

Management of the Malaysian Oil Palm Supply Chain: The Role of FFB Dealers

Ayat K Ab Rahman*;
Ramli Abdullah*;
Mohd Arif Simeh* and Faizah
Mohd Shariff*

ABSTRACT

The fresh fruit bunch (FFB) dealer sub-sector is part of the Malaysian palm oil supply chain. It is inter-related with other sub-sectors either directly or indirectly. It serves as a intermediary between the smallholders and the millers. FFB dealers need to be efficient so that the FFB sent to the mills within 24 hr after harvesting remain in good quality. Shortfalls may affect the efficiency of the other sectors as well as the whole industry. The study found that the dealers have found ways of making profits and have undergone several structural changes. Despite the challenges, there is still scope for their improvement.

INTRODUCTION

The Malaysian palm oil supply chain has two levels of activities, namely upstream and downstream. The upstream activities include those of the nursery operators, oil palm smallholders, fresh fruit bunch (FFB) dealers, estates and the input suppliers. Each sub-sector plays a very significant role in the development of the Malaysian palm oil industry.

The FFB dealer is a middle sub-sector that links both FFB suppliers (smallholders and estates) and FFB receivers (mills) in the upstream level. The FFB dealer collects FFB produced by independent smallholders or estates and sends them to mills. Independent smallholders are free to sell either to the dealers who are middlemen or directly to mills – though in many cases only one mill is sited close enough to the smallholding to allow for rapid delivery of FFB

(Vermeulen and Goad, 2006). Thus, the dealer sub-sector plays a significant role, especially for the smallholders, by helping them send their FFB to the mills usually within 24 hr to maintain the good quality of the fruits. Fast delivery of FFB will encourage the mills to pay higher rates due to the freshness of the fruits.

Dealers also play an important role in assisting the mills in carrying out their activities more efficiently. Dealers help to separate the unripe from the ripe FFB harvested by smallholders, and send only the ripe FFB to the mills. This helps the mills to increase their average oil extraction rate (OER). More importantly, mills prefer to transact business only with dealers because their number is smaller than smallholders. In this way, managing their accounts is much easier for the mills. Dealers in turn can open their own accounts with the smallholders.

* Malaysian Palm Oil Board,
P. O. Box 10620,
50720 Kuala Lumpur,
Malaysia.

There were 1860 oil palm dealers registered in MPOB's database for 2007 (Table 1). Johor has the largest number of dealers (at 584) representing about 31% out of the total number of dealers in Malaysia. Meanwhile, Perak, Selangor and Sabah have 354, 292 and 168 dealers, respectively, together representing about 44% of the total number of dealers in Malaysia. The other states make up only around 25% of the total number. All these dealers can be divided into many types, namely individual proprietorship, partnership, co-operative, semi-government company, and other types.

TABLE 1. NUMBER OF FRESH FRUIT BUNCH (FFB) DEALERS BY STATE (2007)

State	2007	%
Johor	584	31.40
Perak	354	19.03
Selangor	292	15.70
Sabah	168	9.03
Pahang	149	8.01
Terengganu	81	4.35
Negeri Sembilan	70	3.76
Kedah	45	2.42
Melaka	39	2.10
Sarawak	33	1.77
Kelantan	30	1.61
Pulau Pinang	15	0.81
Total	1 860	100.00

Source: MPOB (2007).

As a supply chain is defined as an activity associated with the flow and transformation of goods from the primary production stage to the end-user, the FFB dealer is part of the chain. Thus, for the success of the full implementation of the supply chain, efficiency is very important. The FFB dealer

sub-sector is not to be excluded as its efficiency is also very important because it can partly assist the industry to be more competitive. In this respect, if the whole Malaysian palm oil industry is efficient, competitiveness of its palm end products would be ensured. Also, a high efficiency level can only be achieved when high quality end products are produced at a minimum cost of production.

This article will investigate the role of the FFB dealers in the palm oil supply chain at the upstream level. The dealers were interviewed to identify elements of inefficiencies and structural changes in the sub-sector. This article highlights the findings of the survey, and wherever possible strategies were suggested to increase the efficiency of the dealers.

LITERATURE REVIEW

Supply chain management technology has been defined in many ways. The definition by Kalakota and Whinston (1997) is that the new supply chain is a collection of interdependent steps that, when followed, accomplishes a certain objective, such as meeting customer requirements. Another definition is by Aitken (1999) who defined it as a network of connected and interdependent organizations mutually and co-operatively working together to control, manage and improve the flow of materials and information from suppliers to end-users. Tan and Shaw (1998) gave another definition, namely, "a supply chain is a network of business units and facilities that produce raw materials, transform them into intermediate goods and the final products, and deliver these products to customers through a distribution system".

Handfield and Nichols (1999) emphasized the importance of managing the whole supply chain which encompasses all activities associated with the flow and transformation of goods from the raw materials stage (extraction) to the end-user. Meanwhile, a study conducted by Poirier and Reiter (1996) concentrated on the optimization of the supply chain. The supply chain should be an error-free, totally efficient network, from original supply to final consumption.

The issue of the FFB dealers, however, has had little research compared to the oil palm small-holder sector. Despite that, market chains for palm oil in Malaysia are adapted here from PORIM and Universiti Putra Malaysia (UPM) survey on smallholders in Peninsular Malaysia in 1988, which indicate the position of FFB dealers in the industry (Figure 1). It is clear that the dealers serve as an intermediary between smallholders and millers. They collect FFB from the smallholders and later send the FFB to the mills for further processing. All three sub-sectors need to be efficient and, as far as possible, they need to avoid any slack in their operations so that there will be a smooth flow of good quality fruits from the smallholders to the mills. This will then satisfy part of the concept of the supply chain.

METHODOLOGY

The study was done through face-to-face interviews. These were conducted in all the states of Malaysia. A sample of FFB dealers was selected for each state from MPOB's database based on statistical sampling procedure.

The sample size for the dealers was determined based on

Yamane's (1967) formula¹. Using this formula, a total sample of 95 dealers was required at the 10% degree of confidence. After determining the total sample size, the next step was to determine the sample size by state based on the stratification formula². The distribution of samples in each state is shown in Table 2; however, a higher total sample size of 99 is shown, giving a higher degree of confidence. The actual selection of dealers in each state was then based on simple random sampling. Following this procedure, all the dealers in each state were numbered and random numbers were generated for them based on the calculated size of respondents for each state. The dealers with the numbers that corresponded to the generated numbers were selected as respondents in the sample. However, to ensure that the data are statistically reliable, the number of interviewed dealers generally exceeded the sample size statistically recommended in Table 2. Each selected dealer was then interviewed face-to-face at his office using a guided questionnaire.

RESULTS AND DISCUSSION

A number of primary data was gathered from the dealers during the survey. These are described below:

Basic Statistics

Average weight of FFB collected.
The average weight of FFB collected by each dealer varied significantly, ranging from 20 t to 3600 t per month. Each of the 119 dealers collected on average about 846 t of FFB, with a median of 650 t per month (Figure 2).

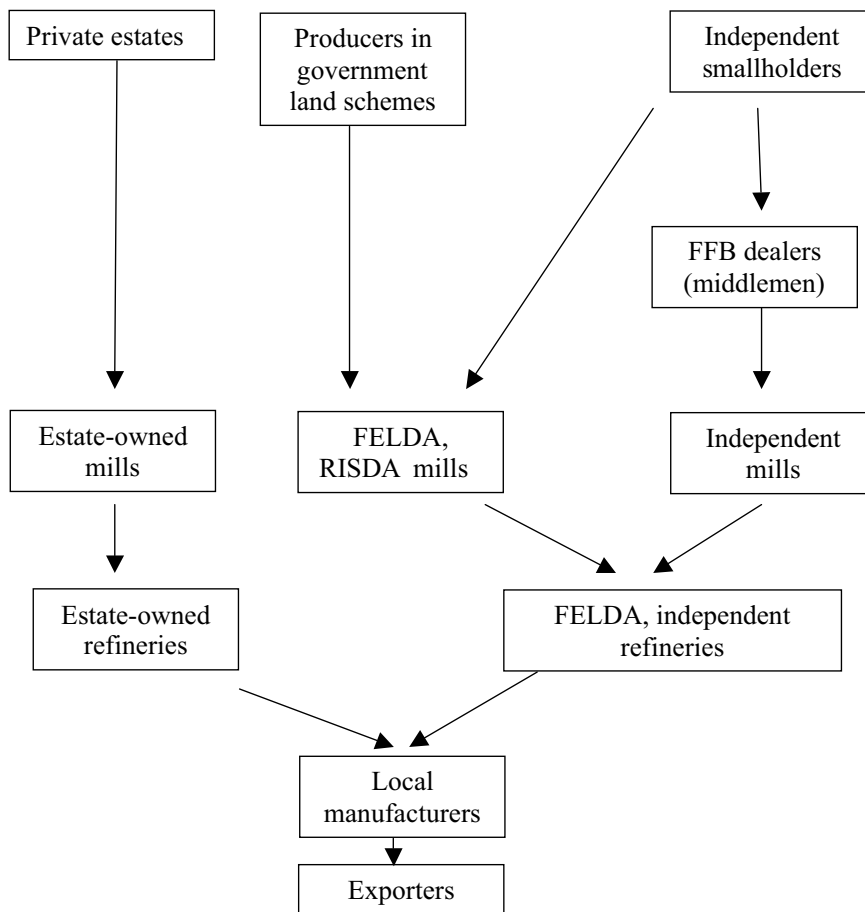


Figure 1. Market chains for palm oil in Malaysia.

TABLE 2. THE DISTRIBUTION OF A MINIMUM SAMPLE SIZE AND THE NUMBER OF DEALERS INTERVIEWED BY STATE

State	Minimum sample size	Interviewed
Johor	30	32
Perak	18	20
Selangor	15	16
Sabah	9	10
Pahang	8	14
Terengganu	4	5
Negeri Sembilan	4	6
Kedah	3	4
Melaka	2	5
Sarawak	2	3
Kelantan	2	2
Pulau Pinang	2	2
Total	99	119

¹ The general formula of Yamane (1967) is: $n = N/[1+N(1-e)^2]$, where n = total sample size of dealers to be interviewed in Malaysia, N = total number of dealers in Malaysia, and e = degree of confidence.

² The general stratification formula is: $n_i = n \times (N_i/N)$, where n_i = total sample size of dealers to be interviewed in state i , n = total sample size of dealers to be interviewed in Malaysia, N_i = total number of dealers in state i , and N = total number of dealers in Malaysia.

Oil Extraction Rate (OER) Offered to Smallholders by Dealers

The survey showed that the OER offered by the dealers to the smallholders ranged between 18% and 19% (Figure 3), and this distribution gives an average OER of about 18.42% and a median of 18.50%.

OER Offered to Dealers by Mills

The survey showed that the OER offered by the mills to the dealers ranged between 18.10% and 19.80%. The reported OER averaged at 18.87% and the median was 18.90% (Figure 4).

Analysis of Operational Cost of FFB Dealers

Operational cost of FFB dealers was examined based on computation from various cost components. Table 3 shows an example of a calculation of operational cost for one of the dealers. This dealer collected around 12 907.83 t of FFB in a year, or 1075.65 t in a month. This activity involved three major variable costs. First was the labour cost, which included the wages of lorry drivers, manager and clerks. Second was the cost of transportation, which included road tax and insurance, maintenance cost of lorries, cost of the diesel consumed and loan installment for the lorries. Lastly were other costs which included utility bills for water and electricity as well as the cost of the weighbridge (service, tax and inspection costs).

Based on the calculations in Table 3, the total operational cost faced by this particular dealer was RM 870 080 a year, or by about RM 72 506 per month. In other words, his total operational cost was RM 67.40 /t of FFB.

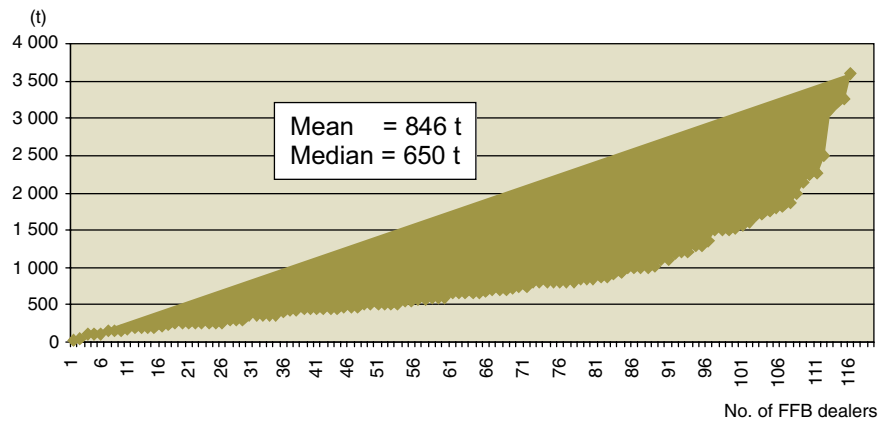


Figure 2. Average weight of fresh fruit bunch (FFB) collected by each dealer (t/month).

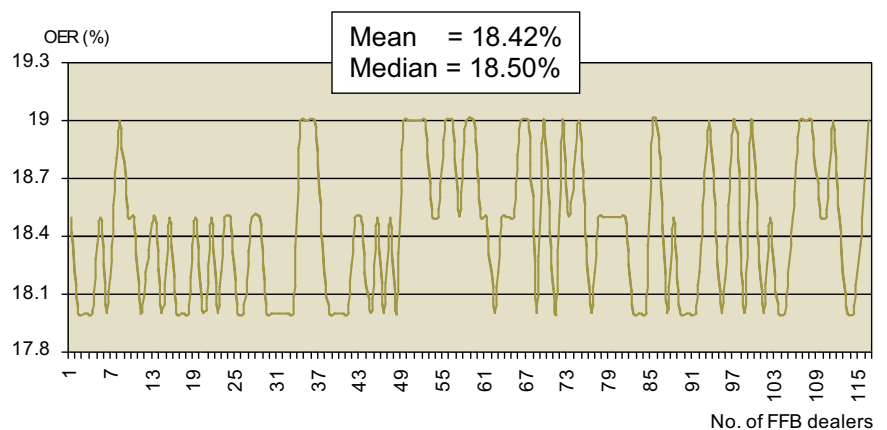


Figure 3. Average oil extraction rate (OER) offered to smallholders by dealers (%).

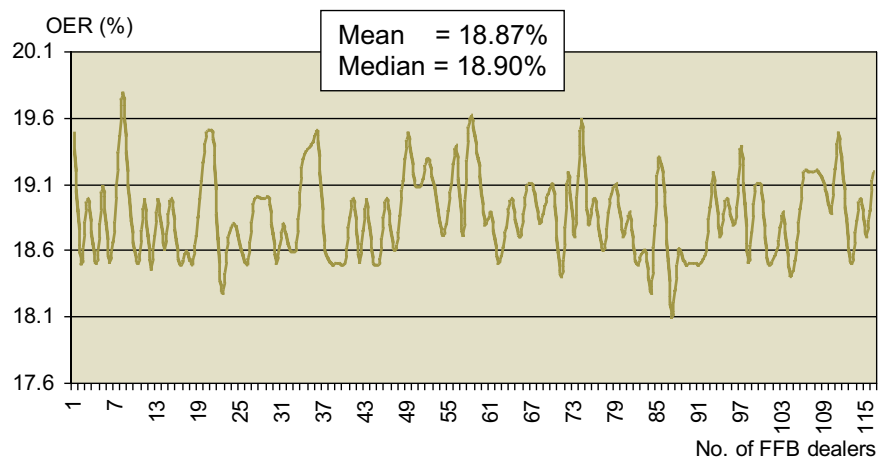


Figure 4. Average oil extraction rate (OER) offered to dealers by mills (%).

TABLE 3. OPERATIONAL COST OF A FRESH FRUIT BUNCH (FFB) DEALER

Variable cost item	Cost (RM/yr)	Cost (RM/month)
Labour cost		
i) Salary of drivers of small lorries (8 workers)		
- Basic	48 000	4 000
- Incentives	51 631	4 303
ii) Salary of drivers of trailers (3 workers)	85 200	7 100
iii) Manager	60 000	5 000
iv) Clerk (3 workers)	32 400	2 700
Cost of transportation		
i) Road tax and insurance for small lorries*	13 600	1 133
ii) Road tax and insurance for trailers**	14 640	1 220
iii) Maintenance of lorries/trailers	120 000	10 000
iv) Installment payments for lorries/trailers	102 000	8 500
iv) Diesel	336 000	28 000
Others:		
i) Utility bills (water and electricity)	3 600	300
ii) Cost of weighbridge		
- Service	1 000	83
- Tax	1 009	84
- Inspection	1 000	83
Total cost	870 080	72 506

Note: * For 4 lorries.

** For 2 trailers.

The above figures were obtained from one of the dealers who had a handling capacity above 1000 t per month.

Techniques Used by Dealers to Generate Profits

The FFB dealers generally adopted three techniques to generate profits. They used any one or more of the techniques. One was based on the differential rates between the OER offered by the mills and the OER offered to the smallholders. Another was they did not offer an kernel extraction rate (KER) to the smallholders which had been offered by the mills. The third was they charged the smallholders additional fees like transportation cost for sending the FFB from the smallholders' farms to their ramps and from their ramps to the mills, as well as other deductions such as fees for using the weighbridge and fees for the forklift.

Using the example of the same dealer as mentioned, and based on the scenario in January 2007, the

profits he made can be calculated. This dealer accepted an average of 19.00% OER from the mill, and later offered an OER of 18.80% to the smallholders. The average price of FFB based on the OER offered by the mill was RM 340/t, or RM 17.90 for every 1% of OER. Meanwhile, this dealer also accepted a 5% KER from the mill, valued at RM 42/t. In effect, this dealer received a real price of RM 382/t (RM 340 + RM 42) in January 2007 from the mill.

Table 4 shows the profit made by the dealer in January 2007 when adopting all the three techniques mentioned. Through option one, the dealer received around RM 3.60 gross profit for each tonne of FFB collected. This is because the OER offered by the mill to him was 19.00%, while he offered his smallholder customers a rate of 18.80%. Therefore, there was a difference of 0.20%, representing

a profit of RM 3.60 (RM 17.90 x 0.20). The dealer also accepted a 5% KER offered by the mill (which he did not offer to the smallholders). Therefore, the extra profit received was RM 42/t. For transportation fees, the dealer charged RM 15 for each tonne of oil palm fruits collected from farm to ramp. At the same time, he also imposed an additional transportation fee from ramp to mill, which was RM 20/t. Lastly, he deducted RM 1/t as a weighbridge fee and RM 1.50/t as a forklift fee.

Based on the calculation of profits shown in Table 4, the total gross profit generated by the dealer in question was RM 84 346.50 per month. To arrive at the net profit, there was another cost involved, i.e. the cost of FFB weight loss which is usually 1% out of total FFB collected in a month. This weight loss was valued at RM 3400. Therefore, the real total gross profit became RM 80 946.50 for the month which then gave a total gross profit of RM 79.80/t. Thus, the total net profit received by this dealer was RM 12.40/t (RM 79.80 – RM 67.40) of the FFB collected, or RM 12 586 a month (RM 12.40 x 1015 t).

Elements of Inefficiencies among Oil Palm Dealers

The study identified five elements of inefficiencies among the oil palm dealers, and they were:

Offering OER to smallholders without following standard procedures. The findings showed that about 33% of the 119 FFB dealers interviewed offered OER to oil palm smallholders without following standard procedures. This was mainly due to high competition among themselves in their areas. Therefore, they usually fixed the OER to be offered to the smallholders, for example, at 18%.

TABLE 4. PROFIT GENERATION TECHNIQUES OF DEALERS

Item	Value of deduction	Gross profit (RM/t)	Total profit (RM/t)
Difference in OER offered by the mills and offered to the smallholder	0.2%	3.60	3 654.00
Kernel extraction rate (KER) offered by the mills	5%	42.00	42 630.00
Transportation cost			
- From farm to the dealer's ramp	RM 15.00/t	15.00	15 225.00
- From the ramp to the mill	RM 20.00/t	20.00	20 300.00
Other deductions:			
- Fee for weighbridge	RM 1.00/t	1.00	1 015.00
- Fee for forklift	RM 1.50/t	1.50	1 522.50
Total gross profit (RM)	-	-	84 346.50
Total cost from weight of FFB loss (RM)	-	-	3 400.00
Real total gross profit (RM)	-	-	80 946.50
Total gross profit for each tonne (RM)	-	-	79.80
Total cost (RM/t)	-	-	67.40
Total net profit (RM/t)	-	-	12.40
Total net profit in a month (RM)	-	-	12 586.00

This was to ensure that the price offered will be standardized among them. There were also dealers who never attended any grading course. As a result, the average OER offered by the mills will be declared as the OER to be offered to the smallholders.

It is important that dealers did not offer the same OER accepted from mills to smallholders. If this happened, they would mix FFB received from various smallholders at their ramps until there was enough to make a trip to mills. This meant that there would be several smallholders owning the oil palm fruits in a trailer which would be of varying qualities. Thus, different OER should be offered to different smallholders. It is an unfair practice if the dealers only offered an OER to the smallholders based on the average OER the former received from the mills, especially for those smallholders who produced high quality oil palm fruits. The study observed that the majority of the dealers followed this unfair practice.

Not offering KER to smallholders.

The second element of inefficiency was that dealers did not declare the KER to oil palm smallholders. The findings showed that about 41% of 119 FFB dealers did not offer a KER to the smallholders when determining the price of the FFB for smallholders. This was because they used the margin from KER as a fee for transportation. As a result, all smallholders were charged the same transportation fee which was not fair to the smallholders who were located closer. The distance from the oil palm holding for each smallholder to his dealer's ramp was different from one smallholder to another. Thus, the transportation fee (based on the distance of the oil palm holding to the dealer's ramp) should vary accordingly among the smallholders. The transportation fee for smallholders is supposed to be based on the actual distance of their oil palm farm to the dealer's ramp.

Correcting the above situation will have an effect on the income of smallholders, as illustrated in *Table*

5. *Table 5* shows the monthly prices of palm kernels in 2006 and 2007, which averaged RM 905 and RM 1426/t, respectively. Assuming a 5% KER, the average prices of FFB based on the KER portion would be RM 45 and RM 71/t in 2006 and 2007, respectively. If KER was not declared to the smallholders, it would become a hidden charge for transportation imposed by the dealers on smallholders. The charge for transportation imposed from KER was not fair to smallholders especially during the times when the kernels fetched high prices such as in 2007. This is because when the price of kernel increased to RM 1747/t in December 2007, the price of FFB based on KER would reach RM 87/t. If the dealer used RM 87 as the transportation fee for each tonne of FFB conveyed by them, it would not be fair to the smallholder. This is because the smallholdings are normally very near to the dealer's ramp.

Some dealers claimed that they were not offered a KER from the mills. Despite this, they used

TABLE 5. FLUCTUATIONS IN KERNEL PRICES AND THE PRICE OF FRESH FRUIT BUNCH (FFB) BASED ON KERNEL EXTRACTION RATE (KER)

Month	Price of palm kernels (RM/t)		Price of FFB based on 5% KER (RM/t)	
	2006	2007	2006	2007
January	1 022	1 091	51	55
February	1 019	1 089	51	54
March	935	1 112	47	56
April	908	1 238	45	62
May	868	1 327	43	66
Jun	815	1 517	41	76
July	842	1 542	42	77
August	862	1 511	43	76
September	817	1 572	41	79
October	812	1 673	41	84
November	922	1 693	46	85
December	1 034	1 747	52	87
Average	905	1 426	45	71

Source: MPOB (2006; 2007).

KER as an element to determine the price of oil palm fruits for the smallholders. This situation usually happened when a dealer used other dealers' accounts to send their oil palm fruits to the mills. This is because a dealer who had an account with a mill would use the extra boost in price from KER as his fee to his other dealers who did not have accounts with the mills. Therefore, the dealers who use other dealers' accounts could not include KER as an element to determine the price of oil palm fruits to the smallholders they serviced. With this practice, the incomes of smallholders would be affected and they would register a loss in potential income from KER that they should rightfully enjoy from their dealer.

Dirty conditions at the ramp. The third element of inefficiency was the dirty conditions at the dealers' ramps. About 54% of the dealers' ramps were not cemented. As a

result, mud accumulated on these ramps after rain. The situation could become bad as there were forklifts and trailers unloading FFB at the ramps. This could cause dirty FFB which, in turn, reduced their quality before they were sent to the mills. Muddy FFB contain a lot of mud and soil which affect milling. In addition, rain water can also reduce the quality of FFB.

Delay in conveying FFB harvested by smallholders. The fourth element of inefficiency of some dealers was the delay in conveying FFB harvested by the smallholders. About 22% of the dealers were observed to delay the conveyance of the FFB by more than one day. They gave several reasons for this delay. One reason was that they had insufficient lorries to move FFB, especially during the weekends. Based on their experience, many smallholders harvested their FFB during the weekends. As a result, they faced problems of insufficient

lorries. Another reason was that, in the rainy season, the job to move FFB was difficult, especially for holdings located far from the main road. This was because there was quite a high probability of the lorry getting stuck in the mud and resulting breakdowns during the rainy season.

Conveying unripe FFB. The fifth element of inefficiency for some dealers was their tendency to transport unripe oil palm fruits harvested by the smallholders. Fifty-two percent of them did this because of the high competition among them. They claimed that the smallholders would get angry if any FFB was left behind at their farms, and that they threatened to sell their FFB to other dealers the next time around. Hence, the dealers were forced to accept unripe FFB. This was to avoid loss of their customers in the long-term. This element of inefficiency reduced the average OER offered to them as a result of the low OER offered by the mills. Ultimately, the income of the smallholders would be affected by the low price of FFB.

Changing Structure of Oil Palm Dealers

Some FFB dealers had changed the way they managed their businesses. In general, the result of implementing these changing structures was a direct increase in their efficiency level in terms of managing their businesses. The study determined five changing structures for FFB dealers:

Appointment of agents. About 9% of the 119 dealers appointed agents to act on their behalf. Each agent had the function of persuading independent smallholders to sell their oil palm fruits to that dealer. Normally, their agents came from the heads of the groups which harvested and collected FFB and

also the heads of villages. These agents received incentives from the dealer of about RM 1 to RM 2 for each tonne of FFB sent to them. This payment incentive continued as long as that smallholder sent his FFB to that dealer. The benefit of this strategy was that it could increase the oil palm fruits collected as well as their income.

Sale of fertilizers and weedicides at the dealer's ramp. Most of the FFB dealers (81%) who were interviewed were found to sell fertilizers and weedicides at their ramps. Their main purpose was to attract the smallholders to sell their FFB to them. Using this strategy, the dealers were able to give credit to the smallholders to buy their fertilizers or weedicides. Such a credit scheme did attract the smallholders to sell their FFB to that dealer who would in turn deduct the amounts owing from their income when they sold their FFB. The deduction from their income could also be made over several months as agreed upon by both parties. In this way, the smallholders felt that their burden of buying fertilizers could be reduced. As a result, this changing structure not only attracted the smallholders to sell their oil palm fruits to a dealer who provided such credit but also generated extra income for the dealer.

Rental of their lorries to other parties. About 11% of the dealers rented their lorries to other parties for the purpose of maximizing

their resources. In addition to extra income earned through this strategy, they also provided a transportation service. For example, they rented their lorries to the smallholders for a fee (transportation) to convey the oil palm seedlings purchased by the smallholders from the nursery operators. This strategy indirectly also helped to maintain their close relationship with their customers in the long-term by providing transportation services to those who needed them.

Engagement of a contractor to convey oil palm fruits. About 19% of the dealers who were interviewed applied this strategy. Two types of contractors existed. The first type was the contractor who was responsible for conveying FFB harvested by smallholders to the dealer's ramp. This type of contractor received a transportation fee of around RM 15 to RM 30 for each tonne of FFB conveyed. The second type was the contractor who was responsible for sending FFB from the dealer's ramp to the mill. This type of contractor also received a transportation payment based on his trips.

In doing this, dealers were able to reduce their cost of transportation and cost of hiring lorry drivers. In addition, their efficiency in transportation management could also be increased as each of them usually engaged several contractors. As such, the dealers did not have to face delays in conveying the FFB harvested by smallholders or in

sending the fruits to the mill.

Provision of labour to oil palm smallholders. As a result of high competition among dealers, about 29% of them supplied labour to smallholders. The labour skills included harvester and collector as well as general workers. Normally, the dealers engaged foreign labour so that a minimum labour cost was charged to the smallholders. This strategy attracted more smallholders to sell their FFB to these dealers as a minimum labour cost was charged.

It was found that this strategy of providing labour to the smallholders could easily increase their FFB collection in a month to more than 1000 t. In addition, the strategy helped the dealers to maintain a long-term relationship with many of the smallholders who were dependent on them for labour to manage their oil palm holdings.

CONCLUSION

The study found that there are areas for improvement in the FFB dealer sub-sector in the Malaysian palm oil supply chain. Increasing their efficiency will benefit other sub-sectors, especially the mills which will receive higher quality FFB. In return, the smallholders will also benefit as they will be able to receive a higher income due to an improved supply chain in the industry.

REFERENCES

- AITKEN, J M (1999). Supplier associations, a methodological opportunity supply chain research. 8th *International Annual IPSERA Conference, 1999*. Belfast and Dublin. p. 13-22.
- HANDFIELD, R B and NICOLS, E L (1999). *Introduction to Supply Chain Management*. Prentice-Hall International.
- KALAKOTA, R and WHINSTON, A B (1997). *Electronic Commerce – A Manager Guide*. Addison-Wesley.
- MPOB (2008). *Malaysian Oil Palm Statistics*. Various issues (2005 – 2008). MPOB, Bangi.
- POIRIER, C C and REITER, E S (1996). *Supply Chain Optimization*. Ingram Publication Series.
- PORIM and UPM (1988). *Oil Palm Smallholder Survey in Peninsular Malaysia*. PORIM and UPM joint study.
- TAN, G W and SHAW, M J (1999). Applying component technology to improve global supply chain network management. *International Conference of Information Systems*. 13-16 December 1998. p. 296-301.
- VERMEULEN, S and GOAD, N (2006). Towards better practice in smallholder palm oil production. *Natural Resource Issues Series No. 5*. International Institute for Environment and Development (IIED). London, WC1H 0DD, UK.
- YAMANE, T (1967). *Elementary Sampling Theory*. Prentice-Hall, Inc., Englewood Cliffs, N.J.