Selling the Green Palm Oil Advantage?

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ABSTRACT

Palm oil has many positive environment attributes; this paper discusses the green palm oil advantage *(GPOA) and the prospects of using it as a marketing edge over competing edible oils. Compared with the major oilseed crops (soyabean, rapeseed and sunflower), oil palm is considered the most environmentally friendly with respect to land use efficiency and productivity, energy efficiency and inputs of fertilizers and pesticides and pollution potential. It contributes positively to climatic change through effective carbon sequestration and it is not genetically modified. When defining GPOA, due consideration must be given to the expectations of its stakeholders and how well they are met. At present, some major stakeholders are concerned over the potential linkage between forest destruction and loss of biodiversity with the expansion of the oil industry. As this concern could lead to consumer action that could undermine the competitive position of oil palm, it is vital that the industry engages the stakeholders concerned, to bring about a win-win resolution to this contentious issue and enhance the green palm oil advantage.*

INTRODUCTION

Traditionally, companies are largely driven by three factors to maintain their competitiveness – quality, cost and delivery (QCD). Growth of a company, in terms of profit and market share is determined by how well it is able to meet customers' expectations and requirements, producing the products at the lowest cost possible and managing efficient delivery systems. These factors essentially focus on the financial or economic bottom line. However, from the last decade, particularly since the United Nations Conference on Environment and Development (UNCED), or the Earth Summit in 1992 which produced an action plan (Agenda 21) for sustainable development globally, the business community has responded to the environmental challenge by embracing the triple bottom line

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philosophy. The three inter-related value systems of sustainable development pertaining to society, economy and the ecosystem (people, profits and planet) are translated to the economic bottom line, environmental bottom line and the social bottom line of business. There is now a large pool of empirical evidence to demonstrate that companies that have incorporated social and environmental considerations as an integral part of doing business have been able to enhance their economic bottom line and competitiveness (Sustainability Ltd UNEP, 2001; Sustainability *et al.*, 2002; Holliday *et al.*, 2002). Thus, doing business in the new century would require an additional factor – sustainability (QCD+S).

From the consumer perspective, there is a growing awareness and demand for products that have been produced sustainably, from sustainable agriculture. In developed economies, consumers already have a choice of a wide array of sustainable food products, mainly in the form of certified organic foods. Such products are also making their presence in the shelves of supermarkets in developing countries. Responding to this trend, and in line with their commitment to sustainable development, a number of food manufacturers have taken initiatives to ensure that sustainability principles are adhered to along the supply chain. For example, Unilever launched its Sustainable Agriculture Initiative in 1998 for major food crops such as oil palm, tea, tomatoes, peas and spinach that it produces or controls through contract growers (Vis *et al.*, 2001). Migros, the largest retail chain in Switzerland, in January 2002 incorporated sustainability criteria in its purchasing policy for palm oil (http://news.ft.com).

Palm oil has many attributes that are environmentally friendly; can the industry in Malaysia use the green image to demonstrate that it is produced sustainably and enhance its competitiveness and secure the potential market for sustainable palm oil? This paper discus the *green palm oil advantage* and the prospects of using it as a marketing edge over competing edible oils.

WHAT IS THE GREEN PALM OIL ADVANTAGE? (GPOA)

While the GPOA has not been formally defined, over the years, numerous papers and articles have been written on the environmental attributes and performance of the oil palm; those which had given comprehensive accounts include:

- *Oil Palm and the Environment – a Malaysian Perspective* (Gurmit *et al.*, 1999);
- *Oil Palm and the Environment* (PORIM, 1998);
- *The Malaysian Oil Palm Industry: Progress Towards Environmentally Sound and Sustainable Crop Production* (Gurmit, 1999);
- *Targeting Zero Wastes in Oil Palm* (Yusof and Ariffin, 1996);
- *Environment, Sustainability and Trade Linkages for Basic Foodstuffs* (FAO, 1966);
- *The Oil Palm – a Very Environmental Friendly Crop* (Pushparajah, 1998); and
- *Land Use and the Oil Palm Industry in Malaysia* (Teoh, 2000).

What is the GPOA? In attempting to describe the GPOA, it is assumed that the green advantage will be in relation to the other competing edible oils, particularly soyabean oil, rapeseed oil and sunflower oil. The indicators that likely to be relevant include:

- crop productivity;
- energy balance;
- fertilizer input;
- pesticides usage;
- emissions;
- carbon sequestration; and
- genetic modification.

Crop Productivity

Compared to the annual oil-seeds, oil palm is the most productive crop (*Table 1*), its oil yield per hectare being seven times higher than soyabean, five times higher than sunflower and 2.5 times higher than rapeseed.

In terms of land utilization, oil palm is most efficient, requiring only 0.30 ha to produce 1 t of oil while soyabean, sunflower and rapeseed need 2.17 ha, 1.52 ha and 0.75 ha respectively. Among the four edible oils, soyabean oil which accounts for 36% of total world

TABLE 1. AREA UNDER CULTIVATION BY VARIOUS VEGETABLE OIL CROPS (2000)

Crop	Production (10^6t)	Oil/ha/yr (t)	Area (10^6 ha)	% Of total
Oil palm	21.730	3.30	6.563	7.5
Rapeseed	14.237	1.33	10.704	12.3
Sunflower	9.630	0.66	14.591	16.7
Soyabean	25.483	0.46	55.398	63.5

Source: Chan (2002) cited by Yusof and Chan (2003).

production of these oils require about 64% of the total land area while palm oil which has a 31% share of production need only 7.5% of the land area. Fairhurst (2003) argued that in view of its *unrivalled potential productivity*, oil palm is the logical choice for vegetable oil production. In comparing the competitiveness of vegetable oils, with regard to the world vegetable oils and fats index (WOFI), Yusof and Chan (2003) stated that the efficient use of land by oil palm would enhance its competitive position over other oil crops.

Energy Balance

On energy input:output efficiency, the work by Wood and Corley (1991) had been frequently cited in many publications. They estimated that the output:input energy value for oil palm was 9.5 times compared with 3.0 and 2.5 times for rapeseed and soyabean respectively. A FAO study (FAO, 1996) showed that oil palm had the second lowest energy requirement for the production of fresh fruit bunches (FFB), at 0.5 Giga-Joules (GJ) to produce 1 t of oil compared with 2.9 GJ and 0.7 GJ for soyabean and rapeseed, respectively. Sunflower oil had the lowest energy input at 0.2 GJ t^{-1} (*Table 2*). There is little or no fossil energy requirement for processing the fruits into palm oil as the mill is self-sustaining in energy through the use of palm biomass and shell as fuel.

Fertilizer Input

The FAO (1996) study showed that oil palm had the lowest requirement for nitrogenous fertilizer and phosphates (*Table 2*) while soyabean needed the highest inputs. About 47 kg of nitrogen are required to produce 1 t of palm oil while 315 kg would be necessary to obtain 1 t of soyabean oil; thus the demand for nitrogen by soyabean is 6.7 times higher than that of palm oil. Soyabean requires about 10 times the amount of phosphates compared with oil palm. A high level of recycling of organic matter is currently practised in plantations; Gurmit (1999) estimated that 80% to 95% of pruned fronds and trunks and fronds at replanting are recycled while about 65% of the empty fruit bunches recovered from oil mills are returned as organic fertilizer and mulch to the fields. He estimated that in 1998, about 30 million tonnes of biomass had been recycled in Malaysia with total value of about US$ 255 million in value of equivalent fertilizers. The use of chemical fertilizers is also reduced through the application of agronomic practices such as planting of leguminous cover crops which can fix up to 250 kg N ha^{-1} (Gurmit, 1999).

TABLE 2. INPUT-OUTPUT ANALYSIS OF INTENSIVE OILSEEDS AND OIL PALM CULTIVATION (per tonne of oil)

Items (unit)	Soyabean oil	Sunflower oil	Rapeseed oil	Palm oil
Inputs				
Seeds for planting (kg)	150	6.3	2.5	
Nitrogen [N (kg)]	315	96	99	47
Phosphates (P_2O_5-kg)	77	72	42	8
Pesticides/herbicides (kg)	29	28	11	2
Others (kg)	117	150	124	88
Energy (GJ)	2.9	0.2	0.7	0.5
Outputs				
Oilseeds/fruits (kg)	5 000	2 500	2 500	4 540
Emissions to soil and water (kg)				
- Nitrogen	32	10	10	5
- Phosphates	23	22	13	2
- Pesticides/herbicides	23	22	9	0.4
Emissions to air (kg)				
- NO_x	4	0.3	0.8	0.5
- SO_2	2	0.1	0.4	0.2
- CO_2	205	16	50	32
- Pesticides/herbicides	6	6	2	0.1

Source: FAO (1996).

Pesticide Usage

Compared to oilseed crops, oil palm had the lowest inputs for pesticides and herbicides, as shown in the FAO (1996) study (*Table 2*). Application of crop protection chemicals was only 3 kg/ha compared to 28 and 29 kg/ha for sunflower and soyabean, respectively. Consequently, the emissions by pesticides to soil and water were also very low for oil palm. The low pesticide input in oil palm has also been confirmed in other reports, for instance, by Wood and Corley (1990) who estimated that only about 1% of the oil palm planted area was treated with pesticides annually. Implementation of integrated pest management (IPM) practices on a commercial scale by the industry since the 1980s has enabled the industry to be less dependent on chemical inputs. Today, biological control approaches such as the use of barn owls to control rats and natural enemies to check the outbreaks of leaf eating pests are commonly practised (Chung and Sharma, 1999).

Emissions

The comparative emissions to soil, water and air during the cultivation of the oil crops and during processing of oilseeds and palm oil fruits are presented in *Tables 2* and *3* respectively. In the production phase, oil palm had the lowest levels of emissions to soil and water by applied fertilizers (nitrogen and phosphates) and pesticides/herbicides while soyabean oil and sunflower oil had the highest emissions. On emissions to air, soyabean oil production resulted in the highest discharge of NO_x, sulphur dioxide and carbon dioxide, compared to the other three oils. Use of the zero burning technique during crop establishment or replanting has also ensured minimal emissions to the air by oil palm. During the processing of oilseeds and oil palm FFB into vegetable oils, the oilseeds had negligible emissions to water while oil palm had a Chemical Oxygen Demand load of 2 kg/t oil to degrade the biodegradable matter during effluent treatment. However, the main environmental pollutant from processing oilseeds using solvent extraction is the emission of residual solvent (hexane) into the atmosphere (FAO, 1996).

In its economic assessment of pollution control measures, FAO (1966) analysed the current and projected pollution control costs for the four vegetable oils, a summary of which is presented in *Table 4*. The future pollution costs are estimated by the input-based method where the reduction in pollution is achieved through reduction in agricultural inputs and the discharge-based method where pollution abatement is through preventing discharge to ground and surface water. The analysis showed that oil palm had the second lowest current pollution costs, after rapeseed oil. However, estimates of future pollution costs indicate that oil palm would have the lowest cost according to both methods of computation while soyabean oil and sunflower oil would require the highest monetary input for pollution control.

TABLE 3. INPUT:OUTPUT ANALYSIS OF PROCESSING OILSEEDS AND PALM OIL FRUIT TO VEGETABLE OILS AND MEALS (average input/output unit/tonne of oil)

Items (unit)	Soyabean oil	Sunflower oil	Rapeseed oil	Palm oil
Inputs				
Oilseeds (kg)	5 000	2 500	2 500	4 540
Hexane (kg)	4.3	4	4	-
Energy (GJ)	2.2	3	3	-
Outputs				
Emissions water (kg)	negligible	negligible	negligible	2 COD*
Emissions to air (kg)				
- Solvents	4.3	3.8	3.9	-
- NO_x	0.1	0.3	0.3	-
- SO_2	0.2	0.7	0.7	-
- CO_2	56	164	164	-
Final products (kg)				
- Vegetable oil	1 000	1 000	1 000	1 000
- Meal/kernels	4 000	1 500	1 500	200

Note: * COD = Chemical Oxygen Demand.
Source: FAO (1996).

TABLE 4. ESTIMATION OF CURRENT AND POSSIBLE FUTURE AVERAGE POLLUTION CONTROL COSTS IN PRODUCING 1 t OF VEGETABLE OIL (US$/t)

Pollution control	Soyabean oil	Sunflower oil	Rapeseed oil	Palm oil
Current pollution control costs	18	15	6	11
Future pollution control costs – input based	266	242	111	22
Future pollution control costs – discharge based	233	206	114	33

Source: FAO (1996).

Carbon Sequestration

As a perennial crop, oil palm is an effective carbon sink and can contribute significantly towards mitigating climate change through sequestration of carbon in the biomass and in the soil. Although a significant amount of biomass is removed in the FFB, the net carbon fixation has been similar to that of a lowland forest (Henson, 1999). The total carbon stock in the 3.38 million hectares of oil palm in the year 2000 in Malaysia was estimated to be 89.27 million tonnes (Chan, 2002). The oil palm industry can potentially play a positive role in reduction of greenhouses gasses through implementation of projects under the Clean Development Mechanism (CDM) of the Kyoto Protocol such as production of renewable energy from palm biomass and land use in the land use, land use change and forestry (LULUCF) sector.

Genetic Modification

Advances in genetic engineering in the 1990s have resulted in the commercial production of genetically modified (GM) agricultural crops, particularly soyabean, rapeseed and maize. In spite of the potential benefits that GM crops can offer, the commercialization of GM crops has met strong resistance from consumers, NGOs and other stakeholders in developed as well as developing countries. A major public concern is over safety, with regard to human health and the broader environment. Although the Malaysian Palm Oil Board and some universities are undertaking research to produce transgenic oil palm with improved characteristics such as production of high oleic oils, it has been estimated that it may take 15 to 40 years (Corley, 1999; Jalani, 1998) before this can become a commercial reality. Considering the long time lag to commercialization, Teoh *et al.* (2001) suggested that it would be commercially and economically attractive and advantageous for palm oil to remain GM-free and to be labelled and marketed as such.

The Green Palm Oil Advantage (GPOA)

From the foregoing discussion, it can be concluded that the GPOA over major competing edible oils consists of the following elements:

- highest crop productivity and the most efficient utilization of land resources;
- positive energy balance, being self-sufficient in energy through utilization of its own biomass;
- lowest requirement for inputs of fertilizers and pesticides and least polluting of the major vegetable oil crops;
- positive contribution to climate change through efficient sequestration of carbon; and
- natural and not GM.

WHO ARE THE CUSTOMERS OF GREEN PALM OIL ADVANTAGE (GPOA) AND WHAT ARE THEIR EXPECTATIONS?

Having defined GPOA, the next step is marketing it. As in the case of physical products, the needs and expectations of customers must be given due consideration when marketing GPOA. Who are the customers of GPOA? Companies tend to focus on the immediate buyers of their products and services as primary customers while employees, suppliers, investors and government agencies are seen as secondary customers. In the case of palm oil which is usually traded in bulk, companies seldom see the ultimate consumers of the product. In reality, customers, and, in the broader context, stakeholders of any product are a cast of characters with diverse needs and expectations. Menon *et al.* (2003) have identified the principal stakeholders along the palm oil supply chain, from growers and millers to intermediate food processors, retailers and customers (caterers, restaurants and households). In addition, the financial sector and civil society such as consumer groups and NGOs should also be considered as they may exert significant influence on the purchasing decisions of others. The influence of NGOs often goes beyond consumer preferences or demands as they represent the wider interests of society on various issues and ensure that the decision-making process on issues of importance to society involves representative participation of the stakeholders. Thus, when selling GPOA, it is essential to consider the various stakeholders along the supply chain.

Among the major importers of palm oil, GPOA would be of immediate relevance to consumers in developed economies, particularly in Europe where environmental campaigns have been conducted against palm oil in the last few years. While these actions are seen as a threat or obstacle, can the industry use GPOA to create a commercial opportunity for sustainable palm oil? Before doing so, it is necessary to establish if the features of GPOA match the needs and expectations of the major stakeholders, particularly, food processors and retailers, environmental NGOs and the financial services sector.

Environmental NGOs (ENGOs)

A survey of the websites of major ENGOs such as Worldwide Fund for Nature (WWF), Greenpeace, Friends of the Earth (FoE) and World Resources Institute (WRI) can provide an indication of their expectations. By and large, these focus their concerns and campaigns on global environmental issues, one of them being protection of the world's original forests, both in the northern and southern hemispheres while the other is concern over loss of biodiversity. WWF has the *Forests for Life* campaign (www.panda.org/forests4life/) which is directed at protection, management of forests and restoration of degraded forests. The rapid expansion of the oil palm industry, particularly in Indonesia and the development of large-scale soyabean cultivation in South America, particularly in Brazil are seen by the ENGOs as serious threats to the remaining forests in the Tropics. Various actions have been initiated by ENGOs to address this concern, a notable example being WWF's forest conversion initiative (FCI) which has the goal by 2005 to ensure that high value conservation forests, freshwater ecosystems and habitats of key species in focal ecoregions are no longer threatened by the expansion of palm oil and soya (Ng *et al*., 2003). An action plan has been put in place to work in collaboration with the oil palm and soyabean industries towards achieving this objective.

Food Processors and Retailers

In the process of greening the supply chain, environmental considerations have increasing been incorporated in the purchasing decisions and long-term relationships among players along the chain. As mentioned earlier, Unilever has the Sustainable Agriculture Initiative to ensure that the major agricultural crops it requires are produced in a sustainable manner. In line with its long-term environmental and social commitment, Migros, the largest retail chain in Switzerland announced on 22 January 2002, its commitment to source all its palm oil from plantations that have not been established at the expense of tropical forests (http://news.ft.com) and have incorporated the following principles in its purchasing policy:

- environmental standards. Forest, habitat and wildlife are protected. Plantation and processing plants minimize environmental impacts;
- social standards. Producer companies actively address social impacts and have policies to secure working and safety condition according to national laws and international agreements. Companies communicate and consult with stakeholders;
- legal compliance. Producer companies agree to adhere to all national and regional laws; and
- transparency and independent verification. Identified suppliers (company group) and plantations (estate level) agree to provide an independent third party certification of the chain of custody of all products. All producers agree to an independent verification of best practice principles.

Karlshamms AB of Sweden, one of the world's largest manufacturers of specialty oils and fats have stated that it would rely only on suppliers who refrain from utilizing high value conservation forests to expand production, and the company therefore buys all palm oil from a limited number of carefully selected suppliers from western Malaysia (www.karlshamms.com).

Financial Services Sector

The financial services sector has an indirect environmental impact through the services they offer clients. Recognizing their potential role in promoting sustainable development, financial institutions and banks have moved towards integrating ecological and social considerations in the assessment of credit worthiness of clients or choice of companies for investment or ethical funds. The expectations of some banks in promoting sustainable development in oil palm and forest plantations can be seen in the additional investment criteria imposed by three Dutch banks (ABN-Amro, Rabobank and Fortiss Bank) in October 2001 (Focus on Finance News Special Issue, 2001). Companies submitting investment proposals in Indonesia are required to comply that the proposed developments should:

- not be involved in burning forestland;
- not be clearing tropical rainforest;
- respect the rights and wishes of local communities; and
- respect Indonesia's law and relevant international conventions.

The requirements of managers of sustainable investment funds are focused on the way companies are managed rather than the product attributes. Evaluation criteria generally encompass the triple bottom line dimensions covering economic, environmental and social aspects, as can seen from the evaluation criteria for the Dow Jones Sustainability Global Index (www.sustainability-indexes.com/html/assessment/criteria.html) and the FTSE4Good World Social Index (www.ftse4good/FTSE4GoodCriteria.pdf). Environmental criteria that are commonly adopted by sustainable and responsible investment (SRI) funds include implementation of ISO 14000 systems, eco-efficiency, air pollution, management of wastes and toxics, impacts on biodiversity, *etc.* (Chung, 2001).

MATCHING GREEN PALM OIL ADVANTAGE (GPOA) WITH CUSTOMER EXPECTATIONS

Although GPOA offers a distinct competitive edge over other major competing edible oils, the forgoing discussion indicates that it does not entirely address the expectations of some stakeholders, particularly ENGOs whose primary concerns are over deforestation and loss of biodiversity. These are contentious issues and have been the basis for recent ENGO actions against palm oil as well as soyabean oil. Divergent views and positions have been maintained by the oil palm industry and ENGOs. In general, the oil palm industry, notably that in Malaysia, holds the view that development of plantations had not been at the expense of forest resources and biodiversity. Logging for valuable timber has been seen as the root cause for destruction of forests and the problem has been exacerbated by illegal logging in many tropical countries. The industry maintains new oil palm plantings have been mainly developed from deforested or degraded land. On the other hand, ENGOs asserted that various studies have shown a linkage between oil palm development and forest destruction, particularly in Indonesia.

The 1997/98 fires in Southeast Asia had raised global awareness of the potential role of plantations in contributing to both air pollution and loss of biodiversity. Notwithstanding other factors such as *El Nino* that could have exacerbated the problem, Rowell and Moore (2000) reported that up to 80% of the fires in Sumatra and Kalimantan were started by plantations using fire as a tool to clear land. This impasse is clearly untenable to both the industry and ENGOs, as well as other stakeholders. Contrary to expectations by the industry, the ENGO campaigns had not led to a boycott of palm oil or a switch to other oils by consumers, as confirmed by consumer feedback to WWF's recent *Know Your Oils* campaign (Vellacott, 2003). Instead, food processors and retailers are seeking assurance from the producers that palm oil is produced in a sustainable manner, without harm to forests or biodiversity. This has the case with Migros which has included sustainability criteria in its purchasing policy for palm oil. Karlshamms AB has also affirmed its preference for palm oil as an essential in its products, provided it is produced sustainably. A way forward is for the industry and ENGOs to work in partnership to resolve the debate over linkage of oil palm development and forest destruction. It is encouraging that the Malaysian Palm Oil Association (MPOA) and WWF have made good progress in this direction (Khairudin, 2003; Ng *et al.*, 2003). The proposed *Roundtable for Sustainable Palm Oil* among palm oil producers, purchasers, ENGOs and other stakeholders in August 2003 is an excellent platform to facilitate the engagement process towards a better understanding, and, hopefully, an eventual win-win resolution to this conflict.

Meeting customers' needs can be facilitated by effective labelling of GPOA and appropriate communication to various stakeholders. Environmental labelling enables consumers to make purchasing decisions on the choice of similar products on the basis of their environmental profiles. It can be used as a marketing tool to promote GPOA. In order to ensure credibility of the label in the market place, it is necessary to follow internationally recognized standards, the most widely accepted being the ISO 14000 standards. There are three types of environmental labels under the ISO/TC207 umbrella:

- Type I Environmental Labelling which is based on third party labelling to allow buyers to recognize products that have met the environmental criteria set by the certifying body. Examples of Type I label include Blue Angel (Germany), EcoMark (Japan), Environmental Choice (Canada), EU Daisy and Nordic Swan (Europe) and Green Label (Singapore).

- Type II Environmental Labelling which refers to a self-declared label on the environmental attributes of a product or service of a company, using environmental symbols such the *Mobius Loop* to show recyclable materials or the content of recycled materials in a product.
- Type III Environmental Labelling which is a third party environmental labelling certification that uses quantified environmental data of a product based on life cycle assessments (LCA) and other environmental information.

Among the three approaches, Type II Environmental Labelling based on the ISO 14021: 1999 standard can be relevant to the oil palm industry. This standard provides guidelines on voluntary declaration by an organization or company on the environmental aspects of its products or services. The standard provides advice on the choice of environmental statements and use of symbols to ensure that self-declared environmental claims are accurate and verifiable.

CONCLUSION

Compared with the major oilseed crops (soyabean, rapeseed and sunflower), oil palm is considered most environmentally friendly with respect to land use efficiency and productivity, energy efficiency and inputs of fertilizers and pesticides and pollution potential. It contributes positively to climate change through effective carbon sequestration and it is not genetically modified. These environmental attributes, combined with palm oil's health advantage as a naturally low *trans*-fatty acid oil, could provide a marketing edge for the industry. At present, some major stakeholders are concerned over the potential linkage between forest destruction and loss of biodiversity with the expansion of the oil industry. As this concern can lead to consumer action that can undermines the competitive position of oil palm, it is vital that the industry engages the stakeholders concerned, particularly the ENGOs, to bring about a win-win resolution to this contentious issue and enhance the green palm oil advantage.

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