

Monitoring and Reporting of Oil Palm Fresh Fruit Bunch (FFB) Transactions among Independent Smallholders and Dealers: An Analysis of a Case Study in Selangor, Malaysia

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ABSTRACT

Most oil palm smallholders do not practice consistent and accurate farm record-keeping. Thus, it is difficult to provide effective extension services without knowing the actual production of the smallholders in relation to cost and profit. Currently, there is no specific system in place to capture records of fresh fruit bunch (FFB) yield and price received by individual oil palm smallholders in Malaysia. Therefore, a new system known as the Oil Palm Smallholder Information Card or Kad Informasi Pekebun Kecil Sawit (KIPS) has been developed to capture the FFB transactions by smallholders using dealers as the intermediary. This study aimed to assess the adoption, challenges and effectiveness of the proposed KIPS system. Apart from that, the study aimed to identify the current record-keeping practices and FFB transaction practices among smallholders and dealers. The study was carried out among oil palm smallholders who are selling FFB to three FFB dealers in the Sepang and Kuala Langat districts in Selangor, Malaysia. Proportionate and simple random sampling was employed in this study to determine the respondents for each dealer while interview-administrated questionnaires were employed to obtain the relevant data. The adoption level of the KIPS system among smallholders was found to be poor. One of the challenges of the KIPS system is the difficulty for smallholders to be present during every FFB transaction. The study revealed that the proposed KIPS system needs to be improved to include an online-based web portal for data entry in addition to the use of the card prior to implementing this system all over the country.

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INTRODUCTION

Malaysia is one of the major players in the world's oil palm cultivation, coming after Indonesia. Both Malaysia and Indonesia produced up to 85% of the world's palm oil in 2016, apart from other producing countries such as Thailand and Colombia. In 2016, Malaysia had about 5.74 million hectares under oil palm cultivation.

Malaysia's oil palm cultivation comprises areas under plantation companies (estates), government agencies, organised and independent smallholders. The independent smallholders sector plays a significant role in the Malaysian oil palm industry as its share has been continuously increasing from 14% of the total oil palm area in 2013 to 16.3% (0.93 million hectares) in 2016 (MPOB, 2016). By definition, an oil palm smallholder is one who owns land less than 40.46 ha under oil palm, or in aggregate amounts totalling less than 40.46 ha (Malaysian Palm Oil Board Licensing Regulations, 2005).

Generally, the palm oil supply chain has two segments of activities – which are the upstream and downstream activities. Nursery operators, smallholders, fresh fruit bunch (FFB) dealers, estates and mill operators are part of the upstream segment which involve activities such as seed production, nursery management, cultivation, harvesting and milling. FFB dealers serves a intermediary role between the FFB producers (smallholders and estates) and the millers. As of February 2016, there were 2966 registered dealers in Malaysia, including 102 dealers from the Kuala Langat district and 27 dealers from the Sepang district of Selangor (MPOB, 2016). Dealers collect an average of 846 t of FFB per month with an average oil extraction rate (OER) of 18.42% (Ayat *et al.*, 2009).

A licensed oil palm dealer can buy oil palm fruit from estates or smallholders and sell the fruit to the oil palm mills. The Malaysian Palm Oil Board (MPOB) strictly regulates the issuance of such licenses as there are a few specific criteria to be met. One of the criteria is the ratio of dealer to oil palm area which must be more than one dealer to 200 ha in the district where the application of a license is made while the premises of the new applicant must be more than 2 km away from the current existing dealers' premises. A smallholder is also required to have a license from MPOB for selling the fruit from his own oil palm land. The majority of the smallholders sell their FFB through dealers rather than selling them directly to the mills due to the long distance to the mills or the small amount of FFB produced. Smallholders will either send their FFB using their own transport to a collection point or will engage a dealer's transport services. The dealer's FFB price determination is either based on the daily FFB price issued by MPOB or the average price in the previous month. The final price of the FFB offered to smallholders depends on the balance after deduction of service charges imposed by dealers for transportation, weighing fee and many others. All these charges are not controlled and vary according to the dealer, thus causing problems to the smallholders (Jamil *et al.*, 2001).

Currently, there is a lack of systematic record-keeping practices among smallholders and dealers. An earlier study conducted on oil palm smallholders in Malaysia suggested that the majority of them did not have a systematic record-keeping practice which resulted in inefficiency in oil palm management (Ayat *et al.*, 2008). Most small-scale dairy farmers in Malaysia still use manual recording systems such

as hand-written record books which were very tedious and time-consuming; hence, it was difficult to search for and analyse the data (Jeyabalan, 2010). It was reported that 76.7% of the farmers in Ohio, USA, believe that keeping records is one of the most important practices that have led them to the use of computers (Batte, 2005). Record-keeping initiatives among farmers have also become a priority in Chile where several management centres were created throughout the country to implement record-keeping practices among the farmers as a way to help them keep and analyse data on economics and production information (Engler and Toledo, 2010).

Small farmers tend not to keep records as they claim the practice does not benefit them as they own very small farming areas (Enoch *et al.*, 2010). However, farmers owning bigger farm sizes are found to be higher adopters of record-keeping technology compared with small-scale farmers (Grisham and Gillespie, 2008; Chagunda *et al.*, 2006). A study conducted on Chilean farmers reported that a farmer's educational level, age and land leasing were statistically significant in relation to their digital data-recording methods (Engler and Toledo, 2010). Among the main reasons farmers do not keep farm records are a lack of knowledge on record-keeping, a perceived lack of the need to keep records, too much work and a lack of time (Dudafa, 2013; Justice, 2012).

Most of the smallholders who do not keep records on their farming activities will have difficulty in determining their actual costs and profits, which results in them not showing any initiative to increase FFB yield or to reduce cost (Ayat *et al.*, 2008). Dairy farmers who kept records were found to have better milk production as they were most

likely to use the records to improve efficiency (Yeamkong *et al.*, 2010). About 87% of livestock farmers in Tanzania who kept records on their farm activities agreed that their records were helpful in making effective decisions on their daily farm activities. The remaining 13% responded that they did not keep any records on their farm activities because they did not have time and they perceived it as unnecessary (Gladness *et al.*, 2014).

Currently, there are not many applications of technology such as QR Code®-based identification and reporting systems that are available for small farmers. The application of personal digital assistants (PDA) for record-keeping in cucumber production in China was found to improve the efficiency of record-keeping (Li *et al.*, 2010). Radio frequency-based electronic identification (RFID) recording systems in dairy livestock for small farmers in India were also found to be effective for preventing livestock insurance-related irregularities as well as for providing a cost-effective animal performance recording service (Abdul *et al.*, 2010). A study on the evaluation of mobile application for documenting poultry production activities using PDA reported that the success and accuracy of the reporting depends mainly on user efficiency and dedication in providing inputs into the system (Sallabi *et al.*, 2011).

Oil palm smallholders in Malaysia have undergone major transformation programmes to enhance their productivity, quality and income via a few assistance schemes from the government. Despite these advances, record-keeping practices on their farm activities have not been a great focus of attention among smallholders and dealers. Thus, it is difficult to provide effective extension services without knowing the actual production of smallholders

in relation to costs and profits. Therefore, an effective system is needed to capture the records on farm activities among smallholders and dealers. In the meantime, there is no specific real-time system in place to capture FFB yield and price records of individual independent smallholders in Malaysia. Currently, dealers are required to provide monthly records of their FFB sales to MPOB based on overall sales rather than on individual smallholders. Therefore, MPOB has difficulty in assessing yield records of individual smallholders in real-time to identify any problems, such as the sale of stolen FFB or unauthorised use of smallholder licenses.

Other than that, MPOB via its extension services is also having difficulty in determining the overall FFB yield of oil palm smallholders due to the lack of record-keeping practices among them. Besides that, record-keeping has been an important criterion evaluated under the various certification schemes available to the oil palm industry because consumers are demanding for sustainability. Apart from that, FFB theft has become a growing problem which may be considered to be related to the unauthorised use of smallholder licenses to sell the stolen FFB. Accurate and complete yield records will allow extension agents to compare yield data from various farms and highlight any substantial yield differences among smallholders. Therefore, in this project, we have developed a new system known as *Kad Informasi Pekebun Kecil Sawit* (KIPS) to capture FFB yield and price records among oil palm smallholders via dealers as intermediaries. This study aimed to assess the adoption, challenges and effectiveness of the KIPS system. It also aimed to identify current FFB transactions and record-keeping practices among independent smallholders and dealers.

METHODOLOGY

Materials

The study was carried out among oil palm smallholders who are selling FFB to three FFB dealers in the Sepang and Kuala Langat districts which are situated in the state of Selangor. These two districts were purposely chosen for this pilot study because they were nearer to the MPOB Head Office which allowed for frequent and easy monitoring. The three dealers (A, B and C) were chosen based on their willingness to participate in the study as it required extra work to be done by the dealers; they needed to scan and key in data into the system. The smallholders were chosen for being existing customers selling FFB to these dealers. There were a total of 332 smallholders with 104 of them having transactions with dealer A, 156 with dealer B and 72 with dealer C. Information on and the list of smallholders and FFB dealers were obtained from MPOB's Extension Unit Central Zone and Licensing Division. Proportionate and simple random sampling was employed in this study to determine the respondents for each dealer. Based on the method of Krejcie and Morgan (1970), the total sample size of smallholders for the study was 179. Based on proportionate sampling, sample sizes comprising 56 respondents selected from dealer A, 84 respondents from dealer B and 39 respondents from dealer C were adopted. However, due to cases of incomplete survey forms, data of only 78 respondents from dealer B and 27 respondents from dealer C were used in the analysis while respondents from dealer A remained at 56 smallholders.

The KIPS system comprises an Android™ application on a smartphone or tablet which will utilise the camera function of the

tablet to scan the quick response code (QR Code®) on the KIPS card of individual smallholders and a web-based system which allow users to view the transaction reports (Figure 1). The QR Code® is constructed as a two-dimensional framework, allowing the code to be read up and down as well as across. This allows the QR Code® to contain much more information than a barcode system.

The use of a hand-held device such as a tablet or smartphone allows mobility for the dealers to scan and key in data from any place. The proposed tablet or smartphone application has been developed on the Android™ platform for smartphones as the Android™ operating system (OS) is an open-source mobile operating system developed by Google Inc. which has greater freedom in its development programme. The Android™ application was preset to be the only application that can scan and retrieve the correct information on the proposed QR Code® for security reasons. Smallholders need to hand over

their card to the dealers every time they sell their FFB. The use of the KIPS card for individual smallholders in this system also acts like a verification system whereby dealers are only able to key in the transaction once the individual card has been scanned. This is one way to curb the sale of stolen FFB without licenses as dealers will not be able to key in the transaction without the card being provided by smallholders. However, the effectiveness of this proposed method depends on whether or not smallholders bring along their cards for every FFB transaction they make. Once the dealers have scanned the cards, they need to key in the amounts of FFB sold, the price, the weightage ticket number and vehicle number into the Android™ application (Figure 2).

The data entered will be saved on the device until Internet connectivity is available which then allows the data to be synchronised to the server. This function is very helpful as some of the dealers might not have Internet connectivity at

their ramps or at the smallholders' farms. Once the data are synchronised, users are able to view their particular reports in real time by logging in at a web portal (Figure 3). There are four user modules (for MPOB officer, smallholder, dealer and administrator) that allow a login into the portal with a specified access for each module. An automated notification system has been built into the web system to automatically alert the administrator if a FFB transaction of a smallholder is more than 3 t/ha/month. This notification helps MPOB in identifying any abnormalities in FFB yield records in relation to farm size. This data will be later verified further with particular smallholders or dealers as a way to curb the sales of stolen FFB or sales made without an MPOB license.

Currently, an oil palm smallholder's license is printed on an A4 size paper when issued by MPOB. However, under the KIPS system, it has been proposed to issue a card to replace the existing A4 size license (Figure 4). Information

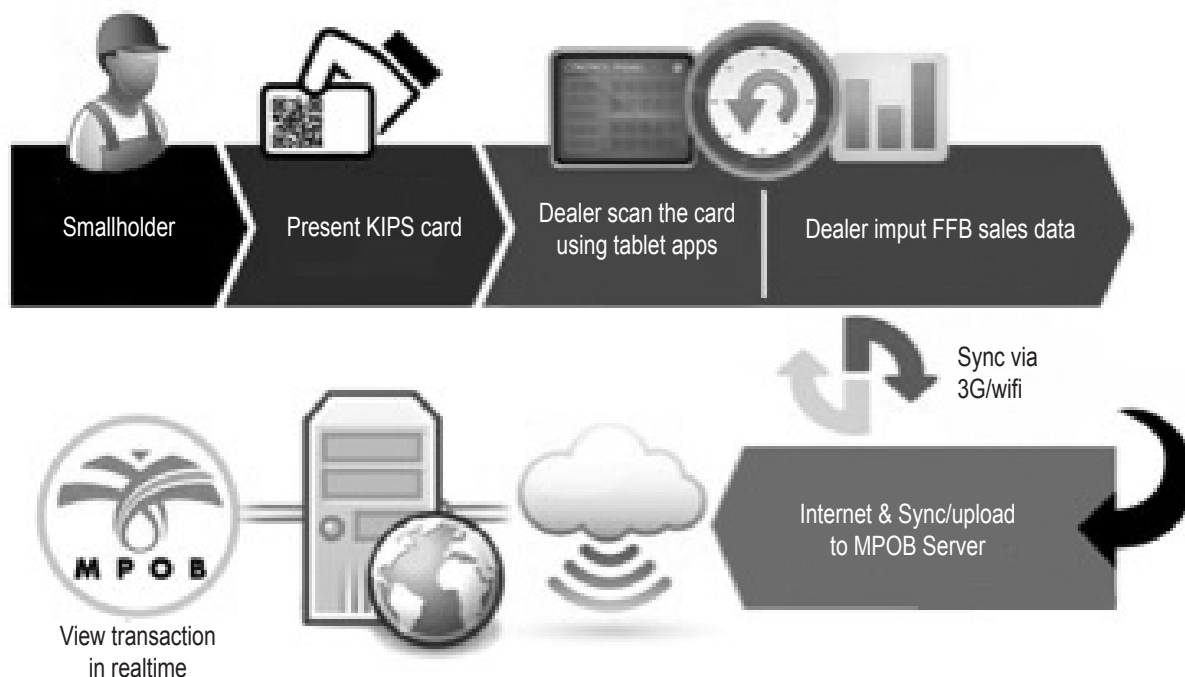


Figure 1. Operational flow of Kad Informasi Pekebun Kecil Sawit (KIPS) system.



Figure 2. Kad Informasi Pekebun Kecil Sawit (KIPS) system for Android™ application.

such as the MPOB license number, name of smallholder, identification card number and address will be printed on the card together with a QR Code®. Dealers who previously kept transaction data in paper-based records will be able to move into digital-based recording; the latter in turn helps to capture accurate data on FFB yield of and price offered to smallholders using the KIPS system. Paper-based records are found to be easily damaged or lost, and pose some challenges for analysing the data because a longer time is required compared with computerised record keeping (Gladness *et al.*, 2014).

Methods

The study employed a survey research methodology using

interview-administrated questionnaires to gather information on the adoption, challenges and performance of the KIPS system. Apart from that, the questionnaires were designed to capture information on current record-keeping, FFB harvesting and sales practices among the respondents. The interviews were conducted by field extension agents from MPOB. Descriptive statistics were used to depict the data gathered.

RESULTS

Socio-demographic Characteristics of Respondents

Table 1 shows the socio-demographic characteristics of the smallholders interviewed in the survey. The average farm size of the respondents was 1.9 ha with 49.1% of them having a land area between 1.1 and 2.0 ha. Most of the respondents were old farmers with an average age of 61.8 years. The majority of the respondents were male as they represented 83.2% of all the respondents, while only 16.8% were female. Almost half of the number of respondents (48.4%) had attended at least secondary school education. A total of 77.0% of the respondents were full-time oil palm smallholders, most of them being retirees. Only 19.9% of the respondents had access to the Internet which will pose some challenges for them if they want to access their FFB transactions via the online medium as intended in this project in future. The respondents had an average of 22.5 years of experience in oil palm management. Most of the respondents lived within 6-10 km of their farms. Similarly, their farms were situated within 6-10 km of the dealer's ramp. This short distance might be a win-win situation for both smallholders and dealers in the selling and buying of FFB.



Figure 3. Kad Informasi Pekebun Kecil Sawit (KIPS) web portal.



Figure 4. Kad Informasi Pekebun Kecil Sawit (KIPS) card.

TABLE 1. SOCIO-DEMOGRAPHIC PROFILE OF RESPONDENTS (smallholders)				
Respondent's profile	Category	Frequency (n)	Percentage	Average
Farm size (ha)	≤1.0	33	20.5	1.9
	1.1-2.0	79	49.1	
	2.1-3.0	32	19.9	
	3.1-4.0	3	1.9	
	>4.0	14	8.7	
Age (yr)	≤30	3	1.9	61.8
	31-40	5	3.1	
	41-50	26	16.1	
	51-60	43	26.7	
	61-70	39	24.2	
	>70	45	28.0	
Gender	Male	134	83.2	-
	Female	27	16.8	
Education level	No formal education	45	28.0	-
	Primary school	78	48.4	
	Secondary school	37	23.0	
	College/university	1	0.6	
Full-time oil palm smallholders	Yes	124	77.0	-
	No	37	23.0	
Availability of Internet facility	Yes	32	19.9	-
	No	129	80.1	
Experience in oil palm management (yr)	≤10	27	16.8	22.5
	11-20	45	28.0	
	21-30	42	26.1	
	31-40	15	9.3	
	>41	4	2.5	
	Data missing	28	17.4	
Farm distance from house (km)	<1	13	8.1	-
	1-5	64	39.8	
	6-10	69	42.9	
	>10	15	9.3	
Farm distance from dealer's ramp (km)	<1	12	7.5	-
	1-5	62	38.5	
	6-10	70	43.5	
	>10	17	10.6	

Practices of FFB Transactions

Table 2 shows the practices of FFB transactions by oil palm smallholders. Most of the smallholders (34.2%) had been selling their FFB to the same dealers for 6-10 years, while the whole sample averaged 14.4 years. A total of 65.2% of the respondents received credit assistance from the dealers, mostly in the form of cash advance and input purchase, and this suggests that such assistance might be one of the ways for

dealers to attract and retain their customers. More than half of the respondents (58.4%) hired external labour to conduct FFB harvesting at their farms, while only 11.2% did the harvesting on their own. This might be due to the fact that most smallholders were old and not capable of conducting harvesting activities which require a lot of physical strength. A total of 75.8% of the respondents used transportation services provided by the dealers to transport FFB from their farms to the ramp. Almost

all the respondents (97.5%) relied on the dealers to weigh their FFB while 82% of them did not monitor the weighing process. The majority (80.1%) of the respondents were satisfied with the FFB weighing process by the dealers. These data imply that the smallholders were very much dependent on the dealers for FFB transportation and weighing because this was the most convenient and easy way to sell their FFB, and receive payment, without much hassle. All the respondents received their

TABLE 2. FRESH FRUIT BUNCH (FFB) HARVESTING AND SALES PRACTICES OF SMALLHOLDERS

Practice	Category	Frequency (n)	Percentage	Average
Period of selling FFB to dealer (yr)	≤5	19	11.8	14.4
	6-10	55	34.2	
	11-15	30	18.6	
	16-20	18	11.2	
	21-25	4	2.5	
	> 25	21	13.0	
	Data missing	14	8.7	
Received credit assistance from dealer	Yes	105	65.2	-
	No	56	34.8	
Harvesting activities	On his/her own	18	11.2	-
	Hired external labour	94	58.4	
	Used dealer services	49	30.4	
FFB delivery to dealer	Transport by dealer	122	75.8	-
	Own transport	19	11.8	
	Other external transport	20	12.4	
FFB weighing practices	Weighing by dealer	157	97.5	-
	Other external weighing	4	2.5	
Monitoring weighing activity	Yes	29	18.0	-
	No	132	82.0	
Satisfied with FFB yield achieved currently	Yes	129	80.1	-
	No	32	19.9	
Method of payment by dealer	Cash	161	100.0	-
	Cheque	0	0.0	
	Bank transfer	0	0.0	
	Purchased inputs to replace cash	0	0.0	
Issued receipt for payment	Yes	142	88.2	-
	No	1	0.6	
	Sometimes	18	11.2	
Meeting frequency between smallholder and dealer per month	Never	18	11.2	-
	Once	88	54.7	
	Twice	46	28.6	
	Thrice	7	4.3	
	> 4 times	2	1.2	
Time of meeting with dealer	During harvesting	8	5.6	-
	During transportation	18	12.6	
	During payment	117	81.8	

payments for FBB by cash, but only 88.2% of them consistently obtained receipts from the dealers for the FFB sold. Slightly more than half of the respondents (54.7%) met the dealers only once a month, which was when they received payments for the FFB sold.

Table 3 depicts the FFB buying and selling practices of dealers. FFB transactions were not the

only services offered by the dealers. They also offered related services to oil palm smallholders such as FFB transportation, land preparation, FFB harvesting, oil palm management and sales of agricultural inputs. These extra services, especially the sales of agricultural inputs such as fertiliser and weedicide, were one of the strategies by which the dealers

attracted the smallholders to sell their FFB, and also as a means to generate more income for themselves (Ayat *et al.*, 2008). Their main methods for determining FFB price for the smallholders were based on the monthly FFB price. In determining FFB weight, two of the dealers responded that they kept the different smallholders' FFB separated when loading a

lorry until full, and then sent them to the ramp to be weighed later. The remaining dealer's approach was different as he transported and weighed FFB from each individual smallholder separately. Similar to the response from the smallholders, the dealers only met with the smallholders once a month which was during payment for the FFB sold. This situation caused some problems in getting the smallholders' involvement in bringing their KIPS cards to dealers each time FFB is transported to the dealers. The result was that dealers tended to keep hold of the cards on behalf of the smallholders.

Record-keeping Practices

Based on *Table 4*, the majority of the smallholders (63.4%) did not keep any records of their farm activities, mainly because they did not know how to keep records and also because of their perception

that record-keeping is not important for them. Among those who kept farm records, almost all (98%) used books or paper to record mainly FFB yield and price. A total of 44.1% said they retained their records for less than a year. One of the main problems faced by the respondents in record-keeping was that they tended to forget to keep records consistently. The majority of the respondents (61%) used farm records to track their monthly FFB yield, while 18% used them to determine profit and loss.

Table 5 shows the record-keeping practices among dealers. All the dealers kept records on their FFB sales which included information on the name of each smallholder, MPOB license number, FFB weight, FFB price and lorry plate number. Two of the dealers used paper records as their main method of record-keeping while one dealer used the computer. They retained

their records for an average of 5.3 years before disposal.

Adoption, Challenges and Effectiveness of KIPS System

Based on *Table 6*, all the smallholders involved in the study did not use the KIPS card for FFB transactions during the four months of the pilot project. One of the main reasons was that most of them left their cards with the dealer due to the inconvenience of bringing them to be scanned for every FFB transaction. This finding is consistent with the earlier reports that most smallholders did not follow their consignments of FFB to monitor the weighing process, and that they only met with the dealers to receive payment for FFB. More than half (66.5%) of the respondents were not interested in joining the KIPS system in future because most of them (47.7%) were older farmers and were not capable

TABLE 3. FRESH FRUIT BUNCH (FFB) BUYING AND SALES PRACTICES OF DEALERS

Practice	Category	Frequency (n)	Percentage
Providing other services* to smallholders besides buying and selling of FFB	Yes	3	100
	No	0	0
Main method of determining FFB buying price	Daily price	0	0
	Monthly price	3	100
Practice of FFB weighing for smallholders	Weigh at ramp separately for each smallholders	1	33.3
	Separate in one lorry and weigh later	2	66.7
	Estimate FFB weight at farm	0	0
Frequency of meeting smallholders in a month	Never	0	0
	Once	3	100
	Twice	0	0
	Thrice	0	0
	> 4 times	0	0
Time of meeting with smallholders	During FFB harvesting	0	0
	During FFB transport	0	0
	During FFB payment	3	100

*Note: Transportation, land preparation, harvesting, loan facility, etc.

TABLE 4. FARM RECORD-KEEPING PRACTICES OF SMALLHOLDERS

Practice	Category	Frequency (n)	Percentage
Practice record-keeping	Yes	59	36.6
	No	102	63.4
Main reason for not keeping records	Don't know how to keep records	34	33.3
	Records don't have any importance	32	31.4
	Don't have time	6	5.9
	Always forget to record	30	29.4
Method of record-keeping	Book/paper	58	98.3
	Computer	1	1.7
Time period for retaining records (yr)	< 1	26	44.1
	1-2	16	27.1
	3-4	8	13.6
	> 4	9	15.3
Problem in record-keeping	Time constraint	2	3.4
	Forget to record	38	64.4
	Missing records	12	20.3
	Inadequate knowledge on how to keep records	7	11.9
Benefit of record-keeping	To keep track of yield	36	61.0
	To know when palms were planted	2	3.4
	To keep track of profit and loss	11	18.6
	To plan farm activities	2	3.4
	To keep track of farm activities	8	13.6

*Note: Transportation, land preparation, harvesting, loan facility, etc.

TABLE 5. RECORD-KEEPING PRACTICES OF DEALERS

Practice	Category	Frequency (n)	Percentage
Practice record-keeping	Yes	3	100
	No	0	0
Method of record-keeping	Book/paper	2	66.7
	Computer	1	33.3
Time period for retaining records (yr)	5	2	66.7
	6	1	33.3

of always meeting with the dealers to scan their KIPS cards during FFB transactions. Other than that, they were very satisfied with the existing way of conducting business with the dealers.

Table 7 shows the adoption and challenges of the KIPS system among dealers. All three dealers used the KIPS system during the pilot project. However, based

on the final data captured by the KIPS system at the end of the pilot project, only 54% of all the smallholders had their FFB transactions recorded under the KIPS system by the dealers. The dealers attributed a lack of manpower as their main constraint in recording FFB yields of all their customers (smallholders) because they needed to keep the usual

records on paper as well as to input data into the KIPS system. Their main method of using the KIPS system was to hold on to and scan the KIPS card on behalf of the smallholders for every FFB transaction. This may have been due to the reason that most smallholders were not able to meet with the dealers for every single FFB transaction, so they ended up by

TABLE 6. ADOPTION, CHALLENGES AND EFFECTIVENESS OF KIPS SYSTEM FROM SMALLHOLDERS' POINT OF VIEW

	Category	Frequency (n)	Percentage
Used KIPS for FFB transactions	Yes	0	0
	No	161	100
Main reason for not using KIPS	Inconvenience in using card; left with dealer	132	82.0
	Not living near farm	2	1.2
	Data missing	27	16.8
Interested to join KIPS system in future	Yes	54	33.5
	No	107	66.5
Main reason for disinterest in KIPS	Busy	21	19.6
	Not handling the farm by oneself	2	1.9
	Not living near farm	4	3.7
	Satisfied with current system	22	20.6
	No need to know yield and price of FFB	7	6.5
	Old age and not capable	51	47.7

Note: KIPS - *Kad Informasi Pekebun Kecil Sawit*. FFB - fresh fruit bunch.

TABLE 7. ADOPTION AND CHALLENGES OF KIPS SYSTEM FROM DEALERS' POINT OF VIEW

	Category	Frequency (n)	Percentage
Used KIPS for FFB transaction	Yes	3	100
	No	0	0
Main method of scanning KIPS card	Hold on to and scan card on behalf of smallholders	3	100
	Meet with smallholders when FFB transported from farm	0	0
	Smallholders bring card during FFB delivery	0	0
	Meet with smallholders after FFB delivery	0	0
Can KIPS be implemented all over the country?	Yes	0	0
	No	3	100
Preference of choice if new system requires data entry on FFB transactions using MPOB license number instead of KIPS card	KIPS	0	0
	New system	3	100

Note: KIPS - *Kad Informasi Pekebun Kecil Sawit*. FFB - fresh fruit bunch.

leaving the cards with the dealers. In anticipation of this problem, the dealers were asked their preference of choice if a new system was introduced in replacement of the

current KIPS system which would enable them to enter data on FFB transactions of each smallholder into an online portal using the MPOB license number instead of

scanning the card and using the existing data entry methods of KIPS. All three dealers responded that they preferred the proposed new system. This is not surprising as

the main problem reported earlier with the KIPS system was get the smallholders to bring their KIPS card for every FFB transaction. In line with this problem, all the three dealers agreed that the KIPS system cannot be implemented all over the country in its current form.

Table 8 shows the effectiveness of the KIPS system among dealers. The overall effectiveness of the project was separated into questions based on hardware (tablet and card), software (Android™ application on tablet), Internet connectivity and practicality of the KIPS system. Hardware (tablet and card) and software (Android™ application) scored an average of 4.08 and 4.78, respectively, in a five-point

likert scale (with 5 being the most effective), suggesting that the dealers were satisfied with both the hardware and software aspects of the system. Meanwhile, Internet connectivity scored an average of 2.83, reflecting the poor mobile Internet connection that was provided to all the dealers during the pilot project. However, one dealer responded that he had good Internet connection, suggesting that Internet connectivity may depend on the location as well as the service provider. An average score of 2.27 was obtained for the practicality aspect of this project, indicating the poor acceptance level of the project among the dealers. However, most of the dealers agreed that the KIPS system may help them keep more

systematic records compared with their current manual records.

DISCUSSION

The KIPS project is a significant initiative for collecting data on FFB production by oil palm smallholders in Malaysia. However, based on the analysis conducted in this study, it was found that the current proposed system needs to be improved to be more effective. Figure 5 shows a SWOT analysis of the KIPS system.

The current system which requires the involvement and cooperation of the oil palm smallholders in bringing their KIPS card for every FFB transaction was found to be unfeasible in a real

TABLE 8. EFFECTIVENESS OF KIPS ACCORDING TO DEALERS

Question	Disagree		Undecided		Agree	
	n	%	n	%	n	%
Effectiveness of hardware (tablet and card)	*Average: 4.08					
Tablet is easy to use	1	33.3	2	66.7	0	0
Battery durability is good	0	0	0	0	3	100
Card can be scanned faster using QR Code®	0	0	1	33.7	2	66.7
Card is durable and not easily damaged	0	0	0	0	3	100
Effectiveness of software (application)	*Average: 4.78					
App is easy to use	0	0	1	33.3	2	66.7
App has fast response time	0	0	0	0	3	100
Menu in app is clear and easy to understand	0	0	0	0	3	100
Effectiveness of Internet connection	*Average: 2.83					
Synchronisation of data is fast	2	66.7	0	0	1	33.3
Internet connection is fast	2	66.7	0	0	1	33.3
Practicality of KIPS system	*Average: 2.27					
KIPS is more effective in recording FFB sales compared with existing methods	1	33.3	1	33.3	1	33.3
KIPS can overcome the problem of selling FFB without license/theft	1	33.3	0	0	0	0
KIPS helps dealer to determine FFB transaction records faster and more systematically	0	0	1	33.3	2	66.7
Smallholders are able to bring KIPS card for every FFB transaction	3	100	0	0	0	0
KIPS does not pose additional work load compared to existing method	2	66.7	1	33.3	0	0

Note: n - frequency, % - percentage.

*Average scores are based on likert scale of 1-5 (with 5 being the most agreed).

KIPS - *Kad Informasi Pekebun Kecil Sawit*. FFB - fresh fruit bunch.

situation. The reason is that most of the smallholders were not able to be present and bring the card for every FFB transaction. Most of them only met with the dealers once a month to collect their payment. Therefore, the proposed system needs to be improved by switching to the use of an online-based web portal for data entry instead of using the current method of scanning the card for data entry for every FFB transaction (Figure 6). This can be established by introducing a new module into the existing web portal to allow the

dealers to enter the FFB transaction data. This method will not pose any additional workload for the dealers as it will just replace the current record-keeping practices using paper or the computer. However, a complete infrastructure needs to be in place consisting of a computer with reliable Internet connectivity as well as training for dealers. In addition, further initiatives to integrate this system to the current weighbridge system at the ramp also need to be explored. Meanwhile, the low

adoption level of Internet among smallholders might pose difficulties if they wish to access information on their FFB transactions online. Alternatively, a short messaging service (SMS) based notification can be introduced for smallholders to check on their monthly FFB transactions.

CONCLUSION

It can be concluded that the KIPS system has proven to be an effective tool for capturing FFB production

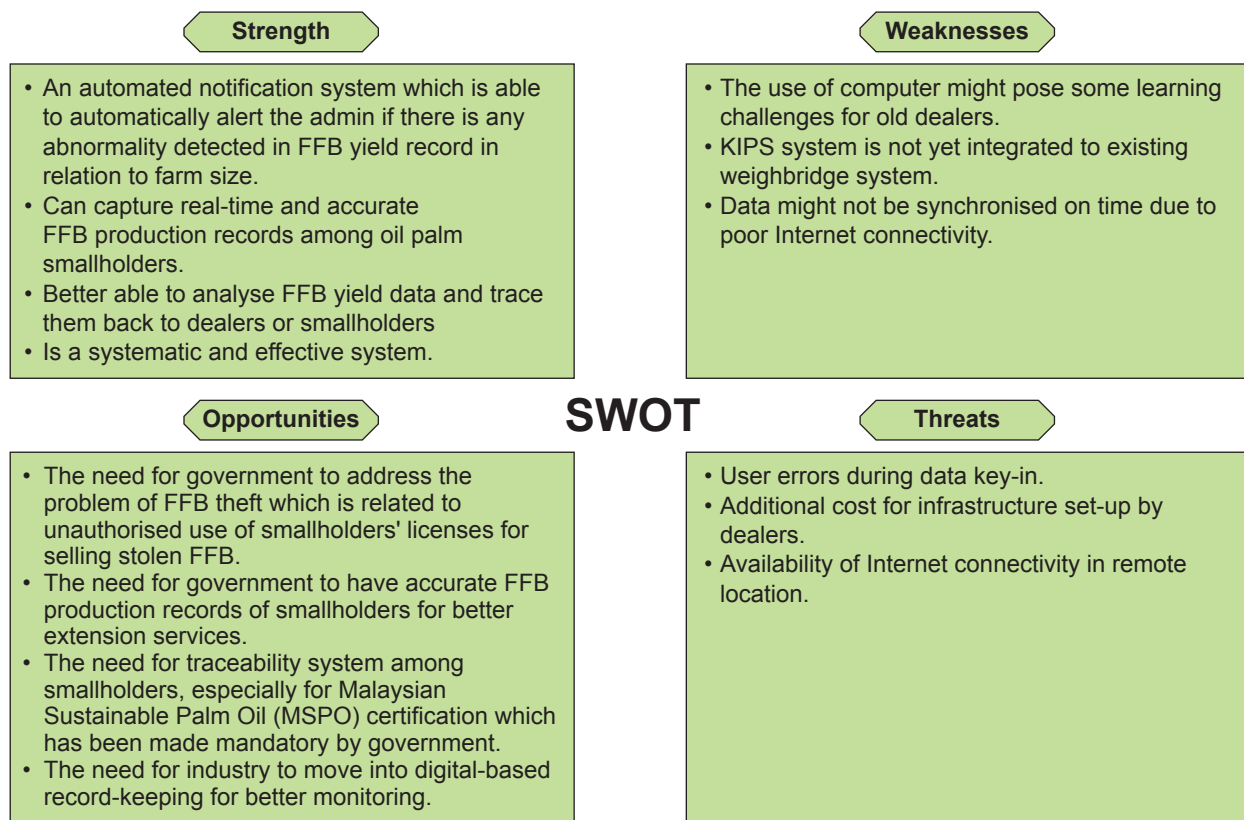


Figure 5. SWOT analysis of Kad Informasi Pekebun Kecil Sawit (KIPS) system.

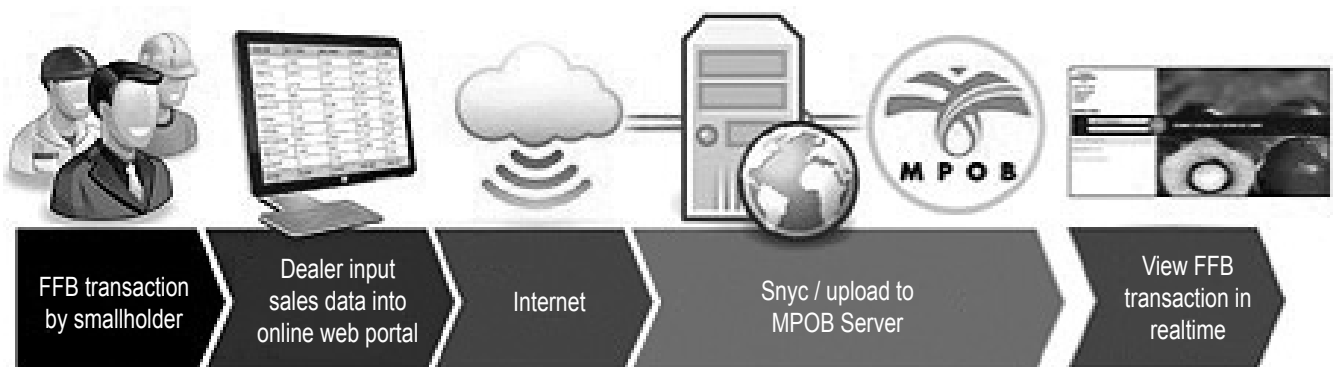


Figure 6. Proposed improvements in Kad Informasi Pekebun Kecil Sawit (KIPS) system.

of oil palm smallholders. However, the adoption level of KIPS system was poor among the smallholders due to the necessity for them to be present and to bring their card for every FFB transaction. Similarly, the dealers considered the system, especially the requirement to scan the card for every FFB transaction, time-consuming and requiring a lot of manpower, thus preventing them from fully adopting the KIPS system. Therefore, based on the results of this study, it is suggested that the proposed KIPS system be improved by converting it into an online web-based portal system whereby dealers will be able to input data directly into the web

portal using the smallholders' identification card without the need to scan the card. For FFB transaction practices, the relationship between smallholders and dealers is based on coexistence and dependence on each other. Smallholders preferred the easy and convenient way of doing business with dealers so that they can sell their FFB without much hassle and receive their due payments. Meanwhile, dealers were able to retain their customers by offering many extra services and benefits. In terms of record-keeping practices, most smallholders did not keep any farm records as they did not know how to keep records, and also because

of their perception that record-keeping was of no importance to them. Extension agents need to further enhance training on record-keeping to smallholders and change their perception on its importance. All the dealers kept records on their FFB transactions as encouraged by MPOB; however their methods of record-keeping were outdated and needed improvement.

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