Palm Oil and Its Global Supply and Demand Prospects

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ABSTRACT

The paper outlines the global palm oil situation and highlights the developments in the Malaysian and Indonesian palm oil industry. Palm oil has played a positive role in the world oils and fats supply and demand equation largely due to its techno-economic advantages and versatility as well as some of the developments in the world in relation to security of supply, health and environment. The paper will also discuss the various challenges confronting palm oil in the world market, namely self-sufficiency policies by developing countries, crop subsidies by developed countries, stringent standards and quality for trade, non-tariff technical barriers and effects of exchange rate variations.

WORLD PALM OIL SCENARIO

As shown in Table 1, world palm oil production in 1990 doubled to 11.0 million tonnes from a mere 5.0 million tonnes in 1980. The following decade, production doubled to 21.8 million tonnes by the year 2000. About half of the world palm oil production (10.8 million tonnes) was accounted for by Malaysia. Besides Malaysia, other palm oil producing countries also recorded favourable growth in production during this period. Indonesia, in particular, registered a double-digit growth of 11.2% per annum with production increasing from 2.4 million tonnes in 1990 to 6.9 million tonnes in 2000. Thailand and Colombia also registered impressive growth of 9.2% and 8.8% respectively, albeit with relatively low hectarage.

Despite the linear upward trend, the world production of palm oil also experienced a shortfall from 17.84 million tonnes in 1997 to 16.68 million tonnes in 1998 before it recovered in 1999. This was due to the worldwide moisture stress, brought about by the El Nino phenomenon that coincidentally occurred at a time when the palm trees were facing cyclical stress. Palm oil production in Malaysia fell sharply by about 800 000 t to 8.3 million tonnes in 1998 from 9.1 million tonnes in 1997. Likewise, Indonesian production dropped by 380 000t to 5.0 million tonnes from 5.38 million tonnes during the

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TABLE 1. WORLD PRODUCTION OF PALM OIL BY MAJOR COUNTRIES (1000 t)

Countries	1980	1990	1997	1998	1999	2000	Annual growth rate (%) 1990-2000
Ivory Coast	182	270	240	275	269	266	-0.1
Nigeria	433	580	680	690	720	740	2.5
Colombia	74	226	441	422	475	524	8.8
Ecuador	37	120	203	200	220	250	7.6
Indonesia	691	2 413	5 380	5 006	5 900	6 950	11.2
Malaysia	2 576	6 095	9 069	8 320	10 554	10 840	5.9
Thailand	13	232	390	355	400	560	9.2
PNG	35	145	575	215	270	296	7.4
Others	768	934	866	1197	1 173	1 371	3.9
Total	**4 804**	**11 014**	**17 844**	**16 680**	**19 981**	**21 797**	**7.1**

Source: Oil World (various years); MPOB (2000;2001); FAO (1982).

same period.

The sterling increase of palm oil output was mostly triggered by continued worldwide expansion of oil palm planted areas. This was more apparent as oil palm has been featured as an important socio-economic crop in most producing countries. In the year 2000, there were about 6.6 million hectares of matured oil palm land as compared to only 3.5million hectares in 1990. This implies an annual increase of 6.6% per annum. Malaysia continues to lead by commanding nearly half of the world's matured oil palm areas. In 2000, there were about 3.38 million hectares of oil palm in Malaysia, of which 2.94million hectares were matured areas (Table 2).

It is to be noted that the Malaysian oil palm land area had only increased at the rate of 5.5% per annum, which is slightly below the world average. In recent years, much of the expansion was due to conversion of areas under rubber and cocoa to oil palm. Area expansion was constrained by limited land resources and labour shortage. On the contrary, other countries especially Indonesia and to a lesser extent Colombia and Thailand have shown prolific expansion in oil palm area over the last decade. Indonesia, in particular, which is endowed with large tracts of land and abundance of labour, has shown a double-digit growth rate in land expansion at 12.6% per annum.

The expansion of oil palm planted area in Indonesia in part has been attributed to the increase in foreign investments,particularly from Malaysia.There were about30 joint ventures involving Malaysian investment partners covering about 700 000 ha in Sumatra and Kalimantan. It is postulated that if the land expansion continues to increase at the present rate, Indonesia is poised to supersede Malaysia in terms of palm oil production by the turn of the decade.

On the basis of the dominance of Malaysia and Indonesia in world palm oil production, it is meaningful to examine the oil palm industry in these two countries in order to get a closer view of what holds for the world in respect of oil palm's contribution to the global supply and demand equation.

TABLE 2. WORLD MATURE AREAS OF OIL PALM (1000 ha)

Countries	1980	1990	1997	1998	1999	2000	Annual growth rate (%) 1990-2000
Ivory Coast	100	128	159	135	136	139	0.8
Nigeria	220	270	355	358	358	360	2.9
Colombia	27	81	119	121	128	134	5.2
Indonesia	230	617	1 517	1 647	1 840	2 014	12.6
Malaysia	805	1 746	2 455	2 597	2 857	2 941	5.5
Thailand	15	94	146	148	155	199	7.8
Others	151	527	602	596	521	731	3.3
Total	**1 756**	**3 463**	**5 353**	**5 602**	**5 995**	**6 563**	**6.6**

Source: Oil World (various years); MPOB (2000;2001).

MALAYSIAN PALM OIL SCENARIO

The palm oil industry is an important component of the national economy and especially the agriculture sector. Oil palm currently accounts for 58% of the total cultivated land in Malaysia. Of the 3.38 million hectares of oil palm area in 2000, about 60.0% was under private plantation and 40.0% under organized and independent smallholders. Hence, oil palm is an important socio-economic crop for Malaysia. The oil palm industry provides about half of the overall agricultural employment (1.4 million) in the country.Exportearnings contributed by the industry reached RM 19.2 billion in 1999, but declined to RM 14.9 billion in 2000 due to lower prices in the world market. Palm oil export earnings accounted for 4.0% of the nation's total export of merchandise in the year 2000 (Ministry of Primary Industries, 2001).

The palm oil industry is a well-developed and diversified industry in Malaysia. Aside from the plantation and smallholders sectors, there is a well-established processing sector, which encompasses the milling, refining, crushing and oleochemical subsectors. The status of mills, refineries, crushers and oleochemical plants operating in Malaysia is as shown in Table 3. Malaysia exports more than 90% of its palm oil products, with some level of processing for edible and non-edible purposes. The palm oil industry is now at the stage of seeking more value-added products not only from the oil and kernel but also its biomass. In the case of biomass, there is ample opportunity to convert the 13.2 million tonnes (dry weight) of biomass per year available in the oil palm sector into pulp and paper, particleboard, medium density fibreboard, furniture etc. (Kamaruddin et al., 1997). Malaysia is also pushing ahead with the next phase of the oleochemical industry by getting the industry to produce oleochemical derivatives and finished products.

Although the current average yield of palm oil is 3.5 tonnes per hectare, it is envisaged that with the development of new high yielding planting materials including clonal planting materials, the industry can achieve yields of up to 7-8 tonnes per hectare. This will be facilitated by the aggressive replanting programme that has been initiated, where about 200 000 ha of palm trees exceeding 25 years are expected to be replanted with new planting materials by mid 2002. Research and Development (R&D) will also continue to develop planting materials with specific traits such as high oleic palm oil to meet the demands of certain markets. Although labour supply is a problem, the advancement in mechanization has somewhat reduced the dependence on labour, which is increasingly sourced from overseas. The Malaysian Palm Oil Board (MPOB) is on the threshold of a breakthrough in developing a suitable machine to harvest oil palm - the one aspect of oil palm production that has been most difficult to mechanize.

INDONESIAN PALM OIL SCENARIO

Oil palm cultivation in Indonesia expanded at a tremendous rate in the 1990s. This expansion was partly brought about by the Indonesian Government's encouragement of foreign investment where trade and economic liberalization as well as policy deregulation and debureaucratization created a conducive investment climate. Investment in the plantation sector was given priority since this is expected to increase the socio-economic standard of people in the rural areas. The inability of local private investors to raise all the huge financial requirements for oil palm development resulted in the inflow of foreign investments. Companies from Malaysia, the United States and Singapore played a major role in investing in oil palm plantations in Indonesia. The oil palm area consequently increased from 2.03 million hectares in 1995 to 3.18 million hectares in 2000, an increase of more than one million hectares.

Nevertheless, the country in the early 2000s was beset with numerous economic and social problems that derailed many development programmes, including those involving oil palm development. Economic uncertainties followed by

TABLE 3. NUMBER OF PALM OIL MILLS, REFINERIES, OLEOCHEMICAL PLANTS AND KERNEL CRUSHERS IN MALAYSIA (2001)

Mills in operation		Refineries in operation		Oleochemical Plants in operation		Palm kernel crushers in operation	
Number	Capacity (tonnes/yr)	Number	Capacity (tonnes/yr)	Number	Capacity (tonnes/yr)	Number	Capacity (tonnes/yr)
352	67 744 720	46	15 479 400	17	1 957 509	38	4 312 100

Source: MPOB (2001).

bureaucratic constraints as well as a lack of infrastructure have jeopardized the flow of investment funds to the oil palm sector.

The recent events in Indonesia creates uncertainty over the role Indonesia will play in meeting the global supply of palm oil.But as part of the International Monetary Fund's initiated reform, the export duty structure that was once very high was reduced to ensure that the palm oil produced finds its market overseas and that the country obtains its much required foreign exchange. In addition, there was always the pressure on the industry to meet domestic demand in view of the fact that Indonesia has a large population of over 220 million people. Nevertheless, the country's production of palm oil is anticipated to trend upwards in line with the increase in relatively new immature area coming into maturity and as the productivity of the palms increases with age.

POSITIVE DEVELOPMENTS AFFECTING SUPPLY AND DEMAND OF PALM OIL

The ascent of palm oil in the global oils and fats market has been achieved by leveraging the techno-economic advantages of palm oil vis-à-vis competing oils as well as some of the developments in the world in respect to health, environment and security of supply. These positive developments regarding palm oil have and will continue to influence its dominant role in the global oils and fats supply and demand equation.

High Output Value Vis-a'-Vis Other Oilseeds

Palm oil gives the highest output value compared to major oilseed crops, namely rapeseed, soyabean and sunflower, as illustrated in Table 4.Indeed the total value/hectare/year for palm oil at US$ 1135 is more remunerative than rapeseed at US$ 696, soyabean at US$ 543 and sunflower at US$ 334 (Khoo, 2001). Hence, in an environment where in most countries, the agricultural land is shrinking with urbanization brought about by industrialization, coupled with the fact that within the agricultural sector oilseeds have to compete with grains for available arable land, the cultivation of oil palm is the most obvious option to meet the world's growing oils and fats needs.

The Need for Security in Oils and Fats Supply

The oils and fats balance for selected countries for the year 2000 is illustrated in Table 5. The total production of oils and fats of these countries was 110.9 million tonnes. When comparing oils and fats pro-

TABLE 4. OUTPUT VALUES OF VARIOUS OILSEED CROPS

Crop		Palm oil – Malaysia 2000	Rapeseed-EU 15 1999/2000	Soyabean-USA 1999/2000	Sunflower-Argentina 1999/2000
Harvest yield (tonnes/ha/yr)		18.33	3.18	2.45	1.77
Oil	Oil Extraction (%)	18.86	41.70	18.80	37.50
	Oil yield (tonnes/ha/yr)	3.46	1.33	0.46	0.66
	Price (US$/tonne)	310	347	338	392
Non-oil: Meal or kernel	Extraction (%)	5.52	56.80	79.10	39.40
	Oil yield (tonnes/ha/yr)	1.01	1.81	1.94	0.70
	Price (US$/tonne)	63	131	200	106
Output	Total value (US$/ha/yr)	1135.43	696.76	543.27	334.11

Source: Khoo (2001).

TABLE 5. BALANCE OF OILS AND FATS BY SELECTED COUNTRIES - 2000

Country	per cap (kg/cap)	Population (million)	Production ('000 t)	Import ('000 t)	Export ('000 t)	Disappearance ('000 t)	Self- sufficiency %
EU	47.4	377.24	15257	4884	2688	17792	85.8
Others W. Europe	40.5	12.38	377	386	247	502	75.1
Central Europe	23.4	121.32	2517	534	241	2838	88.7
Ex-USSR	14.4	290.3	3955	828	594	4188	94.4
Algeria	14.2	30.81	57	324		430	13.3
Cameroon	13.6	15.2	213	15.4	27	202	self-sufficient
Egypt	17.6	69.06	175	1148	106	1196	14.6
Ivory Coast	16.5	16.35	347	19	100	264	self-sufficient
Libya	22.5	5.4	0	137	0	119	0.0
Morocco	16.7	30.43	134	355	13	498	26.9
Nigeria	13.1	116.89	1327	169	17	1489	89.1
Senegal	20.3	9.63	151	133	101	191	79.1
S.Africa,Rep	20.3	44.46	504	443	56	880	57.3
Sudan	10.2	31.78	245	65	16	317	77.3
Tunisia	29.4	9.56	200	219	133	278	71.9
Zimbabwe	11.2	12.83	65	77	0	142	45.8
Canada	46.3	31.03	2162	369	1143	1422	self-sufficient
USA	50.3	285.9	15631	1748	2746	14240	self-sufficient
Costa Rica	22.6	4.11	169	12.8	94	91	self-sufficient
Cuba	9.6	11.24	0	100	0	108	0.0
Dominican Rep	24.5	8.5	33	177	0	206	16.0
El Salvador	20.1	6.4	0	119	0	126	0.0
Guatemala	14.8	11.69	72	133	27	169	42.6
Honduras	17.3	6.58	102	34	25	111	91.9
Jamaica	16.7	2.6	0	1000	0	43	0.0
Mexico	24.0	11.38	1447	1000	27	2372	61.0
Argentina	24.7	37.5	5654	32	4694	914	self-sufficient
Bolivia	12	8.46	206	61	169	100	self-sufficient
Brazil	25.2	172.61	5215	293	1147	4302	self-sufficient
Chile	25.8	15.4	208	184	17	392	53.1
Colombia	17.4	42.84	641	208	105	731	87.7
Equador	22.7	12.88	283	68	52	287	98.6
Paraguay	14.2	5.63	169	0	96	78	self-sufficient
Peru	15.1	26.1	651	142	466	387	self-sufficient
Uruguay	16.8	3.36	79	0	37	56	self-sufficient
Venezuela	21.4	24.63	193	340	0	518	37.3
Bangladesh	6.7	140.3	193	755	0	916	21.1
Myanmar	10.5	48.36	289	196	0	501	57.7
China,PR	14	1262.81	14960	2942	146	17482	85.6
Hong Kong	38.6	6.97	39	803	520	265	14.7
India	11.9	1024.98	6816	5445	243	11981	56.9
Malaysia	14.8	21.8	12026	570.8	10084.2	2153.7	self-sufficient
Indonesia	15.4	214.83	8537	81	5454	3264	self-sufficient
Iran	16.4	71.39	227	1169	224	1153	19.7
Iraq	11.5	23.55	41	225	0	264	15.5
Israel	30.9	6.11	140	37	0	186	75.3
Japan	21.4	127.33	2041	712	16	2724	74.9
Jordan	23.0	5.05	11	144	44	113	9.7
Korea, South	20.6	47.07	442	529	21	961	46.0
Pakistan	18.7	144.95	1188	1432	0	2644	44.9
Philippines	7.7	77.11	1533	122	1052	580	self-sufficient
Saudi Arabia	15.8	21.01	0	316	11	321	0.0
Syria	18.6	16.61	208	112	0	300	69.3
Taiwan	36.1	22.35	485	307	11	800	60.6
Thailand	12.8	63.57	861	83	104	806	self-sufficient
Turkey	26.7	67.6	1049	816	79	1783	58.8
U Arab Emirat	23.2	2.65	0	236	172	61	0.0
Australia	33.1	19.34	983	206	576	633	self-sufficient
New Zealand	32.1	3.81	491	65	438	121	self-sufficient
Grand Total		**5362.03**	**110999**	**33061**	**34379.2**	**107991.7**	

Source:Oil World Annual (2001).

duction with imports or disappearance, it is noted that at least 17 countries are self-sufficient in these materials. These countries include Cameroon, Ivory Coast, Canada, USA, Costa Rica, Argentina, Bolivia, Brazil, Paraguay, Peru, Uruguay, Malaysia, Indonesia, Philippines, Thailand, Australia and New Zealand. The rest of the countries have self-sufficiency ratios ranging from 0% (UAE, Saudi Arabia, El Salvador, Jamaica, Cuba, Libya, etc.) to highs of more than 90% for ex-USSR(94.4%), Honduras (91.9%), Equador (98.6%) etc. These countries have to import oils and fats to meet their respective domestic demands. As oils and fats are essential in the daily livelihood of any community, it is important that there is security of supply.

The list of countries importing oils and fats in 2000 is in Table 6. In these importing countries, the proportion of palm oil import to total oils and fats imports ranged from 0.4% for Jamaica to as high as 96.9% for Myanmar. The absolute import in tonnes ranged from zero for Bolivia in 2000 to 3.76 million tonnes for India. Most palm oil imported by these countries is Malaysian palm oil. Oil palm being a perennial crop can be counted on as a steady source of raw material to meet the growing oils and fats needs of the world. Rarely does palm oil experience an output decline due to weather. In the last 20 years, the global supply of palm oil has quadrupled and the rare occasion when production did decline, as in 1998 due to the El Nino phenomenon, it was indeed marginal. Furthermore, given its price competitiveness, palm oil has been the vegetable oil that has served to meet the needs of the less affluent countries. Although in some countries, palm oil has the image of a poor man's oil, the palm oil industry takes pride in the fact that it has been able to leverage its cost competitiveness to reach the lower strata of society to meet their basic food need.

TABLE 6. PALM OIL IMPORTS BY SELECTED COUNTRIES - 2000

Country	Total Imports ('000 t)	Palm oil imports ('000 t)	Palm oil Imports Share (%)
EU	4884.0	2414.1	49.4
Others W. Europe	386.0	23.1	6.0
Central Europe	534.0	117.8	22.1
Ex-USSR	828.0	142.1	17.2
Algeria	324.0	56.5	17.4
Cameroon	15.4	8.0	51.9
Egypt	1148.0	523.5	45.6
Ivory Coast	19.0	13.0	68.4
Libya	137.0	4.4	3.2
Morocco	355.0	11.0	3.1
Nigeria	169.0	110.7	65.5
Senegal	133.0	32.0	24.1
S.Africa,Rep	443.0	195.4	44.1
Sudan	65.0	61.0	93.8
Tunisia	219.0	17.6	8.0
Zimbabwe	77.0	24.0	31.2
Canada	369.0	4.4	1.2
USA	1748.0	165.1	9.4
Costa Rica	12.8	3.0	23.4
Cuba	100.0	30.0	30.0
Dominican Rep	177.0	10.5	5.9
El Salvador	119.0	37.0	31.1
Guatemala	133.0	6.3	4.7
Honduras	34.0	5.0	14.7
Jamaica	1000.0	4.0	0.4
Mexico	1000.0	138.9	13.9
Argentina	32.0	0.3	0.9
Bolivia	61.0	0.0	0.0
Brazil	293.0	35.7	12.2
Chile	184.0	0.5	0.3
Colombia	208.0	2.0	1.0
Equador	68.0	5.0	7.4
Paraguay	0.0	0.0	0.0
Peru	142.0	4.0	2.8
Uruguay	0.0	0.0	0.0
Venezuela	340.0	13.8	4.1
Bangladesh	755.0	225.7	29.9
Myanmar	196.0	190.0	96.9
China,PR	2942.0	1763.6	59.9
Hong Kong	803.0	187.5	23.3
India	5445.0	3763.3	69.1
Indonesia	81.0	6.8	8.4
Iran	1169.0	168.0	14.4
Iraq	225.0	102.7	45.6
Israel	37.0	2.1	5.7
Japan	712.0	373.4	52.4
Jordan	144.0	76.0	52.8
Korea, South	529.0	199.6	37.7
Pakistan	1432.0	1098.9	76.7
Philippines	122.0	72.6	59.5
Saudi Arabia	316.0	208.0	65.8
Syria	112.0	38.0	33.9
Taiwan	307.0	70.1	22.8
Thailand	83.0	24.5	29.5
Turkey	816.0	203.7	25.0
U Arab Emirat	236.0	115.0	48.7
Australia	206.0	110.4	53.6
New Zealand	65.0	13.9	21.4
Grand Total	**32490.2**	**13233.5**	**1647.8**

Source:Oil World Annual (2001).

Versatile Food Products

The four main traditional uses of palm oil in food products are for cooking/ frying oils, shortening, margarine and confectionery fats. Palm oil is popularly used in solid fats products such as vegetable ghee as well as in the liquid cooking oil sector especially frying applications. It offers several technical characteristics desirable in food application, such as resistance to oxidation, which contributes towards longer shelf life for the end products. Palm oil is ideally suited for use as an ingredient in shortening and margarine as it has 20%-22% solid fat contents (SFC) at 20°C, which helps in the formulation of fat products with plastic consistency. It tends to crystallize in small beta-prime crystals, a property desirable for some application, particularly in table and industrial margarines. Palm oil also has other functional attributes that make it a valuable ingredient in food formulations. In many applications, palm oil can be combined with its harder fractions such as palm stearin to produce products of the required consistency without hydrogenation. Common products made from palm oil and palm kernel oil, wholly or in blends with other oils include frying and cooking oils, shortening, vegetable ghee or vanaspati, margarine and spreads, confectionery and non-dairy products.

The changing trends in lifestyle and demand for consumer products based on convenience and health considerations have led to other areas of applications for palm oil and its fractions. MPOB R&D efforts have succeeded in formulating products to meet such demands, develop new niches, enter new markets and enhance palm oil's competitiveness. New applications of palm oil in foods include its use in emulsion-based powdered and consumer foods such as pourable margarine, mayonnaise, soup-mixes, imitation cheese and microencapsulated palm oil. Exciting products from new processes such as red palm oil or red palm olein have been introduced as healthy cooking and salad oils.

Minor Components in Palm Oil

Palm oil contains minor components including carotenoids, tocopherols, tocotrienols, sterols, phosphatides, triterpenic and aliphatic alcohols. Although these components constitute less than 1% in palm oil, they play an important role in the stability and quality of the oil. Carotenoids and vitamin E (tocopherols and tocotrienols) are important nutritionally. Palm oil contains 500-700 ppm of carotenoids, namely the a-carotenoids and b-carotenoids. These carotenoids have pro-vitamin A activity. In crude palm oil these carotenoids appear to offer some protection against oxidation by themselves being oxidized first prior to the oxidative attack on the triacylglycerols. Crude palm oil is also a rich source of vitamin E (600-1000 ppm). The vitamins that have generated the most interest among the scientific community are the b-carotenes, along with the vitamin C and E. These vitamins are known as biological antioxidants, are considered safe and have no serious side effects. Basically these vitamins deactivate free radicals which otherwise damage other healthy molecules.

Non-Food Uses for Palm Oil

Palm oil products also find wide applications in the non-food sector, especially in the production of soaps and detergents, pharmaceutical products, cosmetics and oleo-chemical products. Soap production is one of the most important applications of oils and fats and the traditional raw materials used were tallow and coconut oil. Due to the similarity in their fatty acid composition, palm and palm kernel oil are good and competitive alternatives to tallow and coconut oil as raw material for soap making.

Fatty acids derived from the splitting process can be used directly in products like candles, cosmetics and in rubber processing. Derivatives of fatty acid include fatty esters (the most important of which is fatty acid methyl ester), fatty alcohols, fatty amines and fatty amides. Fatty esters are used in various industries such as textile, cosmetic, pharmaceutical, plastic and other applications. Although fatty alcohols as such find limited use, their derivatives namely, fatty alcohol sulphates, fatty alcohol ethoxylates and fatty alcohol ether sulphates are used extensively in the production of washing and cleaning products. Fatty amines are mainly used in the detergent industry as softening agents, in the mining industry as anti-caking agent, as biocides and in road building and other applications.

An added advantage of using palm oil products in such applications is biodegradability, thus contributing towards environmental sustenance. It is envisaged that, with growing consideration of environmental sensitivity and the need for eco-friendly products, palm based products will gain greater popularity and wider market acceptance.

Environmental Friendly Crop

With the continuous cultivation of oil palm as a sustainable industry, there is a greater image of oil palm emerging as an environmental friendly crop. It is to be noted that oil palm is a perennial crop that provides forest cover for at least 25 years. Hence, a new positive consideration is the use of the oil palm as a sequester of carbon dioxide. Under the Kyoto Protocol, the carbon sink of the oil palm can be converted to carbon credit which

then can be traded. Its high productivity will allow the importing countries to free the land otherwise allocated to oilseed crops.

Green Fuel Alternative

Oil palm also offers the potential to be a ready source for fuel that is environmentally friendly. The recent low palm oil prices led to MPOB undertaking several initiatives to use palm oil as a fuel to replace/or blend with petroleum fuel. MPOB's long-term programme is to establish a biodiesel plant that will produce methyl ester (biodiesel) that can be used to replace petroleum diesel. This project is viable as its co-products, namely beta carotene and tocotrienol, command premium prices in the world market (Yusof, 2001)

As a short-term measure, MPOB's efforts to burn crude palm oil (CPO) in blend with medium fuel oil (MFO) proved to be successful. It was observed that the CPO/MFO blend was less viscous due to euthetic effect, and therefore contributed to the easier handling of the blended fuels. Similarly, the MPOB also carried out an experiment of blending petroleum diesel with RBD olein as fuel for motor vehicles. The result was equally convincing that RBD olein when blended with diesel contributed to a cleaner fuel. The avenue for palm oil as a fuel is definitely established. Indeed should prices of palm oil fall to very low levels, it would be possible to use some of it as fuel, thus creating a safety net for price stability (Yusof, 2001; Ahmad et al., 2001).

Growing Concern over GMO and Trans-Fatty Acid

The growing concern over the deleterious health effect of consuming food made from genetically modified organism (GMO) products and those that contain trans-fatty acid have had a positive impact on palm oil. Palm oil is GMO-free, and therefore is not affected by the controversy over GMO which has affected some oilseeds like soyabean and canola. There are calls to segregate GMO and non-GMO oilseeds in the trading and distribution chain. Indeed non-GMO canola from Australia is reported to be enjoying a premium of US$ 5/ tonne for exports to Europe. Some countries are also establishing stringent rules to ensure health protection for consumers. The European Commission in July 2001 has unveiled proposals for new labeling and traceability regulations related to GMOs for approval by the EU Governments and European Parliament. If approved, the rules will enter into force by 2003 at the latest. Japan also introduced mandatory labelling of GMO foods from April 2001.

Palm oil being semi-solid need not undergo the process of hydrogenation, which produces trans-fatty acid that studies have shown to be deleterious to health. In fact there is beginning to be a realization even in the US that palm oil is the best choice for preparation of food that uses solid fat, as it is trans-free.

FUTURE CHALLENGES TO PALM OIL

Self-sufficiency Policies by Developing Countries

The major markets for palm oil is in the developing countries. Although these markets have great potential, there are always market impediments as many of these developing countries institute measures to curtail imports to protect their domestic farming community, self-sufficiency objectives or cope with financial constraints including shortage of foreign exchange. For example, China P.R. imposes quantitative restrictions (import quota) on palm oil imports, and India heavily taxes the imports of palm oil. In order for Malaysia to achieve some level of bilateral trade balance, counter trade projects involving the nation's infrastructure projects are offered to importing countries, which could be met with payment in the form of palm oil. This counter-trade arrangement has enabled Malaysia to secure some market share in this competitive world market.

Subsidies by Developed Countries

The provision of crop subsidies by many developed countries pose a serious problem to palm oil. Farmers are given assistance in the form of input subsidies, minimum price guarantees whilst exporters are given export subsidies. Although under the Uruguay Round, commitments were made to reduce the domestic support and export subsidies, it would appear that it has had little effect on the production and export of subsidised oilseeds and vegetable oils. The recent low prices of oils and fats were caused mainly by the increasing production of oilseeds due to such governmental support. For instance, the area under soyabean cultivation in the US increased from 29.3 million hectares in 1999 to 29.4 million hectares in 2000, although prices of soyabean were below the cost of production. This was possible because of the huge outlay under the Loan Deficiency Programme by the US Government to soyabean farmers. For the year 2001, the US government planned to pay out US$ 7.457 billion as agricultural export assistance to its farmers. (USDA FAS, 2001). This all occurred despite the commitment by developed countries to reduce trade distorting domestic support by 20% over a six-year period starting from 1995. In fact, it has been argued that many countries have actually abused the green-box provision of the Uruguay Round, and efforts are underway to introduce discipline on non-trade

distortive measures in the on going negotiation on agriculture, in order to check such abuses.

Standards and Quality

There are challenges in the international scenario over the ever-increasing stringent quality standards. Under the auspices of Codex Alimentarius, negotiations are underway on oils and fats specification to ensure the quality and safety of food supply. It is necessary to be vigilant against efforts by some consuming countries imposing standards that are excessively stringent and not supported by scientific evidence. It must be appreciated that the purpose of Codex is two fold, i.e. to set standards to ensure food safety, and also to facilitate international trade in food especially basic food items such as cooking oil for which purpose palm oil is widely used.

Another organization whose work impinges on palm oil trade is the International Maritime Organization (IMO). It is to be noted that the IMO is imposing more and more stringent shipping rules on carriers to ensure better environmental protection and safety on the sea transportation. The EU Food Safety Policy that takes the form of EU Directives and Regulations also has a bearing on palm oil trade. An example is the EU Directive on Dedicated Vessels (Directive 93/43/EEC and Directive 96/3/EC). There should not be any legislation to force any use of dedicated vessels for shipment of vegetable oils and fats, as this is likely to cause the freight charges to increase and diminish the competitiveness of the palm oil industry. All these aspects are manifestation of the growing concern for quality standard of food items which if not adequately addressed can affect oils and fats trade and in particular palm oil.

The research arm of MPOB has been guiding the industry on quality related to production, handling, processing and transporting of oil palm products. Over and above this, in Malaysia, through the enforcement arm of MPOB, regulations have been put in place to protect the quality interests of the industry. There have been cases of serious contamination when the world's oils and fats prices soared in 1998/99. Thanks to the quality standards in place, Malaysian palm oil was spared these problems because of the effective enforcement of such regulations. Enforcement officers have been embarking on inspection programmes, sampling, and testing to ensure that the products meet contractual specifications.

Non-tariff Technical Barriers

It is justifiable to impose stringent sanitary and phytosanitary (SPS) rules for the procurement of safe, wholesome and nutritious food in this world. However, the imposition of unfair discriminative labeling or unnecessary technical specifications imposed by some countries hampers the smooth trading of palm oil. Such cases include importing countries imposing too stringent quality specifications for food purposes resulting in rejection of cargoes upon arrival of products. Some importing countries also request certifications that require enormous laboratory testing and inspection for traceability, such as radioactivity in palm oil products, which creates unnecessary documentation and slows trade. Such rules certainly go against the spirit of free trade advocated by the WTO, and need to be overcome through negotiations in order to ensure fair trading among nations.

Effects of Exchange Rate Variations

The competitiveness of palm oil in the international market is also influenced by the exchange rate regime in exporting countries. When the Asian financial crisis ravaged the countries in Southeast Asia, Malaysia and Indonesia, the two major palm oil producers saw their currencies depreciate significantly and this of course impacted positively on the palm oil industry as prices of palm oil are quoted in US$. With the introduction of fixed exchange rate in Malaysia since 1 September 1999, the Malaysian Ringgit (RM) depreciated by 34.3% compared to the precrisis level of RM 2.50 = US$ 1. However the Indonesian Rupiah (IDR) endured wider fluctuations and at the current exchange rate of IDR 9500 = US$ 1 the Rupiah had depreciated by 76.3 % compared to precrisis level of IDR 2256 to US$ 1. Whilst the Indonesian palm oil industry enjoyed some advantage vis-ã-vis the Malaysian palm oil industry, the palm oil sector in Asia has now to contend with the producers of oilseeds in Latin America which have liberalized their exchange rate regime. The Brazilian Real (BRL) has depreciated by 59.3 % against the US Dollar (BRL 2.26 = US$ 1) compared to 1995 (BRL 0.92 = US$ 1). The recent financial crisis in Argentina also saw the country breaking from its currency peg of one peso to a US Dollar, which has been in place for a decade to a free floating peso. The value of the peso has depreciated to 2.95 per dollar after the free float in February 2002, thus making their farm exports more competitive.

These problems call for the palm oil industry to be mindful of the fact that although it has yields of up to seven to 10 times more than other oilseeds, its competitiveness can be threatened by low cost producers on account of exchange rate variations. The challenge to the palm oil industry is to watch its cost of production, which has been creeping up slowly. It is important to increase productivity through developing high yielding planting materials and

to improve our efficiency in the field, milling, crushing and refining sectors. At the same time the rising costs of land, labour and raw materials also need to be contained. For example, the rising cost of labour can be overcome by higher adoption of mechanization and automation in all the sectors of the industry.

CONCLUSION

Palm oil will continue to play a positive role in the global supply and demand equation of the oils and fats industry. Aside from its inherent strength as a food product which has seen its share in oils and fats production grow from 7.9% % in 1980 to 18.9% in 2000, there are other attributes of palm oil that will see its expansion gain momentum. These are the minor components in palm oil that can be commercialized as pharmaceuticals products, its environmental friendliness in respect of a sequester of carbon, its suitability as a green fuel, its freedom from GMO associations as well as its trans-free attribute. Most importantly, palm oil is price competitive and is well positioned to meet the growing needs of oils and fats in the global market.

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