WORLD GROWTH
Palm Oil Green Development Campaign

Palm Oil — The Sustainable Oil

A Report by World Growth

September 2009

WORLD GROWTH

Table of Contents

Palm Oil — The Sustainable Oil

Foreword

There are all the signs that a global campaign exists to discredit Palm Oil. This has happened before.

Demand for, and consequently production of, palm oil has increased dramatically over the past decade. Palm Oil has a number of advantages over competitor products. When new products have impact on markets, there is a natural process of adjustment.

The anti-palm oil campaign has now taken on a new dimension and has been wrapped into part of a broader campaign to restrict emissions of greenhouse gases (GHG) by environmental groups and Governments in Europe.

Palm oil now is accused of deforestation, reduction of biodiversity, endangering wildlife and increasing greenhouse gas emissions.

All of these claims are questionable or at best severely exaggerated.

In the process, the vital role palm oil is and can plays in reducing poverty and raising living standards in poor countries is being pushed into the background.

The aim of this report is to review the accusations against palm oil and make a reasoned assessment of its impact on sustainability and economic development.

Executive Summary

What's the Fuss About?

Palm oil accounts for 32 percent of the global production of edible vegetable oils and 59 percent of annual exports.[1] It is produced in tropical climates and has become a staple food in countries such as Malaysia and Indonesia. Global demand is growing as populations increase and standards of living improve.

Production of palm oil is more sustainable than crop based vegetable oils such as soybean and rapeseed. It consumes considerably less energy in production, uses less land and generates more oil per hectare. The palm oil industry is a major driver of rural economic development in Malaysia and Indonesia. It has become a substantial export and a key contributor to poverty alleviation and higher living standards.

Yet green groups in Europe (principally Greenpeace and Friends of the Earth) are campaigning to denigrate palm oil by pressuring processors and consumers to boycott it and EU governments to block imports. The EU Renewable Energy Directive restricts the availability of palm oil. The campaign is based on contentions that palm oil damages the environment and is endangering threatened species, such as the orangutan.

Palm Oil as a Development Tool

Around 89 percent of the world's vegetable oils are produced in developing countries.[2] Vegetable oil is a food staple in the developing world and also a major generator of jobs and prosperity. Palm oil offers poor countries in Africa the opportunity to build significant palm oil industries and to raise living standards as the industry has done in Malaysia and Indonesia.

Restricting palm oil production worldwide and limiting access to European markets would limit an important opportunity for developing countries to raise living standards and reduce poverty. Restricting palm oil imports from developing countries restricts their capacity to grow and reduce poverty.

A Highly Sustainable Industry

Exerting pressure to restrict production of palm oil will simply increase demand for other crops which are less efficient producers of vegetable oil.

Palm oil uses less land than crop-based oilseeds. Only 0.26 hectares of land is required to produce one tonne of oil from palm oil, while soybean, sunflower and rapeseed require 2.2, 2 and 1.5 hectares, respectively, to produce one tonne. Palm oil producers also expect to increase their yield per hectare. Palm oil generates nearly 10 times the energy it consumes, compared to a ratio of 2.5 for soybeans and 3 for ripe oilseed.

The world's leading palm oil producers now are beginning to provide independent certification for the sustainable production of palm oil.

Impact on Biodiversity

It is an undeniable fact that economic growth and population growth puts pressure on habitats and threatens biodiversity in specific locations. Most governments in areas where these pressures exist have collaborated with conservation groups to establish wildlife reserves to protect habitats.

The success of conserving biodiversity is a function of the successful establishment of effective conservation areas. It is not the case that conversion of forestry land automatically entails loss of species and biodiversity. There are examples of successful areas for conserving biodiversity in Malaysia and Indonesia.

Palm oil accounts for 32 percent of the global production of edible vegetable oils and 59 percent of annual exports.

The palm oil industry is not destroying forest biodiversity in developing countries. In Malaysia, the second largest producer, palm oil is restricted to 20 percent of

1 Oil World 2008, *Oil World Annual 2008*, Hamburg.
2 Ibid.

the state's land that is allocated for agricultural purposes. More than 55 percent of Malaysia's territory is reserved for forest, while the European average is 25 percent.

In Indonesia, one of the world's most densely populated countries and the world's largest producer of palm oil, 25 percent of the country has been set aside for forest conservation. Palm oil is only cultivated in areas set aside for commercial production. In both countries, the palm oil industry is an important contributor to programs to protect endangered species, such as the orang-utan.

Production of palm oil is more sustainable than crop based vegetable oils such as soybean and rapeseed. It consumes considerably less energy in production, uses less land and generates more oil per hectare.

Reduces Greenhouse Gas Emissions

The palm oil industry has a positive impact on the reduction of GHGs. The oil palm is an effective carbon sink. Its performance is superior to many established forest species. The oil palm consumes fewer carbon emitting inputs than other oil seeds and has a comparatively smaller carbon footprint. Palm oil can serve as a very effective biofuel and can make a good contribution to efforts in Europe to reduce consumption of fossil-fuel based energy by substituting palm oil-based biofuel.

Where development of palm oil plantations results in releases of emissions of greenhouse gases, this should be treated as a necessary consequence of development in much the same way expansion of energy generation to support economic development results in increases of GHGs. Moreover, the technical understanding of the carbon footprint of palm oil and other plantation and forest industries is still weak. And, as developing countries become wealthier, they will be able to afford the cost increases necessary to reduce this carbon footprint.

1. What's All the Fuss About?

The palm oil industry in Malaysia and Indonesia is seen by many people as one of the engines of rural economic development. The industry supplies a healthy, low-cost product that is a staple of the national diet, as a cooking oil and processed food ingredient. It has also provided substantial regional employment and farm income benefits for many people living in low-income households.

But there are others that view the industry through a different lens. They see the industry as a chief cause of environment degradation in agriculture. Some environmental organisations accuse the industry of deforestation, unsustainable farming practises and contributing to a loss of bio-diversity. They continually raise concerns about the potential consequences of future industry growth.

Overlaying these alternative perspectives is the global issue greenhouse gas emission controls and the carbon footprint of agricultural industry development. Palm oil is a cost competitive ingredient for bio-diesel production and this new demand growth is encouraging an industry expansion. Some see the industry operating in an environmentally-sustainable way providing carbon abatement benefits that cannot be matched by the broad-acre, crop-based oilseeds.

But others dispute this perspective. They point to a loss of native forests as an inevitable outcome of industry growth, with its corresponding release of carbon stored in the forests. In fact, claims made by environmental activists give the over-riding impression that the industry is the sole cause of native forest destruction and a major contributor to GHG emissions in Indonesia and Malaysia.

Future development of the palm oil industry is an issue of some interest in the context of the trade-off between economic development and environmental protection. An added consideration is that the issue focuses on two developing economies at different stages of development. Opportunities for growth and poverty alleviation through changes in land use are at the heart of this issue.

A dispassionate reading of the claims that have been made suggests palm oil may have been unfairly tagged as the cause of widespread environmental and bio-diversity losses. Agricultural development is the building block to higher incomes for the rural poor in developing economies. In part it will involve land use changes including the conversion of some native forest to agricultural production — palm oil is not the only source of land use changes.

Oil palms are ideally suited to the tropical climate and particular regions of these countries. A tree crop with a productive life span of 25 years, they are suitable for small-holders and estate plantations. With appropriate farm management, they can be grown in a sustainable way that brings lasting economic benefits to regional communities in these countries.

The industry supplies a healthy, low-cost product that is a staple of the national diet, as a cooking oil and processed food ingredient.

The Campaign Against Palm Oil

A vigorous campaign is being run by some environmental groups to denigrate the palm oil industry. The aim of the campaign is to pressure processed food manufacturers and consumers into boycotting palm oil. Europe is the focus of the campaign and a concerted effort is being made to persuade EU governments to restrict imports:

- EU import demand has grown as some countries have looked to palm oil as a feedstock for bio-diesel production in response to renewable fuel mandates;
- But the proposed EU Renewable Energy Directive includes conditions that will restrict the availability of palm oil.

Opposition to growth in palm oil production is based on contentions that the industry damages the environment and threatens endangered species such as the orang-utan. The campaign has raised doubts about the longer-term environmental sustainability of the industry and the consequences of further growth of GHG emissions.

These criticisms are made despite the fact that oil palm is a highly efficient crop in terms of resource use. In comparison to broad-acre oilseed crops such as soybeans and rapeseed the industry uses less land and generates more oil per hectare. It also consumes less energy because it is a tree crop with a lengthy productive life span. This means oil palm plantations are themselves an effective carbon sink and may well outperform the carbon storage properties of natural forests.

Opportunities for growth and poverty alleviation through changes in land use are at the heart of this issue.

Moves to restrict imports would seem to be illogical in comparison to the broad-acre oilseed crops. It also seems counter-productive for efforts to reduce fossil fuel consumption and GHG emissions. In producing countries such as Malaysia and Indonesia, European import restrictions would have significant implications for economic development. It would curtail the opportunities for many people in rural communities to gain employment and raise their living standards.

Aim of the Report

As with any public policy issue, those seeking to affect the outcome of political decision making will tend to paint an exaggerated picture of the consequences. They dramatise the nature of their concerns and present an overly pessimistic perspective to build political pressure. An objective review of the available information on the palm oil growth issue would be a worthwhile and long over-due contribution to the current debate.

Good policy development requires a full understanding of the facts in conjunction with a considered reflection on the information. Anecdotal views and unsubstantiated claims must be scrutinised against the facts and subjected to rigorous analysis. This is especially the case when it has implications for the aspirations of low income communities in developing economies to achieve a higher standard of living.

The aim of this report is to sift through the available information and make an objective assessment on the potential contribution of further growth in the palm oil industry. The evidence on some aspects of the issue is limited and may need further investigation. But a review of current knowledge and recent developments will be instructive in establishing a balanced assessment of the industry in light of the campaign by environmental groups.

Primarily, the issue is about the potential consequences of future industry growth. Past developments in land use changes are a sunk cost — what is done is done. What matters now is a balanced assessment of the trade-offs between economic and environmental outcomes of industry growth. Development policies, regulatory controls, industry performance and the production practises of the industry will be key elements of such as assessment.

Concerns about the industry's growth reflect the issues commonly raised by economic development more generally. Population growth and a need for wealth creation to support better living standards is a fact of life. Exploiting natural resources in an environmentally-sustainable way is a necessary requirement of this goal. Implications for GHG emissions are an additional complicating but relevant consideration. This report will review:

- the economic development aspects of recent industry growth;
- the sustainability of the industry;
- the implications for GHG emissions; and
- the impact on bio-diversity.

While the economic development arguments for industry growth are self-evident the environmental concerns are essentially based around the broader issue of the loss of native forest. Some of the materials that try to link or de-link palm oil to this issue seem superficial and simplistic. As is often the case the situation is more complicated than the perception painted by interest groups. A useful starting point is to examine the recent industry growth and performance.

2. Palm Oil as a Development Tool

Palm oil is a major part of the world commodity market for vegetable oils. It competes with a range of broad-acre oilseed crops such as soybeans and rapeseed. The demand for edible vegetable oils has been growing strongly for some time. In more recent times, the growth has been fuelled by the use of vegetable oils in bio-diesel production, although the demand for fuel is so large that biodiesel developed from palm oil can never become a major source of fuel.

Growing demand has encouraged increased production of oilseeds. Since the year 2000 vegetable oil production has risen 47 percent (table 1). Palm oil, soybean oil and rapeseed oil have all contributed to the increased output. The strongest growth has been in palm oil which currently accounts for almost a third of annual global production.

A Staple of the National Diet

Indonesia and Malaysia are the world's largest producers of palm oil with a sizeable export trade. Collectively they account for about 87 percent of global output. In recent years, Indonesia has surpassed Malaysia as the largest producer (chart A). Industry growth in Indonesia is expected to exceed Malaysia for the foreseeable future.[3]

Palm oil is a staple part of the national diet in these countries. The principal domestic use is cooking oil at home and by street vendors. It is also used in solidified spreads and as an ingredient in various processed foods. In Indonesia the price of cooking oil is a sensitive issue because of the large numbers of low-income households.[4] This is reflected in the use of export taxes to ensure there are adequate domestic supplies and moderate price levels during periods of strong global demand.

In recent times the export tax on Indonesian palm oil has been suspended. But in early 2008, the rise in prices of cooking oil and other foods had a big impact on low-income households who spend as much as half of their income on staple foods (USDA 2009c). To relieve the financial pressure several assistance meas-

Table 1 World Production of Vegetable Oils

		1995	2000	2005	2006	2007	2008
Palm Oil *	m tonnes	16.9	21.9	33.8	37.1	38.7	43.1
	% of change	-	*29.2*	*54.8*	*9.7*	*4.1*	*11.5*
Soybean Oil	m tonnes	24.0	25.6	33.6	35.3	35.3	37.2
	% of change	-	*6.5*	*31.5*	*5.0*	*0.0*	*5.3*
Rapeseed Oil	m tonnes	12.3	14.5	16.3	18.5	18.7	19.8
	% of change	-	*18.0*	*12.4*	*13.6*	*1.3*	*5.9*
Other vegetable oils	m tonnes	28.6	30.5	33.6	35.1	34.9	35.8
	% of change	-	*6.6*	*10.2*	*4.3*	*-0.3*	*2.5*
Total	m tonnes	81.8	92.4	117.4	126.0	127.6	135.9
	% of change	-	*13.0*	*27.0*	*7.3*	*1.3*	*6.5*

Source: Oil World 2008.

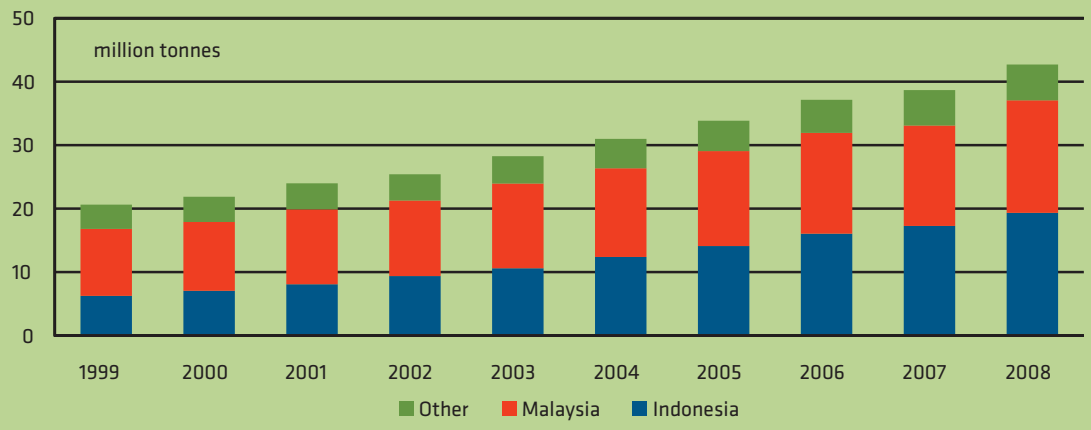
* Excludes palm kernel oil

3 USDA (United States Department of Agriculture)2007b, *Indonesia: Palm Oil Production Prospects Continue to Grow*, Foreign Agriculture Service Commodity Intelligence Report, 31 December, Washington DC.

4 USDA (United States Department of Agriculture) 2007a, *Indonesia Oilseeds and Products - Palm-based Cooking Oil Prices Increase*, Foreign Agriculture Service GAIN Report No. ID7021, 15 June, Washington, DC.

Chart A

Major Palm Oil Producers



Source: Oil World 2008.

ures were implemented, namely:

- to reduce the cost of cooking oil, the export tax on crude palm oil (CPO) would rise from 10 percent to 15 percent if prices exceeded US $1,100/tonne;
- a value added tax (VAT) exemption on domestic cooking oil sales was continued; and
- a US $53.2 million consumption subsidy for cooking oil was introduced to assist 19.1 million low-income families.

The health and nutritional properties of palm oil have seen an increase in demand in other countries. Palm oil is high in mono-unsaturated fats, fats that are considered advantageous for a lower risk of heart disease. A further advantage is that it does not require hydrogenation to achieve a solid state for manufacturing margarine. This avoids the creation of the trans-fatty acids which are considered harmful to human health.

These properties have contributed to an increased demand for palm oil in some developed economies. It has become a strong competitor with vegetable oils made from soybeans and rapeseed that require hydrogenation to achieve a solid state. World trade in palm oil has expanded and has more than doubled since the year 2000 (chart B). Palm oil currently accounts for about 60 percent of the world trade in vegetable oils.

The growth in trade has been a key factor in the industry expansion. A growing demand for edible oil and been supplemented by the use of palm oil in bio-diesel production both domestically and overseas. In both countries bio-fuel plants have been established to supply the domestic demand fossil fuel blends driven by mandatory use requirements. Small amounts of bio-diesel have been exported to some countries.

Contribution to Economic Development

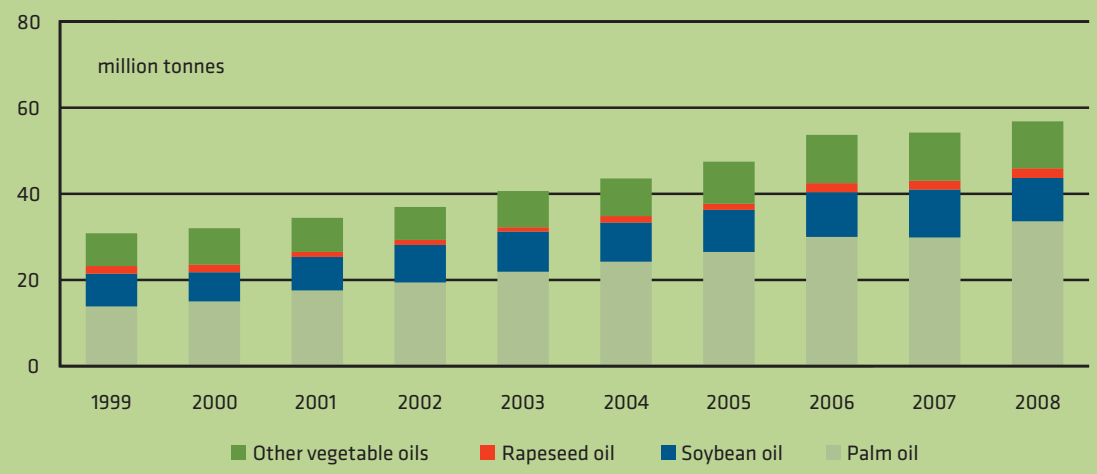
The most recent ADB report on key indicators highlights the continuing importance of rural economic development in Indonesia and Malaysia (table 2). A large proportion of the Indonesian population relies on the rural sector for employment and it remains an important sector in Malaysia as well. In selected regions palm oil is the dominant estate crop and a key source of economic activity:

- Policy measures that restrict the productive capacity of the industry would curtail income growth and could lead to significant regional adjustment issues.

Over the past decade, the industry expansion has made a significant contribution to the alleviation of poverty through farm cultivation and downstream processing. Plantation management and harvesting of

Chart B

World Trade in Vegetable Oils



Source: Oil World 2008.

oil palm fruit are labour intensive activities. The industry has become an important source of employment in selected regional areas.

The Malaysian industry employs more than 570,000 people, with 405,000 of those workers engaged in cultivation.[5] Poverty alleviation benefits for millions of people in Indonesia have also been attributed to the industry.[6] It is generally accepted that the industry has made significant contributions to improving living standards through income growth and associated improvements in education and health.

The industry is composed of small holders and large estate plantations. Both sectors have been expanding and small holders are major contributors to industry output. Government programs have been used to help people in poverty settle and develop small holder palm oil farms in conjunction with other agricultural production.

In 2006, the Indonesian Bureau of Statistics estimated that 45 percent of the total palm area was owned by private plantations. A further 43 percent was owned by small holders — the remaining 12 percent was owned by the government. The Malaysian industry also has a sizeable small holder presence. A program administered by the Federal Land Development Authority (FELDA) distributes 4 ha plots to landless farmers and provides management services for growing oil palms and other crops as they work towards land ownership:

- In 2008, Malaysian government settlement schemes for small holders accounted for 28 percent of the planted oil palm areas;[7]
- Individual privately-owned small holders accounted for 12 percent; and
- Large scale private estates accounted for the remaining 60 percent of plantings.

The palm oil industry has become a major export earner for both countries. Indonesian exports have steadily grown and in 2007 export sales of oil palm products were worth around US $7.9 billion. In 2008,

5 Basiron, Y. 2008, *Malaysia's Oil Palm — Hallmark of Sustainable Development*, Global Oils & Fats Business Magazine, Vol. 5, Issue No. 4.
6 USDA (United States Department of Agriculture) 2007, Indonesia: Palm Oil Production Prospects Continue to Grow, Foreign Agriculture Service Commodity Intelligence Report, 31 December, Washington DC.
7 MPOB (Malaysian Palm Oil Board) 2009, *Oil Palm Statistics 2008*, web page for the Economics and Industry Development Division, www.econ.mpob.gov.my/economy/EID, viewed 2 September, 2009.

Table 2 Economic Development Indicators in Malaysia and Indonesia

		1995	2000	2005	2007
Malaysia					
Population	*million*	20.7	23.5	26.1	27.2
Employment in agriculture *	%	20.0	16.7	14.6	14.8
Poverty indicator **	%	11.0	–	7.8	–
Indonesia					
Population	*million*	194.8	205.8	219.9	225.6
Employment in agriculture	%	44.0	45.3	45.0	43.7
Poverty indicator **	%	84.6	–	53.8	–

Source: ADB 2009.
* Per cent of total employment.
** Per cent of population with less than US$2 per day. Indicators for 1993 & 2005 in Indonesia & 1995 & 2005 in Malaysia.

Malaysian export earnings increased by 44 percent to around US $19.6 billion:[8]

- CPO accounted for most of the export sales — about 73 percent in 2008;
- bio-diesel exports have increased in recent times but remains a minor export product with sales of US $0.2 billion — about 1 percent of total revenue.

Output Growth Drives Industry Development

There has been a substantial expansion in palm oil production over the past decade. The growth is a response to higher returns driven by stronger demand. Indonesian CPO production has increased by almost 160 percent since the 2000 to 18.1 million tonnes, and Malaysian production has increased by more than 60 percent to 17.7 million tonnes.

New plantings have contributed to the expansion of output in both countries. One of the concerns raised by environmental groups is the conversion of new land areas to oil palm plantations. Native forests are perceived to be under threat from this industry expansion. This is often portrayed by a comparison of production levels to native forest areas.

This creates a misleading impression because production growth is not solely caused by acreage expansion. Changes in per hectare oil yields also contribute to output changes. In both countries, increased yields have been a significant factor in output growth (table 3). A simple application of the change in yield of the area planted in the previous period illustrates this point.

But, as for most agricultural products, the effect of yield changes on output growth is more complicated than this because of lags in productive performance. About three years after planting a young oil palm, it begins to produce harvestable fruit. Initially, the fruit bunches are small and weigh between two and three kilograms each. Peak harvest usually occurs from years eight to 15 and the productive life of an oil palm is around 25 to 30 years.

The longer-term productive performance of a plantation depends in part on the timing of replanting operations. Older, less productive plants are progressively replaced by new, higher-yielding varieties. At the same time, new plantations areas will gradually come online. These two factors can have an exponential effect on output growth if the industry is in an expansion phase. But it is important to recognise there is likely to be some growth in production even if the planted acreage remains unchanged.

8 MPOC (Malaysian Palm Oil Council), 2009, *Malaysian Palm Oil Industry Performance 2008*, Supplement in the Global Oils & Fats Business Magazine, Vol. 6, Issue No. 1.

Table 3 Oil Palm Industry Performance in Malaysia and Indonesia

		1995	2000	2005	2008
Malaysia					
Area planted	'000 ha	2,540	3,377	4,051	4,488
	change	511	837	675	437
Palm oil yield *	t/ha	3.07	3.21	3.69	3.95
	change	0.1	0.1	0.5	0.3
Palm oil production	'000 tonnes	7,811	10,842	14,962	17,734
	change	1,716	3,032	4,120	2,773
*– area effect on output ** *	change	1,570	2,686	2,492	1,725
*– yield effect on output *** *	change	146	345	1,628	1,048
Indonesia					
Area planted	'000 ha	2,025	4,158	5,454	7,008
	change	898	2,133	1,296	1,554
Palm oil yield *	t/ha	2.21	1.68	2.17	2.58
	change	-1.3	-0.5	0.5	0.4
Palm oil production	'000 tonnes	4,480	7,001	11,862	18,090
	change	2,067	2,521	4,861	6,228
*– area effect on output ** *	change	1,987	3,591	2,818	4,012
*– yield effect on output *** *	change	80	- 1,070	2,043	2,216

Sources: Ministry of Agriculture 2009; Malaysian Palm Oil Board 2009.
* Indicator based on area planted & excludes palm kernel oil.
** Contribution of area growth to the change in palm oil production.
*** Contribution of yield growth to the change in palm oil production.

This means the observed production growth does not necessarily reflect an equivalent increase in plantings. Yields change with the use of new varieties and other factors such as seasonal conditions — most plantations are rain-fed — and fertiliser application rates. The industry performance data over the past decade suggests yield gains have been a significant factor in the output growth of both countries.

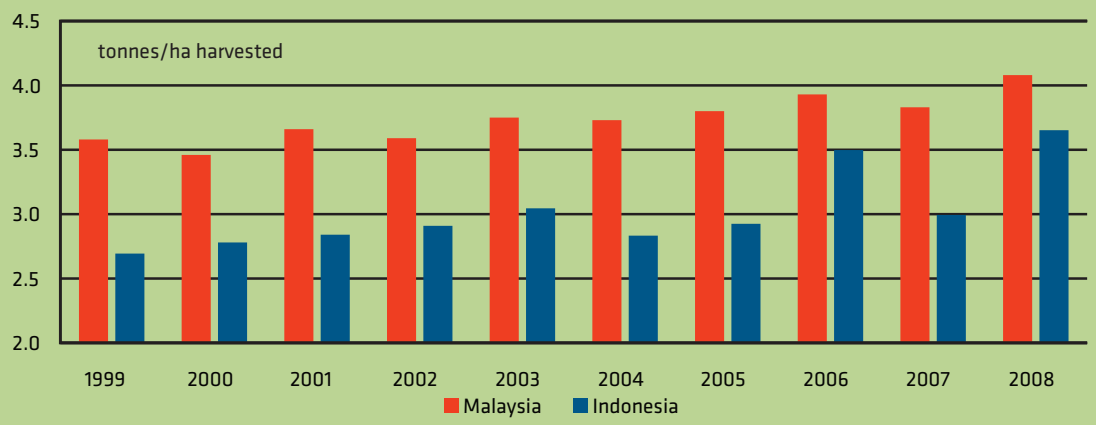
This observation is consistent with government and industry efforts to improve yields. Both countries devote resources to the research and development of new varieties. There is considerable potential for small holders in Indonesia to expand production on existing acreages through the use of fertiliser and new genetic stock.[9] A similar potential exists in Malaysia where a government-run program has been established to assist small holders with replanting new, improved varieties.

Yield estimates based on harvested areas show a distinct improvement in both countries (chart C). Further gains are expected in coming years, which will give a further boost to production levels. For example, some plantation laboratories have successfully cloned higher-yielding varieties to produce clones for replanting purposes.[10] Early studies show yield increases of up to 30 percent over standard hybrid varieties. While these new varieties may not be widely available, they illustrate

9 USDA (United States Department of Agriculture), 2009, *Indonesia: Palm Oil Production Growth to Continue*, Foreign Agriculture Service Commodity Intelligence Report, 19 March 2009, Washington DC.
10 USDA (United States Department of Agriculture) 2007, *Indonesia: Palm Oil Production Prospects Continue to Grow*, Foreign Agriculture Service Commodity Intelligence Report, 31 December, Washington DC.

Chart C

Palm Oil Yield Growth in Malaysia and Indonesia



Sources: MPOB 2009; MOA 2009.

the potential for substantial output growth irrespective of an expansion in acreages.

Policy measures to restrict the growth of the palm oil industry will have economic and environmental implications in other areas, as well. Measures such as import restrictions on palm oil products, a ban on forest clearing, an environmental tax on palm oil production or a prohibition on the use of palm oil in biodiesel production may curtail industry growth. But the end result will be increased demand for substitute edible oils produced in other countries. This demand shift will have its own environmental issues.

The reality is that world demand for edible oils will continue to grow. Increased demand for palm oil will be partially accommodated by yield improvements in Indonesia and Malaysia. The use of new varieties and the transition of recent plantings into their peak production period will help. But upward pressure on prices is likely to encourage more new plantings, and it is important this is done on a sustainable basis.

The pressure for further economic development and poverty alleviation in Indonesia and Malaysia will be another continuing impetus for growth. Both countries export the vast majority of their output — Indonesia currently exports 70 percent of their palm oil, and Malaysia exports approximately 87 percent. Trade restrictions will have significant implications for export earnings and industry returns. These restrictions will limit Indonesia and Malaysia's opportunities for economic growth, and will penalise low-income households that rely on the industry for jobs and wealth creation.

The Adverse Development Consequences of "No Forest Conversion" Policies

Some urge that the conversion of forest land to other purposes must cease. Applying such a policy to palm oil would directly reverse successful strategies to reduce poverty. Research commissioned by the Stern Report demonstrated that palm oil accounted for only 20 to 30 percent of forest land cleared in Malaysia and Indonesia, and that palm oil produced the greatest economic return for hectare of land compared to any other use.[11] Stopping that would retard the leading method of alleviating poverty in developing nations.

A 'no conversion' policy is also in contravention of the UNFCCC framework, which recognises developing nations' right to foster economic development through the expansion of forestry.

11 Greig-Gran M., The Cost of Avoiding Deforestation: Update of the Report Prepared for the Stern Review of the Economics of Climate Change, 2008, International Institute for Environment and Development.

3. A Sustainable Industry

One concern of environmental groups is the growth of the palm oil industry, and the subsequent deforestation and environmental impact of oil palm cultivation and processing. Questions have been raised about the environmental sustainability of the industry. It is important to examine the legitimacy of these concerns to see if the palm oil industry deserves special scrutiny. The same issues could be raised about many other industries in other economies.

Developed economies such as those in the EU are demanding that palm oil is produced in a sustainable way. A balanced approach is necessary to accommodate the need for land use changes to support economic development objectives and consideration of the environmental issues that can arise. The issue of sustainability can be examined from a number of perspectives:

- environmental aspects of cultivation and processing practises;
- the relative performance of the industry in resource use;
- changes in land use; and
- mechanisms for verifying the ecological sustainability of industry output.

Cultivation and Processing Practises

Oil palm is a perennial tree crop that provides a good foliage cover over an extended period of time. In many ways, plantations will mimic the ecological performance of native forests. Since oil palms have a life cycle of 25-30 years, the land is cleared once only during this period. Mature trees are progressively replaced with little impact on the soil. In comparison to the annual cultivation requirements of broad-acre farming, there are minimal impacts on soil erosion and silting of waterways.

Despite these important advantages, concerns have been raised about the cultivation practises of oil palm plantations. A review of actions taken by government and industry indicate these concerns are overly negative. Over time considerable efforts have been made to ensure plantation management practises are sustainable from an environmental perspective. This is especially the case in Malaysia.

For some time there has been a 'no burn' policy in Malaysia in respect to land-clearing activities.[12] Soil erosion is controlled by building terraces and banks to reduce water run-off. Leguminous crops are planted around the trees during the initial growth phase to control erosion. A natural plant cover is grown throughout the mature tree production phase for similar reasons.[13]

Environmental Impact Assessments are compulsory for land to be developed for growing oil palms. These assessments are required for land use changes of 50 ha or more that cover the establishment of new large scale plantations. It involves an assessment of the site suitability, the potential environmental impacts and the control measures that may be required to manage adverse environmental effects.

Over time considerable efforts have been made to ensure plantation management practises are sustainable from an environmental perspective.

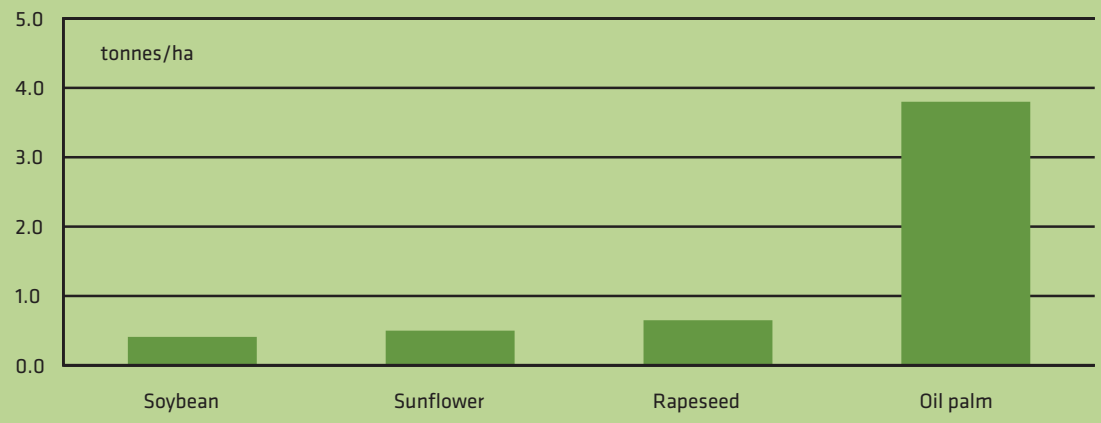
Indonesia has adopted similar plantation management practises and is strengthening regulatory controls. The government and Indonesian Palm Oil Board have collectively initiated several measures to address concerns about land clearance burning and other environmental issues. A 'zero burn' policy has been adopted and training programs on waste management and the recycling of nutrients have been implemented according to the principles set out by the Roundtable on Sustainable Palm Oil (RSPO).

The potential environmental impact of palm oil processing is often mentioned as another source of concern. This relates to the treatment and use of waste products.

12 Basiron, Y. 2008, *Malaysia's Oil Palm – Hallmark of Sustainable Development*, Global Oils & Fats Business Magazine, Vol. 5, Issue No. 4.
13 Land and water management practises of the plantations compare favourably with those of well managed farms in developed economies. Integrated pest management practises based on FAO Codes of Conduct have been long adopted by the industry and like the developed economies Malaysia has regulatory controls and monitoring systems in place to manage waste management.

Chart D

Comparing Land Use Yields of Oilseed Crops



Source: Oil World 2008.

In the milling operation about 70-75 percent of a harvested fruit bunch is waste in the form of empty fruit bunches, palm fibre and palm kernel shell. The management of these waste products is regulated and not simply dumped into the environment surrounding the mill.

In Malaysia, the empty fruit bunches — palm fibre and kernel shells — are generally treated as by-products and used in different ways. They are often used as fuel to provide power for the mill. In some cases the empty bunches are mulched and returned to the plantation as a soil cover to enhance moisture retention and provide organic matter for the soil.

The processing of oil palms also produces liquid effluent. It is treated before being released into the environment. This typically involves a fermentation process in large ponds in compliance with regulatory requirements. Malaysia has strict standards based on the Biological Oxygen Demand (BOD) composition of effluent. In some cases the treated effluent is used as a compost fertiliser and irrigation water on the plantations.

The management of mill waste has become an important environmental consideration as the industry has grown in both countries. For example, there are currently 405 mills in Malaysia producing around 54 million tonnes of effluent per year.

New technologies are available that will enable the effluent to be used to produce energy for the mills and bio-fertilisers for the plantations. Empty fruit bunches and mill effluent have a high nutrient content which can be recycled to reduce the dependence on chemical fertilisers in plantations management.

The effluent also generates a biogas with high methane content. This is an important issue because of its contribution to GHG emissions. New technology will allow the methane to be used to generate energy for the mills or to supply the national electricity grid. The Malaysian government has a program to encourage the application of this technology and provide a source of renewable energy.

Concerns about environmental damage once the plantations and mills are established seem exaggerated. Recent developments in Malaysia indicate a responsible approach to managing the environmental impacts. Regulatory controls, changes in management practises and new processing technologies are continually improving the sustainability of the industry. There is also a growing movement in Indonesia toward producing palm oil in a sustainable manner.[14]

14 USDA (United States Department of Agriculture), 2009, *Indonesia: Palm Oil Production Growth to Continue*, Foreign Agriculture Service Commodity Intelligence Report, 19 March 2009, Washington DC.

Industry Performance in Resource Use

Industrial sustainability can also be examined from a resource use perspective. In terms of land use, palm oil substantially out-performs crop-based oilseeds. A comparison of oil yields on a per ha basis illustrates this point. It takes considerably less land to produce a tonne of palm oil than it does to produce a tonne of soybean oil (chart D):

- In 2008 the average oil yield from 1 ha of oil palm was 3.8 tonnes; and
- Oil yields for soybean and rapeseed crops were 0.4 and 0.7 tonnes respectively.

On the basis of land utilisation the palm oil industry is highly-sustainable in comparison to the crop-based oilseeds. The use of other cultivation inputs such as fertiliser, pesticides and fuel is a further consideration. It is difficult to make robust comparisons between variable inputs by different crops in different regions. But some general points can be made from the available information.

Palm oil has a decided advantage in fuel use. Oil palms have a 25-30 year life cycle and field crops have an annual production cycle. Over a comparable life cycle production period, the use of fuel in field preparation and crop support activities will be much higher for products such as soybeans and rapeseed.

Comparisons in fertiliser and pesticide use are more difficult to judge. There is evidence to suggest palm oil needs less of these inputs.[15] FAO research indicates a nitrogen requirement of 47kg to produce a tonne of palm oil. This compares with 315kg for soybean oil and 99kg for rapeseed oil. Pesticide and herbicide usage for palm oil is 2kg per tonne produced compared with 29kg for soybean and 11kg for rapeseed.

Limited use of fertiliser and pesticides is consistent with industry observations in both countries especially among small holders. It is also consistent with the views of seed companies in Indonesia on new varieties potentially achieving palm oil yields of over 5 tonnes/ha without the use of fertilisers.[16]

In general the cultivation and processing of palm oil needs less of these inputs than crop- based oil seeds. In annual energy equivalent terms it is estimated that a tonne of palm oil needs 19.2 gigajoules per ha per year. The products derived from the palm oil generates an energy equivalent of 182.1 gigajoules per ha per year[17] (MPOC 2009b). This input-output energy ratio of 9.5 compares favourably with soybeans (2.5) and rapeseed (3.0).

Deforestation and Land Use Changes

Another aspect of sustainability is changes in land use. The palm oil industry is accused of causing widespread deforestation in Malaysia and Indonesia. The image painted by environmental groups is that all the output growth has come from turning virgin forests into plantations, and that palm oil is the only cause of deforestation.

This image is misleading. Increased oil palm plantings over the past decade have resulted in land use changes. But it is important to recognise that opening up new land is not the only way to increased acreages. Output substitution effects can alter the use of existing agricultural land. Acreage growth can also come from using previously cleared but undeveloped land and the rehabilitation of abandoned arable land.

Land use in Malaysia is regulated by a zoning system. Since 1990, the government has maintained a fixed allocation of 23 percent of the land area to agriculture.[18] There is a pledge at the Rio Earth Summit to maintain a minimum land allocation of 50 percent

It takes considerably less land to produce a tonne of palm oil than it does to produce a tonne of soybean oil (chart D).

15 Basiron, Y. 2008, *Malaysia's Oil Palm — Hallmark of Sustainable Development*, Global Oils & Fats Business Magazine, Vol. 5, Issue No. 4.
16 USDA (United States Department of Agriculture), 2009, *Indonesia: Palm Oil Production Growth to Continue*, Foreign Agriculture Service Commodity Intelligence Report, 19 March 2009, Washington DC.
17 MPOC (Malaysian Palm Oil Council), 2009b, *Palm Oil and the Environment: Positive Energy Balance*, MPOC web site, www.mpoc.org.my/Palm_Oil_and_The_Environment, viewed 2 September, 2009.
18 Basiron, Y. 2008, *Malaysia's Oil Palm – Hallmark of Sustainable Development*, Global Oils & Fats Business Magazine, Vol. 5, Issue No. 4.

Table 4 Land Used for Selected Crops in Malaysia and Indonesia

		1995	2000	2005	2008 p
Malaysia					
Oil palm	'000 ha	2,540	3,377	4,051	4,488
	change	*511*	*837*	*675*	*437*
Rubber & cocoa *	'000 ha	1,665	1,506	1,293	1,246
	change	*- 342*	*- 159*	*- 214*	*- 47*
Indonesia					
Oil palm	'000 ha	2,025	4,158	5,454	7,008
	change	*898*	*2,133*	*1,296*	*1,554*
Rubber & coconut	'000 ha	7,220	7,068	7,083	7,268
	change	*684*	*- 151*	*15*	*185*
Other estate crops **	'000 ha	3,681	3,874	4,363	4,766
	change	*429*	*194*	*489*	*403*
Rice	'000 ha	11,439	11,793	11,839	12,327
	change	*936*	*355*	*46*	*488*
Maize & soybeans	'000 ha	5,129	4,325	4,248	4,593
	change	*637*	*- 804*	*- 77*	*345*
Other crops ***	'000 ha	2,653	2,293	2,431	2,292
	change	*153*	*- 360*	*137*	*- 139*

Sources: MPOB 2009; MRB 2009; MCB 2009; FAO 2009; MOA 2009.
* Data on other estate crops were unavailable.
** Includes cocoa, coffee, cashews, cloves, sugar, pepper, tobacco & tea.
***Includes mungbeans, peanuts, sweet potatoes and cassava.
p - provisional.

under permanent forest and a policy that no such virgin forest will be opened up for agriculture since the forestry law requires any conversion of forest to be replaced with an equivalent area into forest. Oil palm can only be planted on land zoned for agriculture, outside the permanent forest area.

Since 2000, Malaysian oil palm plantings have increased by about 1.1 million ha, a rise of 32 percent (table 4). The average annual growth of around 130,000 ha is not especially dramatic for an industry experiencing strong global demand and favourable returns. Some of this growth has come from land previously used for other plantations crops.

Many new palm oil plantations are not grown in place of primary or untouched forest. Instead, palm oil is often planted on degraded or secondary forests, where the potential carbon capture of the plantation and rehabilitation of the land is increased.

Plantation areas for rubber and cocoa have fallen by 260,000 ha since the year 2000. This substitution effect has been going on for some time. As forest reserves are protected, the remaining growth in plantings has come from previously logged or cleared land. The supply of undeveloped land suitable for oil palm is limited. Thus, industry and government have switched their focus to yield improvements for output growth.

Indonesia does not have the same rigid zoning system for land use. But the government has designated

Table 5 Land use in Malaysia and Indonesia

		1995	2000	2005	2007
Malaysia					
Agricultural land	'000 ha	7,885	7,890	7,870	7,870
	change	*661*	*5*	*- 20*	*0*
Forestry land	'000 ha	21,984	21,591	20,890	20,610
	change	*- 393*	*- 393*	*- 701*	*- 280*
Other land uses **	'000 ha	2,987	3,374	4,095	4,375
	change	*- 269*	*388*	*721*	*280*
Indonesia					
Agricultural land	'000 ha	42,187	44,777	48,446	48,500
	change	*- 2 896*	*2,590*	*3,669*	*54*
Forestry land	'000 ha	107,210	97,852	88,495	84,752
	change	*- 9 358*	*- 9 358*	*- 9 357*	*- 3 743*
Other land uses *	'000 ha	31,761	38,528	44,216	47,905
	change	*12,254*	*6,768*	*5,688*	*3,689*

Source: FAO 2009.
* Residual of total land area of 181,157 thousand ha - used for housing, infrastructure etc.
**Residual of total land area of 32,855 thousand ha.

around 60 percent of the total land area as permanent forest. Some is classified as conservation forest and the remainder is classed as production forest. As this area cannot be converted to arable land for farming it is not available for oil palm cultivation.

Since 2000, Indonesian oil palm plantings have increased by about 2.9 million ha, an increase of almost 70 percent. The average annual growth of 345,000 ha is larger than the growth in Malaysia. This is not surprising given the favourable global market conditions for palm oil and the stronger focus on poverty alleviation.

Changes in agricultural land use have not been a factor in the growth of plantings in Indonesia. There is little evidence of substitution of oil palm for other crops. As the permanent forest areas are protected the growth has come from the conversion of other land reserves into arable land.

In Malaysia, the growth of the oil palm industry is not causing deforestation. The amount of agricultural land is largely unchanged since the year 2000 (table 5). There has been a small reduction in forestry land, as the minimum 50 percent threshold has not been reached. But the reduction is due to an increase in land used for non-agricultural purposes.

In Indonesia, the amount of agricultural land has increased since 2000. There has also been a significant decline in forestry land — about 13.1 million ha. This decline is due partly to the opening of new land for agricultural purposes. Some of this land has been used for oil palm. Some has been used for other products:

- Indonesian rice areas increased by 534,000 ha since 2000 (table 4);
- plantation crop areas increased by about 1.1 million ha over the same period; and
- total agriculture land increased by 3.7 million ha in that same period.

The opening up of new land and consequent reduction in forest areas is not solely due to oil palm plant-

ings. It has been a factor in Indonesia, but the need for land use changes to stimulate economic development comes from several sources.

Labelling palm oil as the cause of rampant deforestation in Indonesia is excessive. It raises the question of whether they should stop developing new land for rice growing. In fact, the data indicates that a rise in land use for non-agricultural purposes has been a much bigger contributor to the decline in forestry land. Since 2000, other land use, such as buildings and roads, has increased by 9.4 million ha.

A reduction is forestry land is an inevitable outcome of economic growth in a developing economy with poverty alleviation issues. Protecting forests to the exclusion of all other land uses is not a sustainable or rational policy position from an economic and a social welfare perspective. A balanced approach is necessary to accommodate environmental concerns.

It is important to recognise that both countries currently have extensive forest areas. Most of these areas are protected from agricultural production. Currently Malaysia has more than 55 percent of its total land area designated as forest. Furthermore, Indonesia has 47 percent of its land designated as forest. Oil palm plantations are tree crops that mimic the behaviour of a native forest. If oil palms are included, Malaysia has about 69 percent of its land area under tree cover, while Indonesia has 51 percent.

Verifying Ecological Sustainability

In response to concerns about the environmental sustainability of palm oil production, growers in Malaysia have begun to promote a system to verify the sustainability of the production of palm oil. The system lays down an agreed set of principles and guidelines to define sustainable palm oil production. Criteria to demonstrate adherence to the principles incorporate legal, economic viability, environment impact and social benefits of plantation management.

The leading system of certification is that developed by the Roundtable on Sustainable Palm Oil (RSPO). The RSPO, established in 2004, has stakeholders from different sectors of the industry to ensure there is a reflection of different perspectives. The RSPO has undertaken a range of projects including the development of training materials on sustainable production practises for oil palm growers.

Palm oil is the only edible oil crop and perhaps the only crop that can be subjected to auditing under a sustainability certification system in world trade.

Palm oil is being supplied which can be labelled as 'Certified Sustainable Palm Oil'. This gives buyers assurance the product came from oil palms cultivated on legal agricultural land using approved management practices.

The auditing process to obtain the certification is a lengthy process and it will take some time for widespread participation in both countries. Some companies have already gained RSPO certification and several are in the process of achieving certification.

The cost of the auditing process has been an impediment for participating in the scheme, especially for small holders. The Malaysian Palm Oil Council (MPOC) is also looking to develop a less-costly scheme to encourage small holder participation.[19]

The success of certification schemes will depend in part on the ability of commercial players to gain a price premium to off-set the costs of certification and compliance. It will also depend on market acceptance of the independence of the assessment process.

A traceability system for palm oil has been implemented which allows palm oil products to be monitored from the mill through to the end users.[20] This will facilitate the trade in sustainably-produced palm oil between companies at different points on the supply chain. Industry participants also plan to launch a system that will allow segregation between certified and non-certified oil.

19 Basiron, Y. 2008, *Malaysia's Oil Palm – Hallmark of Sustainable Development*, Global Oils & Fats Business Magazine, Vol. 5, Issue No. 4.
20 OFI (Oils & Fats International) 2009, *UTZ Certified system launch*, OFI News Article No. 14792, www.oilsandfatsinternational.com/shownews, viewed 2 September, 2009.

4. Industry Growth and Biodiversity Impacts

Another element of balancing the need for economic development and environmental concerns is the impact of land use changes on biodiversity. Reduced native forest areas in Malaysia and Indonesia have led to concerns about the effect of habitat loss for endangered species. Palm oil industry growth has been accused of being the cause of biodiversity losses by some environmental groups because it is seen to be the cause of deforestation.

There is no denying the fact that economic development puts pressure on biodiversity in specific locations. Land use changes that involve opening up forest land for agricultural and non-agricultural uses will affect the habitats for native flora and fauna. Governments generally respond to these concerns by establishing permanent conservation areas and national parks. Over time this response has been evident in both Malaysia and Indonesia.

Economic Development and the Pressures on Biodiversity

Blaming the palm oil industry for biodiversity losses seems an extreme over-reaction to the wider impact of economic development on the environment. Constant pressures for changes in land use in developing economies for non-agriculture purposes puts pressure on agriculture land use. In effect agriculture is on the 'front line' of land development. In this case, palm oil is one of the agricultural industries that have emerged as a neighbour to undeveloped native forest:

- the increase in non-agricultural land use in both countries was noted earlier;
- it is especially evident in Indonesia where other land uses increased by 9.4 million ha since the year 2000 – palm oil land use increased by 2.9 million ha; and
- it is simplistic and unfair to tag a single industry as the cause of biodiversity losses from reductions in natural habitats for flora and fauna.

The conversion of forestry land to agriculture and non-agriculture does not automatically mean there will be biodiversity losses. It will depend on a number of factors, including the location of land conversions, the amount of land conversion and the amount of remaining forest land in that location. On the specific issue of wildlife habitats it will also depend on the size of the population and their favoured living areas:

- it does not automatically follow that all native forest areas are critical for the survival of a particular species; and
- population surveys and ecological research are needed to establish the facts.

The previous chapter noted new oil palm plantings in Malaysia are only allowed on land zoned for agriculture. This can include previously logged or abandoned land but not forest land. As the industry growth is not causing deforestation it seems reasonable to argue it is not causing a loss of wildlife habitat and biodiversity.

The conversion of forestry land to agriculture and non-agriculture does not automatically mean there will be biodiversity losses.

But the industry is part of regional communities where the wider collective actions of all land users — agriculture and non-agriculture — have an effect on biodiversity over time. Industry and government are aware that in some areas the existing and newly developed plantations are located on agricultural land that borders conservation areas. This may have implications for wildlife movement and there may be other spill-over considerations for regional biodiversity.

In Malaysia the industry has responded to concerns about potential losses of biodiversity by establishing the Malaysian Palm Oil Wildlife Conservation Fund (MPOWCF) in 2006. This demonstrates a social community responsibility to concerns about the environmental impacts of economic development. It compliments government efforts to manage issues on biodiversity through publically funded research, environmental regulations and establishing conservation reserves.

The primary aim of the MPOWCF is to fund projects

and studies on wildlife, biodiversity and environmental conservation that will contribute to the sustainability of local flora and fauna. The fund had an initial investment of US $6.25 million with half from the industry and half from the government. It is administered by MPOC, who will match any independent contributions to the fund.

One of the primary objectives of MPOWCF activities is to promote public awareness among plantation managers and their work force of the benefits of environmental and wildlife conservation.[21] It also supports activities focused on wildlife and biodiversity conservation and studies on the effectiveness of conservation methods.

Applications for project funding are open to universities, public and private research institutes, government agencies and NGOs. Some examples of studies currently being funded by the MPOWCF include:

- jungle patrols to protect wildlife in forest reserves near plantations in Sabah;
- an orang-utan population survey in Sabah in association with other organisations;
- collaboration to operate an orang-utan island infant-care unit; and
- development of educational materials on wildlife conservation in association with the Tabin Wildlife Sanctuary and Sabah Forestry Department.

The Threat to the Orang-utan Habitat

The most sensitive biodiversity issue that has been raised is the plight of the orang-utan. There are concerns that the growth in oil palm plantations is threatening their natural habitats. The orang-utan is only found in Borneo and Sumatra. They are major producing palm oil areas and there has been some growth in plantings in recent years (table 6):

- area growth in the Kalimantan and other Borneo regions has been around 340,000 ha from the year 2000 — area growth in Sumatra has been around 160,000 ha; and
- area growth in Sabah has been around 33,000 ha.

The number of orang-utans living in the wild has declined.[22] A 2004 survey found that 60% of the orang-utan population in Borneo lived in unprotected forest areas either inside or on the edge of oil palm plantations.[23] The remainder lived in protected forest areas. Increased oil palm plantings in the Borneo and Sumatra Provinces does not necessarily mean they have caused a decline in orang-utan numbers. They may have been a contributing factor but:

- it will obviously depend on the proximity of new plantings to native forests that are natural orang-utan habitats; and
- there has been an increase in non-agricultural land use in these regions.

Concerns remain that in some areas the oil palm plantations are contributing to a decline in orang-utan numbers. This is understandable given the findings of the 2004 survey. The opening up of new land in Indonesia for both agricultural and non-agricultural purposes may also be encroaching on existing habitats.

The industry has recognised the need for responsible action on this issue. The RSPO has adopted as one of their primary criteria that, in order to meet the environmental responsibility and conservation of natural resources and biodiversity principal, an Environmental Impact Assessment must be undertaken for plantations to ensure that "aspects of plantation and mill management that have environmental impacts are identified, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and moni-

[The MPOWCF] supports activities focused on wildlife and biodiversity conservation and studies on the effectiveness of conservation methods.

21 MPOC (Malaysian Palm Oil Council) 2008, *Priority for Pongo*, Supplement in the Global Oils & Fats Business Magazine, Vol. 5, Issue No. 3.
22 MPOC (Malaysian Palm Oil Council) 2008, *Priority for Pongo*, Supplement in the Global Oils & Fats Business Magazine, Vol. 5, Issue No. 3.
23 Schill, S. R. 2008, *Palm Oil Fights Back*, Biodiesel Magazine, July 2008 edition, www.biodieselmagazine.com/article-print.jsp, viewed 3 September, 2009.

Table 6

Provincial Plantings of Oil Palm in Malaysia and Indonesia

		1995	2000	2005	2006	2007	2008
Malaysia							
Peninsula Malaysia	'000 ha	1,903	2,046	2,299	2,334	2,362	2,410
	change	–	*7*	*12*	*2*	*1*	*2*
Sabah	'000 ha	518	1,001	1,209	1,239	1,278	1,334
	change	–	*93*	*21*	*2*	*3*	*4*
Sarawak	'000 ha	119	330	543	591	665	744
	change	–	*178*	*64*	*9*	*12*	*12*
Indonesia							
Riau	'000 ha	461	806	1,278	1,548	1,621	1,623
	change	–	*75*	*59*	*21*	*5*	*0*
North Sumatra	'000 ha	562	786	895	980	999	1,027
	change	–	*40*	*14*	*9*	*2*	*3*
Other Sumatra *	'000 ha	279	787	831	946	974	1,024
	change	–	*182*	*6*	*14*	*3*	*5*
Central Kalimantan	'000 ha	21	197	434	572	616	709
	change	–	*848*	*121*	*32*	*8*	*15*
Other Borneo **	'000 ha	259	612	718	973	1,049	1,111
	change	–	*136*	*17*	*36*	*8*	*6*
Other Indonesia	'000 ha	443	970	1,298	1,576	1,508	1,514
	change	–	*119*	*34*	*21*	*- 4*	*0*

Source: MOA 2009; MPOB 2009.
* Includes West Sumatra & South Sumatra.
**Includes West Kalimantan, East Kalimantan & South Kalimantan.

tored, to demonstrate continuous improvement."[24] In addition, the conservation of any rare, threatened or endangered animal must be taken into account in plantation plans, including the avoiding damage to or the deterioration of high conservation value habitat.[25]

Further, Criteria 7.3 states that "new plantings since November 2005, have not replaced primary forest or any area required to maintain or enhance one or more High Conservation Values."[26] Criteria 7.1 also states that any new plantation must also produce a social and economic impact statement,[27] as also required by the Environmental Quality Act 1974.

Another example of this can be seen in the establishment of the Borneo Conservation Trust (BCT). This is a non-profit organisation that aims to contribute to conserving the habitats of Borneo's native wildlife species.[28]

24 Roundtable on Sustainable Palm Oil, RSPO Principles and Criteria for Sustainable Palm Oil Production Guidance Document, March 2006, criteria 5.1.
25 Ibid, criteria 5.2.
26 Ibid, criteria 7.3.
27 Ibid, criteria 7.1.
28 *BCT (Borneo Conservation Trust) 2009, The Green Corridor Plan, web page for Saraya Co. Ltd., www.saraya.com/english/bct, viewed 3 September, 2009.*

The BCT is actively collaborating in initiatives to support biodiversity conservation in Borneo.

One of the first projects of the BCT has been to support the establishment of a 'green corridor' along the Segama and Kinabatangan rivers for the safe migration of wildlife. The BCT has been collaborating with WWF Malaysia on this project (Schill 2008). The objective is to provide a continuous stretch of rainforest that will allow native animals to avoid confronting humans on oil palm plantations.

A cooperative approach between government and industry is the key to successfully managing these biodiversity impact issues.

Another BCT project of some interest involves support to undertake a survey of orang-utan numbers.[29] This project has been a joint effort with the Sabah Wildlife Department and other organisations. The aim is to generate new population estimates to compliment the 2004 survey work and develop a management plan to ensure the survival of the species.

These industry led initiatives show a commitment to invest in wildlife conservation and environment preservation as part of a wider community responsibility. It complements government efforts to address the impact of land use changes on biodiversity through the establishment of conservation reserves. Some impact from economic development is inevitable in a developing economy facing a need to alleviate poverty. A cooperative approach between government and industry is the key to successfully managing these biodiversity impact issues.

29 Schill, S. R. 2008, *Palm Oil Fights Back*, Biodiesel Magazine, July 2008 edition, www.biodieselmagazine.com/article-print.jsp, viewed 3 September, 2009.

5. Implications for GHG emissions

The other issue that has been raised about the sustainability of the palm oil industry is the impact on GHG emissions when palm oil is used for renewable energy. Palm oil is used as a feedstock in the production of bio-diesel with expectations of significant reductions in GHG emissions in comparison to fossil fuels. But questions have been raised about the carbon footprint of the industry.

There has been a debate in the EU about the environmental sustainability of bio-fuels. It reflects an understandable desire for bio-fuels to deliver an actual reduction in GHG emissions once the production process is considered. There are measurement difficulties associated with the concept of life cycle calculations and scientific studies have yielded different results that make it hard to come to definitive conclusions.

GHG Emissions for Bio-Fuels Feedstock

Palm oil substantially out performs the crop based oilseeds in per ha oil yields. This could suggest palm oil would be the best option for bio-diesel production on the basis of GHG sustainability. But there are conflicting views on how to measure the carbon reduction performance of palm oil as a feedstock for bio-fuels.

The EU has set a default value for GHG savings from palm oil at 19 percent if the methane by-product is not captured and 56 percent when the methane is captured. Presumably scientific analysis shows palm oil can achieve a 60 percent net reduction in GHG savings if land use effects are excluded:[30]

- the study suggests that methane emissions from palm oil effluent holding ponds is the key factor in the size of the GHG savings; and
- for crop based oilseeds the key factor is fertiliser use.

Other work has suggested that palm oil has a lower carbon footprint than other vegetable oil crops when used as a bio-fuel.[31] Using a life cycle analysis approach the GHG emissions of palm oil have been estimated at 835 kg carbon equivalent. Soybean emissions were estimated at 1,387 kg and rapeseed emissions at 1,562 kg. The estimates do not account for the carbon storage performance of the oil palm trees:

- separate work cited by Basiron (2008)[32] shows that 1 tonne of palm oil results in the absorption of 413 kg of carbon from the atmosphere or 331 kg if land uses changes are considered.

One of the contentious issues in GHG analysis of palm oil is land use changes. There are concerns about the apparent loss of the carbon storage capacity of native forests when they are cleared. Palm oil plantation growth is accused of causing this outcome.

The loss of the tree cover in native forests does not necessarily mean there will be a rise in GHG emissions. The carbon storage performance of different forest areas will vary and it will depend on the subsequent use of the land. It is not clear that natural forests are the most efficient 'carbon sink' in comparison to other types of tree foliage. Planting trees is often suggested as a way to offset GHG emissions in many developed economies.

It is important to recognise that oil palms are trees with their own carbon sequestration capacity. They have an extensive leaf canopy, are grown for 25-30 years and replaced at the end of their economic life by another tree. Plantations will maximise the per ha tree coverage unlike the random tree growth of native forests:

- oil palm plantations mimic the contribution of native forests to GHG reductions;
- the question becomes a comparison of the net difference between the carbon storage performance of native forests and oil palms.

Other work has suggested that palm oil has a lower carbon footprint than other vegetable oil crops when used as a bio-fuel.

30 Schill, S. R. 2008, *Palm Oil Fights Back,* Biodiesel Magazine, July 2008 edition, www.biodieselmagazine.com/article-print.jsp, viewed 3 September, 2009.
31 Basiron, Y. 2008, *Malaysia's Oil Palm – Hallmark of Sustainable Development*, Global Oils & Fats Business Magazine, Vol. 5, Issue No. 4.
32 Ibid.

The net GHG impact of the replacement of native forests with tree crops like palm oil remains an open question. Further research is required. The key point is that long term tree crops like palm oil and rubber are not necessarily going to result in a loss of carbon storage capacity.

Questions are also raised on how to account for the carbon released in disposal of forest material during new land development. This issue is related to the burning of trash in preparations for planting agricultural crops. Malaysia has maintained a no burn policy for some time and Indonesian has moved to implement the same policy. Further research is needed to clarify the carbon release implications for native forest materials that are not burned during land clearing operations.

Carbon Emissions for Peat Land Development

Sustainability criteria for judging the carbon footprint of bio-fuel feedstock must be based on robust scientific analysis. There are still many unknowns, conflicting scientific results and continuing uncertainties in measurement criteria for global GHG emissions. It is hard to make an informed assessment of the GHG emission savings from using palm oil to make bio-diesel.

Initial studies have found that temperate and tropical peat land has different properties in terms of their rate of carbon release.

More recently the issue of carbon releases from draining peat lands has emerged as a further consideration in the GHG emissions from clearing native forests. The use of peat land for oil palm plantations in Indonesia has become a major source of concern for environmental groups. When peat land is cleared and drained the oxidised layer of decomposed material can emit a significant amount of below ground carbon.

The scientific work on the extent of the GHG emissions from this practise is still in its infancy. The rate of emissions depends on the method of land clearing, what the land is used for and the associated depth of the drainage required.[33] Less drainage is required if the land is used for rice in comparison to oil palm plantations.

Initial studies have found that temperate and tropical peat land has different properties in terms of their rate of carbon release. This shows the need for further research before informed judgements can be made about the implications for future land developments. The Malaysian government has established a Tropical Peat Unit with funding of US $10.9 million to carry out further research.

The environmental implications of peat land development have also become an important issue for the Indonesian government. A one-year freeze on peat land conversion was imposed in response to environmental concerns. The issue is being investigated further and at this stage it is not possible to draw any definitive conclusions for future policy development on land use.

It is estimated there are 7.2 million ha of peat land in Sumatra and 5.7 million ha in Kalimantan.[34] There is a wide variation in the level of below ground carbon stock on a per ha basis and it would be misleading to assign a common GHG emission rate across all peat lands. This underscores the complexity of the issue. There is a need for further detailed scientific investigations to evaluate the use of peat land for oil palm from a carbon foot print sustainability perspective.

Climate Change Negotiations and Carbon Accounting

Contentions over carbon emissions from palm oil plantations, deforestation and other land use changes are central to upcoming climate change negotiations.

The 'Bali Action Plan,' stemming from the climate change negotiations in Bali in 2007, called for "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest

33 Agus, F. 2008, *Environmental Risks of Farming on Peat Land*, Paper presented at the International Workshop on Post Tsunami Soil Management, Bogor 1-2 July 2008.
34 Ibid.

degradation in developing countries."[35] Attempts to create such a system are known as REDD (Reduced Emissions from Deforestation and Forest Degradation in Developing Countries).

The current intent of framework of REDD that both the EU and environmental NGOs are pushing is for developed nations to provide aid to developing nations on the condition that deforestation is ceased and as a result forestry, agriculture and palm oil plantations are not expanded.

In this context, the debate over how to account for the carbon emissions of deforestation, the expansion of palm oil and the conversion of forestry land becomes central to the fate of developing nations' economic development.

Unfortunately, the current accounting practices for deforestation, plantations and land conversion does not accurately reflect the true impact on global carbon emissions.

Current UNFCCC accounting rules for land use, land use change and forestry (LULUCF) do not recognise either the end use of the vegetation removed from the land, or the converted use of the land itself. Therefore the carbon retained in processed timber — approximately 80 percent of logged timber — is not recognised, nor is the sequestering capacity of the new plantation (Box 1).[36]

Common scientific research into carbon emissions is highly uncertain. Estimates vary widely, simple methodological errors are made and wide assumptions are commonly used.

It is clear that the current UNFCCC rules do not properly account for deforestation, new plantations or land conversion. The carbon sequestering capacity of new plantations is significantly higher than what the UN and NGO's currently recognise.

Box 1: Carbon Emissions from Palm Oil on Peat Forest

A secondary forest is a forest which has at one stage been disturbed. The UNFCCC accounting rules, NGO's and most scientific research on the issue do not consider what the future use of cleared land is.

However a recent study by Ywith et al. found that "conversion of secondary forest on peat to initial stages of oil palm plantation seems to not exert any significant difference on carbon storage in tropical peat soil".

This means that in the case of secondary peat forests, a palm oil plantation will sequester carbon from the atmosphere, while maintaining the net carbon storages in the peat soil.

Under the current accounting rules, this net gain for the environment is not counted.

35 UNFCCC, Decisions of the Conference of the Parties – Thirteenth Session, United Framework Convention on Climate Change

36 Ywith, Ahmed, Majid and Jalloh, 2009, Effects of Converting Secondary Forest on Tropical Peat Soil to Oil Palm Plantation on Carbon Storage, American Journal of Agricultural and Biological Sciences 4 (2).

References

ADB (Asian Development Bank) 2009, *Key Indicators for Asia and the Pacific 2009*, ADB annual statistical data book, 40th edition, Manila.

Agus, F. 2008, *Environmental Risks of Farming on Peat Land*, Paper presented at the International Workshop on Post Tsunami Soil Management, Bogor 1-2 July 2008.

Basiron, Y. 2008, *Malaysia's Oil Palm – Hallmark of Sustainable Development*, Global Oils & Fats Business Magazine, Vol. 5, Issue No. 4.

BCT (Borneo Conservation Trust) 2009, *The Green Corridor Plan*, web page for Saraya Co. Ltd., www.saraya.com/english/bct, viewed 3 September, 2009.

FAO (Food and Agriculture Organisation) 2009, *ResourceStat*, FAO statistical database on resources, www.faostat.fao.org/site/405/default.aspx, viewed 2 September, 2009.

___ 2008b, *Malaysian Efforts in Developing Responsible Practises in the Palm Oil Industry*, edited version of the keynote address by the Malaysian Minister of Plantation Industries and Commodities at the World Sustainable Palm Oil Conference, London, 15 September, 2008, published in the Global Oils & Fats Business Magazine, Vol. 5, Issue No. 4.

___ 2008c, Speech by the Malaysian Minister of Plantation Industries and Commodities at the *Malaysian Palm Oil Leadership Awards Dinner,* Kuala Lumpur, 13 October, 2008, www.kppk.gov.my/index, viewed 3 September, 2009.

___ 2009, Speech by the Malaysian Minister of Plantation Industries and Commodities at the *Malaysian Estate Owners' Association Dinner,* Kuala Lumpur, 20 March, 2009, www.kppk.gov.my/index, viewed 3 September, 2009.

MCB (Malaysian Cocoa Board) 2009, *Cultivated Statistics*, web page for statistical database on the Malaysian Cocoa Industry, www.koko.gov.my/lkm/, viewed 2 September, 2009.

MOA (Ministry of Agriculture) 2009, *Agricultural Statistical Database,* Indonesian Ministry of Agriculture, Centre for Agricultural Data and Information, www.database.deptan.go.id/bdsp/index, viewed 2 September, 2009.

MPOB (Malaysian Palm Oil Board) 2009, *Oil Palm Statistics 2008*, web page for the Economics and Industry Development Division, www.econ.mpob.gov.my/economy/EID, viewed 2 September, 2009.

MPOC (Malaysian Palm Oil Council) 2008, *Priority for Pongo*, Supplement in the Global Oils & Fats Business Magazine, Vol. 5, Issue No. 3.

___ 2009a, *Malaysian Palm Oil Industry Performance 2008*, Supplement in the Global Oils & Fats Business Magazine, Vol. 6, Issue No. 1.

___ 2009b, *Palm Oil and the Environment: Positive Energy Balance*, MPOC web site, www.mpoc.org.my/Palm_Oil_and_The_Environment, viewed 2 September, 2009.

MRB (Malaysian Rubber Board) 2009, *Natural Rubber Statistics*, Statistical database on the Malaysian Rubber Industry, www.lgm.gov.my/, viewed 2 September, 2009.

OFI (Oils & Fats International) 2009, *UTZ Certified system launch*, OFI News Article No. 14792, www.oilsandfatsinternational.com/shownews, viewed 2 September, 2009.

Oil World 2008, *Oil World Annual 2008*, Hamburg.

Schill, S. R. 2008, *Palm Oil Fights Back*, Biodiesel Magazine, July 2008 edition, www.biodieselmagazine.com/article-print.jsp, viewed 3 September, 2009.

USDA (United States Department of Agriculture) 2007a, *Indonesia Oilseeds and Products - Palm-based Cooking Oil Prices Increase*, Foreign Agriculture Service GAIN Report No. ID7021, 15 June, Washington, DC.

___ 2007b, *Indonesia: Palm Oil Production Prospects Continue to Grow*, Foreign Agriculture Service Commodity Intelligence Report, 31 December, Washington DC.

___ 2009a, *Malaysia Oilseeds and Products - Annual Report 2009*, Foreign Agriculture Service GAIN Report No. MY9008 (and previous reports), 16 March, Washington, DC.

___ 2009b, *Indonesia: Palm Oil Production Growth to Continue*, Foreign Agriculture Service Commodity Intelligence Report, 19 March 2009, Washington DC.

___ 2009c, *Indonesia Oilseeds and Products - Annual Report 2009*, Foreign Agriculture Service GAIN Report No. ID9013 (and previous reports), 5 May, Washington, DC.

RSPO (Roundtable on Sustainable Palm Oil) 2009, *What is RSPO*, Web site for the RSPO, www.rspo.org/What_is_RSPO, viewed 2 September, 2009.

WORLD GROWTH

Palm Oil Green Development Campaign

PO Box 3693
Arlington, VA 22203-3693
(866) 467-7200

www.worldgrowth.org