

CHAPTER IV

PRODUCTION OF OIL

A. Output and Extraction Ratio :

Penang produces more oil than any other state in the Federation or the Colony of Singapore and in recent years accounts for 40% of the Malayan production.

Production of Coconut Oil - Malaya

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>
Penang	42	41	52	51
Rest of the Federation	39	38	45	44
Singapore	26	16	38	34
Total Malaya	107	95	135	129

All figures in thousands of tons.

Source: Malayan Statistics.

In 1955 about 88% of the Penang output was obtained from the four large mills of the Island while the remaining 12% was produced by a large number of mills scattered mainly in the coconut growing districts of Province Wellesley.

The processing of oil from copra involves the simultaneous production of copra cake, the residue after the extraction of oil. Well prepared copra contains about 65% oil and 4% to 6% water with a free acid content of 1%. However, Malayan and Sumatran copra is generally of a poor quality, containing more water and less oil especially if it has been

prepared from immature nuts. The average extraction rate for the Federation is 56% while the Singapore ratio is slightly higher.

Post war statistics show that the extraction rate for Penang has been practically uniform (57%) though it does not come anywhere near the theoretical maximum of 65%.

OIL PRODUCTION, EXTRACTION RATE, PENANG

<u>Year</u>	<u>Copra Treated Piculs</u>	<u>Coconut Oil expressed</u>	<u>Oil Recovery as percent</u>	<u>Copra cake Piculs</u>	<u>Percent- age copra cake recovered</u>
1948	536,278	306,738	57.2	195,716	36.5
1949	975,601	561,155	56.6	349,643	35.8
1950	1,206,803	682,020	56.5	431,229	35.7
1951	1,427,578	814,543	57.8	512,068	35.8
1952	1,253,279	712,847	56.9	448,498	35.8
1953	1,223,505	692,482	56.6	426,721	34.9
1954	1,557,064	878,571	56.4	548,908	35.2
1955	1,511,738	858,987	56.7	525,448	34.8

Source: Malayan Statistics Department.

The extraction ratio is practically a constant which is determined by the efficiency of the 'expeller' used. Moreover, where the residue, copra cake, fetches a fair price and is used as a fattening food for pigs and poultry and not as a manure, it is important that it contains a fair amount of oil. The residual cake forms about 36% of the weight of the copra.

In passing, it may be of interest to study the figures of the extraction ratios given in Benham's, 'The National Income of Malaya'. These work out to give an extraction ratio

of 54.8, 55.2, 55.2, and 54 percent for 1947 and the succeeding years respectively. Here, I believe, the extraction ratio is a little on the high side, especially so, when Benham has assumed that about two-sevenths of the nuts in 1947 were consumed locally and most of them were pounded into a crude type of oil in the kampongs.* But the yield of oil from the kampong method of production which does not involve any substantial equipment, is indeed low. However, his estimates of the total oil produced in Malaya must be fairly accurate although the quantity of nuts harvested is probably more than what he estimates, for there are small patches of coconuts everywhere in the country ranging from a few palms to half an acre or so and which are unlikely to be shown in any official records.

B. Price factors :

The economic production of coconut oil depends on the prices of all three factors, copra, coconut oil and copra cake. It may be uneconomic to produce oil and copra cake from copra unless the proceeds of the sales of these two products cover the manufacturing costs and the price of copra. Very often the key factor for the Malayan miller is the price of copra cake which is sold locally. The prices of oil and copra are fixed for the millers by the world conditions of supply and demand but the local price of copra cake depends on the supplies available from the neighbouring countries. Malaya is a net importer** of copra cake and on occasions the price of copra

*Page 31.

**See appendix F for Malayan imports, exports and consumption of copra cake.

cake may be so low that the combined prices of oil and cake may not be sufficient to cover the costs of copra and the manufacturing charges. Under such circumstances mill owners suspend production and become copra brokers and exports of copra increase.

As copra contains a fair percentage of oil, one finds that there is a reasonably consistent ratio between the average annual price (F.O.B) of crude coconut oil and copra.

Relation Between Price of Crude Coconut Oil and Copra

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>
A. Crude Coconut Oil	825	950	940	740
B. Copra	520	620	575	495
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A as a percentage of B	160	150	160	160

All figures in dollars per ton.

It is also interesting to note that the international market prices of copra and coconut oil increased in 1952-54 against pre-war almost in the same proportion, namely, copra by 288% and coconut oil by 291%. Prices of copra and coconut oil reached the highest points during the Korean boom. The price of copra reached a maximum in February 1951 being \$57.06 per ton while the price of coconut oil was at its maximum in March 1951 at \$101.00. In 1952, the prices both of copra and coconut oil declined to a minimum of \$23.37 per ton, and \$39.19 per ton, in August respectively.

The price of copra cake does not necessarily follow the price of copra but, as mentioned earlier, depends on the price of imported copra cake and also on the general course of prices of animal foodstuffs mainly rice bran and broken rice. Locally produced copra cake is preferred to imported stuff and commands a higher price in the local market.

Prices of Imported and Locally Produced Copra Cake

	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>
Imports (C.I.F.)	245	245	205	190
Locally produced finest quality	315	310	225	260

All figures in dollars per long ton.

Exports of Malayan copra cake are prohibited so that there will be a reasonable amount for the local farmers. However, in Malaya, unlike India, the cake is not much used by cattle rearers. As the price of copra cake is a key factor in the production of oil and it is the intention of the Government to encourage the rearing of cattle locally, the Ministry of Commerce in conjunction with the Veterinary Department should organise a special campaign for the greater use of copra cake as cattle fodder; the Veterinary Department could issue a recipe to cattle owners on the use of copra cake.

C. Prices and Cost of Production of Oil

Very little is known about the profitability of

coconut oil milling as no figures are published or made known on this matter as the firms are all private companies. The large mills have a comparatively efficient business management which keeps a close watch on the relationship of expenditure and revenue and have their own cost accounting systems - the results are business secrets which are not divulged by the firms for many reasons.

A crude attempt will be made here to give some idea of costs and profits in one of the large firms.

One picul of copra in the Penang mills gives on the average $56\frac{1}{2}$ katties of coconut oil and 35 katties of copra cake. Based on the prices in early September 1956 in Penang, one picul of copra processed will give¹ :

56½ katties of oil at \$39.90 per picul =	\$22.54
35 " " " " \$15.50 " " =	\$ 5.42
	<u>\$27.96</u>
Less average cost of copra	<u>\$24.50</u>
∴ Gross profit	\$ 3.46
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A fairly accurate calculation of the wage bill² of one of the mills (not the largest) works out to \$1.00 per picul of copra milled. Depreciation of machinery and buildings, selling costs, Provident Fund Contributions (Employer's share),

1. There were a number of letters in September 1956 in the Straits Echo, the North Malayan newspaper, on costs of production of oil. The information given in this Exercise is based on interviews with managements, and on these newspaper letters which were from producers of copra.

2. Based on confidential figures on wages of ^a mill.

power, and other overheads may roughly account for \$1.46 and this leaves a profit of \$1.00 per picul of copra milled.

These figures are extremely rough and are to be taken only as indicating the general level of costs and profits. The above assessment is based on a mill that was not working at full capacity. Full economies of production can only be obtained when the mill is working at full capacity, for at other periods the overheads will be disproportionately high. The level of profits per picul of copra milled will be even higher for a larger mill, for it would be generally more economical than a smaller unit; this is because the labour complement tends to diminish in proportion to capacity as the latter increases.

Each of the Penang mills consumes 1,000 - 2,000 piculs of copra per day when working at full capacity on a three shift system. Thus, at present prices, and at all post-war prices, oil milling, where properly managed and supervised, should compare favourably to any of the other Malayan industries.

Oil milling has certain advantages over some of the other secondary industries in the country. The uniformity of the oil, absence of any sudden change in demand due to preference for other types of oil and the fact that the oil may be stored for many months, make it possible to maintain production throughout the year at a constant rate though at

times shortage of copra may temporarily reduce the output of mills.

D. Factory Production of Oil

The oil milling that is carried on in the large factories is highly mechanised when compared to the other Malayan industries. The actual processes involved are complex but the principles are clear.

The processing consists of the following operations:

1. Cleaning the copra.
2. The disintegration of the copra.
3. The extraction of the oil.
4. The refining of the oil.

1. Cleaning the copra:

The copra which is stored in huge piles for a period of about two months is led by conveyors into a rotary screen where the copra dust is separated from the bulk. It is important to remove the dust for it contains a high percentage of the free fatty acid.

The dust-free copra is passed by conveyors over an electric magnet so as to remove any bits of iron which would cause great damage to the expensive machinery and be harmful to the final product.

2. The disintegration of the Copra:

After being weighed automatically the copra is passed into a disintegrator which breaks the copra up into small pieces.

3. The Extraction of Oil:

The pulped copra is then steadily passed on to a battery of oil expellers from which the residual meal and oil are forced out in separate streams.

The oil which is separated out during the milling process is examined for texture and colour from time to time by the foreman. In this way faults which may have occurred in the machinery are corrected.

4. Refining the Oil:

Refining of the crude oil is done in only one of the mills in Penang. As the refining process in coconut oil is a comparatively recent one and is technically involved, most Malayan mills prefer to sell the oil in a crude state. The process of refining involves the neutralising of the slightly acid oil and also, making it colourless and odourless.

Before the oil is exported it has to be graded, for all contracts for the sale of coconut oil abroad require a certificate from a Government Chemist giving the quality and content of the oil shipped against the contract. A certificate from a non-Government commercial chemist will not be acceptable under the terms of the contract.