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Factors Affecting Independent Oil Palm Smallholder's Decision to Participate in Government Replanting Assistance Scheme in Malaysia

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ABSTRACT

The Malaysian government has introduced the replanting assistance scheme under the National Key Economic Areas (NKEA) program to accelerate the oil palm replanting activities among smallholders. This program intends to accelerate the ongoing replanting efforts by smallholders to replace their low-yield and old oil palm trees with new and high-yielding oil palm seedlings. However, their participation in the scheme is low. Therefore, this study is conducted to determine the factors that affect independent oil palm smallholders' decisions to participate in the replanting assistance scheme. Interview administrated questionnaires are employed to 375 respondents among the recipients of the replanting assistance scheme. The significant factors that affect smallholders' decisions are the Fresh Fruit Bunches (FFB) selling price, influence from family members or business peers and long-term investment choice. This study also describes the cross-tabulation of respondents' age and their employment status against these factors. This research is expected to help policymakers and the government realign the timing to introduce the replanting scheme at the right time for the right target groups of oil palm smallholders.

Contribution/Originality: The findings and discussions in this article are expected to help policymakers and related government agencies in planning and implementing oil palm replanting activities for smallholders.

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1. Introduction

The oil palm independent smallholders (ISH) sector has undoubtedly contributed to Malaysia's oil palm industry's development. Year after year, their numbers keep increasing with the increase of oil palm planted areas. The general statement can be stated that the independent oil palm smallholders in Malaysia own fewer than 40.4 hectares, with their small land holding with an average of 3.8 hectares scattered throughout the country (Parthiban et al., 2017a). With the increasing years of oil palm planting, it is noticeable that oil palm planting sites are ready for replanting.

Generally, Wahid et al. (2010) indicated that oil palm should be replanted every 25 years to maintain its productivity and competitiveness. Keeping these old palms of 25 years and above contributed to the national FFB yield stagnation. Wahid et al. (2010) also reported that, as of June 2010, the accumulation of old oil palms of more than 25 years in Malaysia continued to increase to 390,092 hectares. This increment implies that over five years, the proportion of old palms had doubled from 4.09% in 2006 to 8.20% in 2010. To maintain good productivity in oil palm planting, the percentage of tall and ageing palms should be small, preferably less than 10% of the total oil palm planting areas (Wahid et al., 2010). A practical approach toward increasing the production of Malaysian palm oil is by focusing on yield improvements from existing sites through replanting with new higher-yielding materials (Wahid et al., 2010). Therefore, in 2011, Malaysia introduced an oil palm replanting assistance program to subsidize replanting activities among independent oil palm smallholders (Abd Manaf et al., 2013). The primary purpose of oil palm replanting assistance and subsidies programs is to help oil palm smallholders financially with replanting activities. Under this program, the government has allocated a special fund through the Malaysian Palm Oil Board (MPOB) to subsidize oil palm replanting programs (Parthiban et al., 2017b).

This subsidy program has been placed under the National Key Economic Areas (NKEA) program to expedite the ongoing replanting activities among smallholders and rehabilitate old oil palm trees with new and high-yielding seedlings (ETP, 2012). Under this subsidy program, each recipient was allocated agricultural assistance inputs such as oil palm seedlings, fertilizers, pesticides, and herbicides. Other than that, the government also gave additional funds for land clearing activities before replanting. The total value of these subsidies was RM7,500 (US$1,703) per hectare for Peninsular Malaysia and RM9,000 (US$2,043) per hectare for Sabah and Sarawak (Parveez et al., 2020). This subsidy program was a one-off assistance program and provided in stages based on the stipulated schedule.

As of December 2019, 161,425 hectares of oil palm areas under the care of independent smallholders are more than 25 years old (MPOB, 2019), and these areas should be ready for replanting. However, only 47% (75,159 hectares) of smallholders applied for a replanting assistance scheme from January 2011 until December 2019 (Table 1). Therefore, it is essential to identify the factors affecting these independent oil palm smallholders (ISH) who agreed and decided to replant and participate in the replanting assistance scheme.

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Table 1: Progress of Application on Replanting Assistance Scheme Among Oil Palm Smallholders as of 30th December 2019.

Status	Hectares
The total area of oil palm under ISH more than 25 years old	161,425
The total area under ISH applied for the replanting assistance scheme	75,159
Percentage achieved	47%
Balance (percentage) not achieved	53%

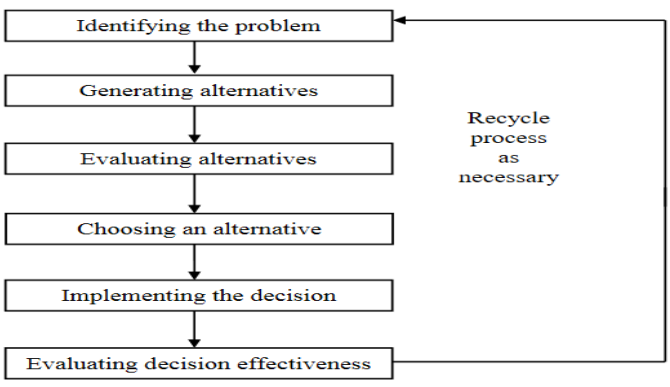
Source: MPOB (2019)

Given the importance of oil palm replanting programs, there is a need to identify the factors on why the remaining 53% of all the targeted smallholders are still reluctant and refuse to replant their old oil palms. These factors are vital in improving the oil palm replanting programs in the future. Therefore, this study aims to identify the factors affecting independent oil palm smallholders' decisions to participate in replanting assistance schemes. At the same time, the findings from this study can help policymakers realign the timing to introduce the replanting scheme at the right time for the right target groups of oil palm smallholders.

2. Literature Review

The success of a program, especially a government-sponsored program, is critically linked to the effective personal decisions made by the targeted participants. The appropriate decision made by the individual may help the success of any planned operations (Ejimabo, 2015). In this study, effective choices made by the oil palm smallholders participating in the oil palm replanting program may affect the program's suitability. Several researchers have conducted decision-making studies and introduced specific models of decision-making study. Researcher; Lunenburg (2010) mentioned that the decision-making process chooses several alternatives to achieve the desired result. The definition of making a decision has three key elements. First, decision-making involves choosing from several options. Second, decision-making is a process that involves more than simply a final choice among the alternatives. Finally, the "desired result" consists of a purpose or target from the mental activity the decision-maker engages to reach the final decision. Lunenburg (2010) also mentioned that scientists had emphasized two basic models of decision making: the rational model and the bounded rationality model. According to the rational/logical model, scientist Lunenburg (2010) breaks down the decision-making process into six steps (Figure 1).

Figure 1: Model of the decision-making process



Source: Lunenburg (2010)

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Lunenburg (2010) mentioned that in this model, identifying the problem is the first and most significant process before making any other decision. Referring to this model as a benchmark, the orientation of this study is to determine the problems faced by the respondents, and the factors that influence the respondents in deciding to engage in palm oil replanting activities were determined briefly.

A previous study was conducted by Akpan and Udoh (2016) on farmers' decisions to participate in government agricultural programs in determining the factors that influence farmers' participation in government agricultural programs in the Southern region of Nigeria. Household size, dependent ratio, farming experience, years in social organization, land ownership, awareness index, membership in a political party, non-farm income, frequency of visits by extension agents, male composition in the farming population, and level of formal education were positive determinants of farmer's participation in government agricultural programs (Akpan & Udoh, 2016). Increasing smallholders' participation in government agricultural programs is one way to measure the suitability and workability of that government policies in agriculture (Akpan & Udoh, 2016). Furthermore, it also can be seen as one reliable way of managing national food insecurity and unemployment issues (Akpan & Udoh, 2016).

Meanwhile, Mukungei et al. (2013) studied socioeconomic factors affecting farmers' decisions in adopting agro-silviculture practices in Turbo Division, Uasin Gishu County, Kenya. They found that farmers' adoption of the agro-silviculture system is significantly affected by age, gender, farmers' level of education, frequent contact with extension staff, awareness, and participation in agroforestry projects. Mukungei et al. (2013) also mentioned that their study provided information for policymakers and key government departments to enhance agro-silviculture adoption among targeted farmers in the Turbo Division and other parts of Kenya.

Although studies on the acceptance of target groups in any programs organized by the government are essential, it is vital to study the need for oil replanting activities, especially for ISH with oil palm areas that are no longer productive and over 25 years old. In previous studies on oil palm replanting activities, Wahid et al. (2010) mention that oil palm producers should replant old, unproductive, and less viable old palms to ensure sustainability in the Malaysian oil palm industry. Additionally, the Malaysian palm oil supply growth was expected to increase moderately due to the introduction of the oil palm replanting scheme with a government allocation of RM 100 million (Ab Rahman et al., 2013). According to Wahid et al. (2010), delayed replanting resulted in a staggering accumulation of old oil palms, which affected the overall national FFB yield.

The oil palm replanting program needs vast capital, which is one of the reasons and problems why the smallholders are delaying the replanting schedule. Mariyah et al. (2018) mentioned that oil palm replanting is a long-term investment decision and requires capital. They also noted that the decision of farm households to join in oil palm replanting was determined by their economic condition and the ability achievement rates in their oil palm production. For small farmers, socioeconomic conditions such as landholding size, income levels, sources of income, and land ownership affect their replanting decisions (Mariyah et al., 2018).

Oil palm producers usually refuse to replant their old oil palm trees because they still produce yield and provide income (Putri et al., 2022). This situation has led to many old palm oil areas still being left to grow, although the oil palm has shown a decrease in

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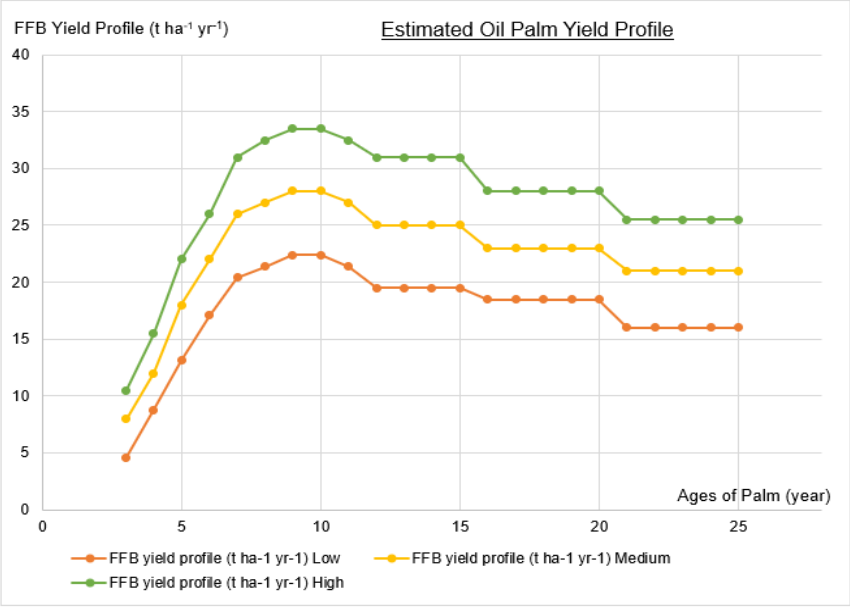
yielding. Kushairi et al. (2011) recorded that oil palms began to show downtrend patterns starting at the age of 20 years after planting (Table 2 & Figure 2).

Table 2: Estimated Yield Profile of Oil Palm

Ages of oil palm (years after planting)	FFB yield profile (t ha^{-1} yr^{-1})		
	Low	Medium	High
3	5	8	11
4	9	12	16
5	13	18	22
6	17	22	26
7	20	26	31
8	21	27	33
9	22	28	34
10	22	28	34
11	21	27	33
12	20	25	31
13	20	25	31
14	20	25	31
15	20	25	31
16	19	23	28
17	19	23	28
18	19	23	28
19	19	23	28
20	19	23	28
21	16	21	26
22	16	21	26
23	16	21	26
24	16	21	26
25	16	21	26

Source: Kushairi et al. (2011)

Figure 2: FFB yields show a downtrend pattern when palm age reaches 20 years old after planting.



Source: Kushairi et al. (2011)

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FFB market value and selling price also play a role in determining oil palm producers' decisions in participating in oil palm replanting programs. A study by Ismail and Mamat (2002) reported that the reduced replanting activity in 1997 and 1998 is due to the oil palm producers taking advantage of the short-term increase in oil prices. The rise in FFB prices, lack of funds, replanting policy, and lack of proper farm planning are some of the reasons that influence the oil palm producers' decisions to delay their replanting activities (Fauziah et al., 2018). According to Nambiappan et al. (2018), the oil palm tree started to produce yield after three years of planting and reached its maximum output at 12 to 15 years, after which the yield begins to decrease. Therefore, the producers must wait up to three years after replanting for the oil palm trees to reach their maturity (Table 2). During this waiting period (1st to 3rd years after planting), the producers assumed they might lose an opportunity to gain any income from the oil palm. Nambiappan et al. (2018) also reported that the factors affecting the decision by the producers to replant would depend on several factors, i.e., the productivity of the oil palms, height of the oil palm, costs of production, and the FFB price. The oil palm producers' improper planning and replanting schedule contributed to the delay in their replanting program. Plantations and smallholders should decide to replant their unproductive oil palm as scheduled to improve productivity and remain cost-competitive (Omar et al., 2001).

3. Methodology

The data was collected through face-to-face interviews guided by a structured questionnaire. The survey was distributed to smallholders who have oil palm trees aged more than 25 years old. As of December 2019, 23,092 smallholders participated in the oil palm replanting program. A random sampling technique was applied where 375 samples were determined. The number of samples was based on a study conducted by Krejcie and Morgan (1970). Questionnaires were distributed to smallholders through MPOB offices around the country. Questions were developed to capture information on smallholders' participation and factors affecting their decision to participate in the oil palm replanting program. The data were analyzed using SPSS software (version 22.0). Quantitative research had been applied to conduct the study, while descriptive analysis had been applied to analyze the data. The investigation also involved the use of cross-tabulation of the quantitative data to investigate sets of relationships among variables (Alimba & Mgbada, 2003).

4. Result and Discussion

4.1. Factors affecting respondents' decision to participate in the replanting assistance scheme

Three main categories have been determined in evaluating the respondents in this study, such as social, personal, and psychological preferences that may affect smallholders' decisions to participate in the oil palm replanting programs. In Table 3 and Figure 3 below, the FFB selling price (36%) is the most influential factor that is affecting smallholders' decisions to participate in oil palm replanting programs compared to the other factors. It is followed by encouragement from family (31%) as the second most crucial factor in determining their decision to participate in the replanting program. Undeniably, the encouragement from their peers (19%) also played an essential role in determining their decision. This is aligned with previous research by Parthiban et al. (2017b) which reported friends as one of the sources of information on oil palm among recipients of

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replanting assistance scheme. Out of the total respondents, only 14% of the respondents said they participated in the replanting program as an option for a long-term investment.

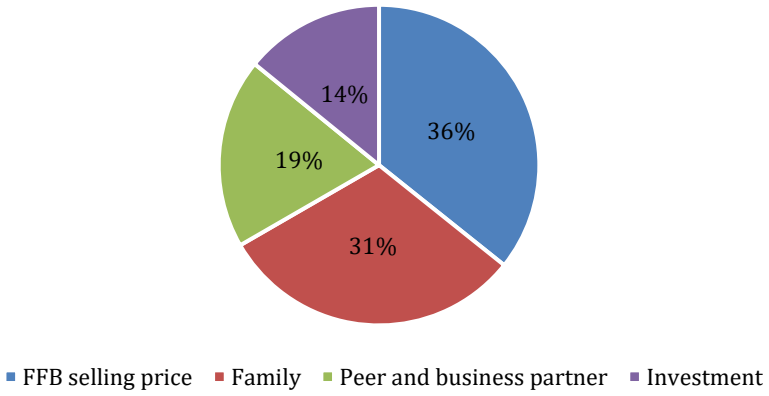
Table 3: Factors Affecting the Decision-Making of The Smallholders Who Participated in The Oil Palm Replanting Program

Factors	Frequency	Percentage (%)
FFB selling price	134	36
Family	116	31
Peer and business partner	72	19
Investment	53	14
Total	375	100

Source: MPOB (2019)

FFB selling price is one of the most prevalent factors affecting the respondents' decisions to replant their old oil palm tree due to the potential income they can gain given the higher FFB price. Based on the results of the interviews, respondents who chose FFB selling prices as the main factor mentioned that they could still earn income even though the oil palm is over 25 years old and their oil palm is still able to produce yield. During the period when the FFB price is higher, smallholders tend to keep their current oil palm tree despite getting a low yield. They only decide to replant when the income from their oil palm begins to decline, and the cost of production increases.

Figure 3: Percentage of factors that affect the smallholders' decision-making in the oil palm replanting program.



Most of the respondents who reported family encouragement as the primary factor influencing their decisions to participate in replanting programs were managers who manage their family heritage land. The encouragement and support from the family are essential because any decision to replant might affect their family's sources of income. They need to find alternative sources of income besides oil palm to ensure continuous income for their families.

Influence from family followed by friends or peers are the other contributing factor influencing smallholders' decisions to participate in replanting programs. Respondents tend to be influenced to replant when their family members or peers share their own benefits after participating in the government's oil palm replanting program, especially on how they received all of the free inputs such as high-quality oil palm seedlings, fertilizers, pesticides as well as the fund for the land preparation. Apart from that,

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respondents also witnessed the incremental FFB yield among the recipients who previously received the oil palm seedlings through the replanting assistance scheme, which further spread the benefits of replanting to other smallholders.

Only 14.1% of respondents chose to participate in replanting programs as their long-term investment, given the potential continuous income that can be derived from the oil palm. They believed that oil palm cultivation provided them with an excellent choice for long-term investment of more than 20 years. When the oil palm yield showed a downtrend pattern within the recommended replanting time period, this group of respondents tends to replant their oil palm trees without hesitation.

4.2. Cross tabulation of factors influencing respondents' participation in the oil palm replanting program against respondents' Age.

A study conducted by Coulibaly-Lingani et al. (2011) reported that people's participation in organized programs could be related to their socioeconomic and demographic attributes. Therefore, adapting from the concept by Coulibaly-Lingani et al. (2011), this study aims to describe the cross-tabulation of respondents' age and the factors that influence their interest in participating in the oil palm replanting program, as illustrated in Table 4.

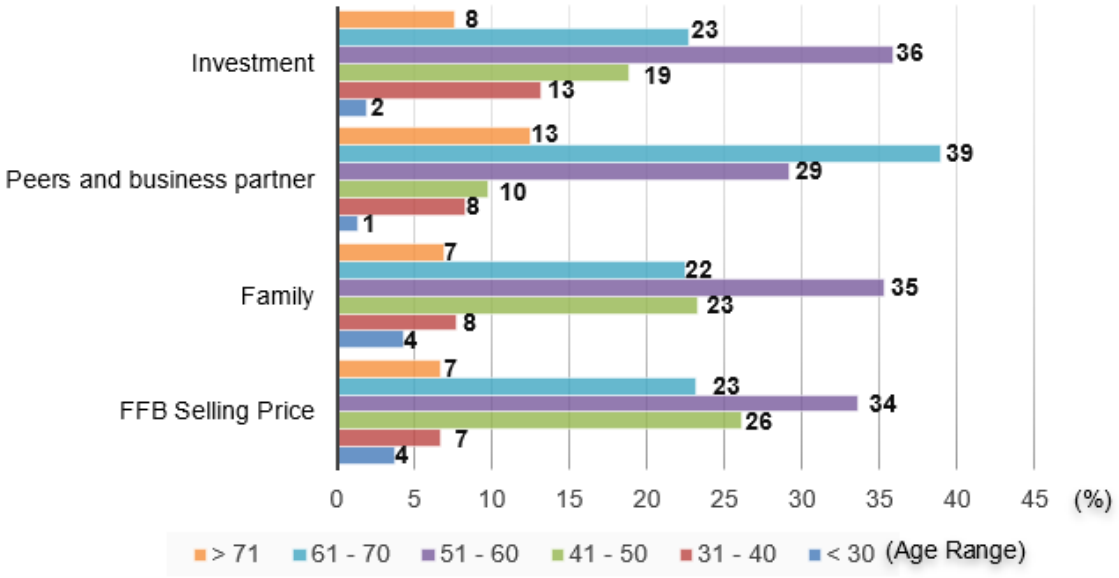
Table 4: Respondents' Age and Factors Influencing Respondents' Participation in The Oil Palm Replanting Program (Cross-Tabulation)

	Factors							
	FFB Selling Price		**Family**		**Peers and business partner**		**Investment**	
Age Range (years)	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
< 30	5	4	5	4	1	1	1	2
31 - 40	9	7	9	8	6	8	7	13
41 - 50	35	26	27	23	7	10	10	19
51 - 60	45	34	41	35	21	29	19	36
61 - 70	31	23	26	22	28	39	12	23
> 71	9	7	8	7	9	13	4	8
Total	**134**	**100**	**116**	**100**	**72**	**100**	**53**	**100**

Table 4 and Figure 4 show respondents' age distribution against the factors affecting their decision to involve in replanting activities. Results showed the respondent's age range was below 30 to above 71 years. Most respondents (34%) were between 51 and 60 years old, and the least was below 30.

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Figure 4: Percentage values (%) of respondents' age range against the factors that affect the respondent's decision-making in the oil palm replanting program.



Based on Figure 4, respondents between 61 and 70 years old reported the highest percentage for factors peer and business partners in assessing their decision to participate in the replanting scheme. The decision of this age group might also be influenced by their contractor or family who is mostly managing their farm. Most of the respondents in this age group stated that they did hire a third party to manage their field operation including field maintenance and harvesting as they are not able to be fully involved in the day-to-day operation. These third parties are often contractors, fruit dealers, or business partners who provide services to manage oil palm fields in the area.

4.3. Cross tabulation of factors influencing respondents' participation in the oil palm replanting program against employment status

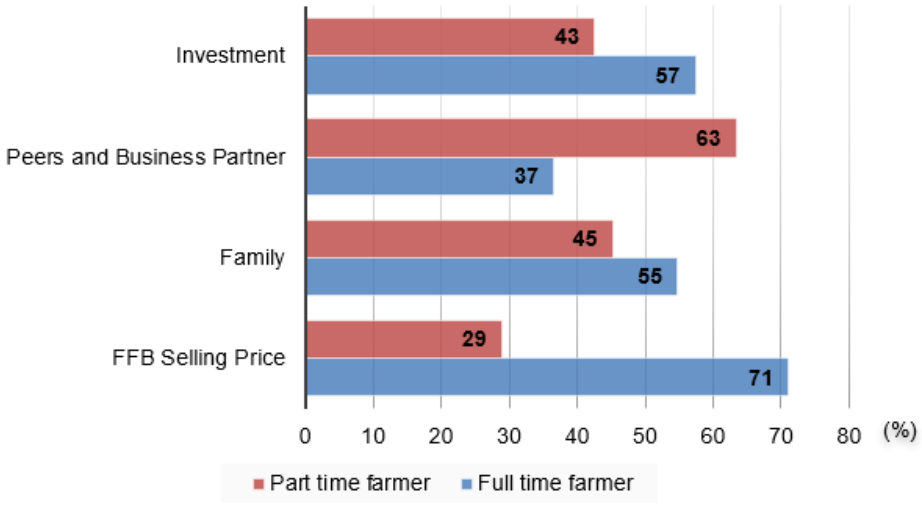
Table 5 and Figure 5 show respondents' employment status against the factors that affect the respondents' decision-making in the oil palm replanting program. The most fundamental difference between part-time and full-time smallholders is their work hours. Their status as part-time or full-time smallholders will determine their time and focus in conducting farm activities. As observed during the interviews, most part-timer respondents have other sources of income such as working as government servants or private sectors like contractors/traders, and other miscellaneous jobs. Most of the full-time smallholders (71%) chose FFB selling price as their most deciding factor when it comes to replanting as oil palm remains their main source of income (Figure 5). Any loss of income by replanting will affect their income. In addition, full-time smallholders often have the time to plant cash crops as integration with oil palm as their alternative source of income while waiting for the palm oil to start producing yields. In contrast, most of the part-time smallholders (63%) chose peers and business partners as their most deciding factors for replanting as they mostly hired a third party to manage their field operation.

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Table 5: Respondents' Employment Status and Factors Influencing Their Participation in The Oil Palm Replanting Program Cross-Tabulation

	Factors							
	FFB Selling Price		Family		Peers and business partner		Investment	
Status of employment	Number of Respondents	%	Number of Respondents	%	Number of Respondents	%	Number of Respondents	%
Full-time farmer	96	71	63	55	26	37	31	57
Part-time farmer	39	29	52	45	45	63	23	43
Total	**135**	**100**	**115**	**100**	**71**	**100**	**54**	**100**

Figure 5: Percentage values (%) of respondents' employment status against the factors that affect the respondents' decision-making in the oil palm replanting program.



5. Conclusion

Based on the study, few factors have been identified that influence smallholders' decisions to participate in the government replanting assistance schemes such as Fresh Fruit Bunches (FFB) selling price, influence from family members or business peers and long-term investment choice. The cross-tabulation of respondents' age against these factors reveals that the respondents in the age group of 61-70 largely choose peers and business partners as their factors in deciding to participate in the replanting scheme. Most of the full-time smallholders choose FFB selling price as their most deciding factor when it comes to replanting while the part-time smallholders choose peers and business partners. Therefore, different strategies are needed to influence different groups of smallholders to replant as well as the proper timing to introduce the replanting scheme. Policymakers need to take into consideration the current scenario of FFB price movements in introducing the scheme to ensure higher participation as higher FFB prices might result in low participation among smallholders for the scheme. Other than that, the primary approach towards introducing the replanting scheme should be targeted toward the third party who is managing the farm on behalf of the smallholders, especially for the older and

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part-time smallholders. The third-party such as contractors and fruit dealers are often the person who makes the decision to replant and directly influence the decision of the farm owner.

Ethics Approval and Consent to Participate

The researchers followed the research ethics and guidelines established by the Malaysian Palm Oil Board (MPOB).

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Conflict of Interests

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest concerning the research, authorship, or publication of this article.

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