

The Pattern of Consumption of Oils and Fats in Malaysia

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INTRODUCTION

This article discusses the pattern of the estimated consumption of palm oil and other oils and fats in Malaysia based on PORIM's previous study (Burhanuddin and Yusof, 1987). The relevant parameters considered were production, imports, stocks, exports, losses and manufacturing. The estimates were made to investigate the pattern of palm oil consumption and the proportion of palm oil in relation to the total consumption of oils and fats.

EQUATION FOR ESTIMATED PALM OIL CONSUMPTION

The consumption of palm oil can be estimated by comparing the supply and demand equations for the product, taking the residual as the estimated domestic consumption. This is called the Balance Sheet Method and is most frequently used by other organizations (FAO 1984a, 1984b, 1987a, 1987b; Oil World 1988, 89; USDA 1986,... 90) in their estimates of consumption of oils and fats. The Balanced Sheet Method is further refined for this article and the relevant equations are as follows; (note *Equation 4*):

$$\begin{array}{llll}
 Q_s & = & Q_d & \dots \text{Equation 1} \\
 Q_s & = & P + S_b + M & \dots \text{Equation 2} \\
 Q_d & = & X + S_e + L + R & \dots \text{Equation 3} \\
 R & = & (P + S_b + M) - (X + S_e + L) & \dots \text{Equation 4}
 \end{array}$$

where:	Q_s	=	palm oil supply,
	P	=	palm oil production (crude),
	S_b	=	palm oil beginning stocks,
	M	=	palm oil imports,
	Q_d	=	palm oil demand,
	X	=	palm oil export, (including manufacture products),
	S_e	=	palm oil ending stocks,
	L	=	palm oil losses,
	R	=	palm oil residual (estimated domestic palm oil consumption).

Note: palm oil here includes both crude and refined.

ESTIMATED CONSUMPTION OF PALM OIL

Using the Balance Sheet Method and *Equation 4* palm oil consumption was estimated at 116 276 tonnes in 1977, increasing to 325 490 tonnes in 1988. The growth rate of estimated palm oil consumption between 1977 and 1988 was thus close to 15% per annum. In each year palm oil consumption was less than 10% of total palm oil production, ranging from 5.7% in 1985 to 8.5% in 1979 and 1981, and averaging 6.8% for the period 1977-1988 (*Table 1*).

Malaysia's population increased from 12.530 million in 1977 to 16.968 million in 1988, at a growth rate of about 2.95% per annum. This may have contributed to the increase in consumption of palm oil.

In general there was a steady increase in the consumption during 1977-1988 although occasional year-to-year declines occurred: in 1977/78, 1982/83 and 1986/87. These declines could have been due partly to economic reasons such as fluctuations in palm oil prices. Palm oil consumption declined by 63 751 tonnes from 1982 to 1983 when the price increase from M\$ 829/tonne to M\$991/tonne. Subsequently palm oil

consumption increase by 44 364 tonnes from 1985 to 1986 when the price declined by M\$ 467/tonne from M\$ 1 045/ tonne to M\$ 578/tonne. The trends in palm oil consumption, production, exports and price are shown in *Figure 1*.

REGRESSION FIT FOR ESTIMATION OF PALM OIL CONSUMPTION

A regression correlation between estimated palm oil consumption and other selected variables would be useful in explaining the factors affecting palm oil consumption. The regression model is as in *Equation 5*.

$$C_{po} = f(P_{po}, Y_c, P_{co}, X_{po}, \text{ and } Q_{po}) \dots \text{Equation 5}$$

where: C_{po} = palm oil consumption,
 P_{po} = palm oil price,
 Y_c = per capita income,
 P_{co} = coconut oil price,
 X_{po} = palm oil export,
 Q_{po} = palm oil production.

A regression fit of the above variables using a stepwise statistical programme indicated that *Equation 6* can explain 85.75 % of the variations in palm oil consumption.

TABLE 1. ESTIMATED DOMESTIC CONSUMPTION OF PALM OIL (tonnes)

Year	Production	Consumption	Consumption as % of Production	Price *	Population ^b
1977	1 612 747	116 276	7.2	1 244	12 530
1978	1 785 525	109 017	6.1	1 178	12 980
1979	2 188 699	187 138	8.5	1 038	13 244
1980	2 573 173	177 548	6.9	919	13 550
1981	2 830 717	241 990	8.5	964	13 785
1982	3 510 920	273 789	7.8	829	14 415
1983	3 016 481	210 038	6.9	991	14 744
1984	3 714 795	228 437	6.1	1 407	15 270
1985	4 134 463	237 061	5.7	1 045	15 677
1986	4 540 277	281 425	6.1	578	16 109
1987	4 531 960	269 562	5.9	773	16 528
1988	5 027 496	325 490	6.5	1 029	16 968
1989 ^c	2 414 282	164 009	6.7	939	17 363

Notes: ^a M\$/ tonne, domestic delivered (PORLA)
^b population in thousand
^c January-June

Source: Department of Statistics, Malaysia.

$$\begin{aligned} \text{Log } C_{po} = & -3.40474 + 0.698214 \text{ log } Q_{po} + 2.421199 \text{ log } Y_c \\ & (1.004) \qquad (1.230) \\ & -0.619277 \text{ log } P_{po} + 0.194907 \text{ log } P_{co} \\ & (1.629) \qquad (1.048) \\ & -0.467955 \text{ log } X_{po} \\ & (-0.628) \end{aligned} \dots \text{Equation 6}$$

$$DW = 2.70944 \quad R_2 = 0.85756 \quad \text{Auto} = -0.49436$$

where: C_{po} = palm oil consumption (in ' 000 000 tonnes),
 Q_{po} = palm oil production (in millions of tonnes),
 Y_c = per capita income (GNP deflated),
 P_{po} = palm oil price, (\$/ tonne deflated by oils and fats index),
 P_{co} = coconut oil price, (\$/ tonne deflated by oils and fats index),
 X_{po} = palm oil exports (in millions of tonnes)

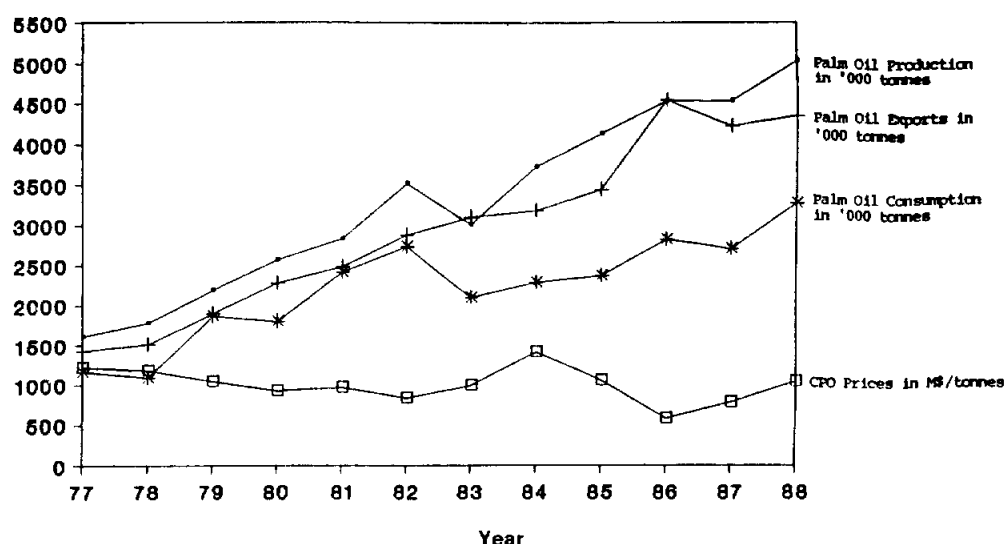


Figure 1. Estimated Palm Oil Consumption

Equation 6 suggests that a 1% increase in palm oil production would increase palm oil consumption by 0.6982%, a 1% increase in per capita income would increase palm oil consumption by 2.4211%; and a 1% increase in coconut oil price would increase palm oil consumption by 0.1949 per cent. However a 1% increase in palm oil prices would decrease palm oil consumption by 0.6192% and a 1% increase in palm oil exports would decrease palm oil consumption by 0.4679 per cent.

ESTIMATED CONSUMPTION OF PALM KERNEL OIL

Using Equation 4, the consumption of palm kernel oil was estimated at 10 716 tonnes in 1978, increasing steadily over the years

to 86 039 tonnes in 1988. The consumption of palm kernel oil as a percentage of production varied over the years, from 1.7% in 1982 to 13.9% in 1988 and averaged 13.1% between 1978 and 1988 (Table 2). The trends in palm kernel oil consumption, production, exports and price are shown in Figure 2.

ESTIMATED CONSUMPTION OF COCONUT OIL

Coconut oil consumption in Malaysia was estimated as production less export. Equation 4 was modified in this case because no data were available on stocks of coconut oil or on products manufactured from it. In general coconut oil consumption (visible, not including consumption of fresh coconut

TABLE 2. ESTIMATED DOMESTIC CONSUMPTION OF PALM KERNEL OIL (tonnes)

Year	Production	Consumption	Consumption as % of Production	Price *
1978	141 939	10 716	7.5	1 428
1979	215 706	6 874	3.2	1 898
1980	265 595	13 573	5.1	1 384
1981	243 354	10 997	4.5	1 229
1982	336 976	5 706	1.7	1 001
1983	372 079	13 495	3.6	1 323
1984	423 375	30 701	7.3	2 102
1985	500 219	42 787	8.5	1 272
1986	590 191	52 994	8.9	626
1987	562 861	68 115	12.1	887
1988	620 101	86 039	13.9	1 298
1989 ^b	306 240	34 652	11.3	1 163

Notes: *unit export value in M\$ /tonne

^bJanuary-June.

Source : Department of Statistics, Malaysia.

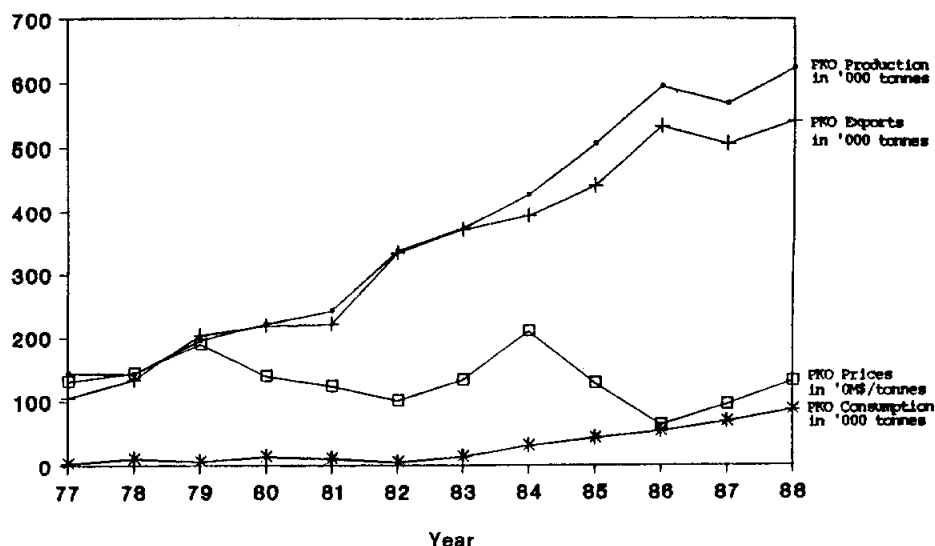


Figure 2. Estimated Palm Kernel Oil Consumption

milk) has been on a steep decline, from 57 900 tonnes in 1970 to about 6 718 tonnes in 1988. Coconut oil consumption average 58 550 tonnes for the period 1970-73, 36 660 tonnes in 1974 -78 and only 4 390 tonnes in 1979-83. During 1970-78, coconut oil consumption average 56.1% of coconut oil production, but it was only 7.5% in 1979-86 (Table 3).

ESTIMATED DOMESTIC SOYABEAN OIL CONSUMPTION

Malaysia's import of soyabean had increased from 255 357 tonnes in 1986 to 279 650 tonnes in 1987 and 146 687 tonnes in January-June 1988 or 293 374 tonnes for 1988 (Department of Statistics, Malaysia). Most of the soyabean imported is

TABLE 3. ESTIMATED DOMESTIC CONSUMPTION OF COCONUT OIL (tonnes)

Year	Production	Export	Consumption	Consumption % of Production	Price ^a
1970	106 200	48 300	57 900	54.5	883
1971	100 000	42 400	57 800	57.8	879
1972	96 100	28 400	67 700	70.4	607
1973	82 400	31 600	50 800	61.7	1 050
1974	70 300	47 500	22 800	32.4	2 290
1975	78 900	39 500	39 400	49.9	1 125
1976	77 400	34 900	42 500	54.9	1 035
1977	70 200	27 600	46 600	60.7	1 597
1978	57 400	21 394	36 006	62.7	1 577
1979	67 300	65 638	1 662	2.5	2 111
1980	65 200	62 474	2 726	4.2	1 602
1981	66 300	63 880	2 420	3.7	1 322
1982	70 400	58 969	11 431	16.2	1 139
1983	70 500	66 787	3 713	5.3	1 659
1984	63 680	67 692	4 430	6.9	2 688
1985	66 000	60 060	5 940	9.0	1 516
1986	64 150	56 080	8 069	12.5	813
1987	n.a.	n.a.	6 146 ^b	n.a.	1 224
1988	n.a.	n.a.	6 718 ^b	n.a.	1 584

Notes: ^a export unit value in M\$/tonne.
^b extrapolated, 3 years moving average.
n.a. not available, inconsistent data

Source : Department of Statistics, Malaysia

crushed for use in the local animal feed industry (constituting 10%–15% soyabean meal). Some amount of the soyabean is consumed fresh, in the form of soyabean curd, soyabean milk, soyabean sauce and other food preparations.

Soyabean oil obtained from soyabean crushing is either exported or blended with other vegetable oils and consumed domestically. Soyabean oil is also imported for domestic use, the total was 1943 tonnes in 1946 but had increased to 50 894 tonnes in 1988 of which 30 488 tonnes was re-exported (Department of Statistics, Malaysia; 1986-88). The domestic consumption of soyabean oil was estimated as imports less re-export, actual and oil equivalents (modified *Equation 4*).

Estimated domestic soyabean oil consumption was 4 374 tonnes in 1977 and had increased gradually to 20 406 tonnes in

1988. The average soyabean oil consumption per annum between 1977-1988 was 10 152 tonnes. Consumption as a percentage of imports had been on a declining trend i.e. from 98.9 percent in 1977 to 36.9 percent in 1988, apparently export and re export had increase at a faster rate (*Table 4*).

ESTIMATED DOMESTIC GROUNDNUT OIL CONSUMPTION

Using the modified *Equation 4* domestic groundnut oil consumption was estimated at 2 904 tonnes in 1977, increasing over the years and was 8 633 tonnes in 1987. The average groundnut oil consumption during 1977-87 was 5 618 tonnes. Since 1980 groundnut oil consumption as a percentage of import had exceeded 90 percent, indicating most of the import is consumed domestically (*Table 5*).

TABLE 4. ESTIMATED DOMESTIC SOYABEAN OIL CONSUMPTION (tonnes)

Year	Import ^a	Export ^a	Consumption	Consumption % of Import	Price ^b
1977	4 423	49	4 374	98.9	575
1978	5 199	305	4 894	94.1	607
1979	5 833	68	5 765	98.8	662
1980	16 946	4 575	12 371	73.0	598
1981	35 389	23 970	11 419	32.3	507
1982	33 324	31 309	2 015	6.0	447
1983	40 351	34 592	5 758	14.3	527
1984	43 773	40 090	3 683	8.4	724
1985	38 008	24 994	13 014	34.2	572
1986	50 460	31 839	18 621	36.9	342
1987	n.a.	n.a.	29 716 ^c	n.a.	334
1988 ^d	50 894	30 488	20 406	40.0	463 ^e

Notes: a oil equivalent.
 b FOB Dutch Ex- mill, US \$/ tonne.
 c Intrapolated
 d January-June
 e January-December
 n.a. not available, inconsistent data

Source: Department of Statistics, Malaysia
^bOil World

TABLE 5. ESTIMATED DOMESTIC GROUNDNUT OIL CONSUMPTION (tonnes)

Year	Import ^a	Export ^a	Consumption	Consumption % of Import	Price ^b
1977	4 035	1 131	2 904	72.0	846
1978	4 997	3 746	1 251	25.0	1 079
1979	4 510	1 415	3 095	68.6	889
1980	7 029	231	6 798	96.7	859
1981	3 232	302	2 930	90.7	1 043
1982	3 421	727	3 194	93.4	684
1983	9 703	91	9 612	99.1	711
1984	6 315	23	6 292	99.6	1 071
1985	9 361	333	9 028	96.4	905
1986	8 190	128	8 062	98.4	569
1987	8 668	35	8 633	99.5	500
1988 ^c	16 346	8 730	7 616	46.5	590 ^d

Notes:^a oil equivalent^b Any origin CIF Rotterdam, US\$/ tonne.^c January-June.^d January-December**Source:**

Department of Statistics, Malaysia

^b Oil World**ESTIMATED CONSUMPTION OF MINOR VEGETABLE OILS**

Minor vegetable oils consumed include olive oil, sunflowerseed oil, rapeseed oil, linseed oil, castor oil, tung oil and sesameseed oil. The consumption of these is estimated as

import less re-export, *i.e.* by a modified version of *Equation 4*. The total estimated consumption of these oils remained small over the years 1972-88, with considerable fluctuations in the case of individual oils (*Table 6*).

TABLE 6. ESTIMATED DOMESTIC CONSUMPTION OF MINOR VEGETABLE OILS (tonnes)

Year	OO	SFO	RSO	LSO	CO	TO	SSO	Total
1972	32	175	505	904	502	136	118	2 372
1973	23	473	496	1 141	531	133	171	2 968
1974	16	224	149	502	710	67	183	1 851
1975	13	367	27	719	259	21	192	1 598
1976	26	379	18	694	730	70	236	2 153
1977	131	106	23	539	719	47	319	1 884
1978	18	215	36	705	756	38	-	1 768
1979	24	230	43	1 129	1 077	43	437	2 983
1980	25	114	34	929	538	33	537	2 210
1981	41	282	32	1 248	1 153	24	354	3 134
1982	24	238	32	1 211	1 059	8	582	3 154
1983	60	192	139	569	1 035	113	-	2 428
1984	42	1 072	486	666	1 121	12	-	3 399
1985	47	148	141	16	1 099	19	-	1 470
1986	41	1 739	152	1 470	988	6	-	4 396
1987	30	594	2 452	963	-	-	-	4 039
1988 ^a	80	1 465	1 225	403	-	4	-	7 122 ^b

Notes:

OO = Olive Oil

SFO = Sunflowerseed Oil

RSO = Rapeseed Oil

LSO = Linseed Oil

CO = Castor Oil

TO = Tung Oil

SSO = Sesameseed Oil

^a = January-June^b = including 3 945 tonnes of corn oil (significant only in 1988)**Source:** Department of Statistics, Malaysia.

For example, castor oil consumption increased from 502 tonnes in 1972 to 1099 tonnes in 1985, and olive oil from 32 tonnes in 1972 to 588 tonnes in 1988. Rapeseed oil consumption also increased, from 505 tonnes in 1972 to 2452 tonnes in 1987, and sunflowerseed oil from 175 tonnes in 1972 to 1739 tonnes in 1986. However the consumption of tung oil declined from 136 tonnes in 1972 to six tonnes in 1986.

ESTIMATED DOMESTIC CONSUMPTION OF ANIMAL OILS AND FATS

Animal oils and fats consumed domestically include poultry fat, lard, tallow and fish oils, which are mostly imported. The consumption of these animal oils and fats has been estimated as import less re-export (*Equation 4*). The total consumption of animal oils and fats declined between 1972 and 1987, from 8 686 tonnes to 1 022 tonnes but the consumption of fish oils increased, albeit the trend was very irregular. The usage of inedible tallow declined from 4 813 tonnes in 1972 to 88 tonnes in 1985.

The consumption of edible tallow, which was estimated at 2 729 tonnes in 1972, was down to 727 tonnes in 1985, while consumption of lard and poultry fats declined from 670 tonnes in 1972 to 202 tonnes in 1986. Consumption of fish oil increased from 46 tonnes in 1972 to 1 579 tonnes in 1984 and estimated 614 tonnes in 1988 (*Table 7*).

SUMMARIZED PATTERN OF TOTAL OILS AND FATS CONSUMPTION

The estimated consumption of total oils and fats increased from 187 427 tonnes in 1977 to 387 233 tonnes in 1987 (the main oils and fats consumed being palm oil, palm kernel oil, coconut oil, soyabean oil and groundnut oil). This represents a growth rate of 9.6% per annum in 1977-87, with an average annual increment of 18 165 tonnes. In general consumption of vegetable oils and fats showed a steady increase except for reductions from 1977 to 1978 and from 1982 to 1983 (*Table 8* and *Figure 3*).

TABLE 7. ESTIMATED DOMESTIC CONSUMPTION OF ANIMAL OILS AND FATS (tonnes)

Year	LPFR	LTS	LPF	ET	IET	AF	FO	Total
1972	670	363	--	2 729	4 813	65	46	8 686
1973	683	404	--	1 143	9 335	10	98	11 673
1974	1 068	175	--	996	19 524	15	46	21 824
1975	577	25	--	1 425	4 016	213	109	6 365
1976	265	17	--	320	2 743	13	92	3 451
1977	313	6	--	739	3 832	19	93	5 002
1978	277	--	--	879	3 111	2	583	4 851
1979	147	18	--	629	3 030	--	1 579	4 501
1980	248	50	--	455	444	--	173	1 062
1981	184	47	--	413	193	4	28	869
1982	241	19	--	386	37	--	251	934
1983	431	53	280	469	94	9	484	1 820
1984	390	62	391	932	1 137	10	1 579	4 501
1985	302	62	479	727	88	6	589	2 253
1986	202	34	294	(657)	()	30	334	1 264
1987	()	456	()	(534)	()	--	30	1 022
1988*	()	339	()	(250)	()	--	307	896

Notes: LPFR = Lard poultry fat 'rendered'
 LTS = Lard tallow stearin
 LPF = Lard poultry fat
 ET = Edible Tallow
 IET = Inedible Tallow
 AF = Animal fats (other than LPFR, LTS, LPF, ET, IET, & FO)
 FO = Fish oil
 a = January-June

Source: Department of Statistics, Malaysia.

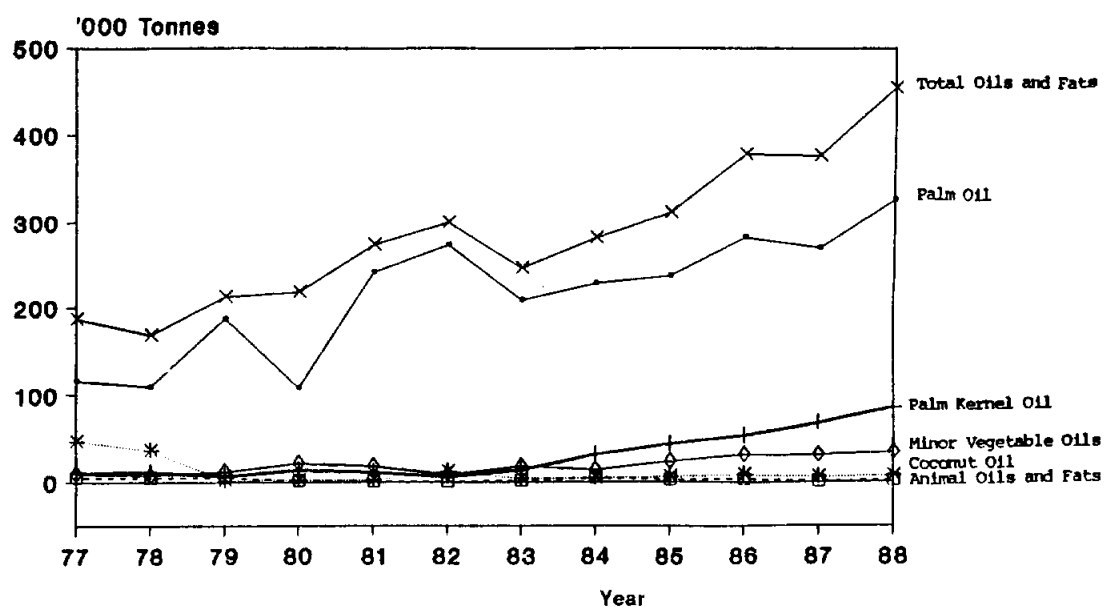


Figure 3. Total Oils and Fats Consumption

TABLE 8. DOMESTIC CONSUMPTION OF TOTAL OILS AND FATS (tonnes)

Year	PO	PKO	CNO	SBO	GNO	MVO	AOF	Total
1977	116 276	10 387	46 600	4 374	2 904	1 884	5 002	187 417
1978	109 017	10 716	36 006	4 894	1 251	1 768	4 851	168 503
1979	187 138	6 874	1 662	5 765	3 095	2 983	5 002	212 519
1980	180 021	13 573	2 726	12 371	6 798	2 210	1 072	218 758
1981	241 990	10 997	2 420	11 419	2 930	3 134	869	273 759
1982	273 789	5 706	11 431	2 015	3 194	1 154	934	300 223
1983	210 038	13 495	3 713	5 758	9 612	2 428	1 820	246 864
1984	228 437	10 997	4 430	3 683	6 292	3 399	4 501	281 443
1985	237 061	42 787	5 940	13 014	9 028	1 470	2 253	311 553
1986	281 425	52 994	8 069	18 621	8 062	4 396	3 368	376 935
1987	269 562	68 115	6 146	29 716	8 633	4 039	1 022	387 233
1988 ^a	325 490	86 039	6 718	40 812	15 232	14 244	1 792	490 327 ^b
1989 ^c	328 018	69 304	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Notes:

- PO = Palm Oil
- PKO = Palm Kernel Oil
- CNO = Coconut Oil
- SBO = Soyabean Oil
- GNO = Groundnut Oil
- MVO = Minor Vegetable Oils
- AOF = Animal Oils and Fats
- ^a = Preliminary, for SBO, GNO, MVO, AOF; 2x January-June.
- ^b = Huge fluctuation compared to 1987 possibly due to, import/export changes July - December not included.
- ^c = Preliminary, 2x January-June
- n.a. = Not available

Source: Department of Statistics, Malaysia.

From 1977 to 1987 consumption of palm oil as a percentage of total oils and fats increased from 62.0% to 69.4%, while the share of palm kernel oil rose from 5.5% to 17.5 per cent. Consumption share of minor vegetable oils also increased, from 1.0% in 1977 to estimated 5.8% in 1988. Consumption of tallow and marine oils ('animals oils and fats') declined from 2.6% of the total in 1977 to 0.3% in 1988 (Table 9). The

trends in the proportions of various oils and fats in the total consumption are shown in Figure 4.

TRENDS IN FUTURE CONSUMPTION OF OILS AND FATS

Consumption of total oils and fats in Malaysia is estimated at 28.89 kg/cap for 1988. By way of comparison, the per caput con-

TABLE 9. CONSUMPTION OF INDIVIDUAL OILS AND FATS AS A PERCENTAGE OF THE TOTAL (%)

Year	PO	PKO	CNO	SBO	GNO	MVO	AOF	Total
1977	62.0	5.5	24.8	2.3	1.5	1.0	2.6	99.7
1978	64.8	6.3	21.3	2.9	0.7	1.0	2.8	99.6
1979	88.0	3.2	0.7	2.7	1.4	1.4	2.3	99.7
1980	82.2	6.2	1.2	5.6	3.1	1.0	0.4	99.7
1981	88.3	4.0	0.8	4.1	1.0	1.1	0.3	99.6
1982	91.1	1.9	3.8	0.6	1.0	1.0	0.3	99.7
1983	85.0	5.4	1.5	2.3	3.8	0.9	0.7	99.6
1984	81.1	10.9	1.5	1.3	2.2	1.2	1.5	99.7
1985	76.0	13.7	1.9	4.1	2.8	0.4	0.7	99.6
1986	74.6	14.0	2.1	4.9	2.1	1.1	0.8	99.6
1987	69.4	17.5	1.5	7.6	2.2	1.0	0.2	99.6
1988*	66.3	17.5	1.3	8.3	3.1	2.9	0.3	99.7

Notes: PO = Palm Oil
 PKO = Palm Kernel Oil
 CNO = Coconut Oil
 SBO = Soyabean Oil
 GNO = Groundnut Oil
 MVO = Minor Vegetable Oil (other than PO, PKO, CNO, SBO, & GNO)
 AOF = Animal Oils and Fats
 * = Preliminary (for SBO, GNO, MVO, AOF; 2x January-June)

Source: Department of Statistics, Malaysia.

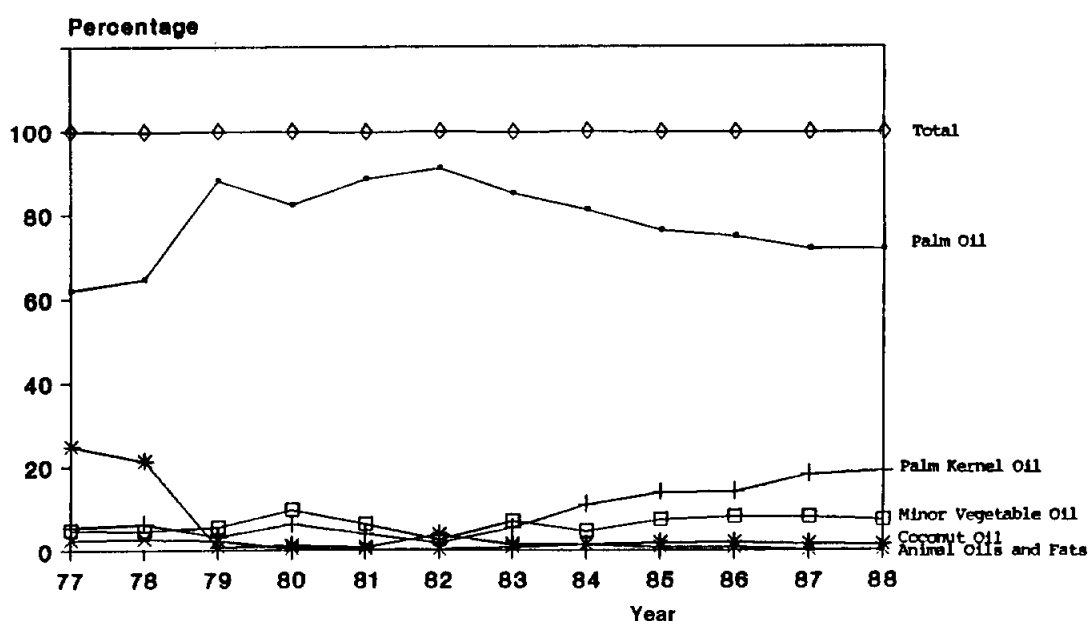


Figure 4. Consumption of Individual Oils as a Percentage of Total Consumption of Oils and Fats (1977-1988)

sumption of oils and fats around the world ranged from 3.9 kg in Bangladesh to 40.0 kg in the USA, with an average of 14.75 kg in 1988. Total oils and fats consumption in Malaysia including palm oil will continue to increase in the future with the expected increase in its population. Domestic palm oil consumption in Malaysia is projected to reach 358 275 tonnes in 1990, 487 912 tonnes in 1995 and 647 423 tonnes in 2000 based on time trend of current consumption level (1977-88) and population increase (Table 10).

TABLE 10. PROJECTION OF DOMESTIC PALM OIL CONSUMPTION FOR 1990 - 2000 (tonnes)

Year	Palm Oil Consumption*	Population ^b ('000)
1990	358 275	17 966
1991	381 402	18 487
1992	405 678	19 023
1993	431 129	19 573
1994	457 874	20 142
1995	487 912	20 727
1996	515 287	21 328
1997	546 061	21 946
1998	578 318	22 583
1999	612 089	23 238
2000	647 423	23 911

Notes: *generated from Equation 7
^brate of increase as in Table 1

The equation for projecting domestic palm oil consumption in 1990 - 2000 (Table 10) is obtained by regressing palm oil consumption (1977-88) with future population (1990-2000) and time trend, and the projected domestic palm oil consumption for 1990-2000 is shown in Figure 5. This method of projecting future oils and fats consumption based on time trend and population increase has been used in the past (Oil World 1988). In this article the equation is as in Equation 7.

$$Y = 132.6526 + 0.000897 X1 \quad \dots \text{Equation 7}$$

(5.471)

where: Y = palm oil consumption in tonnes,

$$X1 = t \times X2 / 10,$$

X2 = population in thousands.

$$[t= 1, 2, 3, \dots, n; t=1 for 1977, t=24 for 2000]$$

$$DW = 1.45610 \quad \text{Auto} = 0.25612 \quad R_2 = 0.74958$$

CONCLUSION

This article supplies statistics on the consumption of oils and fats, including palm oil, in Malaysia using the balance sheet approach which were not hitherto available. It has been found that in 1988 Malaysia consumed in total, 490 327 tonnes of oils and fats, of which palm oil accounted for 325 490 tonnes or 66.3 per cent. Consumption of palm kernel oil increased from 10 387 tonnes in 1977 to 86 039 tonnes in 1988 or 17.5 percent. Of the other oils and fats which have a share in the Malaysian market, soyabean oil amounted to estimated 40 812 tonnes in 1988 or 8.3%, having increased from 4374 tonnes in 1977. There have also been increases in the consumption of other oils and fats. In the future the consumption of palm oil and other oils and fats in Malaysia is expected to increase, due to increase in population.

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REFERENCES

BURHANUDDIN ABD SALAM and YUSOF BASIRON (1987), *An Estimation of the Domestic Consumption of Palm Oil and Other Oils and Fats in Malaysia*, PORIM Report G(98)87, General.

Department of Statistics, Malaysia (1980-1988)., *Import Export Trade Statistics*, Malaysia.

FAO (1984., 1987a)., Inter Governmental Group on Oilseeds Oils and Fats Secretariate, 'World Major Consumers of Palm Oil Domestic Use per caput'.

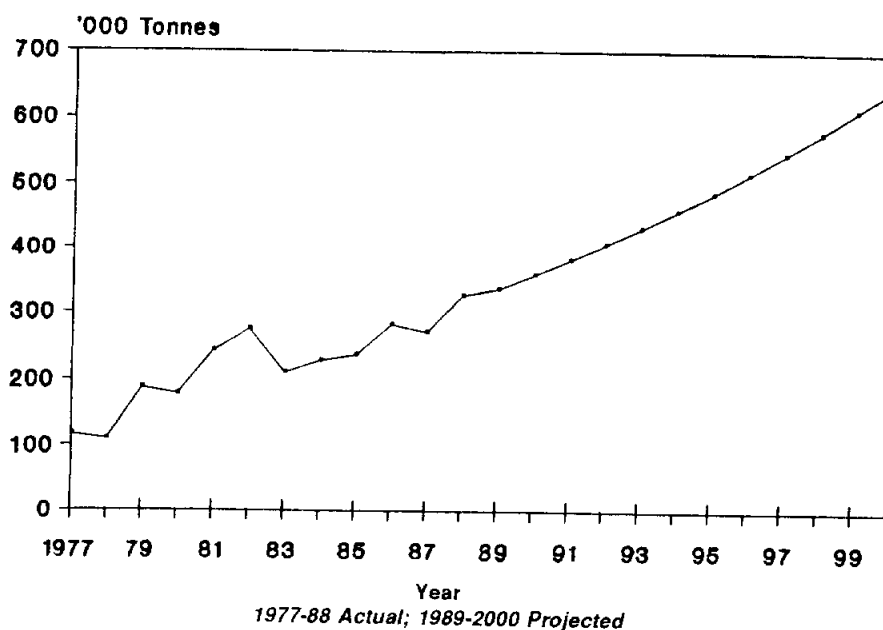


Figure 5. Projection of Domestic Palm Oil Consumption in Malaysia

FAO (1984., 1987b)., Inter Governmental Group on Oilseeds Oils and Fats Secretariate, 'World Major Consumers of Palm Kernel Oil Domestic Use per caput'.

Oil World (1988), ISTA Mielke GmbH, *Oil World 1958-2007*, "Oil and Fats: Total World Consumption of Oils and Fats up to year 2007", pp: 32-8.

Oil World (1988,...90), *Oil World Annual*, "Oils and Fats Balance", various countries/products.

USDA (1986, ...90), Foreign Agricultural Service, Agricultural Attache Report, *Oilseeds and Products*, "Production, Supply and Distribution Table", various countries/products.