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EARLY IMPACT OF OIL PALM REPLANTING AND NEW PLANTING SCHEMES ON PRODUCTIVITY AND FIELD PRACTICES OF SMALLHOLDERS

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ABSTRAT

Oil Palm Replanting and New Planting Schemes for independent smallholders were launched in 2011 under the 10th Malaysia Plan.It is an Entry Point Project 1 (EPP1) under the National Key Economic Area of oil palm commodities. The schemes provided smallholders with high quality of seedlings, agricultural inputs such as fertilizersand chemicalsas well as the cash fund for preparation of land and planting of the seedlings. The smallholders participated in the scheme were also given advisory services on various aspects of management of oil palm by the extension officers of Malaysian Palm Oil Board (MPOB). The study found that the average age of the participants ismore than 59 years old. The average yield of fresh fruit bunches harvested for the first year is improved at 6.55t/ha/year. Increase in yield has contributed to increment in monthly income of RM100/month (14.28%) for Replantingparticipantsand RM800/month new income for the New Plantingparticipants. In addition, there were participants who integrated short-term crops with oil palmto generate additional income while awaiting the oil palm to produce yield.Participants responded well towards the servicesgiven by the MPOB Extension Officers. Improvementin adopting Good Agricultural Practicies by participants were also obsderved.Most of the participants were satisfied with the implementation of the scheme and services ofextension officers. The study concluded that this scheme is relevent if it is continuously implemented in the future with improved implementation methods to increase its efficiency in order to achieve the intended objectives.

Keywords: Agriculture Practices, Assistance Scheme, Extension Services,Oil Palm, Smallholders

Introduction

In the Malaysian oil palm industry, independent smallholders contributed to 16.9% of land holding from the total of 5.81 million hectares of oil palm planted area (Kushairi, 2017). In 2017, the average production of oil palm by the independent smallholders is around 17.19t/ha/year which is lower than the national average of 22t/ha/year (MPOB, 2017). In 2016 the production is slightly declined by 6.9% to 16.12 t/ha/year, which is mainly due to El-Nino phenomenon. Among the main factors that caused low yield

productivity of smallholders is identified due to the use of poor quality of oil palm seedlings. Low productivity has greatly affecting the income of independent smallholders. MPOB (2017)reported that the average of net income of the oil palm smallholders is RM 1,609/month/family. Additional income could also be generated from the integration of crops and livestocks with oil palm (Suboh et al., 2014).

Reliasing the important of independent smallholder sector, under the National Key Economic Area (NKEA), the government has introduced the Entry Point Project 1 (EPP1) for oil palm with the main purpose to increase the income of oil palm smallholders(Pemandu, 2010). The targeted activities of the EPP1 is to accelerate the replanting of old oil palm trees that are no longer productive and have low yield. In theEPP1,it isalso included the implementation of new planting of oil palm by the independent smallholders. Through these two activitiesthe production of fresh fruit bunches (FFB) and the acreageof oil palm planted area and the income of oil palm independent smallholders can be increased (Choo, 2011).

The scope ofEPP1insentive is to provide the independent smallholders the aid fund with the value of not exceeding RM7,500/ha for Semenanjung (Peninsular Malaysia)and RM9,000/ha for Sabah and Sarawak. Smallholders who applied are eligible to be provided with quality seedlings, fertilizers for initial stage, chemicals to control weeds and pests as well as cash incentive for land preparation prior planting the palm seedlings. They would also received advisory services from MPOB Extension Officers on Good Agricultural Practices, particularly on cultivation and management of oil palm (MPOB, 2014). As of December 31, 2015, the EPP1 has provided 42,196 independent smallholders with oil palm seedlings covering planted areas of 96,880 hectares (MPOB, 2016). From these total planted areas, cultivation in year 2011 and 2012 alone involving a total of 14,902 hectares.

The previous Oil Palm Seedlings Assistance Schemes (SBABB), implemented from 2006 to 2010, showed that smallholders who joined the scheme have recorded FFB yield up to 7.3t/ha/year in the first year of harvest, higher than those smallholders who did not join the SBABBof 3.42t/ha/year (Zulkifli et al., 2013).The survey also found out that smallholders who participated in SBABB have successfully obtained a gross income of RM3,250/ha/year for the first year of harvesting.

In this study we evaluated the early impact of EPP1 in terms of FFB yield and income of participants in the first year harvest who planted oil palm in year 2011 and 2012. In addition, other findings related to the implementation of the scheme such as integration

activity of crops with oil palm, Good Agricultural Practices (GAP) and satisfaction of smallholders on services provided by the MPOB Extension Officers are also assessed.

METHODOLOGY

Study Population and Sample Number

The study population consists of 8,901 participants of Replanting and New Plantingin state of Johor (a state in Penisular Malaysia) who have cultivated oil palm in the year 2011 and 2012. This group of smallholders have received all agricultural inputs. Based on G-Power sampling methods, the numbers of samples required in this study was determined 90 participants.

Data Collection and Analysis

Data were collected through face to face interviews using a structured survey form that has been tested. The design of the survey form is divided into five parts and includes information on background of smallholders and plantation, data on yield, income, implementation of GAP and perception towards scheme and MPOB as the executor agency. As an initial assessment, the data collection was divided according to Zone and the first phase conducted in South Zone which is Johor. A total of 90 smallholders have been involved and responded in the survey that was conducted in June 2016.

RESULT AND DISCUSSION

Participant Demographic Profile

The details of participant demographic profiles are shown in Table 1.The age of smallholders who participated in the Replanting and New Planting Schemesare ranging from 55 to 65 years old, while most of them (56.8%) have education level up to secondary school. From the total of 90 respondents, nearly 63.3% of smallholders are full-time oil palm smallholders as well as cultivating their own oil palm plantation (45.6%). Most ofoil palm managementactivitieswere hired to the third parties for implementation as due older age and lack of knowledge of smallholders in carry out the works. Among the major activities hired to contractors included land preparation (51.1%) and harvesting FFB (55.6%).

For experience in cultivating oil palm, Replanting participants have more experience (21-30 years; 48.9%) as they cultivated oil palm before replanting, as compared to New Planting participants (1-10 years; 53.3%). This factor will be more favorable to the Replanting participants to be more successfull in the management of oil palm after joining the

scheme. The result also showed that the scheme participants who made the oil palm plantation as an option is due to two factors, namely source of income (78.9%) and interest (53.3%).

TABLE 1 : DEMOGRAFPHIC PROFILE OF PARTICIPANT

Items	Total N (%)	Replanting n (%)	NewPlantingn (%)
No. of Respondents	90	45 (50%)	45(50%)
Ethnic group:			
Malay	64 (71.1%)	34 (75.6%)	30 (66.7%)
Chinese	26 (28.9%)	11 (24.4%)	15 (33.3%)
Average Age:	59 years old	62 years old	57 years old
Education Level			
No formal education	3 (3.4)	2 (4.5%)	1 (2.3%)
Primary school	30 (34.1)	21 (47.7%)	9 (20.5%)
Secondary school	50 (56.8)	21 (47.7%	29 (65.9%)
College/Univerisity	5 (5.7)	-	5 (11.4%)
Status of Cultivated Plantation			
Full time	57 (63.3%)	34 (75.6%)	23 (51.1%)
Part time	33 (36.7%)	11 (24.4%)	22 (48.9%)
Other Jobs			
Government employee	5 (10.0)	-	5 (17.9%)
Private sector employee	5 (10.0%)	1 (4.5%)	4 (14.3%)
Self-employed	40 (80.0%)	21 (95.5%)	19 (67.9%)
Plantation cultivated by			
Own	41 (45.6%)	18 (40.0%)	23 (51.1%)
Contract	22 (24.4%)	8 (17.8%)	14 (31.1%)
Both	27 (30.0%)	19 (42.2%)	8 (17.8%)
Hired works			
Cleaning/area preparation	46 (51.1%)	21 (46.7%)	25 (55.6%)
Cultivation	40 (44.4%)	20 (44.4%)	20 (44.4%)
Fertilization	34 (37.8%)	15 (33.3%)	19 (42.2%)
Weeding	39 (43.3%)	19 (42.2%)	20 (44.4%)
Harvest	50 (55.6%)	27 (60.0%)	23 (51.1%)
FFB sales	35 (38.9%)	18 (40.0%)	17 (37.8%)
Experience in cultivating oil palm			
No experience	2 (2.2%)	-	2 (4.4%)
1-10 yrs	31 (34.4%)	7 (15.6%)	24 (53.3%)
11-20 yrs	15 (16.7%)	6 (13.3%)	9 (20.0%)
21-30 yrs	27 (30.0%)	22 (48.9%)	5 (11.1%)
31-40 yrs	13 (14.4%)	10 (22.2%)	3 (6.7%)
>40 yrs	2 (2.2%)	-	2 (4.4%)
Reason for cultivating oil palm			
Interest	48 (53.3%)	24 (53.3%)	24 (53.3%)
Occupy spare time	7 (7.8%)	3 (6.7%)	4 (8.9%)
Hereditary heritage	17 (18.9%)	11 (24.4%)	6 (13.3%)
Source of income	71 (78.9%)	32 (71.1%)	36 (86.7%)
Manageable	7 (7.8%)	4 (8.9%)	3 (6.7%)
Soil suitability	1 (1.1%)	-	1 (2.2%)

Information on Plantation

Basicinformation onparticipants' plantation which are collected during the survey are shown in Table 2. This information is important to estimate the actualpotential of yield production based on soil type, topography, crop density and accessibility to plantation (Idris et al., 2007). Nearly 45.6% of the scheme participantscome from in the inland soil type and planting in the flat land (85.6%). The crop density is also compatible with the type of soil, a total of 148 palm/ha (46.7%). However, about 36.7% of the participants inform that there are issues related to accessibility to the plantation, 15.6% of them were related to plantation road which is not suitable.

TABLE2 :INFORMATION OF RESPONDENT PLANTATION

Items	Total N (%)	Replanting n (%)	New Plantingn (%)
Soil type			
Alluvial	14 (15.6%)	3 (6.7%)	11 (24.4%)
Inland	41 (45.6%)	24 (53.3%)	17 (37.8%)
Peat	35 (38.9%)	18 (40.0%)	17 (37.8%)
Plantation topography type			
Flat	77 (85.6%)	38 (84.4%)	39 (86.7%)
Wavy/hilly	13 (14.4%)	7 (15.6%)	6 (13.3%)
Crop density			
136 tree/ha	20 (22.2%)	9 (20.0%)	11 (24.4%)
148 tree/ha	42 (46.7%)	21 (46.7%)	21 (46.7%)
160 tree/ha	28 (31.1%)	15 (33.3%)	13 (28.9%)
Facing problems in accessing the plantation	33 (36.7%)	16 (35.6%)	17 (37.8%)
Types of problems in accessing the plantation			
Plantation road is not suitable	14 (15.6%)	8 (17.8%)	6 (13.3%)
No access to sell FFB	10 (11.1%)	4 (8.9%)	6 (13.3%)
Flood	6 (6.7%)	5 (11.1%)	1 (2.2%)

Yield of Fresh Fruit Bunches

The land holding size and yield of FFB of the participants are key elements in the study. Out of the total, only 46 respondents responded about the landholding size. The average of land holding size for Replanting and New Planting participants are 1.76 hectares and 1.64 hectares, respectively (Table 3). The land size of participants in both schemes is still below the economic acreage of 4 hectares.

The FFB yield of participants for both Replanting and New Planting schemes are shown in Table 4. It was demonstrated that FFB yield for both schemes increased the as thepalm getting older for both for Replanting and New Planting Scheme. The differences in yield can

be seen for year 2009 and 2010, where there was a decline in the yield for old or unproductive oil palm tree compared to the yield after replanting where the average yield was the highest in 2015, 7.57t/ha/year. According to the estimated potential yield of FFB for inland soil for first year of cultivation is 4.6 to 10.5t/ha/year (Kushairi *et al.*, 2013). The yield for the first year harvest is in the range of potential yield which was set at 6.55t/ ha/year.

TABLE 3 :SIZE OF LAND HOLDING OFREPLANTING AND NEW PLANTING PARTICIPANTS

Scheme	Number of smallholders	Total (Hectare)	Average (Hectare)
Replanting	26	46.00	1.76
New Planting	20	32.80	1.64

TABLE 4 : YIELD OF FRESH FRUIT BUNCHES OF REPLANTING AND NEW PLANTING PARTICIPANTS BEFORE AND AFTER REPLANTING

Year of replanting	Year of harvest	Average yield by year t/ha/year	Remark
	2009	6.9120	FFB yield before replanting
	2010	6.0900	
2011	2013	6.5500	FFB yield after replanting
	2014	6.9000	
	2015	7.5700	

Incomeof Replanting andNew Planting Scheme Participants

This survey showed that the income of participants from the sale of oil palm after participating in the Replanting scheme increased to about RM100/month (Table 5). For New Planting scheme, the new income owned by the participants increasedto about RM800/month. This study clearly showed that by replanting, the oil palm income increases, although it isstill in the early stage of cultivation (under five years) compared to the yield of old oil palm production which is no longer productive. The increase in income is expected to be obtained continuously by the participants include New Planting due to the FFB production trends as shown in Table 4. However, this is subjected to the current price of oil palm for the up coming year. There were also implementation of crop integration activity by the scheme participants such as pineapple, banana, cassava and chilli by eight participants (8.8%) from the total respondents.

TABLE 5 : INFORMATION ON OVERALL INCOME

Items	Total	Replanting	New Planting
Household dependent*(people)*	1-4	1-4	1-4
Average monthly income before joining the schemes(median) *(RM)*	750	700	-
Average monthly income after joining the scheme (median) *(RM)*	800	800	800
Integration*(No. of people)*			
Pineapple	3	1	2
Banana	3	1	2
Cassava	1	1	-
Chilli	1	-	1
Other income before (median) *(RM)*	1,000	1,000	1000
Other income after (median) *(RM)*	1,400	800	2,000

Changes in Good Agricultural Practices (GAP) after joining the scheme

Questions related to Good Agricultural Practices (GAP) was asked to the scheme participants. Four scores were assigned and the detail for each score is as in Table 6.

TABLE 6 : SCORE MARK FOR COMPLIANT IN IMPLEMENTATION OF GOOD AGRICULTURAL PRACTICES (GAP)

No.	Score	Explaination
1	Compliant and change	Changed to comply the GAP after joining the scheme
2	Compliant and unchanged	Remained to comply the GAP before joining the scheme
3	Non-compliant and change	Changed to non-compliant the GAP after joining the scheme
4	Non-compliant and unchanged	Remain non-compliant with GAP before and after joining the scheme

For Replanting scheme, the survey is clearly showed that the majority of the participants haveimproved in compliant to GAP after joining the scheme (Table 7). Improvement of practices included cultivation system (66.7%), quantity (62.2%) and application method of fertilizers (68.9%), weed control (68.9%), disease control (55.6%), monitoring of nutrient deficiency (60.0%) and collecting the loose fruits (62.2%). The percentage of improvement in related field activities could be also represented the effectiveness of the extension services given by the MPOB Extension Officers in providing guidance to the smallholders especially on oil palm management practices.

For the participants of New Planting, majority of the participants were complied to the GAP after implementing the scheme. No changes in the practices because the scheme was introduced to smallholders who newly open land for cultivation of oil palm. It can be concluded that the objective of providing exposure to GAP particularly to the scheme participants has been achieved.

TABLE 7 :IMPROVEMENT IN THE IMPLEMENTATION OF GOOD AGRICULTURAL PRACTICES AFTER JOINING THE SCHEME

Items	Total N (%)	Replanting n (%)	NewPlanting n (%)
No cultivation in area >25°			
Compliant and change	49 (54.4%)	29 (64.4%)	20 (44.4%)
Compliant and unchanged	38 (42.2%)	15 (33.3%)	23 (51.1%)
Non-compliant and unchanged	3 (3.3%)	1 (2.2%)	2 (4.4%)
Fertilization around the tree (young tree)			
Compliant and change	51 (56.7%)	31 (68.9%)	20 (44.4%)
Compliant and unchanged	36 (40.0%)	13 (28.9%)	23 (51.1%)
Non-compliant and change	1 (1.1%)	-	1 (2.2%)
Non-compliant and unchanged	2 (2.2%)	1 (2.2%)	1 (2.2%)
Around the tree is free of weeds			
Compliant and change	51 (56.7%)	31 (68.9%)	20 (44.4%)
Compliant and unchanged	37 (41.1%)	13 (28.9%)	24 (53.3%)
Non-compliant and unchanged	2 (2.2%)	1 (2.2%)	1 (2.2%)
Application of triangular cultivation system			
Compliant and change	49 (54.4%)	30 (66.7%)	19 (42.2%)
Compliant and unchanged	38 (42.2%)	14 (31.1%)	24 (53.3%)
Non-compliant and unchanged	3 (3.3%)	1 (2.2%)	2 (4.4%)
Adequate fertilization			
Compliant and change	48 (53.3%)	28 (62.2%)	20 (44.4%)
Compliant and unchanged	37 (41.1%)	14 (31.1%)	23 (51.1%)
Non-compliant and change	2 (2.2%)	2 (4.4%)	-
Non-compliant and unchanged	3 (3.3%)	1 (2.2%)	2 (4.4%)
Monitor nutrient deficiencies			
Compliant and change	47 (52.2%)	27 (60.0%)	20 (44.4%)
Compliant and unchanged	41 (45.6%)	17 (37.8%)	24 (53.3%)
Non-compliant and unchanged	2 (2.2%)	1 (2.2%)	1 (2.2%)
Monitor disease			
Compliant and change	46 (51.1%)	25 (55.6%)	21 (46.7%)
Compliant and unchanged	42 (46.7%)	19 (42.2%)	23 (51.1%)
Non-compliant and unchanged	2 (2.2%)	1 (2.2%)	1 (2.2%)
Collect loose fruits			
Compliant and change	47 (52.2%)	28 (62.2%)	19 (42.2%)
Compliant and unchanged	40 (44.4%)	16 (35.6%)	24 (53.3%)
Non-compliant and unchanged	3 (3.3%)	1 (2.2%)	2 (4.4%)

Extension services by the MPOB Extension Officers

Table 8 shows that about 93.3% of the participantshave recieved advice from theMPOB Extension Officers.A total of 66.7% of participants attended courses, seminars and workshops organized by MPOB. There is room for improvement that can be taken in the future so that each participant can ultimately be ascertained to attend a course organized by MPOB to ensure that extension services can be implemented more effectively.

TABLE 8 : NUMBER OF SMALLHOLDERS PARTICIPATED IN THE SCHEME RECHIEVED ADVICES FROM MPOB EXTENSIONOFFICERS

Items	Total N (%)	Replanting n (%)	New Planting n (%)
Have received guidance from MPOB extension officers	84 (93.3%)	40 (88.9%)	44 (97.8%)
Have attended courses/ seminars/ interaction sessions with MPOB extension officers	60 (66.7%)	34 (75.6%)	26 (57.8%)

Evaluation of Scheme and MPOB as Implementor Agency

Assessment of participants towards the scheme and MPOB as the implementor agency was also determined in this study. The information is important for MPOB to evaluate the effectiveness implemetation of the scheme, which included the allocation, service quality and policies and distribution of inputs to smallholders. Based on scoresof five (5), whichis indicated strongly agree, the participants were satisfied with the statement that the scheme can help them to reduce the cost of purchasing inputs(4.29), attractedthem to cultivate oil palm (4.39) and the scheme provides benefits to the smallholders (4.42) (Table 9).However, majority of the respondents said that the amount of input allocation of the scheme is just adequate (3.67).

Participants were also satisfied with the services by MPOB as the executor agency (Table 10). They agreed with the statement that they are confident with the ability of MPOB in assisting smallholders (4.37). The distribution of inputs are efficient and fast (4.16), the application process is simple (4.24), the quality of provided agricultural inputs are good (4.33). For the statement of getting agricultural inputs on time, majority of them voted uncertain (3.92).

Respondents were also generally satisfied with the extension services provided by the MPOB Extension Officers. On average, respondents agreed with positive statements related to the services (Table 11).

TABLE 9 :EVALUATION AND SATISFACTION TOWARDS THE SCHEME

Satisfaction towards the scheme	Average satisfaction score (from 5)		
	Total	Replanting	New Planting
EPP1 scheme has able to reduce the cost of agricultural inputs.	4.29	4.18	4.40
Allocations/inputs from the scheme are sufficient.	3.67	3.50	3.84
The scheme attracted me to cultivate oil palm	4.39	4.32	4.47
The scheme provides benefits to the smallholders	4.42	4.40	4.44

TABLE10 : ASSESSMENT TOWARDS MPOB AS EXECUTOR

Assessment towards MPOB as executor	Average Satisfaction Score (from 5)		
	Total	Replanting	New Planting
I am confident in the ability of MPOB in assisting smallholders through EPP1 scheme	4.37	4.29	4.44
This program is carried out continuously by MPOB	4.48	4.41	4.56
The distribution process of seedlings inputs is efficient and fast	4.16	4.02	4.29
The application process is easy	4.24	4.11	4.38
The provided seedlings, fertilizers and chemical pesticides are quality	4.33	4.20	4.47
Participants receive agricultural inputs on time	3.92	3.89	3.96

TABLE11 :EVALUATION TOWARDS MPOB AS EXTENSION AGENT

Evaluation towards MPOB as extension agent	Average Satisfaction Score (from 5)		
	Total	Replanting	New Planting
The Extension Officersare helpful in the application process and distribution of inputs	4.47	4.38	4.56
The Extension Officers havegood experiences in the field of oil palm cultivation	4.36	4.20	4.51
The Extension Officers are honest and trustworthy with their duties	4.42	4.32	4.51
I am satisfied with the guidance and extension services provided by the Extension Officers	4.39	4.27	4.51
The Extension Officers regularly organizes related courses to help smallholders in getting information about the effective oil palm management	4.01	4.02	4.00

CONCLUSION

Generally, participants involved in the scheme are aged, most of them are full time planters which has undergone primary or secondary level of education. There are some of main oil palm management activities which required machinery, skill and hard workingworkers were hired to external parties. These activities such as land preparation, fertilizer application, planting of palm and harvesting of FFB. Majority of participants planted oil palm on flat land and inland soil type. The planting density is found consistent following standard recomendation and depending on type soil owned by them.

The study foundthat after joining Replanting and New PlantingSchemes, the income of participants are gradually increase with the increase of FFB yield. The FFB yield for the first year harvest was recorded at 6.55t/ha/year, then increased to 6.9 t/ha/year and 7.57 t/ha/year in the third year of harverst. In addition, there were also participants who integratedseveral crops withoil palm to get additional income. Extension services by MPOB Extension Officers have achieved the objective as it was discovered that the participants have adopted Good Agricultural Practices (GAP) after joining the scheme.

Allocation of agricultural inputs and the required cost for land preparation as well as distribution methods still could be improved. Participants were satisfied with the implementation of the scheme and services provided by the MPOB Extension Officers. The

result of the study showed that the scheme is relevant to smallholders and will receive good response when it was continues to be implemented in the future.

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