The Production Cost of Oil Palm Fresh Fruit Bunches: the Case of Independent Smallholders in Johor

Azman Ismail*;
Mohd Arif Simeh* and
M Mohd Noor*

ABSTRACT

Like in other perennial crops, the Malaysian oil palm smallholding sector can be broadly categorized into organized and independent smallholders. Despite the overall decline in oil palm smallholdings recently, there has been an expansion of the independent smallholders' land from 287 000 ha in 1999 to 320 000 ha in 2000. However, due to the unorganized nature of the latter, updated data and information pertaining to the performance of such smallholdings are limited. This paper attempts to overview the economic performance of these smallholders based on a survey in Johor, which has the largest number of independent smallholders (45%) and the largest independent smallholdings (40%) in the country. The paper also discusses the production cost structures of the independent smallholders compared to their counterparts in the organized smallholder sector as well as with estates.

INTRODUCTION

Oil palm smallholders can be grouped into two main categories, namely; the organized and independent smallholders. The former participate in public land development schemes such as Federal Land Development Authority (Felda), Federal Land Consolidation and Rehabilitation Authority (Felcra), Rubber Industry Smallholders Development Authority (RISDA), *etc*. Under this organizational set-up, the smallholders get access to services pertaining to technical advice, input supply and marketing outlets from these government agencies. In the year 2000, this group of farmers cultivated 1.03 million hectares of oil palm or one-third of the overall oil palm areas in the country (*Table 1*).

On the contrary, the independent smallholders established oil palm holdings themselves with minimal government assistance, normally in the form of extension services imparted by the Department of Agriculture (DOA)[1].

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

[1] Since oil palm is not under the purview of the DOA, such services are now reduced. Hence, the Malaysian Palm Oil Board (MPOB) has initiated the establishment of *Pusat Tunjuk Ajar dan Nasihat* (TUNAS) which aims at spearheading the provision of extension services to independent oil palm smallholders.

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These holdings are small and scattered. From *Table 2*, it is shown that there were 87 717 independent smallholders in the year 2000. They cultivated 320 835 ha of oil palm or 9.5% of the total oil palm areas in the country.

Table 1 also shows that despite the overall decline in oil palm smallholdings from 1.37 million hectares in 1999 to 1.35 million hectares in 2000, there has been an expansion of independent smallholdings[2] from 286 513 ha to 320 818 ha. Consequently, the independent smallholders' land share has increased from 8.65% in 1999 to 9.5% in 2000. Such a positive response was mainly attributed to favourable crude palm oil (CPO) prices vis-à-vis the prices of other commodities. Due to the unorganized nature of the independent smallholders, however, data and information pertaining to current performance and production cost of the independent smallholders are limited. Such evidence is crucial in view of the need to further streamline the development of the smallholders in the country. This paper attempts to discuss the economic performance of these independent smallholders in particular their production cost, based on a survey in Johor[3].

METHODOLOGY

The study was conducted through a stratified random sampling survey. The independent smallholders from Johor were first listed from MPOB's smallholders database. They were later divided into

TABLE 1. DISTRIBUTION OF OIL PALM PLANTED AREA BY CATEGORY: 1999-2000

Category	1999		2000	
	ha	(%)	ha	(%)
Federal government/				
Felda*	674 948	20.37	598 190	17.72
Felcra	132 354	4.00	154 357	4.00
Risda	41 561	1.25	37 011	1.10
State schemes	235 565	7.11	242 002	7.17
Total organized smallholders	1 084 428	41.38	1 031 560	29.99
Independent smallholders	286 513	8.65	320 818	9.50
Total smallholders	1 370 941	50.03	1 352 378	39.94
Total	**3 313 393**	**100.00**	**3 376 664**	**100.00**

Note: *Inclusive of Felda Plantations Sdn. Bhd.
Source: MPOB (2001a).

TABLE 2. INDEPENDENT OIL PALM SMALLHOLDINGS IN MALAYSIA: 2000

State	No.	(%)	ha	(%)
Johor	39 711	45.26	125 459.83	39.10
Perak	15 921	18.15	53 089.78	16.55
Selangor	15 324	17.47	33 407.47	10.41
Pahang	3 277	3.74	16 683.21	5.20
N. Sembilan	2 015	2.30	11 057.93	3.45
Kedah	1 485	1.69	10 045.77	3.13
P. Pinang	1 119	1.28	6 869.02	2.14
Melaka	626	0.71	4 212.29	1.31
Terengganu	582	0.66	4 042.34	1.26
Kelantan	103	0.12	1 128.96	0.35
P. Malaysia	**80 163**	**91.39**	**265 996.60**	**82.91**
Sabah	5 994	6.83	48 031.85	14.97
Sarawak	1 560	1.78	6 807.21	2.12
Malaysia	**87 717**	**100.00**	**320 835.66**	**100.00**

Source: MPOB (2001b).

[2] The land areas under organized smallholdings have declined from 1 084 428 ha in 1999 to 1 031 560 ha in 2000.
[3] The survey was confined to Johor since it has the largest number of independent smallholders (45%) (*Table 2*) with a total area of 125 459.83 ha.

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four strata, which referred to the selected districts namely: Batu Pahat, Muar, Kluang and Pontian. These districts were selected because 89.6% of the total independent smallholders in Johor are from those areas (*Table 3*). In order to select the respondents from each stratum, the random number table was used. A total of 300 independent smallholders was interviewed and their distribution is as shown in *Table 4*.

RESULTS AND DISCUSSION

Background on Oil Palm Independent Smallholders

Slightly more than three-quarters (77%) of the independent smallholders were Malays. Chinese farmers comprised 22% and the Indians made up only 1%. This is shown in *Figure 1*. The independent smallholders were relatively old. Their average age was 58.6 years with a range of between 45 to 76 years (*Table 5*). Being relatively old, they had little opportunity for off-farm employment. Their livelihood depended mainly on income from their oil palm holdings. The labour that they invested in the oil palm holdings can be considered as valued at zero opportunity cost. Hence, the returns obtained from the oil palm enterprise are considered as the returns to family labour rather than profit.

Slightly more than half of the independent smallholdings (55.4%) were inland soils while the remaining 44.6% were coastal soils. The average farm size was shown to be 2.84 ha, with a range of 0.81 ha to 12.14 ha. The average farm size can be considered as relatively small when compared to the 4 ha owned by Felda settlers.

On average, the age of oil palm owned by smallholders was 19.1 years, with a range of between four to 26 years. In terms of yield, the independent smallholders

TABLE 3. INDEPENDENT OIL PALM SMALLHOLDINGS IN JOHOR BY DISTRICT AND HECTARAGE, 2000

District	No.	(%)	ha	(%)
Batu Pahat	12 669	31.90	32 563.99	25.96
Muar	8 420	21.20	23 727.63	18.91
Kluang	8 304	20.91	30 764.67	24.52
Pontian	6 186	15.58	18 844.94	15.02
Johor Bahru	1 766	4.45	8 099.52	6.46
Segamat	1 115	2.81	4 906.31	3.91
Kota Tinggi	704	1.77	4 413.29	3.52
Mersing	547	1.38	2 139.48	1.71
Total	**39 711**	**100.00**	**125 459.83**	**100.00**

Source: MPOB (2001c).

TABLE 4. SIZE OF SAMPLES OF INDEPENDENT SMALLHOLDERS, BY DISTRICT IN JOHOR

District	Size of samples
Batu Pahat	107
Muar	71
Kluang	70
Pontian	52

The survey was conducted in 2001 with the cooperation of Johor DOA. The agriculture assistants of DOA undertook a one month-long interpersonal interview with the independent smallholders. Such efforts facilitated the search for information since the interviewers had readily established rapport with the smallholders.

TABLE 5. BASIC CHARACTERISTICS OF INDEPENDENT SMALLHOLDERS

Items	Average	Range
Age of smallholders (yr)	58.6	45-76
Holding size (ha)	2.84	0.81-12.14
Oil palm age (yr)	19.1	4-26

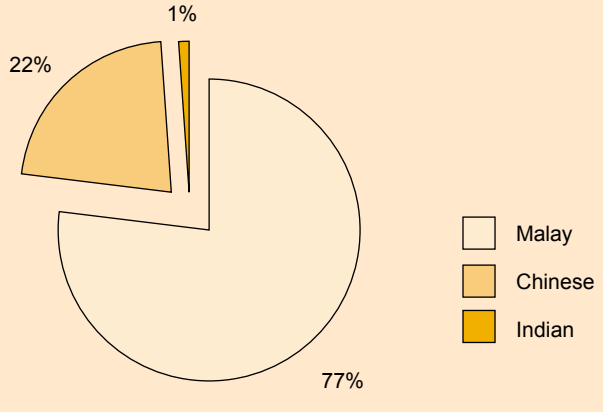

Figure 1. Ethnicity of oil palm smallholders.

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recorded an average yield level of 15.85 t/ha in 2000. This figure is relatively low if compared to their organized counterparts and estates (Azman *et al.*, 2002).

The Cost of Production

In discussing the cost of fresh fruit bunches (FFB) production by independent smallholders, the cost items were grouped according to five cost sub-centres, namely upkeep, fertilizer application, harvesting, transportation, other costs and labour.

Upkeep. This cost category includes the general field maintenance of the independent smallholders' oil palm. These are upkeep of roads, bridges, path, *etc.* in addition to weeding, pruning and replacement of dead palms. The cost of upkeep was RM 385.14/ha or RM 24.30/t FFB in the year 2000. The major cost item was weeding, which constituted about half of the total cost (*Table 6*). The other half of the costs was due to pruning, replacement of dead palms and upkeep of road, bridges, paths, *etc.*

Fertilizer application. The expenses incurred in this operation are the costs of fertilizer purchase and labour. The results, as shown in *Table 7*, indicate that fertilizer purchase, which amounted to RM 332.22/ha, comprised about 93% of the total fertilizer cost. Labour cost amounted to RM 26.77/ha. Each tonne of FFB produced, required RM 1.69 worth of labour services. In total, the average cost of fertilizer and its application in the year 2000 was RM 358.99/ha. For a tonne of FFB produced, the average cost of fertilizer was RM 22.65.

An important finding of the study is that 14% of the independent smallholders did not apply fertilizer in 2000. This can be attributed to the lack of funds for its purchase arising from low FFB price during the year studied. Low margin accentuated less fertilizer purchase. This can be detrimental to short-term productivity of smallholders' oil palm.

Harvesting. The costs involved in this operation are harvesting and collection, and harvesting tools. The survey indicated that slightly more than half of the independent smallholders, *i.e.* 56% hired harvesters to undertake harvesting and collection of FFB to the collection platform. The breakdown of the costs is shown in *Table 8*. For harvesting and collection, it cost the smallholders RM 527.01/ha in 2000. It accounted for 93% of the total harvesting cost, which was RM 566.48/ha in that year. On the basis of the weight of FFB harvested, the cost was RM 33.25/t, also accounting for 93% of the total harvesting cost (RM 35.74/t FFB). On the other hand, cost of harvesting tools amounted to RM 39.47/ha or RM 2.49/t FFB.

Transportation. FFB transportation involves in-field transportation and transfer of FFB to the mill. For in-field transportation, the cost per hectare was RM 68.37 or RM 4.31/t FFB. A total of 7.4% of independent smallholders used machines for their in-field collection. In terms of FFB transportation to the mill, the cost was RM 305.11/ha or RM 19.25/t. As shown in *Table 9*, the total cost of FFB transportation incurred by the independent smallholders was RM 373.48/ha or RM 23.56/t FFB.

Other costs. The cost items grouped in this category include quit rent and other expenses. The former, estimated at RM 22.85/ha (RM 1.44/t FFB) was lower than the latter (RM 65.53/ha or

TABLE 6. COST OF ANNUAL OIL PALM UPKEEP, 2000

Cost items	RM/ha	RM/t
Weeding	176.44	11.13
Upkeep of roads, bridges, paths, *etc.*	84.03	5.30
Pruning	84.80	5.35
Replacement of dead palms	39.87	2.52
Total	**385.14**	**24.30**

TABLE 7. COST OF FERTILIZER AND ITS APPLICATION, 2000

Cost items	RM/ha	RM/t
Fertilizer	332.22	20.96
Fertilizer application	26.77	1.69
Total	**358.99**	**22.65**

TABLE 8. COST OF HARVESTING, 2000

Cost items	RM/ha	RM/t
Harvesting and collection	527.01	33.25
Harvesting tools	39.47	2.49
Total	**566.48**	**35.74**

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TABLE 9. COST OF FRESH FRUIT BUNCHES (FFB) TRANSPORTATION, 2000

Cost items	RM/ha	RM/t
In-field transportation	68.37	4.31
Transportation of FFB to mill	305.11	19.25
Total	**373.48**	**23.56**

TABLE 10. OTHER COSTS INCURRED BY INDEPENDENT SMALLHOLDERS, 2000

Cost Items	RM/ha	RM/t
Land quit rent	22.85	1.44
Other expenses	65.53	4.13
Total	**88.38**	**5.57**

RM 4.13/t FFB) (*Table 10*). The latter refers to the summation of cost, which is itemized as *other costs* in upkeep, fertilization, harvesting and transportation. As a whole, this category of cost amounted to RM 88.38/ha or RM 5.57/t FFB.

Labour cost. Labour can be a significant input and therefore may account for a large proportion of the production cost of FFB. Employment of labour is either by the work being contracted out, use of hired labour or a combination of the two modes of labour employment. Labour usage and management systems in the independent smallholders subsector, are completely different from the estate sector. More family labour was used in place of hired labour. About 83% of the smallholders applied fertilizers themselves while 14% did not apply fertilizers in the year 2000. About 82% of farmers applied agricultural chemicals to their oil palm holdings themselves and 44% did their own harvesting. Family labour was not valued in this study but it was estimated based on either hired or contract labour.

Use of machines in oil palm smallholdings is mainly in the in-field FFB collection work. However, such work was minor compared to the relatively expensive investment that was needed to be made. Only 7.4% of farmers mechanized their in-field collection work mainly through the use of *gerabak bermotor* or power carts. The machines, when used only to service the owners' holdings would tend to be under utilized. Some farmers revealed that the machines were not idle but were hired out.

Cost summary. *Table 11* reveals the production cost summary of independent smallholders. The cost of FFB production was estimated at RM 1772.47/ha in 2000. In terms of FFB tonnage, it implies that for every one tonne of FFB, the production cost was RM 111.82. At 95% confidence interval, the estimate was RM 104.61-RM 119.03 indicating a relatively high precision of cost estimate.

The highest cost component was harvesting and collection work, which amounted to RM 566.48/ha/yr or RM 35.74/t FFB. This cost component represents 31.8% of the production cost. The second most important cost item was upkeep (22%), followed by transportation (21%), fertilizer and its application (20%) and other expenses (5%).

Comparison with Estate

The analysis found that the production cost of FFB by independent smallholders in the year 2000 was lower than that of estates. For independent smallholders, the production cost was RM 1772.47/ha in 2000 or RM 111.82/t FFB whereas for the estate sector, the production cost was RM 2273.63/ha for that year or RM 122.16/t FFB (MPOB, 2001c). The breakdown of the comparison of cost between independent smallholders and estate is shown in *Table 12*. The relatively lower cost incurred by smallholders was mainly due to the absence of joint estate cost (general charges), depreciation and the lower cost of fertilization and transportation. Joint estate cost represents 22.4% of the production cost of oil palm estate. However, with activities such as upkeep and harvesting and

TABLE 11. SUMMARY OF COSTS BY INDEPENDENT OIL PALM SMALLHOLDERS IN JOHOR, 2000

Cost items	RM/ha	RM/t	(%)
Upkeep	385.14	24.30	21.7
Fertilizer and application	358.99	22.65	20.3
Harvesting and collection	566.48	35.74	31.8
Transportation	373.48	23.56	21.1
Other costs	88.38	5.57	5.0
Total	**1 772.47**	**111.82**	**100.0**

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TABLE 12. THE COMPARISON COSTS BETWEEN INDEPENDENT SMALLHOLDERS AND ESTATE, 2000

Cost items	Independent smallholders		Estate	
	RM/ha	RM/t	RM/ha	RM/t
Upkeep	385.14	24.30	347.19	18.67
Fertilizer and its application	358.99	22.65	541.11	29.09
Harvesting and collection	566.48	35.74	461.41	24.81
Transportation	373.48	23.56	490.94	26.39
Joint estate cost	-	-	509.38	27.39
Other cost	88.38	5.57	-	-
Depreciation	-	-	(76.40)	(4.19)
Total	**1 772.47**	**111.82**	**2 273.63**	**122.16**

collection, the costs in the independent smallholdings are more expensive.

Comparison with Other Study

The results of the study are also compared to Malek and Barlow (1988), who studied the cost of production by oil palm smallholders and estates in the mid-1980s. Their findings showed that the costs incurred by smallholders were found to be higher than in oil palm estates (*Table 13*) due to the inclusion of the cost of family labour and management charges.

However in this study, family labour is accounted for all works in terms of hired or contract labour. Given that the opportunity cost of family labour is lower than hired labour due to the lack of off-farm work opportunities, the estimates can be slightly overstated. The study by Malek and Barlow estimated the cost of harvesting as RM 36.20/t FFB. This figure was computed on the basis of 44 man-days at RM 14 per man-day. This works out to be RM 616/ha/yr or RM 36.20/t FFB.

In Malek and Barlow, the additional cost that was not considered in this study was the one that involved management and overhead costs, which amounted to RM 1.80/t FFB in 1988. In order to consistently compare to Malek and Barlow, this cost was adjusted to the year 2000. Taking the rise in harvesting cost as a guide to this adjustment, the cost increase was from RM 20/t FFB (mid-point) to RM 35.74 or a cost increase by 76% over the period. Hence, the cost to independent smallholders in Johor when adjusted to suit the Malek and Barlow's system of cost estimation was RM 113.92/t FFB, still lower than the cost in estates. The addition of the management and overhead cost also brings the cost incurred by independent smallholders in Johor to a comparable state with that of the estate sector.

The Independent Smallholders and the Economy

The finding contradicts the general paradigm that smallholders are less efficient and therefore their costs are higher than what are

TABLE 13. THE COST OF PRODUCTION BETWEEN INDEPENDENT SMALLHOLDERS AND ESTATE IN MID 1980's

Item	Independent smallholders		Estate	
Yields	**17 t/ha**		**20 t/ha**	
Costs	**RM/ha**	**RM/t**	**RM/ha**	**RM/t**
Maintenance, fertilizers and agrocides	600	35.2	500	25.0
Harvesting and collection	616	36.2	450	22.5
Mainline transportation	170	10.0	170	8.5
Management and overhead	30	1.8	500	25.0
Others	20	1.2	30	1.5
Total cost	**1 436**	**84.4**	**1 650**	**82.5**

Source: Malek and Barlow (1988).

TABLE 14. THE COMPARISON INCOME BETWEEN ESTATE AND INDEPENDENT SMALLHOLDERS

Items	Estates	Independent smallholders
Fresh fruit bunches yield (t/ha)	19.3	15.85
Price/t	RM 188.28	RM 188.28
Cost of fresh fruit bunches production/t	RM 122.16	RM 111.82
Income/t	RM 66.12	RM 76.46
Income/ha	RM 3 633.80	RM 2 984.24
Net income/ha	RM 1 276.11	RM 1 211.89
Loss of net income to the nation in Johor*		**RM (8 056 976.98)**

Note: * {(125459 ha x (1 276.11 – 1 211.89)}.

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incurred in the estates. Cost comparison on output terms may not highlight the real difference between the productivity in the estates and independent smallholders as indicated in *Table 14*. When the FFB price was on average RM 188.28/t, it is estimated that the independent smallholder's return to FFB production was RM 2984.24/ha in the year 2000. In the estate sector, it was estimated that the income, on per hectare basis was RM 3933.80. Due to lower production cost incurred by the independent smallholders, their income was higher at RM 76.46/t FFB compared to RM 66.12/t FFB in estates. However, the productivity of the independent smallholders, which is much lower, can lead to lower earning from a hectare of oil palm. *Table 14* hypothetically highlights loss of net income of the independent smallholders in Johor in view of productivity disparity. If the independent smallholders can be encouraged to improve productivity to the level of the estates, the country could earn an additional RM 8 million from Johor. This justifies the establishment of an extension organization, aimed at improving oil palm productivity by smallholders.

CONCLUSION

The study reveals that in the year 2000, the cost of FFB production by smallholders was lower than in estates. This is due to the difference in the cost structure between the two production entities. Smallholders employ family labour for some activities and some even did not apply fertilizer. It is also deduced from the study that the average oil palm age of independent smallholdings is 20 years old. At this age bracket, the palms are already at the declining age profile. It implies that a plan for systematic replanting is crucial in the medium term in order to enhance productivity. The lower yield of 15.85 t/ha is due to palm age and soil types. The yield level is relatively low compared to estates. The farmers must be given extension service to educate them on the proper agronomic practices in oil palm cultivation so that their yield can improve.

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