livelihood for a large number of people all over the world and acts as a source of food security, especially in Asia Pacific countries. In 2014, Indonesia alone produced about 18 million metric tonnes (mt) of coconut, while around 12 million people in India were expected to be employed in the coconut industry (cultivation, processing, and downstream industries) (Vinodhini and Deshmukh, 2017). The coconut industry in Malaysia is divided into two categories: estate or plantation and smallholders. Over 90% of coconut plantations are smallholders, with landholdings of less than one hectare. Smallholder coconut lands were found in Peninsular Malaysia, Sabah, and Sarawak, with an estimated population of 90,000 to 100,000 smallholders (Sivapragasam, 2008). Malaysia produces roughly 555,120 tonnes of coconut every year, according to the Food and Agricultural Organization of the United Nations (FAO). Malaysia is still one of the world's top 10 coconut producers, and coconut is the fourth most

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significant industrial crop after oil palm, rice and rubber. According to FAOSTAT (2016), the country's coconut production increased from 550,140 tonnes in 2010 to 624,152 tonnes in 2013. In order to meet demand, the Malaysian government has planned several actions to expand coconut output. Malaysia was ranked 11th out of the top 12 producers in 2010, with 0.055 metric tonnes produced. This ranking however dropped from 10th to last in the standings between 2014 and 2015.

The coconut industry's productivity and profitability are influenced by a variety of factors. Farmers' labour and performance are influenced by socio-demographic factors such as age, gender, marital status, family size, number of family dependents, level of education, experience, and income (Siti, 2007). According to Herath *et al*. (2015), limited productivity has a negative link with low experience or education level. They said that farmers without the necessary expertise or knowledge to manage their farms would have greater difficulty dealing with insect attacks or plant diseases than farmers with better technical knowledge and a higher education level. Hussain and Hanjra (2004) highlighted that better education and experience contribute to higher output and yield since farmers are more likely to adopt new systems and effective agricultural practices, as well as understand how to reduce risks if something goes wrong with their crops. "Low knowledge will continue to be poor income," they added. As a result, it is worth noting that knowledge, experience, and education are all key components in agricultural progress (Asfaw and Admassie, 2004).

Government agencies, on the other hand, play critical responsibilities in spreading information and technical expertise, as well as advising suitable communication tactics and good channels to persuade smallholders to adopt new technologies (Akinbile and Otitolaye, 2008). According to Christoplos (2012), if knowledge is conveyed to smallholders properly, extension agents may push them to go from "business as usual" to greater productivity and higher revenue. Furthermore, it was highlighted that an extension agent played a vital role in giving smallholders training skills and seminars, which may help smallholders get adequate information and direction on their farming, resulting in enhanced production and productivity (Rivera, 2011).

Agronomical practices were used to define fertilizer usage, according to Muyengi *et al*. (2015), in which, fertilizer is one of the key inputs that may affect coconut output and productivity by increasing or decreasing it. However, it was clear that the majority of smallholders in their research region did not utilize fertilizer, which resulted in a decrease in production and productivity. Mandal *et al*. (2004) explained that chemical fertilizer will reduce organic soil content and is not suitable for certain soil which may reduce the potential benefit of soils. On the other hand, the application of chemical fertilizer is needed to do a soil test to see whether the soil is above or below the requirement (Ogoke *et al*., 2009). Additionally, chemical fertilizers will make soil become acidic and enhance soil contamination and water pollution, and thus may reduce technical efficiency (Chandini *et al.,* 2019). Another factor that affects the productivity of coconut is pests and smallholders need to fix the problem and use pesticides in their farming system. They concluded that the Rhinoceros beetle (*Oryctesmonoceros*) was the major pest in coconut farming and caused tree infestation. Smallholders have been using an intercropping system which is planting crops such as maize, cassava, sorghum and pineapple to cover the loss of coconut and get some profit but still failed because of coconut mites.

The size of the planting area has a significant impact on the output of coconut. The amount of cultivated area is projected to have a favourable impact on productivity (Njeru, 2010). Planting area has a negative association with technical efficiency and productivity (Bhatt and Bhat, 2014). Farmers with a small-scale planting area used all of the agricultural input more efficiently than farmers with a large-scale planting area. To maximise output, farmers with limited planting space have improved soil fertility. On the other hand, inefficient farmers on large farms prefer to focus entirely on new technology and procedures that help them increase production. Therefore, the objective of this study was to analyze and identify the factors influencing the production of coconut among smallholders in Batu Pahat, Johor, Malaysia.

2. Materials and methods

2.1 Location of study

According to the Department of Agriculture (DOA) Malaysia (2017), the Batu Pahat region in Johor is the most productive area of coconut produced by smallholders in Malaysia (Table 1). The overall output of smallholders in Batu Pahat was around 43,644 mt. The samples were collected from three districts in Batu Pahat: Peserai, Parit Raja and Rengit. Using a random sample, the sample size is 152, whereas the population of coconut smallholders in Batu Pahat or all of these districts is 253. Rengit has a population of 128 respondents, and the sample size is around 76. Other districts, such as Peserai and Parit Raja, contain 55 and 70 respondents, respectively, resulting in a sample size of 33 and 43 respondents for these two districts. Following that, the sample size is established based on Krejcie and Morgan's findings (1970). This sampling

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Table 1. Production of coconut in Johor (2017)

Districts	Planted Area (ha)	Harvested Area (ha)	Production (metric tonnes)
Batu Pahat	5, 887	4, 208	45, 000
Johor Bahru	72	45	957
Kluang	572	542	3,311
Kota Tinggi	134	89	2,291
Kulai Jaya	5	5	42
Mersing	448	405	3,647
Muar	908	704	7,759
Pontian	3,608	3,564	29,652
Segamat	742	562	4,746
Tangkak	2,551	2,272	12,384
Total	14,931	12,356	107,731

strategy is used to choose interviewees using a structured questionnaire, which appears to be an effective way of determining the factors and relationships between all variables or issues. Exploratory Factor Analysis (EFA) was used to analyse data in this study to discover variables and constraints that impact coconut output among smallholders in Batu Pahat, Johor, Malaysia.

2.2 Exploratory factor analysis

According to Hadi *et al*. (2016), exploratory factor analysis is a statistical procedure used to reduce a large number of observed variables to a small number of factors or components reflecting that the clusters of variables are in common. The group of observed variables is identified and transformed into a small number of related factors in the correlation. EFA captures the groups of observed variables that are consistently moving together. Factor extraction and factor rotation have been identified from observed variables. Therefore, EFA is a useful tool for investigating the relations among observed variables and a small number of underlying factors (Reio *et al.,* 2015).

The sample size and the strength of the relationship between indicators (variables) are two main issues to be taken into consideration to determine a particular set of EFA data (Pallant, 2010). The adequacy of sampling is tested through KMO (Kaiser, 1970; Kaiser, 1974; Maskey *et al*., 2018), while the strength of the relationship among variables is assessed through Bartlett's test of sphericity (Bartlett, 1954). It is worth noting that the indicators should be measured at the interval level. According to Kaiser (1974) to recommend acceptance, the value of KMO should be greater than 0.5 which is interpreted as barely accepted. In addition, if the value is more than 0.9, it shows that they are superb (Field, 2010).

The exploratory factor analysis (EFA) was used to discover the factor structure of the measure and examine its internal reliability (Bryant and Yarnold, 2004). The reliability test is commonly used by sociologists to calculate the stability and consistency of measurement methods. EFA is a multivariate statistical technique used to reduce a large number of variables into a smaller, usable group of factors which can then be subjected to further analysis (Churchill, 1991; Hair *et al.,* 1998). The EFA was commonly used to reduce data into a smaller set of factors that can be used to reconstruct the original variables (STATA, 2003).

3. Results and discussions

3.1 Socio-economic characteristics of respondents

Table 2 shows that the majority of smallholders in the coconut business are men, with only 34 female responses. The time-consuming and energy-intensive harvesting operations may dissuade female smallholders from participating in the activities (El Pebrian and Yusof, 2016). Table 2 reveals that the average age of the smallholders in Batu Pahat, which included 114 respondents (75%), ranged from 50 to 69 years old. There was only one (1) single smallholder. Despite the fact that the majority of them were married, their family consisted of just 4 to 6 individuals. The majority of coconut smallholders (62.5%) had completed secondary school (95). Only 1.3% (2) of coconut smallholders attended tertiary education or university level, while the remaining 36.2% (55) completed primary education. Malays made up 90.8% of the smallholders, while Chinese made up 9.2%. The findings also suggest that the majority of smallholders in the coconut industry were engaged in full-time planting. Full-time smallholders account for 94.5% of responses, while part-time smallholders account for 5.5%. There were 48 smallholders (31.6%) with 41-50 years of experience or engagement in coconut industry-related activities. This is consistent with the fact that the majority of smallholders in the three areas were in their middle years. It was discovered that the older generation had passed on their expertise in coconut-producing activities to the younger generation to keep the tradition going and meet demand.

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Table 2. Socio-economic characteristics of respondents (by frequency).

Variable	Categories	Number of respondents	Percentage (%)
Gender	Male	118	77.6
	Female	34	22.4
Age (years old)	19-29	3	2
	30-49	27	17.7
	50-69	114	75
	70-79	8	5.3
Marital Status	Married	151	99.3
	Single	1	0.7
	Separated	0	0
Education Level	Primary	55	36.2
	Secondary	95	62.5
	University	2	1.3
Race	Malay	138	90.8
	Chinese	14	9.2
	Indian	0	0
	Others	0	0
Planting Mode	Full time	143	94
	Part-time	9	6
Experience (year)	0-10	17	11.2
	Nov-20	16	10.5
	21-30	21	13.8
	31-40	45	29.6
	41-50	48	31.6
	More than 51	5	3.3
Nationality	Malaysian	152	100
	Non-Malaysian	0	0
Land Type	Own	151	99.3
	Sharing	1	0.7
Field Size	1.0 – 2.0	84	55.3
	3.0 – 4.0	50	32.9
	5.0 – 6.0	17	11.2
	More than 7	1	0.6

All of the smallholders were Malaysians, and 99.3% of them owned their landholdings. There was only one smallholder who shared farmland. It was shown that the majority of smallholders had land holdings ranging from 1.0 to 2.0 acres. This is followed by 50 smallholders who owned 3.0 to 4.0 acres of land and only one individual who had more than 7 acres of land.

3.2 Analysis of exploratory factor analysis

The factor analysis was conducted to identify factors and constraints that influence the production of coconut among the smallholders in Batu Pahat, Johor, Malaysia. Kaiser-Meyer-Olkin (KMO) showed a value of 0.716 which was above the minimum required value of 0.5, and Bartlett's Test with a significance of 1% indicated that the factor analysis is appropriate for this study. Kaiser (1974) asserted that the value of KMO that is greater than 0.5 is considered as barely accepted. However, the value between 0.5 and 0.7 are considered quality good, whereas the value between 0.7 and 0.8 is classified as moderately good. On the other hand, a value is considered great if it is between 0.8 and 0.9. In addition, if a value is more than 0.9, it would be classified as superb (Field, 2010).

The Cronbach's Alpha for reliability test for each factor returns a value that is above 0.5, indicating that the variables were valid and reliable (Table 3). The factors analysis that influences the production of coconut among the smallholders were the agronomic practices, government agency, knowledge of smallholders and other constraints that are faced by the smallholders.

The result in Table 4 shows that the factor loadings of items were all greater than 0.6. There were four factors identified, namely the agronomical practices, government agency, knowledge and constraints. No significant increases in the alpha value for any scale have been achieved by eliminating more items. All factors fall in the acceptable range of 0.5. A high Cronbach's alpha score shows a high correlation among the items. All four

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factors have 82.970 of the cumulative variances explained in the data.

Table 3. KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.716
Bartlett's Test of Sphericity	Approx. Chi-Square	2636.718
	df	91
	Sig.	0.000

The first factor was labelled as "Agronomic Practices" with three items extracted. The factor loading of the items was greater than 0.6. All items were accepted since they fall in the acceptance range. The Cronbach's alpha score for the three items was (0.726), which was above 0.5. The items included for agronomic factors were "fertilizer is important to increase production of coconut", "using the optimum of fertilizer will improve the production of coconut" and "I get the information about fertilizer from the extension agent". The highest item for factor loading was 0.760 and the lowest was 0.611. All the items for the agronomical practices factor were explained by a 27.931% variance in the data cumulative variance of this data. However, the eigenvalue for this factor was 3.910. The agronomical practices were found to be the third important factor that influenced coconut production. In addition, good agronomical practices can be further enhanced to produce higher coconut production (Mohamad Nor *et al.,* 2015). These agronomic practices included optimum crop nutrition and fertilizer management which

Table 4. Factors and constraints that influence the production of coconut among smallholders in Batu Pahat, Johor.

Factors Extracted	Factor Loading
Factor 1: Agronomic Practices	
F1: Fertilizer is important to increase the production of coconut.	0.760
F2: Using the optimum fertilizer will improve the production of coconut.	0.678
F3: I get the information about fungicides and pesticides from the extension agent	0.611
Cronbach's Alpha	**0.726**
Eigenvalue	**3.910**
% variance explained	**27.931**
Cumulative % variance explained	**27.931**
Factor 2: Government Agency	
EA1: Extension agents have a wide knowledge and are very helpful in the implementation of coconut cultivation.	0.671
EA2: Frequent observation and monitoring of coconut cultivation management by the responsible agency such as extension officers, organizations and government.	0.751
EA3: Extension agents always do a seminar for the farmer to increase smallholder's income.	0.666
EA4: The organization such as the State Agriculture Department provides information, training, demonstration and sharing experience about coconut cultivation management.	0.743
EA5: The government provides incentives in a form of fertilizer, equipment, pesticides, fungicides and others.	0.812
Cronbach's Alpha	**0.837**
Eigenvalue	**3.215**
% variance explained	**22.967**
Cumulative % variance explained	**50.898**
Factor 3: Knowledge of Smallholders	
K1: Most of the smallholders cultivated the coconut full-time.	0.671
K2: Knowledge is an influence on whether coconut production increasing or decreasing.	0.827
K3: The smallholders need enough education to manage coconut cultivation to get a higher yield.	0.897
Cronbach's Alpha	**0.604**
Eigenvalue	**3.156**
% variance explained	**22.546**
Cumulative % variance explained	**73.443**
Factor Constraints	
C1: Lack of technology	0.740
C2: Lack of marketing information	0.728
C3: Instability price of coconut.	0.660
Cronbach's Alpha	**0.679**
Eigenvalue	**1.334**
% variance explained	**9.527**
Cumulative % variance explained	**82.97**

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contributed to the highest yield and production of the crop (Magat, 2014). According to Sharadraj and Mohanan (2014), establishing a coconut plantation in a certain area that possesses high humidity and heavy rainfall would cause a serious problem as the bud would easily rot. This will affect the coconut economy. For these reasons, fungicide is important to the coconut plantation to avoid the coconut nut being affected by diseases. Besides, fungicide application is needed in the coconut plantation to avoid the competition of the nutrients with the weeds.

The second factor was labelled as "government agency". The government agency was extracted by five items. The factor loading of items was acceptable where one item was greater than 0.8, while the four items were less than 0.8 but higher than 0.6. All the items were acceptable since they fall in the acceptable range. The Cronbach's alpha score for these five items was 0.837, which was above 0.6, indicating that this question has a good consistency. The items included for government agency factors were; "extension agents have a wide knowledge and very helpful in the implementation of the coconut cultivation", "frequent observation and monitoring towards coconut cultivation management by responsible agencies such as extension officers, organization and government", "extension agent always conduct seminars for the farmer to increase the smallholders' income", "the organization such as the State Agriculture Department provides information, training, demonstration and sharing experience about coconut cultivation management" and "the government provides incentives in the form of fertilizer, equipment, land clearing, pesticides and other". All the items for the government agency explained 22.967% of the variance and 50.898% cumulative variance in the data with the eigenvalue of 3.215. The extension agent service in government agencies is important to encourage and educate smallholders about suitable agronomical practices in their farms and thus encourage them to enhance their productivity (Adesoji, 2009).

The third was labelled as "knowledge". The knowledge factor was extracted by three items as well. The factor loading of items was acceptable with two items greater than 0.8 and one item less than 0.8 but higher than 0.6. All the items were accepted since they fall in the acceptable range. The Cronbach's alpha score for these three items was 0.604, which was above 0.6. The items included for the knowledge factor were "most of the smallholders cultivated the coconut as a full-time job", "knowledge influences the increasing and decreasing of the production of coconut" and "smallholders need enough knowledge to manage coconut cultivation to get higher yield". All the items for the knowledge factor explained 22.546% of the variance and 73.443% cumulative variance in the data, with the eigenvalue of 3.156. The positive coefficient and significance in the farming experience may reflect the age of the smallholders and the nature of the coconut (Adewumi and Adebayo, 2008). The majority of the smallholders are older compared to the rest of the smallholders. This shows that the older or middle-aged smallholders are knowledgeable in coconut production. They know the right method for handling most situations on the farm. The more experience that the smallholders have, the more output that they will get and hence increase their profits.

The fourth was labelled as "constraints". The constraint factor was extracted by three items as well. The factor loading of items was acceptable with two items greater than 0.7 and one item less than 0.7 but higher than 0.6. All the items were accepted since they fell within the acceptable range. The Cronbach's alpha score for these three items was 0.679, which was above 0.6. The most constraint factors were "lack of technology" (0.740), followed by "lack of marketing information" (0.728) and finally "instability of price of coconut" (0.660). All the items for the constraints factor explained 9.527% of the variance and 82.970% cumulative variance in the data, with the eigenvalue of 1.334.

Overall, this analysis indicates that all three factors have significant influences on the profitability and technical efficiency of coconut production among smallholders in Batu Pahat, Johor. Besides that, the factor analysis was also conducted to identify major constraints that influenced the production of coconut among these smallholders in a similar study area. The results indicated that "lack of technology", "lack of marketing information" and "instability of price of coconut" were the major constraints that influenced the profitability of coconut among smallholders.

According to Mwachiro *et al*. (2011), lack of marketing access and price instability were the major constraints in the coconut industry. Among the factors affecting the price and profitability of coconut among smallholders in Batu Pahat included seasonal production variation, middlemen dominance in commodity prices, poor road infrastructure, festive during the year, demand and supply factors and distance from farms to markets. For example, the price of coconut will increase during the festival season in the region such as religious celebrations. On the other hand, the single nut of coconut will be charged differently among customers depending on marketing factors like transport and distance to the market. Low and unreliable prices for coconut may affect the income of smallholders since many of them

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sell coconut independently or through the middlemen. The other major challenge that smallholders faced in coconut farming activities was a lack of daily access to market information in which the prices were only available for the next day. In addition, poor logistics and infrastructure had also constrained smallholders to sell their coconut to the market. In extreme cases, rural roads were impassable, and the smallholders were not able to market their coconut production, which in turn led to great losses.

According to Herath and Wijekoon (2013) and Alouw *et al*. (2020), lack of technology was one of the major constraints in the coconut industry. A higher score that was displayed by the technological constraint indicated that ageing smallholders had more difficulties in accessing new technology. Some of them were relatively traditional and many of them reverted to the conventional method because they had used the same practice for a long time and therefore were quite difficult to accept or adopt a new practice. Other factors such as perceptions, knowledge and education also influenced the uptake of technological innovation among smallholders in the study area.

The internal consistency for each of the scales was examined using Cronbach's alpha. The Cronbach's alpha scores for the agronomic practices, government agency, and knowledge of smallholders and constraints factors were 0.726, 0.837, 0.604 and 0.679 respectively. The Cronbach's alpha scores were in the range of moderate to good; 0.726 for agronomic practices (3 items), 0.837 for a government agency (5 items), 0.604 for knowledge (3 items) and 0.679 for constraints (3 items). The composite scores were created for each of the four factors, based on the mean of the items which had their primary loading on each factor.

A higher score that is achieved by the government factor indicates that the government was the main factor that influences the profitability and technical efficiency of coconut production among the smallholders in Batu Pahat, Johor. This is followed by agronomical practices, constraints and knowledge. According to Joseph (2014), many governments would encourage smallholders to undergo education or training to increase their levels of technical efficiency. An organization such as the State Agriculture Department provides information, training, demonstration and sharing experience about coconut cultivation management and practices. Additionally, the government also provides incentives in the form of fertilizer, equipment, pesticides, fungicides and others to coconut smallholders to encourage them to enhance their production.

Other than that, knowledge is one of the drivers that can help smallholders to be more efficient in production and profitability (Shanmugam *et al.,* 2006). Smallholders with lower education may face difficulties in understanding technology and fail to fully exploit these technical opportunities. Formal education opens the mind of the farmer to knowledge while non-formal education provides hands-on training and appropriate methods of farming practices and helps the smallholders to keep abreast with changing innovations and cutting-edge technologies. Therefore, the result warrants policy interventions that will facilitate further education and training to increase coconut and agricultural productivity and how the educational level of smallholders in the Batu Pahat area can be improved.

These findings, on the other hand, demand measures to be implemented to encourage younger generations, who are stronger than their elders, to enter the coconut sector. A new policy or programme from a government body should entice the young generation by giving training and an insurance plan to them. The government may also hold a seminar or workshop to share young professional success stories in agriculture, optimise the role of social media in spreading a positive message to a global audience, provide information about opportunities in this sector, and accept new ideas and strategies from youths to improve family farm productivity. Furthermore, the elder generation needs additional agricultural technology assistance and training to enable them to expedite the adoption of new methods and technologies in the coconut industry. More research and development (R&D) are needed to improve better quality harvesting and upgrading transportation to help the smallholders gain greater market access. The policy shifts at the regional and global levels and substantial investment in the transport infrastructure is required to enable smallholders to move from production units or farms to the marketplace. Besides that, the smallholder should have enough facility to store productions at a maximum capacity and ease the supply for the end customer as well as the wholesaler. The income of the coconut smallholders can be enhanced not only by increasing production but value addition and better marketing options. The performance of coconut industries would be affected by how efficient value chains can strengthen the value-adding activities by greater utilization of technology and inputs, upgrading infrastructure, transportation, processing and exports. The increasing smallholder's income can be predicted from the implementation of various programs to increase production and increase the added value of coconut.

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4. Conclusion

The study focused on the factors influencing the production of coconut among smallholders in Batu Pahat, Johor, Malaysia. Furthermore, a field visit by an extension agent is necessary to promote the distribution of technological knowledge among smallholder coconut farmers. Other efforts, such as seminars, workshops, or integrated training approaches, are needed so that smallholders can respond to the needs of a more modern agriculture sector, as well as information and communication technologies, to ensure effective delivery and improve their profits and capacities in collective action. We can observe the link between government agencies and elements that impact coconut output among smallholders in Batu Pahat, Johor, with the correct knowledge. Government agencies, such as extension agents, play a key role in smallholder coconut cultivation. Training is crucial in coconut agriculture since it allows people to improve their knowledge and skills. Furthermore, it may directly identify and pay more attention to a group of inefficient smallholders, as well as assist in training them in the best method to use the available inputs, acquire the highest output, and improve agricultural practices.

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