

# Impact of Economic Stimulus Package II Incentive Scheme (PRE2) on Yield and Income of Oil Palm Smallholders in Peninsular Malaysia

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## ABSTRACT

*Oil palms more than 25 years old are no longer productive and high cost to harvest, thus affecting the income of the smallholders. These old palms need to be replanted using high quality planting materials obtained from nursery operators who meet the Code of Practice for Nursery (CoPN). Since smallholders in Peninsular Malaysia have limited land holding and capital, government has introduced the Stimulus Economic Package II Incentive Scheme (PRE2) to help smallholders to replant their old palm between 2009 and 2010. This replanting scheme provides a grant amounted to RM 6000 per hectare for covering the cost of land clearing, purchasing of oil palm seedlings, fertilisers, pesticides and herbicides. The early impact of the replanting program, especially on the first year of fresh fruits bunches (FFB) yield and the gross income among the PRE2 participants was assessed. The influence of participant background, particularly age, level of education and status of smallholders on FFB yield was also determined. Research method involved face-to-face interview assisted by pre-prepared questionnaires and field observations to a total of 248 samples of smallholders. Descriptive statistics were used to analyse FFB yield and income for the first year. Cross tabulation and correlation analysis were used to evaluate the relationship between respondents background and their FFB yield. The study found that the participants of the PRE2 incentive scheme produced 9.28 t/ha/yr of FFB in the first year of harvest, with a total estimated income of RM 4344/ha/yr. The study also found that there was no significant relationship between FFB yield and the background of PRE2 incentive scheme participants. Other factors that may affect the FFB yield among the participants could be the adoption of good agriculture practices.*

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## INTRODUCTION

Going back to 2008, palm oil prices had tumbled to RM 1400 per tonne in November, a drastic reduction of nearly 70% since reaching the highest price of RM 4486 per tonne in March. This was mainly due to the increase in palm oil production and the global financial crisis that led to an increase in palm oil stocks in the local market (Che Johari, 2008a). Crashing in oil palm prices had affected countless smallholders and squeezed their earnings. The production costs, especially fertilisers remain high accounting up to 60% per tonne. Furthermore, oil mills are causing further hardship because they have to buy fruits from smallholders at low prices in order to avoid greater loss (Che Johari, 2008b).

The Malaysian government implemented various programs in 2008 with the main aim of stabilising the palm oil price.

Allocated a fund amounted RM 200 million for the replanting program scheme, known as SITS (*Skim Insentif Tanam Semula*) that involved the replanting of 200 000 ha of old unproductive oil palm more than 25 years old. The program offered a RM 1000 grant per hectare with the goal of reducing palm oil stocks to 700 000 tonnes.

Enforcing the use of B5 to public transport. The B5 is a mixture of 5% oil palm biofuel with 95% diesel fuel. The program anticipated consumption of 500 000 tonnes of oil palm per year.

Increase the crude palm oil (CPO) export quota without tax (Che Johari, 2008c).

In Mac 2009, the government announced a new fund for Economic Stimulus Package II Scheme (PRE2), to help smallholders replant their old oil palm. The total fund was RM 100 million, of which RM 50 million

was allocated for 2009 and the additional RM 50 million was given in the year 2010. This scheme was expected to end in December 2010 (Che Johari, 2008d). The PRE2 scheme provided RM 6000 per hectare for each smallholder to bear the replanting costs including land clearing, purchasing oil palm seedlings, fertilisers, pesticides and herbicides (Che Johari, 2009).

The main objective of the PRE2 scheme is to increase the replanting of oil palm for smallholders under SITS 2008 and also help to reduce the oil palm production in order to reduce palm oil stocks in the market. Independent smallholders with a land area of less than 40.46 ha were eligible to apply the scheme on a first come, first served basis (Mohd Basri, 2009).

As of December 2010, a total of 9151 applications were received and mostly from the Southern region. Out of that numbers, 6667 applications were approved and 3783 recipients implemented replanting and received all incentivised inputs (MPOB, 2013). The distribution of applications based on status of implementation and zones was showed in *Table 1*.

The objectives of this study are to profile the sociodemographic characteristics of the PRE2 participants and to determine the relationship between it and the

FFB yield, as well as gross income for the first year of harvest.

## METHODOLOGY

The population of this study comprises of independent oil palm smallholders who apply the PRE2 and fully implemented the incentive scheme. As of December 2010, a total of 3783 smallholders had fully implemented this scheme. The smallholders completed their replanting between 2009 and 2010. Therefore, the data in this study were collected at three to four years of oil palm age.

The sample size of this study was 351 smallholders, estimated based on the formula developed by Krejcie and Morgan (1970). Out of 351 questionnaires distributed, only 248 complete set were returned. Previous empirical study by Zaki (2018) experienced a response rate between 60% and 90%. Meanwhile, the response rate of this study is 71%, in line with the above suggestion.

The origins of the respondents were divided into four zones in Peninsular Malaysia; Northern (Perlis, Kedah, Penang and Perak), Central (Selangor, Negeri Sembilan and Melaka), Southern (Johor) and Eastern zones (Pahang, Terengganu and Kelantan). Stratified sampling

**TABLE 1. APPLICATION DISTRIBUTION BY STATUS OF IMPLIMENTATION AND ZONES**

Zone	Received		Approved		Implemented	
	No	Ha	No	Ha	No	Ha
Southern	4 715	15 567	3 561	11 691	2 015	6 087
Northern	2 198	9 004	1 704	7 142	1037	4 025
Eastern	494	2 347	294	1 496	196	1 629
Central	1 744	23 552	1 108	3 177	535	1 314
Total	9 151	50 470	6 667	23 506	3 783	13 055

technique was used to determine the number of samples per zone. For the purpose of collecting data, face-to-face interview with independent smallholders and field observation were carried out and assisted by the prepared questionnaire. This survey was conducted in 2014.

The data was analysed using SPSS version 20.0. Descriptive statistics such as frequency, percentage, mean, median and standard deviation were used to achieve first and second objectives, and to analyse the data of the respondent's first year FFB yield and their income. Cross tabulation and correlation analysis were used to meet the third objective, the relationship between respondent's backgrounds and their FFB yield.

## RESULTS AND DISCUSSION

### Demographic Profile of Respondent

The demographic profiles of the respondents who participated in the study were showed in *Table 2*. About 60% of the respondents were from the Southern zone followed by Northern zone (20.6%), Central zone (14.5%) and Eastern zone (6.5%). Majority of the respondents (91.1%) accounted for 226 respondents over 41 years old and the rest 8.9% or 22 respondents were under 40 years of age. A total of 48.8% of respondents are at age more than 60 years old. In terms of gender, 79.4% (197 respondents) were male and 20.6% (51 respondents) were female. In terms of race, 58.1% (144 respondents) were Chinese, 40.3% (100 respondents) were Malay and the remaining 1.6% (4 respondents) were Indian. Majority of the respondents (63.3%) were fulltime smallholders while the remaining 36.7% were part-time smallholders. More than half of the total respondents (53.6%) had

**TABLE 2. DISTRIBUTION OF RESPONDENTS BASED ON AGE, GENDER, ETHNIC, LEVEL OF EDUCATION, STATUS OF SMALLHOLDER AND FARM SIZE**

Demographic profiles	Frequency	Percent
<b>Respondents Distribution</b>		
Northern	51	20.6
Central	36	14.5
Southern	145	58.5
Eastern	16	6.5
<b>Age (year)</b>		
31 - 40	22	8.9
41 - 50	41	16.5
51 - 60	64	25.8
> 60	121	48.8
<b>Gender</b>		
Male	197	79.4
Female	51	20.6
<b>Race</b>		
Malay	100	40.3
Chinese	144	58.1
Indian	4	1.6
<b>Level of Education</b>		
No formal education	38	15.3
Primary School	72	29.0
Secondary School	109	44.0
College/ University	29	11.7
<b>Status of Smallholders</b>		
Fulltime	157	63.3
Part-time	91	36.7
<b>Farm Size (ha)</b>		
< 2	86	34.7
2 - 4	133	53.6
4 - 10	21	8.5
> 10	8	3.2

farm size ranging between two and four hectares and only eight smallholders (3.2%) had farm size more than 10 ha. The average farm size of smallholders participating in the survey was 3.09 ha.

### First Year FFB Yield of Respondents

The average first year yield of FFB produced by the smallholders participating in the PRE2 incentive

scheme was 9.28 t/ha/yr (*Table 3*). According to the age-based FFB classified by Kushairi *et al.* (2013), the FFB yield produced by the PRE2 incentive scheme participants was considered to be moderate. According to Kushairi *et al.*, (2013), the expected FFB yield for the first-year harvest of oil palm aged three years old was between 4.6 and 10.5 t/ha/yr. The FFB yield category by the respondents was also determined

**TABLE 3. DESCRIPTIVE STATISTICS FOR THE FIRST YEAR FFB YIELD (t/ha)**

Statistic	Yield of participants
Mean	9.282
Median	8.315
Std. deviation	5.899

**TABLE 4. YIELD CATEGORY OF RESPONDENTS**

Yield Category	Frequency	Percent
Low	62	25.0
Medium	95	38.3
High	91	36.7
Total	248	100

**TABLE 5. FFB REFERENCE PRICE AT MILL GATE IN 2013**

Region	Grade A		Grade B		Grade C	
	OER (%)	RM/t	OER (%)	RM/t	OER (%)	RM/t
North	20	488	19	465	18	442
South	20	493	19	470	18	446
Central	20	493	19	470	18	446
Eastern	20	492	19	469	18	445
Sabah*	22	477	21	455	20	434
Sarawak **	22	488	21	466	20	445

Note: \* Sandakan, Lahad Datu, Tawau.

\*\* Miri, Bintulu (MPOB, 2014).

**TABLE 6. DESCRIPTIVE STATISTICS FOR PRE2 PARTICIPANTS INCOME (RM/t/ha)**

Statistic	PRE2 participants
Mean	4 344.069
Median	3 899.735
Std. deviation	2 764.056

(Table 4). The results showed that 36.7% of the respondents achieved high level of yield, 38.3% managed to obtain medium level of yield and 25% of them attained only low level of yield.

### Income of Respondents

The estimated gross income of PRE2 incentive scheme participants was estimated based on the average FFB price in 2013 following the MPOB Statistic 2014 (Table 6). Fresh fruit bunches produced from three years old palms were generally small with less oil content. The quality of these FFB can be categorised as Grade C with an oil extraction rate (OER) of 18%. Based on this fact, the average FFB prices in Northern zone was at RM 442/t, RM 445/t in the eastern zone, and RM 446/t in the southern and central zones (Table 5).

The descriptive statistics showed that the gross income gained by smallholders participating in the PRE2 Incentive Scheme was estimated at RM 4344/ha in a year (Table 6). Since the average farm size of the participants was 3.09 ha, therefore, the gross income of the PRE2 participants in the first year of harvest for was estimated to be RM 13 422.

Replanting with quality planting materials and applying Good Agriculture Practices (GAP) will provide higher FFB yield and income to smallholders. Other research work by participants in the Oil Palm Seedlings Assistance Scheme (SBABB) also reported an increase in FFB yield and smallholder income found in this study. A study conducted by Zulkifli *et al.* (2013) showed that the SBABB participants recorded the first year FFB yields of 7.30 t/ha/yr with their gross income estimated at RM 3250/ha/yr. The use of quality oil palm seedlings, proper planting techniques, the

use of suitable fertilisers and herbicides at a right time, and good maintenance of oil palm fields are important factors in achieving high FFB yields.

In other plant replanting schemes such as rubber, the Rubber Industry Smallholders Development Authority (RISDA) had implemented rubber replanting schemes to help smallholders increase their yield and income. The rubber smallholders were given a grant of RM 13 500/ha and received six payments in stages over a of five-year period. The first payment in the first year amounted to RM 6300 including fertiliser, land preparation and seedlings, while the following payment was RM 2300 including fertiliser (The Borneo Post, 2013). The scheme was to increase the income of rubber smallholders to at least RM 2500/month by 2015. This scheme also provides participants with high-yield rubber trees which can produce up to 2000 kg/ha/yr of rubber (The Star, 2013).

For cocoa, the Malaysia Cocoa Smallholder Development Program (CSDP) was initiated in 1995 by the Malaysian Cocoa Board (MCB) to improve the cocoa production. The objective of the program is to increase smallholder cocoa productivity to 1.5 t/ha/yr of dry cocoa beans within 3 years of project implementation. The CSDP program involved replanting of unproductive cocoa tree or farms with new cocoa planting materials. Smallholders were provided with incentives in term of knowledge technologies through extension approaches (courses, demonstration, visit *etc.*) and agriculture inputs covering fertilisers, planting materials and *etc.*). Ramle *et al.* (2008) reported that the average cocoa yield produced by smallholders increased to 1.6 t/ha/yr, slightly higher compared to the targeted yield of 1.5 t/ha/yr.

**TABLE 7. CROSS TABULATION BETWEEN YIELD CATEGORY WITH PRE2 PARTICIPANT'S BACKGROUND**

Variable	Yield categories (%)		
	Low	Medium	High
<b>Age</b>			
31 - 40	2	2	5
41 - 50	3	8	6
51 - 60	8	10	8
> 60	12	18	19
<b>Level of Education</b>			
No formal education	4	6	5
Primary School	6	12	11
Secondary School	12	16	16
College/ University	4	4	4
<b>Status of Smallholders</b>			
Fulltime	13	28	23
Part-time	13	10	14

#### Relationship between Respondent's Background and Yield

Cross tabulation analysis to determine relationship between yield categories and respondent's background (age, educational level and smallholder status) was showed in *Table 7*. Generally, respondents over the age of 60 years old achieved higher FFB yield, followed by respondents at aged 51 to 60, 41 to 50 and 31 to 40. This is possibly due to older people are more knowledgeable and have more experience in managing oil palm than young people.

In term of level of education, 16% of respondents attained secondary school obtained the highest FFB yield followed by 11% of respondents that attained primary school, 5% of respondents had no formal education and 16% of respondents had tertiary education. This showed that, smallholders need a basic level of education so that they can read,

learn and understand relevant news, books, articles, pamphlets and also attend courses or seminars to seek knowledge about managing oil palm in accordance with Good Agriculture Practices (GAP).

For the status of smallholder, the result showed that full-time smallholders gained higher FFB yield compared to part-time smallholders. A total of 23% full-time respondents fall in the high yield category as competed to only 14% part-time respondents from the same yield category. This is possibly due to that the full-time smallholders pay more attention to manage their farms, and the part time smallholders consider that oil palm is just an additional income for them. Therefore, less effort, concentration, commitment and time were allocated to manage their oil palm because they had others job to attend too.

*Table 8* identifies the relationship between the status of smallholders and age towards the production of FFB yield. The results showed that the full-time smallholders with age

more than 60 years old have higher FFB yield category as compared to the part-time smallholders between the ages of 31 and 60. Based on the results, it was clearly showed that full-time smallholders were more focused on managing their oil palm farms and were putting a higher commitment in terms of time spent to closely monitor their farms. A good quality time is needed to ensure that good farm practices were applied correctly in accordance with the recommended guidelines.

While as for the part-time smallholders, it was dominated by smallholders below 60 years old. Even though they do more than one job, they still need to manage their farms to gain better FFB production. Findings in this study were unlikely based on the surveys of other workers which found that part-time smallholders participated in community social activities can gain better knowledge (Ainul 2018). It turns out that social

capital plays an important role in improving the FFB production among the smallholders. This is mainly because they provide connection among individuals in a community or organisation that could give positive impact towards the productivity and economic (Bertrand *et al.*, 2000; Beugelsdijk and Smulders, 2004; Bjornskov, 2006).

The relationship between FFB yield and the background of PRE2 respondents, especially age, level of education and status of smallholders, was analysed. Correlation analysis showed that there was no significant relationship between independent variables, the FFB yield and dependent variables, the background of respondents (Table 9). This finding suggests that the background of respondents such as age, level of education and status of smallholders do not influence the FFB production of the PRE2 incentive scheme participants.

### CONCLUSION

The PRE2 incentive scheme implemented from 2009 to 2010 has benefited a total of 3783 smallholders covering 13 055 ha of land in Peninsular Malaysia. Early assessment showed that the participants could get FFB yield of 9.28 t/ha/yr in the first year of harvest and the estimated income from the sale of FFB was at RM 4344/ha/yr. The study also found that the background of participants, especially age, level of education and type of smallholders did not influence the production of FFB. This suggested that FFB yield was affected by other factors, in particular the good agriculture practices (GAP). Implementation of GAP such as manuring, weeding, harvesting, pruning, pest and diseases control will ensure that smallholders improve their FFB yield. Therefore, the PRE2 incentive scheme participants are encourage to always keep in touch

**TABLE 8. CROSS TABULATION BETWEEN YIELD CATEGORY WITH PRE2 PARTICIPANT STATUS AND AGE**

Variable		Yield categories (%)		
Status of smallholders	Age	Low	Medium	High
Full-time	31- 60	7	13	7
	> 60	5	15	15
Part-time	31- 60	6	7	11
	> 60	7	3	3

**TABLE 9. CORRELATION ANALYSIS BETWEEN FFB YIELD AND BACKGROUND OF PRE2 PARTICIPANTS**

		Age	Level of education	Status of smallholders
FFB Yield	Pearson Correlation	-.097	.024	.025
	Sig. (1-tailed)	.064	.355	.345
	N	248	248	.248

with the MPOB TUNAS officers so that they could receive the latest information and technologies on oil palm.

#### RECOMMENDATION

Finding of the study can help in identifying PRE2 incentive scheme participant's first year FFB yield and their gross income. This information is valuable for determining the impact of PRE2 incentive scheme and can be used for future references. However, the study also reveals 25% of the respondents obtain low FFB yield.

Therefore, further study should be conducted to determine the level of knowledge and adoption of Good Agriculture Practices (GAP) of the PRE2 incentive scheme participants in managing their farms. Indirect factors that cause the participants to achieve low FFB yield can be determined and proper measurement can be taken to overcome this matter.

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