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Biofuels in Malaysia

An analysis of the legal and institutional framework

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CIFOR

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Abbreviations

B5	Fuel blend of 5% palm oil methyl ester and 95% petroleum diesel
CPO	Crude palm oil
DOE	Department of Environment
EU	European Union
EIA	Environmental Impact Assessment
EU-RED	European Union Renewable Energy Directive
FAME	Fatty acid methyl esters
FELDA	Federal Land Development Authority
Ha	Hectares
ISCC	International Sustainability and Carbon Certification
JAMA	Japan Automobile Manufacturers Association
MPIC	Ministry of Plantation Industries and Commodities
MPOA	Malaysian Palm Oil Association
MPOB	Malaysian Palm Oil Board
MYR	Malaysian ringgit
NEM	New Economic Model
Petronas	Petroliam Nasional Bhd
POIC	Palm oil industrial clusters
PME	Palm methyl ester
RBD	Refined, bleached and deodorised palm oil
SLDB	Sabah Land Development Board
SVO	Straight vegetable oil

Foreword

In Malaysia as of 2010, the area of oil palm plantation was 4.85 million ha covering 14% of the total land area in Malaysia. Sabah still has the largest area planted with oil palm of any state, accounting for 1.4 million hectares (ha). Sarawak registered a 9.5% increase in planted area in 2010, the highest in the country, and the state now accounts for 0.9 million ha of oil palm plantation (Choo 2011).

Palm oil prices went above MYR3000 towards the end of 2010 and remained high in early 2011 (MPOB 2011). Although experts expect the price to soften somewhat towards the middle of the year, any decrease in price will still be mitigated by the strength of other major vegetable oils, leading one industry expert to state that palm oil prices are unlikely to fall below MYR3000 in 2011 (Hanim 2011a, 2011b). However, forecasts differ on crude palm oil prices for 2011, reflecting the volatility of influencing factors, such as crude oil prices and changes in biodiesel mandates (The Star 2011, Hanim 2011b).

Malaysian biodiesel exports dropped by 60% in 2010 to 90 000 tonnes, with many producers unable to maintain operations due to the high cost of production (Choo 2011). The Malaysian Palm Oil Board reported that the export of local biodiesel ceased for two months in December 2010 and January 2011 (Hanim 2011c).

The Malaysian government's recent decision to subsidise the price of biodiesel, coupled with the launch of Neste Oil's 800 000 tonne-per-annum biodiesel plant in Singapore, may breathe new life into the local biodiesel industry (Koswanage and Taylor 2011). Many are also hoping that the outlook for biodiesel will be more favourable with the political unrest in the Middle East and North Africa driving crude oil prices above US $100 a barrel (Hanim 2011c). It is anticipated that Neste Oil's Singapore plant could be a substantial source of future feedstock demand for Malaysia (Koswanage and Taylor 2011). However, due to the strength of current and projected palm oil prices, the planned government subsidy is unlikely to be sufficient to offset the high cost of production (Edy 2011).

1. Introduction

Amidst concerns over energy security, volatile fuel prices and rising greenhouse gas emissions, many countries are turning towards biofuels as a more environmentally friendly alternative to fossil fuels. The introduction of legislation mandating the use of biofuels in the energy mix, for example in the United States and the European Union, has stimulated the demand for vegetable oils, for use as biodiesel. Although providing new economic opportunities for producer countries, this development is not without its controversies. The expansion of agricultural land for the cultivation of biofuel feedstocks raises concerns about deforestation, biodiversity loss, land conflicts, competition with land for food and an increase in carbon emissions from land use change.

Malaysia is currently the world's largest exporter and the second largest producer (after Indonesia) of crude palm oil (CPO) (Hoh 2009). In 2009, Malaysia produced 17.6 million tonnes of CPO (Basri 2010). Malaysia's palm oil industry is the fourth largest contributor to the national economy and accounts for 8% of gross national income (GNI) per capita (PEMANDU 2010). Recognising its competitiveness, Malaysia has attempted to capitalise on the emerging biofuel market by promoting the production of palm oil–based biodiesel. The Malaysian government launched the National Biofuel Policy in 2006 and a series of supporting measures to promote sector development. However, since adoption of the policy, palm oil prices have risen and fossil fuel prices have declined, reducing the economic viability of palm oil–based biodiesel production.[1] With the government mandate on the sale of B5 biodiesel blend delayed for over a year and a lack of direct subsidies, the current outlook for the Malaysian biodiesel industry is uncertain.

This report traces the development of the Malaysian biodiesel industry, and assesses the effectiveness of national policies, strategies and laws in promoting and regulating sector development.

1 The average CPO price has increased since 2006, with extreme fluctuations in 2008. Prices have stabilised since and in the first half of 2010, CPO prices were MYR2400–2700 per tonne (MPOB 2010).

2. Evolution of the biofuel sector

This section provides an overview of the state of biofuel development in Malaysia. As ethanol is currently not produced in Malaysia for use as a fuel (Hoh 2009) this report focuses specifically on biodiesel, with palm oil as the feedstock of choice.

2.1 Palm oil–based biodiesel in Malaysia

The high global demand for palm oil is driven by its wide variety of uses, such as cooking oil, food additive, industrial lubricant, cosmetics ingredient and most recently as a feedstock in biodiesel production (MPOC 2007). As a feedstock for biodiesel, palm oil has distinct advantages over other oils (Ramli *et al*. 2007). Firstly, oil palm is the most productive oil crop and, without subsidies, palm oil is cheaper than any other vegetable oil used in biodiesel production (Basri *et al*. 2008). Secondly, as a perennial crop with an economic cycle of about 25 years, oil palm is less susceptible to changes in weather patterns and thus ensures a relatively reliable supply of feedstock for the biodiesel industry in comparison with an annual crop (Ramli *et al.* 2007).

For the production of palm oil–based biodiesel, refined palm oil products—such as refined bleached and deodorised (RBD) palm oil or palm olein[2]—are used as feedstock, rather than CPO (MPOB and Lipochem, undated). The transesterification process produces methyl esters that can be used in most diesel engines with little or no modification.[3] Another method of substituting petroleum diesel involves the direct blending of straight vegetable oil (Lopez and Laan 2008). In Malaysia, this second type of diesel mix was launched with much publicity in late 2006 as 'Envo Diesel' (Bernama 2006). Envo Diesel is a mixture of 5% processed palm oil with 95% petroleum diesel. Since Envo Diesel uses refined palm oil instead of palm methyl ester, the production cost is considerably lower (as it does not need to be transesterified), thereby giving it a higher profit margin (Mamat, personal communication). The initial plan was to use Envo Diesel in government vehicles before gradually extending its use to industrial and transportation sectors in 2010.

However, the implementation of Envo Diesel encountered several obstacles particularly from diesel engine manufacturers. The Japan Automobile Manufacturers Association (JAMA) refused to extend their engine warranty to the use of Envo Diesel, due to concerns over filter plugging, fuel system corrosion and material incompatibility (Petrolworld 2008, Lim and Teong 2010). Furthermore, the fuel blend has a greater tendency to solidify at lower temperatures and is therefore unsuitable for use in cold and temperate climates (Lim and Teong 2010). As a result, the government has switched to what is commonly known as B5, which is 5% palm methyl ester mixed with 95% petroleum diesel (Petrolworld 2008, Zuraimi 2008). Malaysia imports an estimated 10 million tonnes of diesel annually and the use of a B5 blend could reduce the import volume by 500 000 tonnes, saving an estimated US $380 million a year (Lim and Teong 2010).

Although the emphasis has been predominantly on palm oil, there are some initiatives looking into other crops for biodiesel production. The Sabah Land Development Board (SLDB), for instance, is planning to cultivate jatropha on a commercial scale as a means of alleviating poverty in the interior of Sabah (The Star 2008). A pilot project to evaluate the feasibility of jatropha plantations was launched in late 2007 in Kota Marudu, Sabah (Bernama 2007). However, cultivation of jatropha is still very new to Malaysia and has yet to receive full endorsement from the government as a commercially viable biofuel crop (Hanim 2009a).

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2 Palm olein is widely used as cooking oil and is the liquid obtained by fractionation of palm oil after crystallisation at controlled temperatures (MPOC 2009).

3 Transesterification is a process in which oil molecules are mixed with an alcohol (methanol or ethanol) to produce fatty acid methyl esters (FAME) biodiesel (Lim and Teong 2010).

Box 1. A brief look at oil palm cultivation in Malaysia

The oil palm tree (*Elaeis guineensis*) was first introduced to Malaysia (then Malaya) in the early 1870s as an ornamental plant. The first commercial planting took place in 1917 in the state of Selangor. Oil palm has since flourished and established itself as the number one plantation crop in Malaysia. Cultivation was intensified in the 1960s as part of the government's agricultural diversification programme to reduce the country's economic dependence on rubber and tin, and to alleviate rural poverty (MPOC 2007).

Oil palm cultivation covers 14% of the total land area of Malaysia, having grown from less than 1 million ha in the 1970s to 4.69 million ha in 2009 (MPOB 2010). Initially, most of this expansion took place in Peninsular Malaysia but as the availability of suitable land ran out, recent expansions have taken place mostly in the states of Sabah and Sarawak (Teoh 2000, 2002). Sabah is now the largest palm oil producing state in Malaysia, accounting for over 30% of national output and 1.3 million ha of oil palm (POIC 2007, Basri 2010). In 2009, Sarawak registered an increase of 12.8% in the area planted with oil palm, compared to 3.3% in Peninsular Malaysia and 2.1% in Sabah (Basri 2010).

Historically, government land settlement schemes, in particular FELDA[a] (Federal Land Development Authority), have played an important role in the expansion of oil palm plantations (Teoh 2000) and forest conversion in Peninsula Malaysia (Wakker 2005). However, in the Sixth Malaysia Plan (1991–1995) and in subsequent plans,[b] the government started to shift its strategy in favour of large estate development by the private sector. By 1999, private estates were responsible for about 60% of the total area planted with oil palm in Malaysia, with over 70% in the states of Sabah and Sarawak (Teoh 2000). Independent smallholders own 12% of the land cultivated with oil palm, while 28% is under organised smallholders such as those under the FELDA scheme (PEMANDU 2010).

The Malaysian government plays multiple roles in the oil palm industry, acting as regulator, policy maker, law enforcer, land owner, shareholder and promoter (Lopez and Laan 2008). The government and various state funds own almost 70% of Sime Darby, the country's largest company, valued at about US $16 billion (Reuters 2009a). The government has a key role in the Tabung Haji Foundation, which owns TH Plantations (Lopez and Laan 2008). The government is also involved in the industry via government investment funds such as the Employee Providence Fund (EPF), state government parastatal companies and smallholder settlement schemes (Lopez and Laan 2008).

Many Malaysian companies, whether private or state owned, have land banks in neighbouring Indonesia and are starting to look further abroad as land available for oil palm plantation becomes more limited in Malaysia (Mongabay 2008, Sime Darby 2008, Kulim 2009, Reuters 2009b, Zaidi 2010). Sime Darby, for example, has a concession in Liberia to develop 220 000 ha of land into oil palm and rubber estates (Sime Darby 2008).

[a] FELDA is the single largest entity in terms of land management or ownership (Lopez and Laan 2008), with 15% of the total cultivated oil palm land.

[b] In the eighth and ninth Malaysia Plans strong emphasis was placed on improving the competitiveness of the oil palm sector by increasing yield, enhancing private sector involvement, improving research and development, and diversifying downstream markets.

2.2 The history of the biodiesel sector in Malaysia

The commercial interest in biodiesel dates back to the early 1980s. As the world's largest producer and exporter of palm oil at that time, the Malaysian government realised its potential to become a pioneer in the biodiesel industry (Lim and Teong 2010). Laboratory research on palm biodiesel began in 1982, spearheaded by the Malaysian Palm Oil Board (MPOB, then known as PORIM) and funded by a research and development levy on the palm oil industry (Lopez and Laan 2008). Two years later, a pilot plant for producing palm biodiesel was constructed in collaboration with Petronas (Petroliam Nasional Bhd) (Lim and Teong 2010). By 1985 it was producing palm oil methyl ester at 3000 tonnes per annum (MPOB and Lipochem, undated). In the years that followed, laboratory testing, stationary engine evaluation and field trials were carried out successfully on a large number of diesel-powered vehicles including taxis, commercial trucks, passenger cars and buses (Lim and Teong 2010, MPOB and Lipochem, undated).

In 1992, MPOB successfully developed a winter-grade biodiesel production technology, which enabled

the use of palm biodiesel at low temperatures (Lim and Teong 2010). However, despite the extensive research and field trials that took place during the 1990s, Malaysia's biofuel industry came to a standstill. The sector was given new life when the Fifth Fuel Diversification Policy was adopted under the Eighth Malaysia Plan (2001–2005) (Lim and Teong 2010). In response to policy objectives, efforts were made to promote the use of biomass, biogas, municipal waste, solar and mini-hydro as renewable energy sources (EPU 2001). This was further emphasised in the Ninth Malaysia Plan (2006–2010). In a bid to reduce dependency on fossil fuels and adopt more renewable energy sources, alternative fuels like palm biodiesel were promoted, especially in the transport sector (EPU 2006).

In 2006, the government adopted the National Biofuel Policy to further promote the production and consumption of biodiesels. In support of the policy, the government announced a pledge to set aside 6 million tonnes of CPO for biodiesel production (MIDA 2006). In August the same year, Malaysia's first commercial-scale biodiesel plant began operations in Pasir Gudang, Johor (Abdullah *et al.* 2009). During August–December 2006, 55 000 tonnes of biodiesel was produced in Malaysia. This increased to almost 130 000 tonnes in 2007 (MPOB 2008). By the end of September 2007, the government had approved 92 licences for individual biodiesel projects with a combined production capacity of 10.2 million tonnes (Lopex and Laan 2008). However, many of these proposed projects have been delayed or cancelled due to the dwindling viability of biodiesel, resulting from increasing palm oil prices and decreases in fossil fuel prices (Abdullah *et al.* 2009). In October 2008, the Minister of Plantation Industries and Commodities announced that only 14 biodiesel plants were in production with a combined installed capacity of 1.68 million tonnes (Zuraimi 2008), realising only 16% of the total production volume that was licenced in 2007.

In 2009, exports of Malaysian biodiesel increased by 24.9% to 230 000 tonnes, from 180 000 tonnes the year before (Basri 2010). The European Union was the largest biodiesel export market, accounting for 119 000 tonnes (or 52.4% of total biodiesel exports), followed by the United States with 40 000 tonnes (17.4%) (Basri 2010). According to the MPOB, the export revenue generated from biodiesel was MYR605.8 million in 2009.[4] Nevertheless, less than 1% of palm oil produced in Malaysia is used in biodiesel production (SOPPOA 2009).

The Malaysian government had originally set 1 January 2010 as the deadline to sell B5 biodiesel at all petrol stations nationwide (Ooi 2010a). Due to high palm oil prices and consequently the large government subsidy needed (estimated at MYR250 million per year) to blend and distribute the biodiesel, the government also considered reducing the B5 blend to a B3 blend (StarBiz 2009a, Ooi 2010a). Understandably, the proposal was heavily criticised by biodiesel producers as a B3 mandate would mean using only 300 000 tonnes of biodiesel, too little to make production economically viable (Hanim 2009b, Lim 2010). Consequently, the government reverted to the original mandate of using the B5 blend. Implementation was delayed to June 2011 and limited to the Central Region comprising Kuala Lumpur, Melaka, Negeri Sembilan, North Johor, Putrajaya, Selangor, Southern Perak and West Pahang (Dompok 2010).

For this purpose, construction of in-line blending facilities by the government are underway at an expected cost of MYR43.1 million (US $13.5 million) in petroleum depots in Klang Valley Distribution Terminal and Port Klang in Selangor, Negeri Sembilan, Port Dickson and Tangga Batu in Melaka (Dompok 2010). Biodiesel will cost an additional MYR0.04–0.05 a litre compared to petroleum diesel. According to the Minister of Plantation Industries and Commodities, Tan Sri Bernard Dompok, the Cabinet has yet to decide if consumers should bear the extra cost (Ooi 2010b). However, the MPOB has provided a start-up fund worth MYR1 million each to the five petroleum companies operating in the country: BHP, Chevron, ExxonMobil, Petronas and Shell (Hanim 2010a). The fund is meant for the development of the infrastructure required to set up B5 blending depots in the Central Region.

Malaysia has 25 biodiesel plants, with the great majority operating in Peninsula Malaysia. These have a total capacity of 2.6 million tonnes; however current production is less than 10% of the total installed capacity (PEMANDU 2010).

4 In September 2010, MYR1 was equivalent to US $0.32. This conversion rate is used throughout this report.

Table 1. Chronology of biodiesel development in Malaysia

Year	Milestone
1982	Laboratory research on palm methyl esters (PME) biodiesel began
1983	Palm Diesel Steering Committee formed by the Minister of Primary Industries
1984	Construction of a PME biodiesel pilot plant (3000 tonnes a year capacity) began
1984–1985	Preliminary field trials in taxis conducted
1985	PME biodiesel pilot plant launched
1986–1989	Field trials phase I began—31 commercial vehicles and stationary engines
1990	Field trials phase II began—bench test by Mercedes Benz in Germany
1990-1994	Field trials phase III began—commercial buses
1995	Transfer of PME production technology to industry to produce oleochemicals, carotenes (pro-Vitamin A) and Vitamin E
2001	Use of a CPO and fuel oil blend for power generation initiated
	Research on low-pour-point palm biodiesel initiated
2002	Field trials using processed liquid palm oil and petroleum diesel blends (B2, B5, B10) in MPOB vehicles began (i.e. a straight vegetable oil [SVO] biofuel blend)
2004	Trials of refined, bleached and deodorised (RBD) palm oil and petroleum diesel blends (B5) using MPOB vehicles (i.e. an SVO biofuel blend) began
2005	Transfer of technology from the MPOB to Lipochem (M) Sdn Bhd and Carotino Sdn Bhd to build PME biodiesel plants
	Design of commercial low-pour-point PME biodiesel plant
	National Biofuel Policy drafted
2006	National Biofuel Policy launched
	First commercial-scale biodiesel plant began operations
	Envo Diesel launched
	92 biodiesel licences approved
2007	Increase in CPO price caused many biodiesel projects to be either suspended or cancelled
2008	Malaysian Biofuel Industry Act 2007 came into force
	Usage of Envo Diesel was scrapped and replaced with B5
2009	Government vehicles from selected agencies began use of B5 blend
2010	Government announcement that the B5 mandate for commercial use will be deferred to June 2011

Sources: Lopez and Laan (2008), Dompok (2010), Lim and Teong (2010), MPOB and Lipochem (undated)

3. Institutional and legal framework specific to biofuels

3.1 Malaysia's National Biofuel Policy

The National Biofuel Policy was formulated in 2005 following stakeholder consultations, and was based on earlier research findings by the Malaysian Palm Oil Board (NBP 2006).[5] The Ministry of Plantation Industries and Commodities (MPIC) is responsible for both policy development and implementation. At the time the policy was formulated, the government was motivated in particular by the need to stabilise the CPO price and exploit new export market opportunities. The policy was eventually launched in March 2006 and is underpinned by five strategic thrusts, with short-, medium- and long-term implementation periods. The policy was expected to bring the following main benefits:

- reduce dependency on fossil fuels;
- mobilise local resources for biofuels;
- exploit local technology for biofuel production;
- create new demand for palm oil;
- stabilise the CPO price; and
- mitigate climate change by reducing greenhouse gas emissions.

The policy focuses on the blending of processed palm oil with petroleum diesel and the conversion of palm oil into biodiesel (palm methyl esters) for export (NBP 2006). The policy has yet to meet its medium- and long-term goals, mainly due to the increase in CPO price and the drop in oil prices (Lim and Teong 2010). The National Biofuel Policy is summarised in Figure 1.

The National Biofuel Policy is the main policy underpinning the Malaysian biodiesel industry. The policy focuses on the commercialisation, usage, research, technology and export of biodiesel but does not include upstream aspects of sector development (e.g. the production of biodiesel feedstock). The oil palm industry is supported by various economic development policies, such as the 5-year Malaysia plans,[6] the New Economic Model (NEM),[7] Sarawak Corridor of Renewable Energy (SCORE)[8] and federal and state agricultural policies, such as the Third Agriculture Policy 1998–2010 (NAP3)[9] and the Sabah Agricultural Policy.[10] These policies emphasise increasing productivity, maximising returns through optimal use of resources, research and development, improved technological capacities, market instruments, and diversifying downstream products.

As part of the mid-term goals of the National Biofuel Policy, quality standards for palm methyl ester biofuels were to be established by SIRIM Bhd.[11] The rationale behind having a Malaysian Standard for Biodiesel is to regulate the quality of biodiesel and thus provide assurance to engine manufacturers and consumers alike (Cheng *et al*. 2005). MS 2008:2008, the quality standard for 100% biodiesel (B100) was published in 2008, largely based on the European

5 The National Biofuel Policy states that extensive consultations took place during policy formulation but no information is available on which parties were consulted and the impact they may have had on the proceedings.

6 The Ninth Malaysia Plan (2006–2010) touches on the establishment of palm oil industrial clusters (POIC), export promotion, commercialisation and increasing research and development.

7 The NEM recognises the palm oil industry as an important contributor to the Malaysian economy and emphasises initiatives to enhance productivity and sustainability (Hanim 2010b).

8 The palm oil industry is listed as one of the top 10 priority industries in SCORE.

9 An excerpt from the executive summary of NAP3 states, 'the growth of the oil palm industry will be sustained through productivity improvements and development of new varieties for specific functional end-uses. Focus will also be given to productivity improvement in the downstream processing and manufacturing of higher value-added palm oil products such as oleochemicals.'

10 Sabah Agricultural Policy (1992–2010) encourages the expansion, efficiency and productivity of palm oil cultivation, production and processing to maximise returns (EPD 2005).

11 SIRIM Bhd was appointed by the Department of Standards Malaysia (STANDARDS MALAYSIA) as the sole National Standards Developing Agency (SIRIM Bhd 2009). STANDARDS MALAYSIA is an agency under the Ministry of Science, Technology and Innovation and acts as the national standards and accreditation body in Malaysia. STANDARDS MALAYSIA was established in 1996 following the corporatisation of the Standards and Industrial Research Institute of Malaysia (SIRIM) into SIRIM Bhd (STANDARDS MALAYSIA 2009).

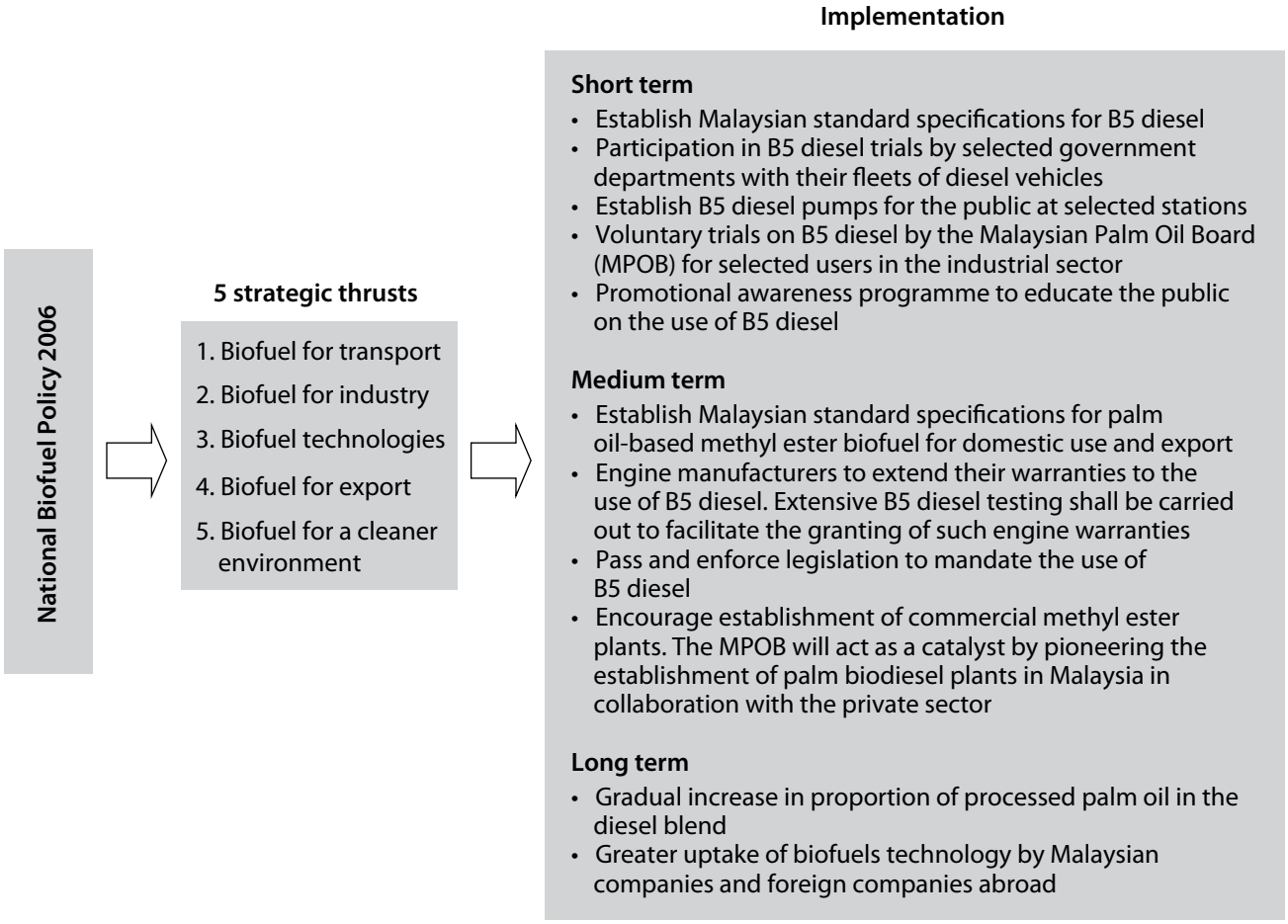

Figure 1. Malaysia's National Biofuel Policy

standard EN 14214, with some minor modifications suggested by the Technical Committee on Petroleum Fuels (Nik Aida, personal communication).[12] For blended biodiesel, on the other hand, the quality standard is MS 123:2005, which is essentially a quality standard for Euro 2M diesel. At the moment, adherence to the published Malaysian biodiesel standards is still voluntary and they are mainly used as a business to business tool (Nik Aida, personal communication).

3.2 The Malaysian Biofuel Industry Act

Following the development of the National Biofuel Policy, the Malaysian Biofuel Industry Act 2007 was introduced to further regulate and facilitate sector development. The act came into force on 1 November 2008 and provides for mandatory blending of biofuel with petroleum diesel and licencing of downstream activities, such as production, blending, storage, transportation and export (MPOB 2009a). The act only regulates palm olein and methyl ester and not any other type of biofuel (Faizah 2008).

The task of issuing biofuel manufacturing licences was taken over by the MPIC from the Ministry of International Trade and Industry. Prior to this, anyone who wished to manufacture biofuels had to apply for two licences (Faizah 2008): a manufacturing licence from the Malaysian Industrial Development Authority,[13] and a licence to use palm oil raw materials at the manufacturing plant from the MPOB.[14]

12 The European EN 14214 determines the specifications and test methods for FAME to be used neat, as automotive fuel for diesel engines, or as an extender (for blending with petroleum diesel) for automotive fuel for diesel engines.

13 Malaysian Industrial Development Authority is under the Ministry of International Trade and Industry.

14 The Malaysian Palm Oil Board (Licensing) Regulations 2005 requires all those involved in the palm oil business to obtain the appropriate licences from the MPOB (Faizah 2008).

Table 2. Activities licenced under the Malaysian Biofuel Industry Act 2007

Production of biofuel	Construction of any biofuel plant or biofuel blending plant
	Production of any biofuel
	Blending of any biofuel with any other fuel or biofuel
Trading of biofuel	Export, import, transport and/or storage of any biofuel, biofuel blended with any other fuel or biofuel blended with any other biofuel
Biofuel services	Survey or testing of any biofuel, biofuel blended with any other fuel or biofuel blended with any other biofuel

Source: MPIC (2009)

Since the Malaysian Biofuel Industry Act came into force, biodiesel companies only need to apply for one licence (Faizah 2008), thereby streamlining the management and administration of licence holders.

The act empowers the Minister of Plantation Industries and Commodities to prescribe the type of biofuel (i.e. palm olein and methyl ester) and its percentage by volume to be blended in any fuel; or the activity for which the use of biofuel is to be made mandatory (Faizah 2008). A Biofuel Licensing Task Force has been formed under the Secretary General of the MPIC to process the licence applications. The Biofuel Working Committee evaluates and makes recommendations on the applications, which are then submitted to the Biofuel Licensing Committee for consideration and approval (MPIC 2009).

Applications for biofuel licences were only considered on a limited basis until 31 December 2009, subject to the fulfilment of the following conditions (MPOB 2009a):

- Applicants need to show proof that they have secured the finances and stable feedstock supply to start operations; and
- Applicants are undertaking capacity enhancement and have been in operation since 31 December 2007; or
- Applicants produce phytonutrients[15] from oil palm products.

By March, 2010, the government had approved 56 licences for biofuels production under the act, for a combined production capacity of 6.8 million tonnes (Dompok 2010).

The licencing authority maintains the right to suspend or revoke a licence if the licencee stops the production or operation of any activity for which the licence was issued (MPOB 2009a).

15 Phytonutrients are natural substances found in plants that are beneficial to health. Phytonutrients of palm oil remain intact during biodiesel processing and can be extracted and sold as high-value health supplements (MPOB and Lipochem, undated). In order to make up for the poor profit margin in biodiesel, biofuel producers such as Carotech Bhd are also involved in the extraction and sale of palm oil phytonutrients (Hanim 2010d).

4. Institutional and legal framework relevant to biofuels

Palm oil is the primary biofuel feedstock in Malaysia; hence, it is also worthwhile to look at the legislation and policies that govern the Malaysian oil palm industry. At the federal level, the Ministry of Plantation Industries and Commodities (MPIC) is the primary authority responsible for overseeing oil palm plantations, mills and refineries. The Ministry of Human Resources regulates wages and health and safety standards, whereas work permits and issues related to illegal migrant workers fall under the purview of the Ministry of Home Affairs (Lopex and Laan 2008). The Ministry of Natural Resources and Environment regulates issues related to the environment and land use change (Lopex and Laan 2008).

This section describes nonsectoral policies and legislation that influence biofuel production and the cultivation of feedstock (oil palm) in Malaysia, including environmental safeguards, land use and land allocation policies, market instruments and certification schemes.

4.1 Incentives, taxes and levies

In support of the biodiesel industry, the Malaysian government reportedly allocated about US $26.8 million in the form of low-interest loans and federal grants for research and development and demonstration projects, between 2004 and 2006 (Lopez and Laan 2008).

It is unclear to what extent companies engaged in biodiesel processing have actually benefitted from these tax incentives (Lopez and Laan 2008). Some industry sources have pointed out that tax exemptions offer only a small compensation since production is running at a loss and operations are suspended for many months of the year.[16] The government does not provide direct subsidies for the production and consumption of biodiesel (Lopez and Laan 2008).

As incentives to biodiesel manufacturers, biodiesel processing projects are eligible for pioneer status or the Investment Tax Allowance (ITA) under the Promotion of Investments Act 1986 (Abdullah *et al.* 2009). A company with pioneer status is granted tax exemption on at least 70% of its statutory income for 5 years (Biofuel Database 2007). The degree of tax exemption varies depending on the type of product or activity. Accumulated losses and unabsorbed capital allowances incurred by companies during the pioneer period are allowed to be carried forward and deducted against the post-pioneer income of a business relating to the same activity or product (Biofuel Database 2007).

The ITA is an alternative incentive that companies can apply for, other than pioneer status, and is meant to accommodate projects with large capital investments and a long gestation period. The ITA grants a company at least 60% of qualifying capital expenditure (e.g. factory, plant, machinery) incurred within 5 years of the date the first capital expenditure was incurred. Like pioneer status, the degree of allowance entitled to a company with an ITA depends on the type of activity or product promoted. The company can offset this allowance against 70%–100% of its statutory income for each year of assessment. Any unused allowance can be carried forward to subsequent years until fully used (Biofuel Database 2007). Companies that are at least 51% Malaysian owned, with export potential in the rubber, palm oil and wood-based industries, are eligible for 'Reinvestment Incentives for Resource-Based Industries' (Lopez and Laan 2008). These companies can apply for another 5 years of pioneer status or ITA for reinvestment in expansion (Lopez and Laan 2008).

If biodiesel projects meet certain criteria, they may also be considered for 'Incentives for High Technology Companies' or 'Incentives for Commercialisation of Research and Development Findings of the Public Sector in Resource Based Industries' (NBP 2006).

Palm oil producers do not receive any direct subsidies and are, in contrast to biodiesel producers, heavily

16 Personal communication with participants at a biofuel dialogue organised by Neste Oil and Shell held in June 2010.

taxed (without qualifying for tax exemptions) (see Table 3). The palm oil industry pays a number of cesses, levies and taxes to the MPOB and the Ministry of Finance. A cess of about MYR11 (US $3.4) per tonne of CPO produced is paid to the MPOB for research and development (Chandran 2004). Palm oil planters also pay a cess to the palm oil price stabilisation fund of MYR2 (US $0.6) per tonne (before the review in 2009, this was MYR4 per tonne) (Hanim 2009c). The cooking oil price stabilisation scheme was introduced in May 2007 and required owners of oil palm estates larger than 40.46 ha to pay a cess that is meant to subsidise the price of cooking oil to help counter the high CPO price (The Star 2008b). Smallholder and government land schemes are exempt from payment (The Star 2008b). Additionally, in order to encourage domestic palm oil processing, the Malaysian government also imposes export duties on CPO, though not on processed palm oil or biodiesel (Hoh 2009).

Palm oil producers also pay a windfall tax when CPO prices are above MYR2500 (US $769.2) per tonne in Peninsular Malaysia and MYR3000 (US $923.1) per tonne in Sabah and Sarawak (Hanim 2010b). Smallholders owning 40 ha and below are exempt from paying the windfall tax. Unlike the corporate tax, the windfall tax is not based on actual profits but on CPO production, an issue that many palm oil planters are unhappy with, as profitability of oil palm plantations depends on the age and productivity of the trees rather than the price of CPO (Ooi 2009).

Palm oil industry players regard the windfall profit tax, cess for cooking oil price stabilisation and cess for palm oil price stabilisation, as overly burdensome and unfair (MPOA 2009, Hanim 2010b). The Malaysian palm oil industry claims that the many taxes and levies make palm oil the highest-taxed vegetable oil in the world (Ooi 2009).

4.2 Environmental regulations

The expansion of oil palm plantations in the tropics has been associated with a host of environmental problems such as deforestation, biodiversity loss, water pollution, soil erosion, carbon emissions resulting from land use change and forest fires, and pesticide use. However, much of the growth in palm oil production is driven by global demand for edible oils. Therefore the link between these environmental problems, particularly deforestation, and the expansion of biodiesel production itself is less clear.

Table 3. Taxation on the Malaysian oil palm industry

Charge	Rate
Corporate tax	25% of corporate profit
Cess for MPOB	MYR11 per tonne of CPO
Cess for Price Stabilisation Fund	MYR2 per tonne of CPO
Cess for cooking oil subsidy	5% above CPO price of MYR1700 per tonne
Windfall profit tax	15% above CPO price of MYR2500 per tonne (Peninsular)
	7.5% above CPO price of MYR3000 per tonne (Sabah and Sarawak)
Foreign workers levy	MYR540 per worker
Sabah sales tax	7.5% for CPO price at MYR1000 per tonne and above
Sarawak sales tax	2.5% for CPO price at MYR1000–1500 per tonne
	5.0% for CPO price above MYR1500 per tonne
Sarawak land tax	MYR5 per ha
Property assessment tax (by District Councils)	0.5% of rental value of land
Export duty on CPO	10%–30% per tonne of CPO
Goods and Service Tax (GST)	*4% of sales value on fresh fruit bunch, CPO, processed palm oil (proposed implementation by 2011)*

Source: Malaysian Estate Owners Association, *quoted in* Hanim (2010b)

The relevant federal and state legislation covering the oil palm industry is listed in Annex I. The states of Sabah and Sarawak manage their own environmental regulations independent of federal control. In this section, the Environmental Impact Assessment Regulation and its relevance to the biodiesel and oil palm industry is explored.

In Malaysia, an environmental impact assessment (EIA) is required for activities prescribed under the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987,[17] which came into force on 1 April 1998. EIAs need to be conducted for prescribed activities and approval needs to be obtained from the Director General of Environment, before a permit for implementation of a project can be allocated by the relevant federal or state authority (DOE 2008). Items listed in this order that are applicable to the biodiesel sector are shown in Box 2.

Malaysia has two EIA procedures: the Preliminary EIA and the Detailed EIA (DOE 2008). In Sabah these procedures are referred to as the Normal EIA and the Special EIA (Moduying 2001). Preliminary EIAs are required for the activities listed in Box 2. Activities which are considered to have a significant impact on the environment require a Detailed EIA. These are listed in Appendix 4 of the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 and include activities relevant to the construction of hydropower dams, pulp and paper mills, the iron and steel industry and logging exceeding 500 ha (DOE 2008). However, the Director General of Environment has the right to request a Detailed EIA of a project that has significant impacts on the environment, or is located in or adjacent to environmentally sensitive areas despite its activities not being listed in Appendix 4 (DOE 2008).

Box 2. Excerpts from Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987, Appendix 2

1. Agriculture

a. Land development schemes covering an area of 500 ha or more to bring forest land into agricultural production.
b. Agricultural programmes necessitating the resettlement of 100 families or more.
c. Development of agricultural estates covering an area of 500 ha or more involving changes in types of agricultural use.

(...)

8. Industry

a. Chemicals—Where production capacity of each product or of combined products is greater than 100 tonnes/day.

In contrast to Preliminary EIAs, Detailed and Special EIAs require public participation (Moduying 2001, DOE 2008).[18] The public can provide input at two stages of the process: the terms of reference (TOR) and the review of the completed EIA report. These documents are made available on the Department of Environment website and at their offices. Oil palm plantations and biodiesel projects are typically subject only to Preliminary or Normal EIAs, where public participation is not required. For these types of EIAs, the TORs are typically finalised by an EIA consultant, based on a review by the DOE (EPD 2005). The DOE review will seek inputs from other relevant government agencies and external experts, should it be deemed necessary (EPD 2005). Palm oil mills are listed as prescribed premises (not prescribed activities) and therefore do not require an EIA, but require written permission from the Director General of the DOE and an operation licence (MIDA 2008).

The states of Sabah and Sarawak manage their own environmental regulations. Certain prescribed activities listed in the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 do not apply to these two states (Moduying 2001, Emang 2006). In 1996, the Sabah state government passed the Conservation of Environment Enactment (CEE) to provide a legal framework for the protection and enhancement of the state's environment (Moduying 2001). The Conservation of Environment (Prescribed Activities) Order 1999 was introduced a few years

17 The order applies to the whole country except Sabah and Sarawak. These states are given more autonomy than the other Malaysian states as part of the agreement signed when they joined the Federation of Malaya in 1963.

18 EIAs in Sarawak, however, are not categorised as 'preliminary' or 'detailed' and there is no legal provision for public participation (Emang 2006). The decision to include public participation can be made voluntarily by the project proponent (Emang 2006).

later, mandating the need for an EIA for prescribed activities in Sabah (Moduying 2001). These were replaced by the Sabah Environment Protection Enactment 2002 and the Sabah Environment Protection (Prescribed Activities) Order 2005 (EPD 2005). The administration of the EIA system in Sabah is jointly shared by the Sabah Environmental Protection Department, formerly known as the Sabah Environmental Conservation Department, and the Federal DOE (Moduying 2001). The Sabah Environment Protection Department is responsible for EIAs under the Sabah Environment Protection (Prescribed Activities) Order 2005. Box 3 shows prescribed activities that are applicable to oil palm development in Sabah.

In Sarawak, the law on environmental management is the Sarawak Natural Resources and Environment Ordinance 1993; the mandatory requirements for an EIA report are provided for in its subsidiary legislation, the Natural Resources and Environment (Prescribed Activities) Order 1994 (Emang 2006). Box 4 shows the prescribed activities that are applicable to oil palm development in Sarawak.

Box 3. Excerpts from Sabah Environment Protection (Prescribed Activities) Order 2005, Second Schedule

1. Agriculture

i Development of agricultural estates or plantations covering an area of 500 ha or more;
ii Development of agricultural estates or plantations involving change in type of crops covering an area of 500 ha or more;
iii Conversion of wetland forests into agricultural estates or plantations covering an area of 50 ha or more; or
iv Agricultural programmes involving the settlement of 100 families or more.

Box 4. Excerpts from Sarawak Natural Resources and Environment (Prescribed Activities) Order 1994, First Schedule

1. Agricultural development

i Development of agricultural estates or plantations of an area exceeding 500 ha
   a. from land under secondary or primary forests; or
   b. which would involve the resettlement of more than 100 families; or
   c. which would involve modification in the use of the land.
ii Conversion of mangrove swamps into agricultural estate having area exceeding 50 ha.

EIAs for oil palm plantations in Sabah and Sarawak are processed and approved by the Sabah Environmental Protection Department and the Natural Resources and Environment Board of Sarawak, but EIAs for the establishment of biodiesel plants are administered by the DOE.

Each state has the autonomy to exercise its own governance on matters relating to land and water. This serves as a major constraint to the effectiveness of the federal EIA procedures, as the management of these resources is beyond the scope of the Environmental Quality Act and the DOE (Memon 2000).

In terms of content, the EIA report must consist of an assessment of the potential environmental and social impacts of the project and impact mitigation and monitoring proposals (EPD 2005). In the case of an oil palm plantation the potential impacts include soil erosion, biomass disposal (as a result of land clearance), water and air pollution, and impacts on surrounding communities (social, economic and environmental) (ECD 2002). However, it is not unusual for negative impacts to be understated in EIAs. As pointed out by Memon (2000), the accuracy and quality of EIA reports is limited by a lack of environmental, social, and economic baseline data.

Public participation in the EIA review and approval process is also limited (Memon 2000, Emang 2006, Marzuki 2009). In the case of Sarawak, public participation is not a requirement in the EIA process but may be included at the prerogative of the project proponent. This severely undermines the transparency of the EIA approval process.

In Malaysia EIA is generally perceived as a barrier to development, as it can delay the approval and implementation of a project (Memon 2000). Many EIAs are undertaken late in the project planning and design stages and consequently issues such as location choice, design, and technology alternatives are not adequately considered (Memon 2000, Briffett *et al.*

2004). The effectiveness of the EIA system in Malaysia comes under great pressure when decisions are made on what is environmentally acceptable and what is economically desirable (Briffett *et al.* 2004).

4.3 Certification

The palm oil industry has for many years been associated with forest conversion, biodiversity loss, habitat destruction, and land conflicts with indigenous communities. The Roundtable on Sustainable Palm Oil (RSPO) was formed in 2004 in response to global market pressure to enhance the sustainability of palm oil (RSPO 2010). The RSPO unites and engages stakeholders of the palm oil industry to promote the consumption and production of sustainable oil palm products through credible global standards (RSPO 2010). Certification under the RSPO requires palm oil producers to meet 8 principles and 39 criteria covering best management practices, social responsibility and environmental considerations in order for their palm oil to be labelled as 'Certified Sustainable Palm Oil' (RSPO 2010). For instance, with regards to land tenure and native customary claims, RSPO requires that local people are compensated for any agreed land acquisitions or surrendering of rights subject to free, prior and informed consent and fair and transparent negotiation. RSPO certification is a voluntary scheme and some have challenged its credibility. For example, RSPO members are expected to implement more sustainable management practices, such as identifying forest areas of high conservation value before the establishment of new plantations or the expansion of existing ones (RSPO 2010). However, there are no clear guidelines on the identification of high conservation value areas and how these should be conserved. This leaves the determination of what constitutes an high conservation value area open to interpretation (Koh *et al.* 2009).

In support of the RSPO, the Malaysian government allocated MYR50 million (US $15.4 million) in 2009 for the establishment of an RSPO fund, to be managed by the MPIC (MPOA 2009). The purpose of the fund is to help support the cost of complying with the RSPO Principles and Criteria in order to facilitate certification (MPOA 2009). Disbursement of funds to cultivators is subject to certain terms and conditions.[19] For example, large estates are not eligible for reimbursement of the RSPO certification costs; whilst individual and organised smallholders are (the actual percentage of reimbursement depends on the size of the plantation). However, all are eligible for some small funding support to carry out environmental and social activities. As of March 2011 Malaysia, had 53 RSPO-certified palm oil mills, producing slightly over 2 million metric tonnes of certified palm oil (RSPO 2010).[20]

In September 2010, the RSPO submitted two applications to the European Commission to request formal recognition of the RSPO system and the RSPO Renewable Energy Directive (RSPO-RED) as voluntary schemes under EU Renewable Energy Directive (EU-RED) requirements (RSPO 2010). If the RSPO is recognised as a voluntary system, RSPO certified palm oil will meet the sustainability requirements for biofuels in the EU under certain conditions. The 'RSPO Additional Guidance for Compliance with the EU Renewable Energy Directive Requirements' has been developed as a voluntary add-on to the RSPO Principles and Criteria and will only be used if an RSPO certification applicant requests it (RSPO 2010). This is preferable to incorporating the additional EU-RED requirements into the RSPO Principles and Criteria, which is a contentious issue amongst RSPO members (many of whom are not involved in biofuels).

Biodiesel producers are recognising the benefits of pursuing another certification system, the International Sustainability and Carbon Certification (ISCC) system, as a means of securing entry into the European biofuel market. The ISCC is a global certification system for biomass and biofuels that is approved by the German Federal Agency for Agriculture and Food (ISCC 2011). ISCC complies with the sustainability requirements set out in the EU Renewable Energy Directive (ISCC 2011). FELDA Global Group and Mission Biotechnologies Sdn Bhd are working together to establish Asia's first fully integrated ISCC certified palm biodiesel

19 More details on RSPO fund application and eligibility can be found on the Malaysian Palm Oil Association (MPOA) website: www.mpoa.org.my.

20 In 2010, Malaysia's production of CPO was 16.99 million tonnes.

supply and production chain (Bernama 2011). Neste Oil's biodiesel refinery in Singapore, which also sources palm oil feedstock from Malaysia, is also ISCC certified.

4.4 Forests, land allocation and native customary rights

Under the Constitution of the Federation of Malaysia, matters related to forest, land and water are delegated to the state. The states of Sabah and Sarawak enjoy slightly more autonomy than the other states and can pass laws about land or local government independent of Parliament.

Forest policies are made at the state level and state governments have the power to decide on the use and allocation of forests, declare reserves and issue logging permits (JOANGOHutan 2006). The federal government still has power over certain provisions for forests and forestry, resource conservation and local government plans and may introduce legislation relating to these matters. However, the legislation can only be enforced if accepted by the states, and federal and state policies on lands, forests and the environment are often contradictory (JOANGOHutan 2006).

Based on the legal gazettement of forest areas, the forests in Malaysia can be categorised by forest type (Jomo *et al.* 2004):

- **Permanent forest estates**: comprised of protective forests and commercial or production forests. Production forests are forests that are set aside for logging and harvesting of forest products;
- **National parks and wildlife reserves**: land under strict protection; and
- **State land forests**: forests that have not been gazetted as forest reserves and belong to the state.

Permanent forest estates cannot be converted to other land use types, such as agriculture, unless the area is first degazetted or excised. Section 12 of the National Forestry Act 1984 requires that an equal area of land excised from permanent forest reserves be replaced if suitable land is available. However in practice, Section 12 is rarely enforced, and the clause 'if suitable land is available' creates a loophole that allows replacement of such forests to be ignored.

State land forests are not protected in any way and the state reserves the right to alienate such lands for development. These are the forests that are usually logged and cleared for agriculture (Toh and Grace 2006). In Sabah for example, state land forests can be alienated and the rights to the land leased to individuals or companies under Town Lease, Country Lease or Native Title (McMorrow and Mustapa 2001). A Country Lease is typically allocated to land alienated for agricultural use for 99 years, whereas a Native Title is for land alienated only to natives in perpetuity for agriculture (McMorrow and Mustapa 2001). The various land title types have time limits for the start and completion of cultivation or development.

The potential for increased forest conversion to oil palm plantations, as the market for biofuels grows, is a cause for concern. However, the role of biofuel production in any incremental forest conversion to oil palm is not clear. Deforestation undermines any environmental benefits that biofuels are said to bring especially in terms of greenhouse gas emissions. This is particularly true if the feedstock crop (in this case oil palm) is grown in carbon rich areas such as peatlands. A recent report by Wetlands International found that 20% of all Malaysian palm oil is produced on drained peatlands (Wetlands International 2010). In Sarawak, 41% of peatland is covered by oil palm plantations. Of all the deforestation on peat that occurred during 2005–2010 in Sarawak, about 65% was due to the establishment of oil palm plantations (SarVision 2011).

The National Land Code 1965 provides for state governments to draw up individual State Land Rules (Shukri, M.I., personal communication,15 May 2010). As such, land application procedures differ from state to state. For instance, land matters in Sarawak are governed by the Sarawak Land Code, whereas in Sabah they fall under the Sabah Land Ordinance. Figure 2 provides a brief description of the land application procedure for oil palm plantation development using the state of Sabah as an example.

Land conflicts involving indigenous communities, as a result of oil palm expansion (and other types of development), occur throughout Malaysia, but appear to be more prevalent in the states of Sabah and Sarawak (Wakker 2005, SUHAKAM 2006,

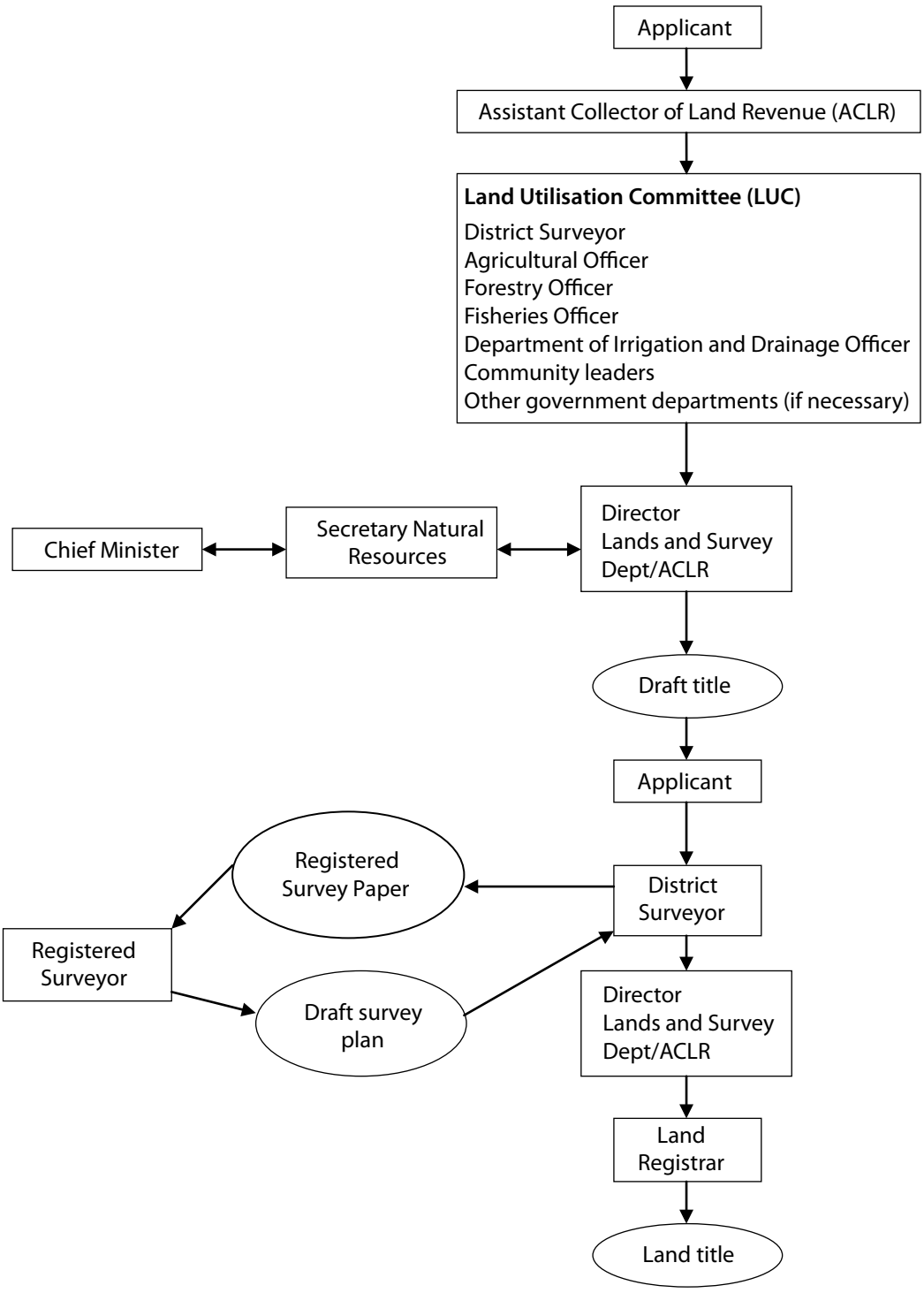

Figure 2. Land application procedure for oil palm plantation development in Sabah, Malaysia

Source: ECD (2002)

Tan 2008). According to SUHAKAM statistics, Sabah recorded the highest number of complaints on land issues in the country (Daily Express 2004). Although legal provisions exist for the recognition of native customary rights to land, in practice, proof of ownership or customary claims to land are often difficult to establish. Loopholes in the Land Code enable the state to circumvent claims to customary land and instead develop the land in the interests of the state (Cooke 2002). Land clearance for oil palm has taken place on land under native customary rights in Sarawak, despite strong protests by native

communities (Devisscher 2007, Michael 2009). The affected communities can, and have, brought their grievances to court; some have been successful (Ling 2010), but such cases often take many years to come to trial (Devisscher 2007).

4.5 Palm oil development and poverty alleviation through land settlement schemes

Three land settlement schemes have played significant roles in the growth of oil palm cultivation in Malaysia: those managed by the Federal Land Development Authority (FELDA), the Sabah Land Development Board (SLDB) and the Sarawak Land Development Board.

FELDA was established under the Land Development Act 1956, with the support of the World Bank and United Nations (Gustafsson 2007, FELDA 2008), as part of a poverty reduction scheme for landless farmers and smallholders. At first, FELDA's role was to manage and channel federal funds to the respective state governments for land development and settlement projects. However in 1961, FELDA was tasked with conducting its own land development and settlement schemes nationwide. Through the settlement scheme, settlers (low income and landless rural people) are each allocated a housing plot and a plot of land to cultivate (Lopez and Laan 2008). Income is obtained from plantation production, other farming activities and non-farm income. FELDA also provides settlers with a guaranteed minimum income (Lopez and Laan 2008). Settlers eventually gain ownership of their plots after they have paid for the development costs of their units. Of this development cost, 42% is borne by the government, whilst each settler is expected to bear the remaining cost (Lopez and Laan 2008).

FELDA has supported the resettlement of more than 100 000 families who were previously landless and living below the poverty line by providing each family with 4 ha of land cultivated with crops such as oil palm, rubber or cocoa (Gustafsson 2007). Settlers are prohibited from converting oil palm to other crops, or from selling or leasing land to others without prior approval from the state. Nevertheless, in some instances, settlers have sold or mortgaged their lands without the knowledge of FELDA or the state (New Straits Times 2003, Wakker 2005). Through this land scheme, FELDA currently manages 853 313 ha of plantations (about 85% is planted with oil palm) and provides basic amenities such as piped water, electricity, schools, roads and medical facilities to farmers (FELDA 2008).

During the Sixth Malaysia Plan (1991–1995), less emphasis was given to developing new land for agriculture in favour of increasing agricultural productivity (Sutton 2001). Settler recruitment by FELDA ceased and those areas not yet settled were allocated to estate companies. Agricultural labourers were recruited instead of settler families. FELDA was restructured to create a new division, FELDA Plantations Sdn Bhd, which manages 38% of FELDA's land area, leaving the rest as settler schemes. New plots were usually planted with oil palm. This policy shift in the Sixth Malaysia Plan continued in the Seventh Malaysia Plan (1996–2000). The Sabah and Sarawak land development agencies were tasked to develop 37 090 ha of new land, with private companies developing a further 88 890 ha of land. Thus the Malaysian government's political philosophy shifted from state companies in favour of the private sector (Sutton 2001).

The Sabah Land Development Board was formed in 1969 and incorporated under the Sabah State Enactment Bill 23 in 1981 (SLDB 2008). The Board's primary objective is to develop agricultural lands for the resettlement of landless people in Sabah (SLDB 2008). Sawit Kinabalu Bhd was formed in 1996 when the Sabah state government decided to corporatise the Board through a merger with Borneo Samudera Sdn Bhd (Sawit Kinabalu, undated). In 2002, Sawit Kinabalu Bhd and the SLDB were separated into two different entities. Sawit Kinabalu Bhd is an investment holding company owned by the Chief Minister Incorporated, whilst the Sabah Land Development Board remains a state government agency in charge of rural development and poverty eradication programmes (Sawit Kinabalu, undated).

In Sarawak, land resettlement schemes were at first modelled on FELDA. The schemes were initially implemented by the Agriculture Department but were later taken over by the Sarawak Land Development Board (Cooke 2006). The schemes failed and were later abandoned as they lacked the labour and

expertise required, and farmers were often unable to make the necessary loan repayments (Cooke 2006).

In the 1990s, the Sarawak government introduced the New Concept Model (*Konsep Baru*) as a strategy for rural development on land under native customary rights (Cooke 2006). This involves the formation of a joint venture company. The concept of the joint venture is based on the assumption that fragmented areas of native customary land can be pooled into a Native Customary Land Bank. The Sarawak Land Development Board and the Land Custody and Development Authority are appointed as managing agents (Cooke 2006). Native Customary Land owners have to sign a trust deed to assign all their rights, interests, and shares in the land to the government agency, which will then enter into a joint venture with a private company (Cooke 2006). Under the joint venture company arrangement, the private company holds 60% ownership, the landowner holds 30% and the government agency holds the remaining 10%. Land titles are issued to the joint venture for 60 years (Cooke 2006). The Sarawak state government expects this strategy to make 'idle'[21] native customary land more productive and profitable, as well as to help achieve the target of developing 1 million ha of oil palm plantations by 2010 (Cooke 2006, Wong 2010).

The Sarawak government considers most native customary land in the state to be idle land (Michael 2009, Wong 2010). The Sarawak Land Consolidation and Rehabilitation Authority currently has 18 000 NCR landowners, covering an area of 50 000 ha, participating in its oil palm plantation scheme (Davidson 2010). This Authority is planning to expand participation in the scheme to 90 000 NCR landowners by 2020 (Davidson 2010).

Many cases have been reported in Sarawak where communities were not consulted before oil palm plantation expansion occurred and their native customary rights to land were not recognised by the state government (Cooke 2002, Michael 2009). Even when consultations were made (e.g. negotiations for compensation), it was the village headmen that were involved, excluding the rest of the community from the decision-making process (Devisscher 2007). Also, native communities have voiced distrust over the transparency of joint venture company accounts and decision-making processes, to which the communities have no access. Communities are completely at the mercy of the joint venture company when it comes to the allocation of benefits and profit (Cooke 2002, Devisscher 2007).

21 It is a commonly held notion that land is productive only when occupied and improved (Cooke 2006). In some ways, the colonial belief that subsistence-based agriculture and shifting cultivation, as practiced by natives, are wasteful and that state intervention through the introduction of modern agricultural techniques and plantation agriculture is required, is still retained by the government (Doolittle 2004, 2007).

5. The political economy of biofuels in Malaysia

5.1 Main stakeholders in the palm oil and biodiesel sector

The major stakeholders in the Malaysian palm oil industry are briefly summarised in Figure 3. The development of Malaysian plantation and commodity sectors, with respect to crops such as palm oil, rubber and wood, falls under the Ministry of Plantation Industries and Commodities (MPIC). Three other organisations actively involved in the palm oil industry are the Malaysian Palm Oil Association (MPOA), the Malaysian Palm Oil Board (MPOB) and the Malaysian Palm Oil Council (MPOC).

The Malaysian Palm Oil Association (MPOA) was established in 1999 through the merger of four major plantation associations: the Rubber Growers' Association; the United Planting Association of Malaysia; the Malaysian Oil Palm Growers' Council; and the Malaysian Estate Owners' Association. MPOA members jointly manage about 40% of the total oil palm area under cultivation and control 60% of the palm oil milling capacity in Malaysia (Chandran 2004). Although the main focus is on oil palm, the MPOA also serves the interests of other plantation crops such as rubber, cocoa and tea, and deals with non-crop issues relating to land, labour, trade and pricing (MPOA 2009). The MPOA's priorities are labour matters, productivity issues, yield, market competitiveness, taxation and cess, and the duty structure of the palm oil industry. The MPOA's interest in biodiesel itself is marginal as the great majority of its members are not involved in the sector.

The Malaysian Palm Oil Promotion Council was established in 1990 and was renamed the Malaysian Palm Oil Council (MPOC) in 2006 (MPOC 2008). It is the main promotional and marketing vehicle of Malaysian palm oil in the international arena. The MPOC is a semi-government agency under the MPIC and its mission is to promote palm oil

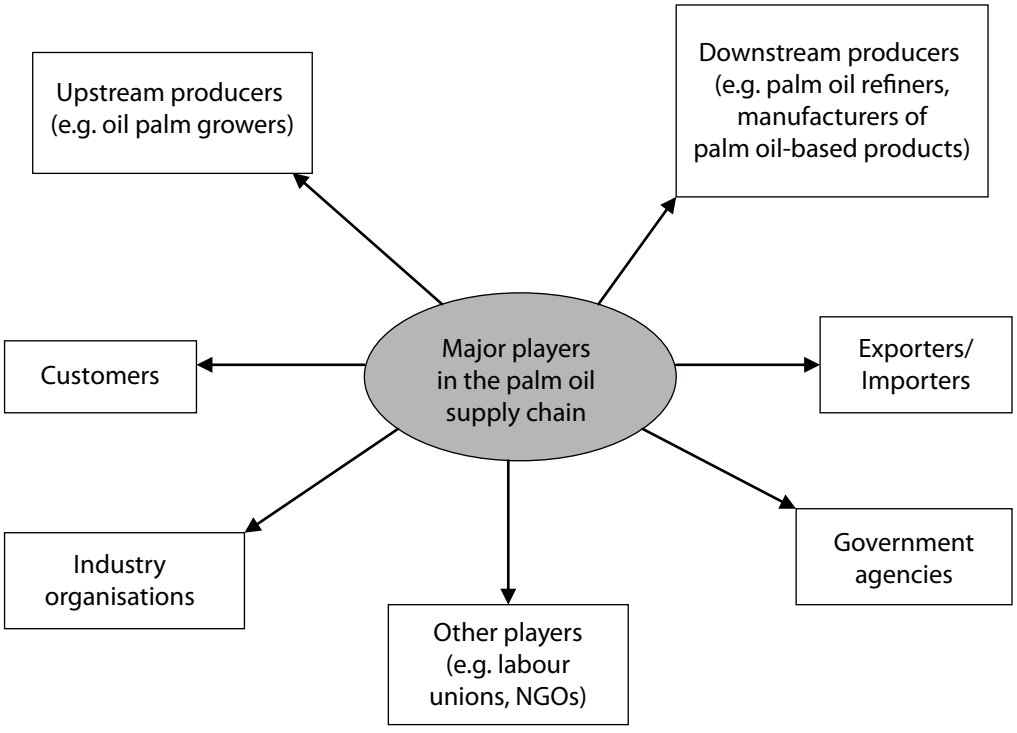

Figure 3. Major players in the palm oil supply chain

Source: Teoh (2002)

products, including biodiesel, and manage the image of palm oil in key international markets (especially in relation to environmental sustainability) (MPOC 2008). The MPOC has always been very defensive and highly critical of anti-palm oil campaigns by international NGOs.

In the local biodiesel sector, the two key actors are the MPIC and MPOB (Mamat, personal communication; Chan, personal communication). As the main ministry governing the palm oil industry, the MPIC oversees the development and implementation of the National Biofuel Policy and the Biofuel Industry Act. The MPOB is an agency under the MPIC, and was established in 2000 through a merger of the Palm Oil Research Institute of Malaysia and the Palm Oil Registration and Licensing Authority (MPIC 2010). The MPOB is funded from government budget allocations and a government imposed cess on the palm oil industry (see Table 3). The MPOB's functions include the registration, regulation, coordination and promotion of all activities relating to the planting, supply, sale, purchase, distribution, movement, storage, surveying, testing, inspecting, export and import of oil palm products and the milling of oil palm fruit (MPIC 2010). In 2006, the MPOB's total funding was MYR282 million (US $86.8 million), around 95% of which came from the cess (Lopez and Laan 2008).

The MPOB is the lead government agency in research and development on palm oil–based biodiesel, and has been quite successful in developing its own biodiesel technologies, including winter-grade palm biodiesel technology. The technologies developed by the MPOB are licenced to the industrial sector for a fee (Hoh 2009). Three winter-grade palm biodiesel plants and six normal-grade palm biodiesel plants use MPOB technology, including one plant in South Korea and another in Thailand (Dompok 2010).

The Malaysian biodiesel industry is still relatively small, with 25 biodiesel plants (PEMANDU 2010).

Box 5. Role of the Malaysian Palm Oil Board

- Implement policies and develop programmes to ensure the viability of the oil palm industry of Malaysia
- Conduct and promote research and development activities relating to the oil palm and palm oil industry
- Regulate, register, coordinate and promote all activities relating to the palm oil industry
- Develop, promote and commercialise research findings and provide technical advisory and consultancy services to the palm oil industry
- Develop and maintain markets for oil palm products and promote efficient marketing
- Liaise and coordinate with other bodies within or outside Malaysia to further enhance the palm oil industry
- Be the resource and information centre of the palm oil industry, including the publication and dissemination of information on palm oil and other oils and fats

Source: MPOB (2009b)

Box 6. Malaysian Biodiesel Association members

- AJ Oleo Industries Sdn Bhd
- AM Biofuels Sdn Bhd
- Carotech Bhd (previously Carotech Bio-fuel Sdn Bhd)
- Carotino Sdn Bhd
- Fima Biodiesel Sdn Bhd (previously Titian Asli Sdn Bhd)
- Future Prelude Sdn Bhd
- Global Bio-diesel Sdn Bhd
- Golden Hope Biodiesel Sdn Bhd
- Gomedic Sdn Bhd
- Himpunan Sari Sdn Bhd
- KLK Bioenergy Sdn Bhd (previously Zoop Sdn Bhd)
- Lereno Sdn Bhd
- Mission Biofuels Sdn Bhd
- Mission Biotechnologies Sdn Bhd
- Nexsol (M) Sdn Bhd
- PGEO Bioproducts Sdn Bhd
- Plant Biofuels Corporation Sdn Bhd
- Platinum Biofuels Sdn Bhd (previously Ganz Biofuels Sdn Bhd)
- SPC Biodiesel Sdn Bhd
- Vance Bioenergy Sdn Bhd
- YPJ Palm International Sdn Bhd

Membership is made up of biodiesel manufacturers (MBA, personal communication)

Source: Chan (personal communication)

The Malaysian Biodiesel Association is the only industry association that represents the interests of the biodiesel industry, unlike the MPIC and MPOB which represent the government's interests. Established in 2008, the Malaysian Biodiesel Association currently consists of 22 members, located in Peninsular Malaysia and Sabah. Members meet on a quarterly basis or when the need arises (Chan, personal communication). One of the current priorities of the Malaysian Biodiesel Association is to engage with relevant government ministries and agencies on the effective implementation of the mandatory biodiesel blending target in Malaysia (Chan, personal communication).

The direction of the biofuel sector is very top-down, in terms of policy and implementation, with key decisions lying with government bodies like the MPIC and MPOB.[22] Although the Malaysian Biodiesel Association has been rather vocal about the plight of biodiesel investors and the need for direct subsidies, its influence on government policy remains limited.

Some NGOs have unfavourable positions towards biofuels (e.g. Sahabat Alam Malaysia and Wetlands International) but still actively engage with government and industry. Many NGOs are active in addressing the environmental and social impacts of oil palm development, and focus on biodiversity loss, habitat fragmentation, land conflicts, water pollution, better management practices, RSPO certification, and the marginalisation of indigenous communities. Industry representatives have questioned the NGOs' silence on the benefits of switching to a renewable fuel (biofuel), whilst only focusing on the negative impacts of oil palm development.[23]

22 Personal communication with participants at a biofuel dialogue held in June 2010.

23 Personal communication with participants at a biofuel dialogue held in June 2010.

6. Implementation and performance

Despite 56 licences being issued under the Biofuel Industry Act 2007 (Dompok 2010), Malaysia has only 25 biodiesel plants, with many of them operating below their installed capacities. Within the Sabah Palm Oil Industrial Cluster (POIC), for example, eight biodiesel licences have been issued but only two plants have been constructed and are operational, whilst the rest have been put on hold (Bilson, personal communication). In 2009, biodiesel production was reportedly below 10% of the domestic total installed capacity (Hanim 2009b).

According to the Malaysian Palm Oil Association (MPOA) Chief Executive Officer, Datuk Mamat Salleh, a financially viable biofuel programme would require extensive subsidies. This is due to a number of factors:

- The price of CPO is currently too high for biodiesel production to be profitable.[24] When the CPO price is at MYR2500 (US $769.2) per tonne and Tapis crude oil is US $80–90 per barrel, biodiesel costs an estimated 60 sen (US $0.2) per litre more to produce than petroleum diesel (Hanim 2010c). At this crude oil price, many CPO producers stop production once the CPO price hits about MYR2000 (US $615.4) per tonne (Hanim 2009d).
- Biodiesel will not be competitive domestically, as petroleum diesel is highly subsidised by the government.[25] One of the major challenges for producers is the high cost of palm biodiesel, which is sold at MYR2.80 (US $0.9) per litre compared with about MYR1.70 (US $0.5) per litre for petroleum diesel (Hanim 2009d). Without a price subsidy or support, biodiesel simply cannot compete in the domestic market (Mamat, personal communication; New, personal communication).
- The domestic demand may not be large enough to sustain the industry as diesel vehicles account for only 5% of private vehicles in the country (Hoh 2009). The uptake of B5 by diesel vehicles belonging to the Ministry of Defence, the Kuala Lumpur City Hall and Selangor's Public Works Department is a disappointing 40 tonnes a month on average in 2009 (Hanim 2009d).
- Petroleum companies have been reluctant to set up the necessary blending facilities to make B5 more widely available at their retail stations (Hanim 2009e). This probably led to the setup of the MYR5 million start-up fund offered by the Malaysian Palm Oil Board to offset some of the initial cost of infrastructure investment.

The biodiesel market in the EU and USA is supported by a range of incentives and mandates (Fry 2008). Consistent demand for biofuels can only be guaranteed once government mandates blending with fossil fuels, which renders biodiesel demand independent of fossil diesel prices (Fry 2008; Suharto, personal communication). Otherwise, the prices that blenders are willing to pay for vegetable oils would fluctuate according to petroleum diesel price (Fry 2008). However, mandates can also be a risk as many of the regulations governing the mandates are still under development, leaving biofuel investors to anticipate the variety of the regulations which will be issued (Suharto, personal communication). Therefore, a major issue facing the industry is the 'shifting goalposts' in regulatory and sustainability requirements, which creates considerable uncertainty (New, personal communication; Suharto, personal communication).

Biodiesel is not competitive with petroleum diesel without substantial subsidies or tax incentives, except in cases where the price gap between petroleum and vegetable oils is suitably large. The Malaysian government spent MYR74 billion (US $22.8 billion) on subsidies for fuel, infrastructure and other commodities in 2009 (The Star 2010) and will unlikely make an additional subsidy allocation for biodiesel for fear of increasing the budget deficit (Lim

24 Prior to June 2006, there was no statistical link between fuel and CPO prices. However, with increasing usage of vegetable oils as biofuel, the price of vegetable oils, such as palm oil, started to move in tandem with crude oil prices (Fry 2008).

25 In 2009, the Malaysian government paid MYR23.5 billion in fuel subsidies (Jagdev 2010). In terms of low petrol prices, Malaysia ranked 157 out of 175 countries (Jagdev 2010).

2010). A nationwide B5 mandate would translate to a consumption of 500 000 tonnes of biodiesel per year. Depending on the price of crude oil, relative to the price of CPO, the cost of subsidy required to put the retail price of biodiesel on a par with petroleum diesel could be MYR0.5–1.5 billion (US $153.8–461.5 million) per annum (Mamat, personal communication). In October 2009, Plantation Industries and Commodities Minister, Bernard Dompok stated that the government would need to spend MYR250 million (US $76.9 million) a year to subsidise the B5 blend (Lim 2010).

Malaysian biodiesel producers are dependent on export markets. However, the international demand for palm oil as a biofuel is suppressed as a result of environmental concerns and protectionist measures in major consumer countries. For example, the EU-RED on greenhouse gas emission and the US legislative provision of a tax credit for domestically produced biodiesel reduce the competitiveness of Malaysian biodiesel in the international market (Hanim 2009e).

Under the EU-RED, all biofuel sources are required to have a minimum life-cycle carbon emission savings of 35% compared to fossil fuels and not coming from lands of high biodiversity or carbon stocks (European Commission 2010). Currently the default greenhouse gas savings value provided by the EU-RED for palm biodiesel is 19%, a value viewed by the industry as being based on politics rather than science[26]. This disqualifies palm oil as a suitable feedstock for biodiesel to be used in EU member countries. Therefore the EU RED could, over time, contribute to further reducing international demand for Malaysia's biodiesel.

Although considered carbon neutral by some, many environmentalists argue that greenhouse gas reductions resulting from biofuel combustion are dependent on a variety of factors, including emissions resulting from transport, processing and land clearing. Some studies have shown that biodiesel originating from oil palm cultivated on peatlands results in a net increase in carbon emissions (Mongabay 2007, Science Daily 2007, Yee *et al.* 2009). Biofuel companies are constantly pressured to demonstrate that their feedstock is obtained from sustainable sources.

RSPO certification, which is being pursued by many Malaysian palm oil companies, does not fully meet the sustainability and environmental requirements under the EU-RED. This challenge could be overcome if the RSPO Principles and Criteria were made more stringent with regard to greenhouse gas emissions. Whether or not the RSPO should bridge the gap, to make certification compliant with EU-RED, is the subject of much debate, since the palm oil industry is resistant to including greenhouse gas considerations into the existing Principles and Criteria (Mamat, personal communication). As a compromise, the RSPO has developed the 'RSPO Additional Guidance for Compliance with the EU Renewable Energy Directive Requirements' as a voluntary 'add-on' to the RSPO Principles and Criteria for members who are biofuel producers. In addition to RSPO certification, companies involved in palm oil–based biodiesel production have also pursued International Sustainability and Carbon Certification (ISCC) which is compliant with EU-RED requirements.

In the case of a nationwide B5 mandate in Malaysia, only 570 000 tonnes of CPO would be required for the production of 500 000 tonnes of biodiesel (Lopez and Laan 2008). Since Malaysian CPO production in 2009 amounted to 17.6 million tonnes, the amount needed to meet the biodiesel mandate is only about 3% of total annual production. Furthermore, with the delayed 2011 mandate only covering the Central Region, which is only a fraction of the domestic diesel market, the volume of biodiesel required would be considerably less. As such, domestic consumption of biodiesel will likely not drive extensive land use change. Considering low domestic demand, the threat of biofuels inducing deforestation comes more from international demand. However, palm oil still makes up a very small portion of global biofuel supply and a number of political and market forces limit Malaysia's palm oil from becoming significant as an international biodiesel feedstock.

26 According to MPOC, current studies show that palm oil's greenhouse gas savings can range from 19 percent to 72 percent over fossil fuels, making it difficult to decide on a standard value (Starbiz 2009b). The huge variation depends on whether or not methane is captured at the mills and only 4 percent of the country's mills had been equipped with methane-capturing technology (Starbiz 2009b).

7. Conclusion

The outlook for the Malaysian biodiesel industry hinges upon whether substantial government subsidies or incentives are forthcoming in the near future. In February 2010, the government decided to push back the implementation of the B5 mandate to June 2011. Even with this mandate, it is unlikely that domestic demand will be sufficient to sustain the industry. The industry is extremely vulnerable as a result of fluctuating palm oil and petroleum prices and restrictive biofuel policies in key consumer markets. Whether or not palm biodiesel will be acceptable under the EU-RED will depend on negotiations between the Malaysian government, the RSPO, industry associations and the EU.

Despite current pessimism surrounding the viability of the domestic biodiesel industry, the Malaysian palm oil industry as a whole is unlikely to be profoundly affected by these issues. The future demand for palm oil for food is expected to increase independently from how much is actually used for biodiesel, driven by population growth and the increase in per capita consumption in developing countries.

The Malaysian government will need to decide on the role of biofuels in the country's economy for the coming decade. Will biofuels primarily be produced for export earnings, capitalising on demand from EU and US markets? Or, will biofuels be consumed primarily in the domestic transport sector? In the former case, the government will need to actively engage with the European Commission to ensure that palm oil is a favourable feedstock under the EU-RED. At the same time, the government needs to be sensitive to the greenhouse gas emissions of palm biodiesel production and put appropriate policy safeguards in place to regulate land use changes, especially of peatland, and promote methane capture technologies.

If biodiesel is to be consumed primarily in the domestic transport sector, the government will have to subsidise it as well as restructure fossil fuel subsidies, in order for the domestic biodiesel market to be viable. Biofuels will not serve as a significant new source of energy for Malaysia, which makes the added expense of introducing a separate biodiesel subsidy difficult to justify. Instead, the domestic biofuel sector should be encouraged to diversify the choice of feedstocks (e.g. animal fats and waste oil) to reduce dependency on palm oil .

8. References

Abdullah, A.Z., Salamatinia, B., Mootabadi, H. and Bhatia, S. 2009 Current status and policies on biodiesel industry in Malaysia as the world's leading producer of palm oil. Energy Policy 37: 5440-5448.

Basri, M.W., Faizah, M.S., Balu, N. and Nazlin, I. 2008 EU's Renewable Energy Directive: possible implications on Malaysia palm oil trade. Oil Palm Industry Economic Journal 8(2): 1-7.

Basri, M.W. 2010 Overview of the Malaysian oil palm industry 2009. Malaysian Palm Oil Board. http://econ.mpob.gov.my/economy/Overview_2009.pdf (2 May 2010).

Bernama 2006 PM launches 'Envo Diesel' biofuel. Bernama, 21 March. http://www.bernama.com/bernama/v3/news_lite.php?id=187164 (8 March 2010).

Bernama 2007 Biofuel crop jatropha to be cultivated in Sabah. Bernama, 28 September. http://www.bernama.com.my/bernama/v3/news_lite.php?id=287422 (8 March 2010).

Bernama 2011 Felda Global and Mission Biotechnologies establish Asia's first fully integrated ISCC. Bernama, 15 March. http://www.palmoilprices.net/news/felda-global-and-mission-biotechnologies-establish-asias-first-fully-integrated-iscc/ (15 March 2010).

Biofuel Database in East Asia 2007 Malaysia. Chapter 2: Energy policy. http://www.asiabiomass.jp/biofuelDB/malaysia/contents002.htm (20 March 2010).

Briffett, C., Obbard, J. and Mackee, J. 2004 Environmental assessment in Malaysia: a means to an end or a new beginning? Impact Assessment and Project Appraisal 22(3): 221-233.

Chandran, M.R. 2004 Impact of globalisation on plantation industry: the private sector perspective. Presentation to the National Economic Action Council, Putrajaya, Malaysia, 29 July 2004.

Cheng, S.F., Choo, Y.M., Yung, C.L., Ma, A.N. and Yusof, B. 2005 Palm biodiesel: gearing towards Malaysian biodiesel standards. Palm Oil Developments No. 42, June 2005. http://palmoilis.mpob.gov.my/publications/pod42.html (20 March 2010).

Choo, Y.M. 2011 Overview of the Malaysian oil palm industry 2010. Malaysian Palm Oil Board. http://econ.mpob.gov.my/economy/Overview_2010_final.pdf (10 March 2011).

Cooke, F.M. 2002 Vulnerability, control and oil palm in Sarawak: globalization and a new era? Development and change 32(2): 189-211.

Cooke, F.M. 2006 State, communities and forests in contemporary Borneo. Asia-Pacific Environment Monograph 1. ANU E Press, Australian National University, Canberra, Australia.

Daily Express 2004 Sabah tops the Suhakam complaints list; most land. Daily Express, 20 November.

Davidson, D. 2010 Salcra expects to pay higher dividend. New Straits Times, 24 May. http://www.nst.com.my/nst/articles/Salcraexpectstopayhigherdividend/Article/#ixzz0sCw1oomk (9 June 2010).

Devisscher, T. 2007 The effects of palm oil biodiesel in producer developing countries: a case analysis of Malaysia. Master's Thesis, IIIEE, Lund University, Sweden.

DOE (Department of Environment) 1987 Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987. Department of Environment, Malaysia.

DOE (Department of Environment) 2008 Environmental impact assessment (EIA). Official website of the Department of Environment, Ministry of Natural Resources and Environment. http://www.doe.gov.my/en/content/environmental-impact-assessment-eia (22 May 2010).

Dompok, B.G. 2010 The use of palm biodiesel by Sime Darby vehicles. Speech by Y.B. Tan Sri Bernard Giluk Dompok, Minister of Plantation Industries and Commodities, 24 March 2010. Carey Island, Selangor, Malaysia. http://www.kppk.gov.my/en/speech-collection-mainmenu-29/speeches/2010/689-speech-launching-on-the-use-of-palm-biodiesel-by-sime-darby-vehicles.html (5 May 2010).

Doolittle, A.A. 2004 Powerful persuasions: the language of property and politics in Sabah, Malaysia (North Borneo), 1881-1996. Modern Asian Studies 38(4): 821-850.

Doolittle, A.A. 2007 Native land tenure, conservation, and development in a pseudo democracy: Sabah, Malaysia. Journal of Peasant Studies 34(3): 474-497.

ECD (Environmental Conservation Department) 2002 Environmental impact assessment (EIA) guidelines for oil palm plantation development. Environmental Conservation Department, Sabah, Malaysia.

Edy, S. 2011 Analyst: subsidy for biofuel not enough. The Star, 9 March. http://thestar.com.my/news/story.asp?sec=business&file=/2011/3/9/business/8212867 (11 March 2011).

Emang, J.J.J. 2006 Public participation in EIA process in Sarawak: any room for improvement? Presented at the 4th Sabah-Sarawak Environmental Convention. Kota Kinabalu, Sabah, 5 September.

EPD (Environment Protection Department) 2005 Handbook on environmental impact assessment in Sabah, Second edition. Environment Protection Department, Sabah, Malaysia.

EPU (Economic Planning Unit) 2001 Eighth Malaysia Plan 2001–2005. Economic Planning Unit, Prime Minister's Office. Kuala Lumpur, Malaysia.

EPU (Economic Planning Unit) 2006 Ninth Malaysia Plan 2006–2010. Economic Planning Unit, Prime Minister's Department, Putrajaya, Malaysia.

European Commission 2010 Communication from the Commission on the practical implementation of the EU biofuels and bioliquids sustainability scheme and on counting rules for biofuels. Official Journal of the European Union (2010/C 160/02).

Faizah, J. 2008 The Malaysian Biofuel Industry Act 2007, Legal insights. SKRINE Newsletter, Issue 1/2008. http://www.skrine.com/pdf/1_2008.pdf (5 May 2010).

FELDA 2008 Federal Land Development Authority—Background. http://www.felda.net.my/felda/english/fel_latarbelakang.asp (10 June 2010).

Fry, J. 2008 World biodiesel viability amidst high feedstock prices. Oil Palm Industry Economic Journal 8 (1): 12-17.

Gustafsson, F. 2007 The visible palm: market failures, industrial policy and the Malaysian palm oil industry. Phd. Thesis, Lund Studies in Economic History, Lund University, Sweden.

Hanim, A. 2009a Time to give jatropha a serious thought. The Star, 29 January. http://biz.thestar.com.my/news/story.asp?file=/2009/1/29/business/3137866&sec=business (5 May 2010).

Hanim, A. 2009b Biodiesel programme at the crossroads. The Star, 28 November. http://biz.thestar.com.my/news/story.asp?file=/2009/11/28/business/5198291&sec=business (8 March 2010).

Hanim, A. 2009c. Planters crave for more cuts in cess and taxes. The Star 22 January. http://biz.thestar.com.my/news/story.asp?file=/2009/1/22/business/3075196&sec=business (5 May 2010).

Hanim, A. 2009d Govt's biodiesel programme hits a speedbump. The Star, 13 October. http://biz.thestar.com.my/news/story.asp?file=/2009/10/13/business/4892489&sec=business (8 March 2010).

Hanim, A. 2009e High CPO price hurting biodiesel industry. The Star, 14 October. http://biz.thestar.com.my/news/story.asp?file=/2009/10/14/business/4896532&sec=business (8 March 2010).

Hanim, A. 2010a Start-up fund for biodiesel programme. The Star, 5 October. http://biz.thestar.com.my/news/story.asp?file=/2010/10/5/business/7159562&sec=business (5 Oct. 2010).

Hanim, A. 2010b Planters seek review of tax, cess and levy. The Star, 11 January. http://biz.thestar.com.my/news/story.asp?file=/2010/1/11/business/5408427&sec=business (5 May 2010).

Hanim, A. 2010c Malaysia's biodiesel industry at a standstill. The Star, 6 September. http://biz.thestar.com.my/news/story.asp?file=/2010/9/6/business/6952930&sec=business (6 September 2010).

Hanim, A. 2011a Healthy palm oil price expected. The Star, 10 February. http://biz.thestar.com.my/news/story.asp?file=/2011/2/10/business/8031578&sec=business (11 March 2011).

Hanim, A. 2011b Global demand for palm oil growing rapidly. The Star, 10 March. http://biz.thestar.com.my/news/story.asp?sec=bu&file=/2011/3/10/business/8224650 (11 March 2011).

Hanim, A. 2011c With crude oil price surge is palm biodiesel production viable again? The Star, 8 March. http://biz.thestar.com.my/news/story.asp?file=/2011/3/8/business/8206877&sec=business (11 March 2011)

Hoh, R. 2009 Malaysia biofuels annual report 2009. Global Agricultural Information Network (GAIN). http://gain.fas.usda.gov/Recent%20GAIN%20Publications/General%20Report_Kuala%20Lumpur_Malaysia_6-12-2009.pdf (8 March 2010).

ISCC (International Sustainability and Carbon Certification) 2011. http://www.iscc-system.org/index_eng.html (11 March 2011).

Jagdev, S.S. 2010 Dealing with subsidies is serious business, it cost RM74bil in 2009. The Star, 26 May. http://biz.thestar.com.my/news/story.asp?file=/2010/5/26/business/6338825&sec=business (9 June 2010).

JOANGOHutan 2006 Forest governance in Malaysia. An NGO perspective. A report produced for FERN. Zuidam Uithof, Utrecht, Netherlands.

Jomo, K.S., Chang, Y.T. and Khoo, K.J. 2004 Deforesting Malaysia: the political economy and social ecology of agricultural expansion and commercial logging. United Nations Research Institute for Social Development. Zed Books, London.

Koh, L.P., Levang, P. and Ghazoul, J. 2009 Designer landscapes for sustainable biofuels. Trends in Ecology and Evolution 24 (8): 431-438.

Koswanage, N. and Taylor, M. 2011 WRAPUP 2-Biofuel appeal stokes bullish palm price outlook. Reuters, 8 March. http://uk.reuters.com/article/2011/03/08/asia-palm-oil-idUKL3E7E80W220110308 (11 March 2011).

Kulim 2009 Kulim (Malaysia) Bhd. http://www.kulim.com.my/html/ (10 June 2010).

Lim, S.L. 2010 Malaysia to keep 5% biodiesel blend, but delay plan to 2011. Dow Jones Newswires, 23 February. http://www.palmoilhq.com/PalmOilNews/malaysia-to-keep-5-biodiesel-blend-but-delay-plan-to-2011/ (9 June 2010).

Lim, S. and Teong, L.K. 2010 Recent trends, opportunities and challenges of biodiesel in Malaysia: an overview. Renewable and Sustainable Energy Reviews 14: 938-954.

Ling, S. 2010 Court orders NCR land returned to orang asli. The Star, 21 January. http://thestar.com.my/news/story.asp?file=/2010/1/21/nation/20100121142056&sec=nation (9 March 2010).

Lopez, G.P. and Laan, T. 2008 Biofuels—at what cost? Government support for biodiesel in Malaysia. Prepared for the Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD). Geneva, Switzerland.

Marzuki, A. 2009 A review on public participation in environmental impact assessment in Malaysia. Theoretical and Empirical Researches in Urban Management 3(12): 126-136. http://www.um.ase.ro/No12/10.pdf (8 May 2011).

McMorrow, J. and Mustapa, A.T. 2001 Decline in forest area in Sabah, Malaysia: relationship to state policies, land code and land capability. Global Environmental Change 11: 217-230.

Memon, P.A., 2000 Devolution of environmental regulation: environmental impact assessment in Malaysia. *In*: Wood, C. and Scott, P. (eds.) Impact assessment and project appraisal. Journal of the International Association for Impact Assessment. Vol. 18, No 4, December 2000, 283-293.

Michael, M. J. 2009 Indigenous peoples: stop new plantations! Malaysian indigenous peoples want moratorium on plantations, other extractive projects. http://borneo.live.radicaldesigns.org/article.php?id=774 (5 October 2010).

MIDA (Malaysian Industrial Development Authority) 2006 Malaysia and Indonesia agree on 40% CPO for biodiesel. Malaysian Industrial Development Authority, News, 21 July.

MIDA (Malaysian Industrial Development Authority) 2008 Investor's Guide, Environmental Management. http://210.187.41.3/beta/view.php?cat=3&scat=32&pg=163 (9 June 2010).

Moduying, V.J. 2001 Environmental impact assessment (EIA) system in Sabah. Presented at the 6th SITE Research Seminar, 13-14 September 2001, Sabah, Malaysia.

Mongabay 2007 Palm oil is a net source of CO_2 emissions when produced on peatlands. mongabay.com, 17 December. http://news.mongabay.com/2007/1217-palm_oil.html (9 June 2010).

Mongabay 2008 Malaysia targets Africa and the Amazon for palm oil expansion. mongabay.com, 25 August. http://news.mongabay.com/2008/0825-malaysia_palm_oil.html (9 June 2010).

MPIC (Ministry of Plantation Industries and Commodities) 2009. Licence Application Manual under the Malaysian Biofuel Industry Act 2007. Ministry of Plantation Industries and Commodities, Malaysia.

MPIC (Ministry of Plantation Industries and Commodities) 2010. Official website. http://www.kppk.gov.my/en/about-us/organisation/agency-mainmenu-124.html (9 June 2010).

MPOA (Malaysian Palm Oil Association) 2009 MPOA annual report 2008. Malaysian Palm Oil Association. Kuala Lumpur, Malaysia.

MPOB (Malaysian Palm Oil Board) 2008 Review of the Malaysian oil palm industry 2007. Chapter 3: Production. Malaysian Palm Oil Board. Kuala Lumpur, Malaysia. http://econ.mpob.gov.my/economy/Production%20with%20table.pdf (9 May 2011).

MPOB (Malaysian Palm Oil Board) 2009a Application for biofuel licence under the Malaysian Biofuel Industry Act 2007. http://www.mpob.gov.my/index.php?option=com_content&view=article&id=697%3Aapplication-for-biofuel-licence-under-the-malaysian-biofuel-industry-act-2007-&catid=157%3Ademo-content&Itemid=153&-lang=en (2 May 2010).

MPOB (Malaysian Palm Oil Board) 2009b Directory of Malaysian Palm Oil Processing Sector. 2nd Edition. Malaysian Palm Oil Board. Kuala Lumpur, Malaysia.

MPOB (Malaysian Palm Oil Board) 2011 MPOB website. http://www.mpob.gov.my (11 March 2011).

MPOB and Lipochem (undated). Fuel of the future. Malaysian Palm Oil Board and Lipochem (M) Sdn Bhd Kuala Lumpur, Malaysia.

MPOC (Malaysian Palm Oil Council) 2007 Fact sheets: Malaysian palm oil. Malaysian Palm Oil Council and Malaysian Palm Oil Board, Selangor, Malaysia.

MPOC (Malaysian Palm Oil Council) 2008 MPOC Regional Office Dhaka Bangladesh. http://mpoc.org.bd/about_us.php (8 March 2010).

MPOC (Malaysian Palm Oil Council) 2009. The oil. http://www.mpoc.org.my/The_Oil.aspx (15 August 2010).

NBP (National Biofuel Policy) 2006 Ministry of Plantation and Commodities, Malaysia.

New Straits Times 2003 Felda settlers told not to sell land. New Straits Times, 4 August.

NREB (Natural Resources and Environment Board) 1994 Natural Resources and Environment (Prescribed Activities) Order, 1994. Natural Resources and Environment Board. Sarawak, Malaysia.

Ooi, T.C. 2008 Biodiesel producers in unusual situation. Business Times, 23 October. http://www.palmoilprices.net/news/biodiesel-producers-in-unusual-situation/ (May 2011).

Ooi, T.C. 2009 Oil palm planters questioned legality of windfall tax. Business Times, 12 December. http://www.mpoa.org.my/v2/index.php?option=com_content&view=article&id=224:workers-woes-may-hit-palm-oil-earnings&catid=42:mpoa-news&Itemid=50 (22 May 2010).

Ooi T.C. 2010a Malaysia still committed to selling biodiesel nationwide. Business Times, 27 January. http://www.carodiesel.com/index/news/113.htm (8 March 2010).

Ooi T.C. 2010b Full B5 implementation to be this year. Business Times, 3 February. http://www.carodiesel.com/index/news/115.htm (8 March 2010).

Performance Management and Delivery Unit (PEMANDU) 2010 Economic transformation programme: a roadmap for Malaysia. Chapter 9, Palm oil. PEMANDU, Prime Minister's Department, Malaysia.

Petrolworld 2008 Malaysia: Envo Diesel biofuel to be replaced with methyl ester. Petrolworld, 19 November. http://www.petrolworld.com/alternative-fuels/malaysia-envo-diesel-biofuel-to-be-replaced-with-methyl-ester.html (8 March 2010).

POIC (Sabah Palm Oil Industrial Cluster) 2007 Facts and figures. http://www.poic.com.my/index.asp?p=facts (8 June 2010).

Ramli, A., Roslan, A. and Ayatollah, K. 2007 Impact of palm oil–based biodiesel demand on palm oil price. Oil Palm Industry Economic Journal 7 (2): 19-27.

Reuters 2009a Markets buzz with talk of China-Sime Darby deal. Reuters, 4 November. http://www.reuters.com/article/idUKSP54629120091104 (1 June 2010).

Reuters 2009b Malaysia eyes Africa for oil palm expansion. Reuters, 21 December. http://af.reuters.com/article/liberiaNews/idAFSGE5BK02X20091221 (6 May 2010).

RSPO (Roundtable on Sustainable Palm Oil) 2010 RSPO website. http://www.rspo.org/ (8 June 2010).

RSPO (Roundtable on Sustainable Palm Oil) (undated) Biofuel factsheet. RSPO Secretariat. Petaling Jaya, Malaysia. http://www.rspo.org/files/pdf/Factsheet-RSPO-BiofuelsPosition.pdf (8 June 2010).

SarVision 2011 Impact of oil palm plantations on peatland conversion in Sarawak

2005–2010. Summary Report. SarVision, Wageningen, Netherlands.

Sawit Kinabalu (undated). Website of Sawit Kinabalu Bhd. http://www.sawitkinabalu.com.my/index.php/about/history/ (8 June 2010).

Science Daily 2007 Carbon dioxide expelled from peatland when natural swamp forest is converted to oil palm. Science Daily, 15 December. http://www.sciencedaily.com/releases/2007/12/071206235448.htm (15 June 2010).

Sime Darby 2008 Sime Darby plantation overview. http://www.simedarbyplantation.com/Sime_Darby_Plantation_Overview.aspx (11 March 2010).

SIRIM Bhd 2009 Website of SIRIM Bhd, Standards Management Department. http://www.sirim.my/std_dev/stdpage.htm (7 June 2010).

SLDB (Sabah Land Development Board) 2008 Jatropha curcas: introduction. http://www.sldb.com.my/index.php?sc=Introduction (20 May 2010).

SOPPOA (Sarawak Oil Palm Plantation Owners Association) 2009 SOPPOA position on the draft RSPO GHG criteria for sustainable palm oil. http://www.rspo.org/files/project/GreenHouse.Gas.Working.Group/SOPPOA-Submit%20to%20RSPO.pdf (20 May 2010).

STANDARDS MALAYSIA 2009 Website of the Department of Standards Malaysia. http://www.standardsmalaysia.gov.my/index.php (7 June 2010).

StarBiz 2009a Govt may replace B5 biodiesel with B3. The Star, 10 November, http://biz.thestar.com.my/news/story.asp?file=/2009/11/10/business/5075899&sec=business (8 May 2010).

StarBiz 2009b M'sian standard for palm oil. Country to standardise the way palm oil's impact on the environment is calculated. The Star, 20 October. http://www.carodiesel.com/index/news/107.htm (11 March 2010).

SUHAKAM (Human Rights Commission of Malaysia) (2006). Press Statement: SUHAKAM's report on Penan in Ulu Belaga: right to land and socioeconomic development. http://www.suhakam.org.my/c/document_library/get_file?p_l_id=24400&folderId=26657&name=DLFE-736.pdf (18 August 2010).

Sutton, K. 2001 Agribusiness on a grand scale—FELDA's Sahabat complex in East Malaysia. Singapore Journal of Tropical Geography 22(1): 90-105.

Tan, Y.L. 2008 Land rights, culture key concerns of minorities. The Sun, 26 November. http://www.malaysianbar.org.my/legal/general_news/land_rights_culture_key_concerns_of_minorities.html (18 August 2010).

Teoh, C.H. 2000 Land use and the oil palm industry in Malaysia. WWF Malaysia. assets.panda.org/downloads/oplanduseabridged.pdf (8 May 2011).

Teoh, C.H. 2002 The palm oil industry in Malaysia: from seed to frying pan. WWF Switzerland *assets.panda.org/downloads/oilpalmchainpartaandb_esri.pdf (May 2011)*.

The Star 2008 Launch charts a first in Jatropha use. The Star, 30 January. http://thestar.com.my/news/story.asp?file=/2008/1/30/nation/20168140&sec=nation (20 May 2010).

The Star 2008b Push to abolish palm oil cess. The Star, 25 March. http://biz.thestar.com.my/news/story.asp?file=/2008/3/25/business/20736043&sec=business (20 May 2010).

The Star 2010 No hike in petrol, sugar and oil prices. The Star, 31 May. http://thestar.com.my/news/story.asp?file=/2010/5/31/nation/6370851&sec=nation (7 June 2010).

The Star 2011 CPO price seen lower by mid-year. The Star, 9 March. http://biz.thestar.com.my/news/story.asp?sec=business&file=/2011/3/9/business/8216257 (11 March 2011).

Toh, S.M. and Grace, K.T. 2006 Case study: Sabah forest ownership. *In:* Understanding forest tenure in South and Southeast Asia. Forestry Policy and Institutions. Working Paper 14. Food and Agriculture Organization of the United Nations, Rome. ftp://ftp.fao.org/docrep/fao/009/j8167e/j8167e10.pdf (8 May 2011).

Wakker, E. 2005 Greasy palms: the social and ecological impacts of large-scale oil palm plantation development in Southeast Asia. Friends of the Earth, UK.

Wetlands International 2010 A quick scan of peatlands in Malaysia. Wetlands International-Malaysia, Petaling Jaya, Malaysia.

Wong, J. 2010 Sarawak a hotspot for palm planters. The Star, 8 March. http://biz.thestar.com.my/news/story.asp?file=/2010/3/8/business/5788180&sec=business (10 March 2010).

Yee, K.F., Tan, K.T., Ahmad, Z.A. and Lee, K.T. 2009 Life cycle assessment of palm biodiesel: revealing facts and benefits for sustainability. Applied Energy 86: S189-S196.

Zaidi, I.I. 2010 Plantations eye more estates in Malaysia, abroad. Business Times, 29 June. http://findarticles.com/p/news-articles/new-straits-times/mi_8016/is_20100507/plantations-eyes-estates/ai_n53446835/ (9 June 2010).

Zuraimi, A. 2008 Methyl ester to replace Envo Diesel as biofuel. Business Times, 18 November. http://www.palmoilprices.net/news/methyl-ester-to-replace-envo-diesel-as-biofuel/ (10 March 2010).

Annex 1. Legislation regulating the Malaysian palm oil industry

Aboriginal Peoples Act 1954
Environmental Quality Act 1974 (Prescribed Premises) (Crude Palm-Oil) Regulations 1977
Environmental Quality (Clean Air) Regulation 1978
Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987
Factories and Machinery (Noise Exposure) Regulations 1989
Land Acquisition Act 1960
Land Conservation Act 1960, revised 1989
Malaysian Labour Laws
- Employment Act 1955
- Industrial Relations Act 1967 (Act 177)
- Employment (Termination and Lay-Off Benefits) Regulations 1980
- Employees Provident Fund Act 1951
- Social Securities Organisation Act 1969 (Socso)
- Workmen's Compensation Act 1952

National Forestry Act 1984
National Land Code 1965
National Parks Act 1984
Occupational Safety and Health Act 1994
Pesticide Act 1974 (Pesticide Registration) Rules 1988
Pesticide (Labelling) Regulations 1984
Pesticide (Sale and Storage Licencing) Rules 1988
Protection of Wildlife Act 1972
Sabah Biodiversity Enactment 2000
Sabah Environment Protection Enactment 2002
Sabah Environment Protection (Prescribed Activities) Order 2005
Sabah Labour Ordinance
Sabah Land Acquisition Ordinance (Cap. 69)
Sabah Land Ordinance (Cap. 68)
Sabah Water Resources Enactment 1998
Sabah Wildlife Conservation Enactment 1997
Sarawak Biodiversity Centre Ordinance 1997
Sarawak Land Code, Chap. 81, revised 1985
Sarawak Native Code 1992
Sarawak Natural Resources and Environment (Amendment) Ordinance 1997
Sarawak Natural Resources and Environment (Prescribed Activities) Order 1994 (Incorporating all amendments up to May 1997)
Sarawak Wildlife Protection Ordinance 1998
Use and Standards of Exposure of Chemicals Hazardous to Health Regulations 2000
Workers Minimum Standard of Housing and Amenities Act 1990

Malaysia is the world's largest exporter and the second largest producer of crude palm oil. The government has sought to promote the production of biodiesel derived from palm-oil to capitalise on the growing international demand for biofuels, seen as an alternative to fossil fuels amidst concerns over rising fuel costs, greenhouse gas emissions and energy security. The Malaysian government launched its National Biofuel Policy in 2006 to promote the commercialisation, use, export and research of biodiesel derived from palm oil. Since then, soaring palm oil prices coupled with a decline in fossil fuel prices have significantly reduced the economic viability of palm oil–based biodiesel production in the country. Consequently, biodiesel production is suppressed to about 10% or less of the total domestic installed capacity. In February 2010, the government decided to delay implementation of the mandate on the sale of B5 biodiesel blend until June 2011. The B5 mandate applies only to the Central Region of Peninsular Malaysia and it is unlikely that the domestic demand generated will be sufficient to sustain the industry. The current outlook for the Malaysian biodiesel industry looks rather uncertain, as no substantial government subsidies appear to be forthcoming in the near future. Furthermore, the industry is extremely vulnerable to fluctuating palm oil and petroleum prices and the development of restrictive biofuel policies in key consumer markets. This paper provides an overview of the development of the Malaysian biodiesel industry and a brief assessment of the effectiveness of national policies, strategies and laws that promote and regulate the industry.

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