Short-Term and Long-Term Projection of Malaysian Palm Oil Production

Ramli Abdullah*

INTRODUCTION

Forecasting is of fundamental importance in all of the sciences, including economics. As such, its accuracy is of obvious importance as the forecasts generated are normally being used as inputs to a decision-making process. Knowing this fact, most forecasters have been hard pressed to prepare the most realistic and accurate projections utilizing a variety of quantitative and subjective methodologies. Besides this concern and although it is extremely important to do their best to improve forecast accuracy, we must learn to accept the fact that forecast error is an unavoidable occurrence. Faced with this reality, the forecasters need to effectively capture, measure, report and utilize forecast error to its benefit. They will also keep on reviewing their models from which the forecasts are based on due to the ever changing environment and improving forecast accuracy through a variety of qualitative and quantitative techniques.

Knowing the importance of forecasting in guiding management, Malaysian Palm Oil Board (MPOB) has long had a keen interest in forecasting its crude palm oil (CPO) production. Such forecasts can be roughly divided into two types. The first is produced for periods of several years ahead into the future and usually using annual data. These forecasts are often considered as long-term forecasts. The second type is produced on a shorter-term basis using monthly data and the forecasts generated have long been recognized as important as they will affect decisions in shorter-term in which alteration to the accepted decision may be difficult to be undertaken.

To make the forecasting effort worthwhile, this paper will report on an attempt on the regular exercise by MPOB on long-term as well as short-term forecasting of Malaysian palm oil production. In the next section, major quantifiable factors that influence CPO production will be described. The

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

© MPOB 2003

production will be described. The data section follows, describing the data used in the analysis while the methodology section illustrates the adopted model that has long been established by MPOB. The results of the analysis follow in the next section. The paper will finally report on the conclusion of the study in the last section.

FACTORS THAT INFLUENCE PALM OIL PRODUCTION

Palm oil supply depends on many factors. However, only the major factors will be documented for the purpose of this article. They are maturity of area planted, total area planted, replanting and yield. They are all incorporated in the established model.

Maturity of Area Planted

Harvesting can be carried out when the palm starts to bear fruits three years after planting. Fruit production increases as the palm matures and reaches the maximum yield in the 12th or 13th year after which it starts to decline until the 25th year . The yield potential of the palm trees depends on its maturity. In the long-term, the supply of palm oil will depend on the mature area, new planting, replanting and yield profile.

Total Area Planted

In the early part of the last 40 years, a large area of agricultural land in Malaysia had already been planted with oil palm trees. In 1960, an area of 54 674 ha was planted with oil palm and to date (2002) this area covers 3.67 million hectares *(Table 1)*. Thus, the country recorded a significant increase in area during this 40-year period. Of the 3.67 million hectares planted area in 2002, 59.6% was located in Peninsular Malaysia and 40.4% in Sabah and Sarawak (East Malaysia).

TABLE 1. TOTAL PLANTED AREA IN MALAYSIA (ha)

Year	ha
1960	54 674
1965	97 020
1970	300 311
1975	671 791
1980	1 040 745
1985	1 482 399
1990	2 029 494
1995	2 540 087
2000	3 376 666
2001	3 499 012
2002	3 670 242

In future most of the new planting under oil palm will be in East Malaysia, *i.e.* Sabah and Sarawak. There is still vast land available for agriculture, especially oil palm in this region. Contrary to East Malaysia, land in West Malaysia is gradually becoming a constraint due to rapid industrialization programmes in the region and this is expected to further dampen new planting of oil palm in Peninsular Malaysia. New planting will probably occur in areas presently under rubber or cocoa.

Replanting

Different estates, organized smallholders and individual smallholders will have different strategies of replanting. The decision to replant will be based mainly on level of production, height of the palms and costs of production.

Yield

Differences in yields among estate, organized smallholders and individual smallholders are due to management efficiencies and agronomic practices.

DATA

Annual data is used for the long-term forecast. These include data on area planted, matured area, replanting, new planting, production and yield. Analysis for Peninsular Malaysia and East Malaysia is done separately and a combination of these would result in the total for the whole of Malaysia. Prediction under this exercise is made until the year 2020.

For short-term forecasting (prediction for the year 2003), monthly data is used. In addition to monthly palm oil production data, the monthly published rainfall data collected from the Malaysian Meteorological Department is also used. Annual trend from the long-term forecast will be used as an input to this short-term exercise.

METHODOLOGY

As mentioned earlier, the analysis is broken into two types, namely long-term forecast and short-term forecast based on the model developed by MPOB. Much has

© MPOB 2003

been said in the past publications about this technique of either long-term or short-term forecasting (Chow, 1990; 1991; 1992). In the long-term forecast, the methodology includes estimating a trend which takes into account only the changes in mature area, age distribution of palm trees and yield profile estimated from production of the recent years. It also incorporates into the model a discard system, similar to the Vintage model of the rubber sector (Smith, 1984), for the estimation of replanting requirements.

Short-term forecasting may be considered also as the long-term (trend) forecast adjusted for the short-term effects of season, rainfall and yield cycles. Thus, results from the long-term forecasts, especially the trend are used to account for the major variations in the short-term forecasts.

For many years now, MPOB has adopted this methodology and has forecasted production of palm oil for the benefit of the industry as well as other users for their decision-making process.

RESULTS

The study has obtained the results which are shown in *Tables 2* to *4* and *Figure 1*. This means that these new results will replace those in the earlier paper by Ramli (2000) as we revised the model after incorporating latest available data into it. The revised long-term projection indicates that Malaysian supply of CPO in 2003 would likely increase to 12.22 million tonnes from 11.9 million tonnes in the previous year (*Table 2*), thus indicating an increase of about 310 700 t. Significant increases are expected in the next two years. Production is then expected to increase at a decreasing rate from 2010 until 2020 (*Table 2*). This is due to the fact that total planted area is likely to increase at a slower rate too due to the constraint in land available for oil palm planting in future. As a result, new planting is expected to decrease from 258 572 ha in 2002 to 1000 ha in 2020.

The finding was obtained as a result of aggregating those of East Malaysia (*Table 3*) and Peninsular Malaysia (*Table 4*). It can be seen that the output from East Malaysia is expected to continue increasing at an increasing rate until 2005 to reach 6.3 million tonnes. After that, the rate of increase is expected to decline until 2020 where production is estimated to record 9.8 million tonnes. On the contrary, Peninsular Malaysia had recorded a decline in production in 2002 from 2001 and then is expected to increase until 2010 with production probably reaching 8.35 million tonnes. For the period between 2010 and 2020, production in Peninsular Malaysia is likely to track a declining trend from 8.35 million tonnes to 8.1 million tonnes; thus following an opposite direction to that of East Malaysia. Comparing *Table 3* and *Table 4*, it can be seen that East Malaysian output is likely to overtake that of West Malaysian somewhere between 2005 and 2010 since the output by the former would exceed that of the latter by 2010.

This scenario can be clearly explained by the areas to be planted in future which would become a constraint to Malaysia. The state governments of East Malaysia (Sabah and Sarawak) would impose a limitation to land expansion for oil palm in 2010 onwards (Chang, 2002) and hence, area planted would be stagnant due

TABLE 2. LONG-TERM PROJECTION OF MALAYSIAN PALM OIL PRODUCTION (2003-2020)

Year	Total planted areas	New planting (ha)	Immature areas (ha)	Mature areas (ha)	Crude palm oil production (t)
2000	3 376 664	110 883	434 873	2 941 791	10 842 095
2001	3 499 012	122 346	493 745	3 005 267	11 803 788
2002	3 670 242	258 572	481 935	3 188 307	11 909 298
Forecast					
2003	3 792 000	113 000	503 000	3 290 000	12 220 000
2004	4 034 000	142 000	573 000	3 462 000	13 157 000
2005	4 170 000	135 000	578 000	3 592 000	14 362 000
2010	4 522 000	46 000	130 000	4 389 000	16 964 000
2015	4 907 000	63 000	291 000	4 616 000	17 739 000
2020	4 915 000	1 000	74 000	4 841 000	1 791 900

© MPOB 2003

TABLE 3. LONG-TERM PROJECTION OF EAST MALAYSIAN PALM OIL PRODUCTION (2003-2020)

Year	Total planted (ha)	New planting (ha)	Immature areas (ha)	Mature areas (ha)	Crude palm oil production (t)
2000	1 331 164	69 638	221 744	1 109 420	3 630 556
2001	1 402 156	70 990	237 846	1 164 310	4 326 450
2002	1 483 233	189 844	221 472	1 261 761	4 890 292
Forecast					
2003	1 591 000	100 000	239 000	1 353 000	5 091 000
2004	1 821 000	130 000	364 000	1 457 000	5 500 000
2005	1 946 000	124 000	389 000	1 557 000	6 289 000
2010	2 290 000	40 000	112 000	2 177 000	8 613 000
2015	2 655 000	60 000	260 000	2 395 000	9 500 000
2020	2 655 000	0	61 000	2 595 000	9 802 000

TABLE 4. LONG-TERM PROJECTION OF WEST MALAYSIAN PALM OIL PRODUCTION (2003-2020)

Year	Total planted (ha)	New planting (ha)	Immature areas (ha)	Mature areas (ha)	Crude palm oil production (t)
2000	2 045 500	41 245	213 129	1 832 371	7 211 539
2001	2 096 856	51 356	255 899	1 840 957	7 477 338
2002	2 187 009	68 728	260 463	1 926 546	7 019 006
Forecast					
2003	2 201 000	14 000	264 000	1 937 000	7 129 000
2004	2 213 000	12 000	208 000	2 005 000	7 657 000
2005	2 224 000	11 000	189 000	2 035 000	8 073 000
2010	2 232 000	6 000	11 000	2 221 000	8 351 000
2015	2 252 000	3 000	30 000	2 221 000	8 239 000
2020	2 260 000	1 000	14 000	2 246 000	8 117 000

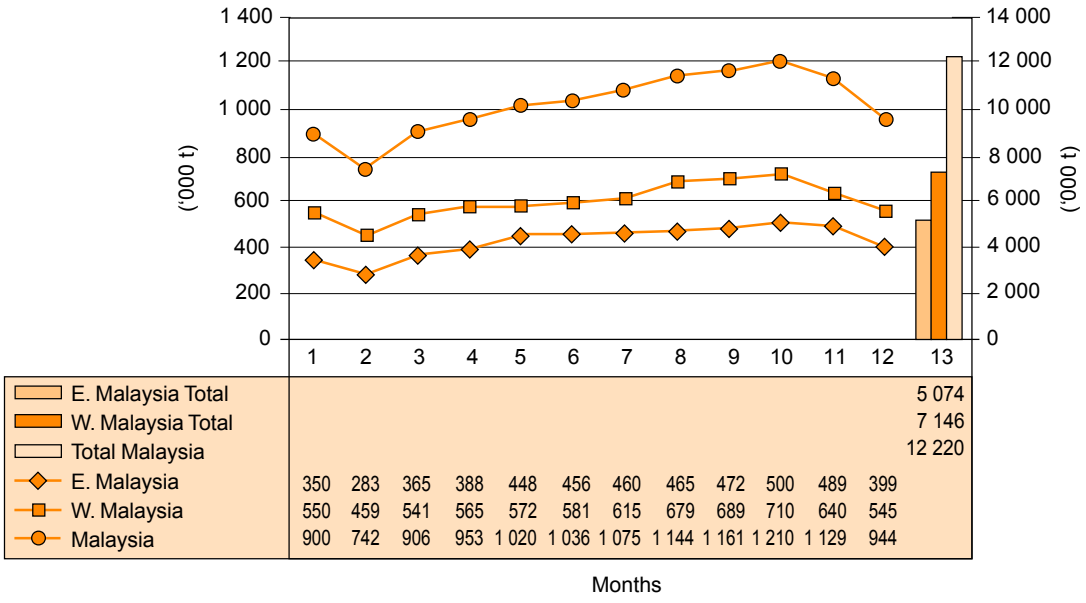

Figure 1. Short-term forecast of Malaysian palm oil production in 2003.

© MPOB 2003

to zero increase in new planting during the period (*Table 3*). In Peninsular Malaysia, land availability for oil palm would also become a problem in future, as not much land is available for the crop as a result of reserving it for other industrialization programmes. Consequently, new planting will reduce to 1000 ha in the year 2020 (*Table 4*).

Figure 1 shows the short-term forecast of Malaysian CPO production for the year 2003. Total production is estimated to be about 12.22 million tonnes, out of which East Malaysia would produce about 42% (5.1 million tonnes) and the balance (58%) by Peninsular Malaysia (7.1 million tonnes). The monthly production patterns of East and Peninsular Malaysia and the total look similar to their patterns in the past years. As can be seen, production in February is expected to be at minimum level for the three series in the chart and the series tend to generally increase towards October to form their own peak months. The total Malaysian output also will probably form a peak in October.

CONCLUSION

Malaysian production of CPO is estimated to be about 12.22 million tonnes in 2003, which is an increase from that of 2002. The increase in production is as expected as there would be an increase in planted areas entering maturity in both East Malaysia and Peninsular Malaysia. Their monthly production patterns are similar to those in the past. However, this did not happen in 2002 for Peninsular Malaysia where areas (planted and matured) increased while its palm oil production decreased by 468 196 t. The decrease in production by Peninsular Malaysia was compensated by the increase in production in East Malaysia. This explained why there was only a slight increase in production in 2002 from 2001 by Malaysia as a whole.

REFERENCES

CHANG, L C (2002). Expansion of oil palm planting in Malaysia. A paper submitted to MPOB management on a study on the potential area in the planting of oil palm in Malaysia especially Sabah and Sarawak.

CHOW, C S (1990). Some notes on Malaysian palm oil production forecast. *PORIM Bulletin No. 21*:1-3.

CHOW, C S (1991). Some results of recent forecast on palm oil production. *PORIM Bulletin No. 23*:1-2.

CHOW, C S (1992). Recent palm oil production in Malaysia, with special reference to the extraction rate. *PORIM Bulletin No. 25*:1-7.

RAMLI, A (2000). Forecast of Malaysia and Indonesian palm oil production. *Oil Palm Bulletin No.43*:23-24.

SMITH, H P (1984). *Forecasts for the World Rubber Economy to the Year 2000*. MacMillan Publishers Ltd.

© MPOB 2003