



Policy and institutional frameworks for the development of palm oil-based biodiesel in Indonesia

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1. Introduction

Energy plays a central role in the global economy. Changes in energy costs have significant effects on economic growth. Increasing oil prices, rising energy demands and concerns over global warming have encouraged many countries to develop biofuels (FAO 2008, Verchot *et al.* 2010). In order to support the emergence of the biofuel sector, many countries have introduced incentives, such as consumption targets, tax breaks, production subsidies and reduced border tariffs. This has stimulated the growth of biofuel production and trade globally during 2000–2011.

Indonesia is seeking to take advantage of this emerging global market for biofuels, as are many developing countries. The country has extensive oil palm plantations and is now the world's leading producer of crude palm oil (CPO); thus, it is well positioned to develop biodiesel production. In 2009, Indonesia produced 20.9 million tonnes of CPO, and together with Malaysia supplied 85% of the global demand for palm oil (Teoh 2010). In order to capitalise on this potential and reduce Indonesia's oil import bill, the Government of Indonesia adopted the National Energy Policy in 2006. The overall goal of the policy was to increase biofuel use to 5% of national energy consumption by 2025. Timnas BBN, the taskforce charged with coordinating the development of biofuels, also aimed to develop up to 5.25 million ha of new biofuel feedstock plantations by 2010, 1.5 million ha of which was to be oil palm.

The expansion plans for oil palm and biofuels in Indonesia have become the subject of much political and environmental debate. Some see oil palm-based biodiesel as playing an important role in mitigating climate change, providing an alternative source of

energy, and contributing to economic development and rural livelihoods (Basiron 2007, World Growth 2009, Basiron 2010). Others are concerned about serious, unintended social, economic and environmental implications (Fitzherbert *et al.* 2008, ICTSD 2008, Marti *et al.* 2008, Bringezu *et al.* 2009, Sheil *et al.* 2009, Sirait 2009, Colchester 2010, FoE 2010). A recent study indicates that in southeast Asia nearly 60% of agricultural land was formerly forested (Gibbs *et al.* 2010). Dillon *et al.* (2008) argue that the impacts of oil palm plantations on forests are relatively limited, as out of 22 million ha of forest allocated for conversion, only 2 million ha were actually cleared and planted with oil palm.

Biofuels continue to feature prominently in Indonesian government development plans, and biofuel targets could have significant land use implications. Thus, it is important to take stock of the developments so far and examine the role of legal and policy frameworks in shaping the development trajectory of biodiesel and related oil palm plantations. This paper examines the historical development of oil palm and biodiesel production with the aim of understanding its legal architecture and the performance of related policies and regulations. It takes stock of progress so far and seeks to inform policy discussions. First, it reviews the evolution of the biofuel sector, then it analyses policy instruments and their contents, assesses the implementation of these policies at the national and local level, and examines the role and relative influence of key stakeholders. The paper concludes with recommended options for sustainable production of biofuels.

2. A short history of the biofuels sector in Indonesia

2.1 Oil palm development in Indonesia

The development of the oil palm sector in southeast Asia dates back to 1848, when four seedlings were transported from Africa to the botanical gardens in Buitenzorg (the present-day Bogor) in Java, Indonesia, which was under Dutch control. The descendants of these four palms were transferred to Deli in Sumatra, where they were initially used for ornamental purposes. The first large-scale Indonesian oil palm plantation was established by Dutch traders in 1911, using the seed from Deli palms. Eventually these plantations grew to cover an area of 200 000 ha. The Dutch colonial plantations were nationalised in 1957 after which they suffered a period of neglect and decline. From 1968, the government of then president Suharto created conditions for renewed investment in the forestry and plantations sector. Initially, the logging and wood processing sectors were much quicker to develop. However, in 1979, the development of private plantations and smallholder estates received renewed stimulus with financial aid from the World Bank (van Gelder 2006).

Despite the financial assistance from the World Bank, the growth of oil palm estates in Indonesia remained

modest until the mid-1990s, yielding to the timber, pulp and paper sectors. However, from the mid-1990s, as demand for edible oils in Europe and other emerging markets began to rise, the rate of expansion of oil palm estates in Indonesia began to increase as well (Figure 1). In 2009, the government estimated that Indonesia's oil palm covered 7 million ha, 60% in the form of large-scale plantations, and 40% owned and managed by smallholders. In 2010, the total plantation area reached 7.8 million ha (Slette and Wiyono 2011).

High demand for palm oil products, both domestically and abroad (especially from emerging markets such as China and India) has encouraged the Indonesian government to support oil palm plantation expansion in various parts of Indonesia. Most plantation concessions have been given out in Kalimantan and Sumatra. By 2011, nearly 11 million ha of land had been allocated for oil palm estates on these islands (Slette and Wiyono 2011) (Table 1). On average, less than half of this area has actually been developed into productive plantations. Thus, further growth can take place by maximising the use of land already allocated for oil palm.

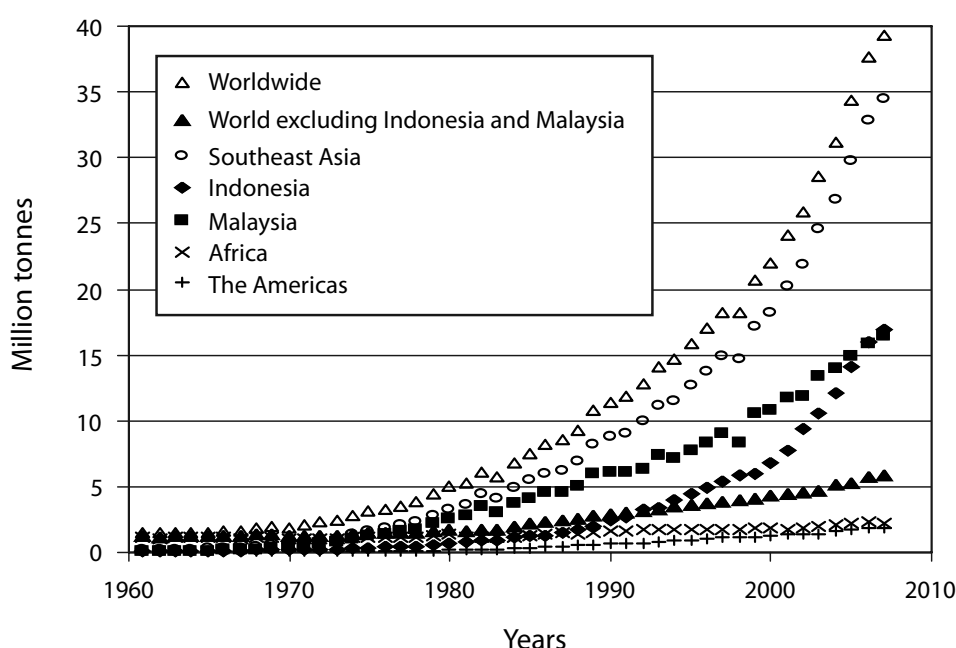


Figure 1. Growth of palm oil production in Indonesia and other key producer countries

Source: Sheil *et al.* (2009)

Table 1. Land allocated for oil palm plantation and its realisation

Island/province		Allocated land (ha)			Planted area (ha)	Realisation (%)	Status
		Location permit	Plantation permit	Cultivation rights			
Kalimantan	West	1 025 000			680 000	66	Jan 2010
	East	217 287	2 257 880	885 659	573 385	17	Oct 2010
	Central	973 163	1 576 996	575 639	1 631 216	52	Aug 2010
	South	373 919		259 344	312 669	49	Dec 2009
Sumatra	Jambi	1 100 000			486 136	44	Dec 2009
	South	1 400 000			708 056	51	Dec 2009
	Bengkulu	730 360			413 020	57	Dec 2009

Source: Slette and Wiyono (2011)

However, new applications for oil palm plantation concessions are being encouraged as well. The main target for new concessions is eastern Indonesia, particularly Papua. In recent years, the area of land acquired for commercial plantation estates in Papua has increased significantly. Oil palm is by far the dominant plantation commodity for which land is being acquired. In 2010, 142 000 ha of land were allocated for oil palm plantations in Papua, of which 38 000 ha have been developed into productive plantations. About 1.5 million ha of new plantation permits are being processed by government authorities, while an additional 2.1 million ha of oil palm plantations and 0.4 million ha of sugarcane estates are at the proposal stage (Papua Province Plantations Bureau, personal communication).

2.2 Biofuel development and plantation targets

Biofuel development roadmap

Since 2005, biofuels have increasingly attracted the Indonesian government's attention due to their potential to reduce the country's reliance on fossil fuels, while providing an additional market outlet for palm oil products. According to the Ministry of Energy and Mineral Resources, petroleum consumption reached 60 billion litres in 2005,¹ more than the country produces. At the current rate of extraction and use, Indonesia's existing oil reserves will last only 25 years (DESDM 2007).

¹ This consisted of 20 million kilolitres of premium grade petroleum, 22 million kilolitres of diesel fuel, 12 million kilolitres of kerosene, and 6 million kilolitres of crude (bunker) oil for burning (in boilers, sugar factories and wood treatment plants, etc.).

Because Indonesia has long been dependent on fossil fuel for revenues and to support economic development, it has become increasingly urgent to conserve the remaining reserves and adopt alternative sources of energy. In 2005, state revenue from the oil and gas sector was about US \$19.2 billion (24% of gross domestic product). Nevertheless, the production level of Indonesian oil has declined during 2000–2010, while consumption levels have increased. Oil and condensate production in 2006 was 1.01 million barrels a day, a decrease of 5% compared to the year before (DESDM 2007), while the consumption level was nearly 1.2 million barrels per day (US Embassy 2007). Indonesia is now a net oil-importing country and its economy is greatly affected by fluctuations in global fossil fuel prices. The spike in the global price of oil in 2008 had important implications for the Indonesian economy. Fuel subsidy costs almost doubled from US \$4.4 billion in 2005 to US \$7.4 billion, which is almost 10% of the total state budget (Dillon *et al.* 2008). It is expected that biofuel development will reduce expenditure on fossil fuel subsidies.

Based on Indonesia's roadmap for biofuel development, prepared by Timnas BBN, biofuels are expected to constitute 5% of the national energy mix by 2025, totalling 22.26 billion litres of biodiesel, bioethanol and bio-oil (Table 2). The use of biodiesel is expected to account for 10% (or 2.4 billion litres) of the total diesel fuel consumption by 2010 and 20% (or 10.22 billion litres) by 2025.

To further support the development of biofuels, Timnas BBN formulated several key strategies including fiscal incentives, price mechanisms, infrastructure development, land procurement

Table 2. Roadmap for Indonesia's biofuel development

Fuel	Use		
	2005–2010	2011–2015	2016–2025
Biodiesel	10% of diesel fuel consumption 2.41 million kilolitres	15% of diesel fuel consumption 4.521 million kilolitres	20% of diesel fuel consumption 10.22 million kilolitres
Bioethanol	5% gasoline consumption 1.48 million kilolitres	10% gasoline consumption 2.78 million kilolitres	15% gasoline consumption 6.28 million kilolitres
Bio-oil			
Biokerosene	1 million kilolitres	1.8 million kilolitres	4.07 million kilolitres
Pure plantation oil (PPO) for power plants	0.4 million kilolitres	0.74 million kilolitres	1.69 million kilolitres
Biofuel	2% of energy mix 5.29 million kilolitres	3% of energy mix 9.84 million kilolitres	5% of energy mix 22.26 million kilolitres

Source: Timnas BBN (2006)

assistance, development of special biofuel zones and increasing the number of energy self-sufficient villages (Timnas BBN 2006). Timnas BBN estimated that large-scale investment in biofuels would not only enhance energy independence and reduce the burden of fuel subsidies, but it would also generate employment and revenues. Table 3 and Table 4 show the expected benefits and required inputs by 2010 and 2015. A review of what has been achieved, particularly for palm oil and jatropha, which are the major concern in this paper, will be undertaken in Section 6.

Land area targets for biofuels

The National Biofuel Team (Timnas BBN) projected that meeting biofuel blending targets would require about 5.25 million ha of land by 2010 and 10.25 million ha by 2015. In order to secure the land for biofuel feedstock plantations, Timnas BBN tasked one of its land procurement working groups to 'ground truth'² land suitable for biofuels. The group worked to synchronise data from different institutions such as the Ministry of Agriculture, the National Land Agency and the Ministry of Forestry. The working group produced an estimate showing that Indonesia possesses approximately 27 million ha of 'unproductive forestlands' that can potentially be converted into plantations for biofuel feedstocks

(Colchester *et al.* 2006). These 'unproductive forestlands' are forest areas considered damaged beyond recovery as a result of destructive logging, shifting cultivation and other activities. The Ministry of Forestry also indicates that there are about 22.8 million ha of convertible forestlands that could potentially be used for biofuel plantations (MoF 2008).

The working group produced land suitability maps focusing on three major feedstocks for biofuels (oil palm, jatropha and sugarcane), identifying four types of land considered suitable for biofuels. The lands and the resulting estimates include:

- Forestlands which have been legally released for nonforestry purposes, but for which associated plantation business permits have not been issued (about 2.7 million ha);
- Abandoned land³ and degraded land⁴ (about 0.3 million ha);

3 Based on Government Regulation No. 36/1998 and No. 11/2010 regarding the control and use of abandoned lands, 'abandoned land' is defined as land for which use rights have been granted, but the land has not been used as specified in the rights. This type of land can be taken back by the state after being verified as 'abandoned' and after the holder of rights has been sent a series of warnings.

4 Based on Directorate General of Forest and Land Rehabilitation Decree No. 41/1998 regarding guidance for watershed management, 'degraded land' is defined as lands that are – due to physical, chemical and biological processes – considered to have lost their hydrological and production capacity.

2 Ground truth is a term used in cartography, meteorology, analysis of aerial photographs, satellite imagery and a range of other remote sensing techniques in which data are gathered at a distance. Ground truth refers to information that is collected 'on location.' (http://en.wikipedia.org/wiki/Ground_truth).

Table 3. Biofuel development in Indonesia, 2010 projection

Parameter	Unit	Palm oil	Jatropha	Sugarcane	Cassava	Total
Direct labour	People	750 000	500 000	1 500 000	750 000	3 500 000
Income per capita	US \$/year/person	2 160	1 458	987	1 296	5 901
Bioethanol/ biodiesel	Tonnes of oil	6 000 000	2 250 000	3 750 000	4 615 385	16 615 385
Production	Tonnes	30 000 000	7 500 000	60 000 000	30 000 000	127 500 000
Industry	Unit	167	22 727	125	288	23 307
Land area	Ha	1 500 000	1 500 000	750 000	1 500 000	5 250 000
Indirect labour	People	1 167	68 182	6 250	11 538	87 137
Seed	Tonnes	202 500 000	3 750 000	6 000 000	12 000 000	224 250 000
On-farm investment	US \$ (millions)	4 860	486	1 215	567	7 128
Off-farm investment	US \$ (millions)	1 080	245	4 725	4 673	10 723

Note: Indonesian rupiah values are converted into US \$ based on www.oanda.com, 10 May 2011.

Source: Timnas BBN (2006)

Table 4. Biofuel development in Indonesia, 2015 projection

Parameter	Unit	Palm oil	Jatropha	Sugarcane	Cassava	Total
Direct labour	People	2 000 000	1 000 000	3 500 000	750 000	7 250 000
Income per capita	US \$/year/person	2 160	1 458	987	1 269	5 901
Bioethanol/ biodiesel	Tonnes of oil	16 000 000	4 250 000	8 750 000	5 100 000	34 100 000
Production	Tonnes	80 000 000	15 000 000	140 000 000	30 000 000	265 000 000
Industry	Unit	444	45 455	292	319	46 510
Land area	Ha	4 000 000	3 000 000	1 750 000	1 500 000	10 250 000
Indirect labour	People	3 111	136 364	14 583	12 750	166 808
Seed	Tonnes	540 000 000	7 500 000	14 000 000	12 000 000	573 500 000
On-farm investment	US \$ (millions)	12 960	972	2 835	567	17 334
Off-farm investment	US \$ (millions)	2 880	491	11 025	5 164	19 560

Note: Indonesian rupiah values are converted into US \$ based on www.oanda.com, 10 May 2011.

Source: Timnas BBN (2006)

- c. Lands where plantation business permits are no longer active (about 2.4 million ha);
- d. Convertible production forestlands.⁵

The first three types of land total to 5.4 million ha. The available land convertible production forest is

⁵ Law No. 41/1999 on Forestry states that Indonesian forest lands are divided into three major functional categories: production forest, protection forest and conservation forest. Convertible production forest is forest which is projected to be deforested for nonforest uses, such as agriculture, estate crops and settlement. The decision to release this land from the forest estate is subject to ministerial approval based on proposals from industry. Once the land is released, its new use may yield products subject to regulation by the local government.

mostly located in the eastern part of the country (Maluku and Papua) and covers about 13.7 million ha. These preliminary land estimates require further steps to confirm with local government institutions whether they are actually available. This also requires coordination between the Ministry of Agriculture, Ministry of Forestry and the National Land Agency, etc. (Timnas BBN 2006, 2007).

3. Sectoral policies relevant to biofuels

This section describes general policies on energy and specific regulations on production, processing and investment. It also explores the government's role in supporting farmers and small- and medium-size enterprises in the biofuel industry through various incentives such as taxes, pricing, subsidies, production targets and other fiscal and nonfiscal instruments.

3.1 General policies on energy and biofuels

One of the key policies for the development of biofuels in Indonesia is Presidential Regulation No. 5/2006 concerning the National Energy Policy. The policy provides a biofuel incorporation target of 2% of national energy consumption by 2010, increasing to 5% by 2025. It tasked the Ministry of Energy and Mineral Resources with developing a national energy management blueprint, covering various energy sources, including biofuels. The blueprint outlines the government's strategies for the management and use of energy resources. Based on this blueprint, the Ministry of Energy and Mineral Resources estimates that the annual production capacity for biodiesel should increase from 1.16 billion litres in 2010 to 4.16 billion litres in 2025 (DESDM 2006).

Presidential Regulation No. 5/2006 was followed by Presidential Instruction No. 1/2006, which provides the framework for coordination among ministries of the development, supply and use of biofuels. It designates ministries responsible for formulating and implementing policies covering: incentives; tariffs and trading systems; standards and procedures for cultivation, processing, quality testing, supply and distribution of biofuels; the provision of land; and the development of research and technology. It also states that provincial governors, district heads and mayors should support and promote the establishment of a domestic biofuel industry.

Presidential Decree No. 10/2006 established a national biofuels taskforce, or Timnas BBN, comprising representatives from government

institutions and corporations, and individuals with an interest in biofuels. The taskforce consists of a steering committee, organising committee and working groups on various themes, such as policy and regulations, land procurement, cultivation and production, markets, and infrastructure. It was tasked with developing a roadmap for biofuel development, defining the necessary steps to be taken by respective institutions, and evaluating the implementation of biofuel policies.

The taskforce eventually issued a blueprint for biofuel development; however, this blueprint is frequently criticised for the manner in which it was produced. Despite the need for public participation and consultation, the blueprint was developed with limited involvement from stakeholders such as the business sector, nongovernmental organisations and the scientific community. Stakeholder input was sought only when the final draft was released.⁶

3.2 Regulatory framework and incentives for investment and production of biofuels

In February 2006, the National Standardisation Agency approved biodiesel and bioethanol standards, which were based on similar standards in the United States and European Union.⁷ The Ministry of Energy and Mineral Resources issued new fuel specifications, which permit diesel and gasoline fuels to contain up to 10% fatty acid methyl ester (biodiesel) and 10% bioethanol. This decree allowed Pertamina to start selling B51 and E52 fuel in mid-2006.⁸

6 In an interview with one of the directors of the Agency for the Assessment and Application of Technology (BPPT), Jakarta, 28 April 2010, it was revealed that the document was formulated by just three scientists from this institution who served as members of the national team for biofuel development.

7 Biodiesel (SNI 04-7182-2006) and bioethanol (SNI DT27-0001-2006) standards were approved. These standards were based on the United States' standard (ASTM D6751) and the European Union's standard (EN14214:2002).

8 The Director General of Oil and Gas Decree No. 3674 and Decree No. 3675 issued on 17 March 2006.

In order to encourage a more conducive business climate for biofuels in Indonesia, in October 2006 the Ministry of Energy and Mineral Resources issued an additional regulation (No. 051/2006) that provided potential investors with guidance on obtaining permission to produce, purchase, sell, export and import biofuels. The regulation requires biodiesel companies to guarantee a continuous supply of biofuel for domestic needs. It also stipulates that the permit granted is valid for up to 20 years and may be extended.

To further support the development of biofuel industries in Indonesia, in 2008 the Minister of Energy and Mineral Resources issued a regulation (No 32/2008) governing the production, trade and use of biofuels. This regulation specifies targets for the phased introduction of biofuels up to 2025, for transportation, industry, and power generation sectors. Industry and other commercial sectors are required to use at least 5% biodiesel (of their total fuel consumption) by 2010, 10% by 2015 and 15% by 2020. The regulation also provides fiscal and nonfiscal incentives for those who implement the phased mandatory use of biofuels. For example, value added tax levied on the transfer of biofuels will be absorbed by the government (Ministry of Finance Decree No. 156/PMK.011/2009).

The biofuels industry is one of the sectors eligible for incentives detailed in Government Regulation No. 1/2007. These incentives take the form of income tax reduction, accelerated depreciation and amortisation, and a government guarantee against operational losses.

In 2009, Presidential Regulation No.45/2009 was issued concerning the procurement and distribution of biofuels. This regulation mandates the Ministry of Energy and Mineral Resources to determine the market price of petroleum and biofuels. In the same year, the government decided that the House of Representatives would consider a subsidy of

IDR1000 (US \$ 0.1) per litre for biofuels if the cost of production was higher than that of petroleum. The subsidy allocated for biofuels in 2010 was IDR2000 (US \$0.2) per litre and the government proposed increasing the subsidy to IDR2500 (US \$0.27) per litre for 2011 (The Jakarta Post 2010a).

3.3 Regulations to support small- and medium-size biofuel enterprises

In late 2006, the Ministry of Finance issued Decree No. 117/PMK.06/2006 to provide subsidised loans to farmers to help them develop biofuel plantations. The decree provides credit to farmers at an interest rate lower than that offered by commercial banks, particularly for planting oil palm. It is interesting to note that *jatropha* is not targeted by this decree.

In 2007, the Minister of Finance issued a decree (No. 79/PMK.05/2007) which enables small- and medium-size enterprises to obtain subsidised financing for food and energy crops. The decree was issued in order to get national banks to support government projects for food security and biofuel feedstocks such as sugarcane, corn, sorghum and cassava. Loans can be given to farmer groups or cooperatives for the designated commodities. The banks do not charge a credit commission or administrative fees; however, they do impose a commercial interest rate. For its part, the government provides an interest subsidy to farmers or cooperatives for a period of 5 years.

The biodiesel industry and biofuel feedstock growers benefit from another regulation issued in 2007, Government Regulation No. 8/2007, which focuses government financing on long-term investment projects deemed important for economic development of the country. In collaboration with the private sector or state-owned companies, the government can provide investment funds to help develop production facilities and supporting infrastructure.

4. Extra-sectoral policies relevant to biofuels

The palm oil and biofuel industries are also governed by laws and policies beyond the biofuels sector and include such policy areas as investment, land tenure and allocation, business development, environmental protection and decentralisation.

4.1 Investment policies

Investment reforms were introduced in 2006 and cover five policy areas: (i) general investment policies; (ii) customs; (iii) taxation; (iv) the labour market; and (v) small- and medium-size enterprises (Supratikto 2007). The Infrastructure Development Package provides the policy framework for public–private partnerships and risk sharing to enable accelerated development of infrastructure. The Financial Sector Reform Package aims at improving coordination between the government and the central bank (Bank of Indonesia), and continuing steps to strengthen the banking industry, nonbank financial institutions and the capital market.

These reform packages seem to have achieved some progress. The risk sharing framework for infrastructure, for example, has been completed, the Customs Law has been revised, and a new Investment Law was issued in March 2007. At the same time, deregulation, administrative and bureaucratic reforms are underway, aimed at increasing the efficiency and effectiveness of public service provision (Supratikto 2007).

Indonesia's new investment law (No.25/2007) is aimed at reinvigorating investment, creating jobs and reducing poverty. The new law replaces the long standing laws on foreign and domestic investment dating back to the 1960s (Down to Earth 2007). In addition to fiscal incentives, the investment law provides investors with other facilities. As mentioned in Articles 21 and 22, the government will assist investors in obtaining land rights with longer tenure. The previous regulations grant investors, including oil palm developers, the right to cultivate (or *hak guna usaha* – HGU) for only 35 years, which may be extended by another 25 years. The new investment law allows plantation companies to lease lands for up to 60 years for the first business cycle, which can be extended for another 35 years. Similarly,

the right to construct and use buildings (or *hak guna bangunan* – HGB) is now granted for a longer term. This right, which is used by investors to build agricultural processing plants and other facilities, can be granted for up to 50 years, with a possible extension of another 30 years. Formerly, this right could be granted for only 30 years with a possible extension of another 20 years. Longer tenure could, however, be granted to those companies that make a long-term investment, help Indonesia increase its economic competitiveness, use state-owned lands, do not require extensive land and do not contradict the public interest.

Although all stipulations regarding investments apply to both domestic and foreign companies, there is an exception in terms of land acquisition. Foreign investors' entitlement to land rights and usage are restricted. Law No. 18/2004 on estate crops stipulates that foreign investors, whether legal entities or individuals, wishing to engage in estate crop plantations must establish joint ventures with Indonesian legal entities (Article 13). In accordance with the Basic Agrarian Law, ownership rights or *hak milik* over land may not be given to foreign investors, neither individuals nor legal entities. The law permits foreign investors, having established a joint venture, to obtain the right to cultivate, the right to construct and use a building and the right to use or *hak pakai*.

President Regulation No. 36/2010 regarding the lines of business closed and open with conditions to investment, stipulate that foreign investors in oil palm plantation and jatropha can hold shares of up to 95% of a joint venture.

4.2 Land allocation and plantation enterprise policies

Article 18 of the 1945 Basic Constitution implicitly recognises the existence of *adat* or customary rights and institutions, but makes these rights subsidiary to national objectives. These rights have been repeatedly ignored in order to prioritise national interests as stated by government institutions (e.g. ministerial objectives such as establishing large-scale plantations and infrastructure projects, seen as important for national economic development). Similarly, the

Basic Agrarian Law (No. 5/1960) explicitly states that indigenous laws will be recognised, as long as they do not contradict national interests. This law also grants powers to the state to control land, water and resources, and make decisions on how natural resources are allocated and used.

Law No. 41/1999 on Forestry recognises traditional forests which are under the jurisdiction of customary communities. However, it classifies customary forests as 'state forest'. It enables customary communities to manage and use customary forest 'as long as they are evidently in place and their presence is acknowledged'. A customary community can only obtain the rights to use and manage customary land or forest if their existence is acknowledged by the state. Although they may have been using the land for many generations, they do not have the right of ownership. While the development of large-scale plantations is often presented as a national priority, which will generate revenues and employment, and improve the livelihoods of local communities, in practice this has often led to the displacement of customary landowners. Although there are regulations regarding how investor companies should approach local communities and make mutually acceptable land use arrangements, including appropriate compensation, the legal position of customary landowners is weak.⁹

Once investors have completed their application at the Investment Promotion Bureau, they have to apply for business licences from the office of the governor or district head, and for land allocation at local National Land Agency offices. Law No. 41/1999 on Forestry indicates that forests may be converted for nonforestry purposes such as plantations, transmigration and agricultural settlements under certain conditions. The more recently issued Government Regulation No. 10/2010 concerning the procedure for changing forest status and functions, states that forests can be converted to accommodate development needs, while ensuring that the remaining forest cover is sufficient. It further stipulates that forest conversion can only take place in convertible production forestlands, regardless of

whether the lands are forested or nonforested (Article 19). The possibility for establishing plantations on either forested or nonforested areas warrants further analysis, as it has implications for the continued conversion of forests to plantations. In addition to establishing oil palm plantations on degraded lands to promote low-carbon development, such a policy is likely to encourage investors and authorities to continue clearing forests as long as forests continue to offer profits from the sale of timber as well as profits from developed oil palm plantations.

Government Regulation No. 10/2010 and the subsequent Ministry of Forestry Decree No. P.34/Menhut-II/2010 concerning the procedure for reclassifying forestland functions are intended to further delineate and optimise the use of forestland. These regulate changes of function in forest areas designated as conservation, protection and production forestlands. If the criteria for certain forest functions are no longer met due to changes in biophysical conditions, the forest's function can be changed. For example, conservation and protection forestlands can be changed into production forestlands if they no longer meet the criteria for conservation. Production forests can also be changed into conservation or protection forests. Permanent and limited production forests can be changed to convertible production forests, where most oil palm plantations are established. It is also possible to change convertible production forests into permanent or limited production forests, if they are deemed to possess important biodiversity. Government Regulation No. 10/2010 (articles 33–42) prevents production forestland from becoming convertible production forest in provinces with forest cover of less than 30% of the land area.

In order to obtain a plantation business license, an investor must first secure a location permit issued by either a governor or regent, depending on the location of the proposed area. A location permit is a license given to the plantation company to enable it to obtain other necessary permits so they can move ahead with land clearance and infrastructure development etc. The license is valid for 1 year for plantation areas less than 25 ha, 2 years for areas of 25–50 ha, and 3 years for areas over 50 ha. If the proposed investment area is in one of the forest zones, the investors must apply to the Ministry of Forestry for approval to release this land for conversion.

⁹ See, for example, the Head of National Land Agency Regulation No. 2/1999 concerning location permits and No. 21/1994 concerning procedures for acquisition of lands for the purpose of investment. While these regulations lay the foundation for how lands should be transferred and necessary compensation made to land owners, they assume that the lands should be released. There are no special regulations governing how the lands should be protected if the landowners decide not to release them.

The procedure for converting forestland into plantations can be separated into several stages. First, applicants (who can be governors, district heads, private companies or foundations) submit their application for the release of forestlands to the Ministry of Forestry, accompanied by a technical proposal. Once the application has been assessed, the Ministry of Forestry issues either a letter of rejection or approval for the release of forestland. The approval letter is valid for 1 year and can be extended twice, for up to 12 months in total. The letter provides the basis for the investors to have the boundaries delineated. Once delineation is complete, the Ministry of Forestry will issue a decree stating that a particular forestland area has been released. Subsequently, this land is no longer under the jurisdiction of the Ministry of Forestry but of the National Land Agency.

In terms of land allocation for biofuel feedstock, a separate Ministry of Agriculture decree (No. 26/Permentan/Ot.140/2/2007) regarding guidelines for obtaining estate crop licences states that a company may be granted a plantation license covering up to 100 000 ha for oil palm, 150 000 ha for sugarcane and 50 000 ha for jatropha. There is a special provision for plantation investment in Papua, where the maximum plantation size may be doubled, due to the perception that vast areas of land are available for development.¹⁰ In order to provide practical guidelines for implementation, the Ministry of Forestry issued Decree No. P.22/Menhut-II/2009 stipulating the size and manner in which forest areas can be converted to estate crop plantations. Forest areas of up to 100 000 ha per company or a group of companies can be converted to plantations, but the clearance permit is given progressively starting at 20 000 ha. In West Papua and Papua provinces, the permitted size is double this.

Biofuel and oil palm development are also governed by two other key policies. Law No. 25/2004 mandates authorities at different levels to prepare 20-year, 5-year and 1-year development plans, outlining vision, mission, strategies and policy instruments. Law No. 26/2007 provides the basis for national and local agencies to develop spatial plans outlining land use. These spatial plans are valid for 20 years and may be reviewed every 5 years. Land use planning in Indonesia is complex and often confusing. It can

¹⁰ Article 12, paragraph 3 of the Ministry of Agriculture Decree No. 26/Permentan/Ot.140/2/2007 regarding guidelines for obtaining estate crops licenses.

take many years before a plan is approved, since the process is not only technical but also political, and involves various actors with competing interests.

4.3 Policies to support different business models

Smallholder estates expanded after 1979 through a government initiative, the Nucleus Estate and Smallholder Scheme (NES), supported by the World Bank (Casson 1999). Under this scheme, private developers (known as nuclei) prepare plots of land for smallholders located nearby. As these plots mature (usually after 3–4 years) operations are transferred to the smallholders (known as plasma), who develop the plantations under the supervision of the nucleus developers. These developers are required to purchase the oil palm fruit from the smallholders. Since the NES scheme was initiated, smallholder plantations have expanded under the Pir-trans programme (1986–1994) and the Prime Cooperative Credit for Members (KKPA) scheme (1995–1998).

The planted area held by smallholders grew from nothing in 1978 to 824 298 ha in 1997 and production jumped to more than 1.15 million tonnes of crude palm oil. In 1997, most smallholder estates were found in Jambi, North Sumatra, Riau and West Kalimantan (Casson 1999).

To support plantation development in Indonesia, the government has developed a number of schemes including Pir-bun; Pir-trans (nucleus and plasma) through Presidential Instruction No.1/1986 on plantation development; and KKPA through a joint decree by the ministries of Agriculture and of Cooperatives and Small and Medium-scale Enterprises.¹¹ Under these programmes, the government assumed the responsibility for infrastructure development and the acquisition of lands. Land clearance was frequently managed by contractors, in exchange for timber rights. The Ministry of Agriculture initiated a 'revitalisation programme' (Decree No. 33/Permentan/OT.140/7/2006) aimed at promoting

¹¹ Indonesian palm oil investment policies have had three distinct periods. During 1968–1988 growth in the subsector came through direct government investments via plantation limited companies. During 1988–1994, most expansion occurred via a joint government–private sector development scheme known as Pir-trans. More recently, the government has initiated a programme of government-supported private sector and cooperative investment known as Prime Cooperative Credit for Members (KKPA) (Larson 1996).

the development of estate crop plantations through expansion, regeneration and rehabilitation activities. This initiative was financially supported by the World Bank, the government, and private companies. Participating farmers were granted access to credit at preferential rates to develop their plantations. Private companies also acted as partners, applying for credit and then channelling the funds to farmer groups.

The government has also sponsored the development of smallholder schemes. The standard arrangement consists of a 20:80 distribution of land between a large estate and smallholdings.¹² The smallholders are located on the periphery of the nucleus. The government provides financing to smallholder groups for planting, living expenses and housing. The nucleus estate is responsible for extension services, as well as for collecting and processing fruit bunches. It was expected that smallholder schemes of this kind would be attractive to rural communities and would facilitate development.

4.4 Policies to ensure environmental sustainability

Law No. 23/1997 on environmental management requires any business enterprise to take full account of the environmental implications of its business operations. In order to obtain a plantation permit, a prospective company must have approved documents, comprising an environmental impact assessment (EIA) and environmental management and monitoring plans. The documents detail potential impacts on the environment and plans for monitoring and managing of those impacts. EIA documents are a tool to help decision makers determine whether or not a project should continue. Government Regulation No. 27/1999 on Environmental Impact Assessment further determines the criteria for significant environmental impacts. Environmental issues to be assessed include physical aspects such as climate, air pollution, soil erosion and hydrological systems; biotic features such as flora and fauna, or biodiversity; social aspects such as labour, income, land tenure and control, and regional economy; and cultural impacts such as conflict, social cohesion, customary rights, and people's perception of the proposed project. In addition, health aspects should also be assessed.

The Ministry of Environment is responsible for the application of EIA law and related regulations. The national-level Environmental Impact Management Agency, Bapedal is authorised to make any decisions on the approval of EIA documents. At the regional level, the governor is responsible for making these decisions. National and local EIA commissions work in collaboration to evaluate EIA documents and provide recommendations to government institutions as input for decision making.

Oil palm plantations covering more than 3 000 ha are subject to EIA. Plantations of this size are considered to have significant impacts on soil, water, ecosystems and social conditions. In addition, according to Law No. 18/2004, oil palm companies are not allowed to clear or manage land for plantations through burning because this leads to excessive pollution and environmental damage. If a company is found to have deliberately used this method, the perpetrator is subject to 10 years imprisonment or a fine of IDR10 billion.

4.5 Decentralisation policies

During 1999–2004, the Government of Indonesia launched a number of decentralisation policies,¹³ which granted provincial and district governments greater authority to manage responsibilities previously under the control of central government. Decentralisation has provided opportunities for the realisation of democratic governance, getting people closer to the decision making process, creating a greater space for public scrutiny over policy implementation. Previously marginalised groups have strengthened their territorial claims and affected negotiation over forest uses. However, the rush to implement policy has resulted in various contradictions among regulations, and a significant lack of coordination among institutions (Turner and Podger 2003, McCarthy 2004, Barr *et al.* 2006).

Local governments can introduce regulations and impose new taxes on investments. While the decentralisation policy was intended to increase efficiency, improve public service and empower local stakeholders, in many regions changes in local

12 Ministry of Agriculture Decree No. 353/Kpts/KB.510/6/2003.

13 Law No. 22/1999 which was replaced by Law No 32/2004 on Regional Autonomy and Law No. 25/1999 which was replaced by Law No 33/2004 on the Fiscal Balance between the Central Government and the Regions. A special autonomy law for Papua was issued in 2001 (Law No. 21/2001)

governance and administration have resulted in trade barriers and high investment costs. In many cases, regional policies hinder and discourage potential investors. Among the key reasons for slow investment rates in the post decentralisation period has been the conflicting and overlapping nature of licenses issued by local and central authorities. The licensing process became more costly, time consuming and inefficient (Akhtar 2003). As foreign investment began to stall, the Indonesian government took steps to improve the investment climate and investor confidence.¹⁴

Local governments now have greater autonomy to make decisions on such sectors as spatial planning, environmental management, investment, agriculture, forestry and mining. In the biofuel and agricultural sector, for example, governors and district governments may issue location permits and licenses for oil palm development. However, if the proposed site for plantation is located in forestland, the central

government still has the authority to decide whether forestlands may be converted. Investors must submit applications for forest conversion to the Ministry of Forestry and often face delays in license approval, despite having already secured permission from the provincial and district governments.

Papua has a greater degree of autonomy than other regions of the country and has the authority to establish an unusual cultural institution, the Papuan People's Assembly, tasked with protecting the cultural and customary rights of native Papuans. Papua also has special powers to govern and administer various sectors, including agriculture and forestry, through the issuance special regional regulations (or *perdasus*) and provincial-level regulations (or *perdasi*). However, it remains unclear how this special power translates into natural resource management, including biofuels and oil palm management, as most of the relevant regulations are still being prepared and debated.

¹⁴ A good indication of the country's investment climate is the World Bank's report 'Doing business 2011', which ranks Indonesia in 121st place (World Bank 2010), an improvement from the rank of 135 in 2007.

5. The political economy of biofuels in Indonesia

5.1 Main actors shaping the oil palm and biofuel sector

The key stakeholders in biofuel and oil palm development in Indonesia are described in Table 5.

5.2 The case of Merauke Integrated Food and Energy Estate (MIFEE)

Following the international food and energy crisis of 2008, the Government of Indonesia initiated the Merauke Integrated Food and Energy Estate in Papua, in 2009, in an effort to secure food and energy resources in Indonesia. The project was initially expected to cover 2 million ha, supported by significant foreign and domestic investment (Damardono 2007). However, following public pressure over possible environmental damage and social conflicts, smaller versions of the project have been discussed: 1.2 million ha, 700 000 ha, or 500 000 ha (Bisnis Indonesia 2010a, 2010b, RAPERDA Merauke 2010). The 1.2 million hectare plan appears to be emerging as the consensus; this is also the size indicated in the Regency Draft Regulation on MIFEE (RAPERDA Merauke 2010). According to this draft regulation, 420 000 ha of plantations will be developed during 2010–2014 and further 630 000 ha will be planted during 2015–2019. In the final stage (2020–2030), an additional 230 000 ha of plantation will be developed.

The concept behind MIFEE began with the Merauke Integrated Rice Estate proposed in 2007 by the Ministry of Agriculture, to establish a large rice plantation and processing complex in Merauke. For a while, the project attracted the attention of investors from the Middle East (Bin Ladin Group) (The Jakarta Post 2008). However these plans were eventually dropped due to criticism over potential deforestation, lack of government guarantees on concession rights, and conflict with local land users (Ekawati and Satriastanti 2010).

Despite these difficulties, the district government of Merauke and the Ministry of Agriculture became strong proponents of the MIFEE project, reportedly

seeing it as an opportunity to tap into corporate financing and advancing the cause of establishing South Papua Province (Zakaria *et al.* 2011). The corporate actors quickly recognised the potential opportunities to be gained in this context and moved ahead with investment pledges. Ito *et al.* (2011) pointed out that from the beginning the policy discourse around this project appealed to corporate actors. Merauke was viewed as an ideal place for large-scale land acquisition – a frontier region with a vast area of relatively accessible land, which has so far remained undeveloped. The investing corporations shaped the policy-making process by focusing the discussion on the urgency and benefits of plantation expansion for food and energy, in the context of global instability.

In 2005, the area saw the arrival of the first major oil and gas conglomerate, the Medco group, that made a strategic decision to diversify into renewable fuels. As part of this diversification, the group established a local subsidiary and in 2007 began the construction of a woodchip plant and a pulp mill with an annual capacity of 500 000 tonnes by 2012 (Wright 2008). It persuaded the local government and the Ministry of Forestry to approve its application for a 300 000 ha timber plantation concession. Medco group enjoyed wide-ranging support from the local government and secured the industry and plantation permits in record time. The District Head of Merauke considers forestry and plantation investment an important vehicle for strengthening his political base in order to create South Papua Province.¹⁵ Medco group emerged as the key supporter of MIFEE and has lobbied strongly for its implementation. It has encouraged other companies to invest as well. As of 2010, 36 companies have committed to invest in the development of about 1.2 million ha of plantations. Medco has joint venture agreements with some of them (e.g. Kertas Nusantara), through which it can control and use other concessions. Medco itself has also established a number of subsidiaries through which it has acquired additional land (Bapinda 2010). Acquiring areas of land of that size would be difficult anywhere

¹⁵ The district head sees the project as a success story that can support his effort to retain power and become governor of the new province (EIA and Telapak 2009).

Table 5. Key stakeholders in the biofuel and oil palm sectors in Indonesia

Stakeholders ^a	Description, interests and motivation
Affected communities	Some communities feel that oil palm has positively affected their livelihoods, providing a steady income, access to health facilities and basic education. Other communities consider oil palm as having negative impacts on their livelihoods and capital.
Indonesian Association of Biofuel Producers (APROBI)	APROBI is an association of private business entities, some of which have established biofuel plants and links to oil palm growers. In 2007, 5 of the 22 APROBI members had biofuel processing facilities, with a total installed capacity of 1.1 million tonnes per year. Unfortunately, only 15% of the capacity was being used due to limited domestic demand and supplies.
Indonesian Palm Oil Association (GAPKI)	This association of oil palm companies was established to develop oil palm plantations and join companies to function as an economic entity that would help improve prosperity and government revenues, and would increase the bargaining position of oil palm companies in the international market. In 2011, the association has 382 members and has been active in providing inputs to the development of policies (e.g. market prices). ^b
Indonesian Palm Oil Commission (KMSI)	The commission, comprising government and private sector elements, was established to foster synergy among oil palm stakeholders, encourage investment in oil palm and promote the country's palm oil in international markets while counteracting the negative campaigns by nongovernmental organisations (NGOs).
NGOs	NGOs have diverse interests. Some of them are proponents of oil palm plantations, highlighting the arguments that oil palm benefits local communities and produces local revenues and employment. Others, however, believe that biofuel development has negatively affected local communities and ecosystems, and should be carefully managed.
Provincial and district governments	Most provincial and district governments consider oil palm plantations and palm oil-based biodiesel development critical for the development of their regions. These industries are regarded as important for the generation of revenues, employment and welfare. This view is particularly obvious in regions which are dependent on agriculture and those newly created (as a result of regional division). Provincial and district governments have the authority to issue location permits and conduct environmental impact assessments. Depending on the scale and geographical location of the proposed concessions, provincial and district governments also have the authority to issue plantation permits that enable investors to start operations.
Roundtable on Sustainable Palm Oil (RSPO)	The roundtable comprises oil palm growers, banks and investors, consumer goods manufacturers, social and environmental NGOs, palm oil processors, and retailers. It has 388 ordinary members, 103 affiliate members and 10 supply chain associates. As of November 2010, certified outputs are 3.25 million tonnes of palm oil and 641 000 ha of oil palm plantations.
Scientific community	This group includes academics and research institutes. While their views are rarely heard in oil palm and biofuel debates, they play a major role in providing scientific evidence and informing decision-making processes. Despite their neutrality, their views on whether biofuels are sustainable are influenced by their institutional missions. Some support and others oppose the expansion of oil palm.
Small-scale oil palm growers	This includes family-based enterprises producing oil palm on less than 50 ha. In 2010, 42% of the country's oil palm plantations (7.8 million ha) were managed by communities. Through various schemes, smallholders play a significant role in the development of the oil palm industry.

Sources: The content has been compiled from different sources, including primarily stakeholders' official website, when available.

a The above stakeholders are in addition to national government institutions and the biofuel taskforce.

b It is the association's role to express its members' interests and concern about specific policies affecting business performance. However, the association and its members disagree, as indicated in their response to the recently issued Presidential Instruction No. 10/2011 on the postponement of the issuance of new licences for business on primary forests and peatlands. While the executive director of the association protested that the instruction will adversely affect oil palm industries, one of its member and a leading oil palm company, PT Smart, considered the instruction a positive step and in line with the company's policy to conserve forests (Kontan 2011).

else in Indonesia and political connections play an important role here.

Several government regulations directly or indirectly facilitate the development of MIFEE. In October 2009, the central government issued Law 41/2009 on the protection of arable land for agriculture. The law is intended to protect existing farm land for food production. It also allows corporate farming ventures, with the government owning a 51% share and foreign investors owning the remaining 49%. In November 2009, the government introduced Law No.39/2009 on Special Economic Zones for Merauke.¹⁶ This law provides investing companies with fiscal incentives, such as reduced corporate income taxes, reduced land taxes, and exemption from value added and luxury goods taxes, such as on private cars, helicopters and airplanes. The companies can also enjoy nonfiscal incentives, such as streamlined immigration procedures and easier access to land and business permits. Unlike existing free-trade zones – which are restricted to international companies – imports of raw materials and exports of finished products will not be tax exempt, but goods produced in the special economic zones will be allowed to be sold on the domestic market. Investors can have their business permits in less than 14 working days, compared to 30–60 days elsewhere, and bypass all licensing laws laid down by local administrations.

In 2010, the government introduced three regulations related to MIFEE in a relatively short time. First, on 22 January, the government passed Regulation No.10/2010 on the Procedure for Forest Conversion, which provides a legal basis for changing the status of convertible production forests into nonforestry lands for development purposes, such as mining, plantations, road development, railways, security and defence. On the same day, the government issued Regulation No.11/2010 on the Control and Use of Abandoned Land, which is expected to facilitate land acquisition for biofuel plantations. On January 28, the government issued Regulation No. 18/2010 on Plantation Enterprise Establishment, which states that in Papua food plantation investors can acquire up to 20 000 ha per company. However, this regulation is not followed in practice.

¹⁶ Special economic zones have been a government strategy since 2006 to increase foreign investment.

The district government is also in the process of preparing the legal framework for the implementation of MIFEE.¹⁷ It plans to issue three supporting regulations on investment procedures and incentives, community empowerment, and protection of indigenous land and resource rights. Civil society groups have raised concern over limited public consultation on proposed regulations.

5.3 The creation of the Indonesian Sustainable Palm Oil standard

In March 2011, the government of Indonesia officially launched the Indonesian Sustainable Palm Oil (ISPO) standard as put forward in the Ministry of Agriculture's decree No. 19/Permentan/OT.140/3/2011. The standard is designed to make palm oil production sustainable in compliance with Indonesian laws and regulations. The standard will be implemented in 2011 on a trial basis and will be mandatory – contrary to the voluntary Roundtable on Sustainable Palm Oil (RSPO) standard – for all oil palm plantation companies operating in Indonesia by 2014. ISPO standard is still being prepared to comprise 7 principles, 39 criteria and 128 indicators covering licensing and plantation management, cultivation and processing, environmental monitoring and management, labor, social and economy empowerment, and business (Dirjenbun 2011b). Some of these aspects may overlap with the RSPO's standard comprising 8 principles, which focus on transparency, compliance with applicable laws and regulations, economic and financial viability, best agriculture practices, environmental and conservation of natural resources and biodiversity, labour and nearby communities, responsible development of new plantings and continuous improvement in key activities.

The government established this new standard for several reasons. Industry representatives expressed disappointment over the inability of RSPO to reassure the international market of Indonesia's commitment to sustainability (Paoli *et al.* 2010). They were stung by increasing criticism of several major oil palm producers by international environmental NGOs. RSPO certification is also considered too costly for smallholders and small- and medium-size companies (The Jakarta Post

¹⁷ Interview with Marco Wattimena, Director of WWF Indonesia Region Sahul, 23 May 2010, Merauke.

2010b). The government was also motivated by the inability of the country's producers to gain a fair price, as this is mostly driven by the buyers. With the new standard, it is expected that Indonesia could determine the selling price of its crude palm oil (CPO) (Antaranews 2011). Interestingly, the Directorate General of Estate Crops offers a different justification for the new standard. It argues that the adoption is not because of demands from other countries and markets, nor is it due to negative issues facing Indonesia's oil palm industry. Instead, it claims this is an expression of the nation's fundamental attitude towards sustainable development as mandated in the Basic Constitution of 1945 (Dirjenbun 2011). While increasing awareness of the importance to produce sustainable palm oil, the new standard also serves to accelerate Indonesia's production of sustainable palm oil and enhance the country's palm oil competitiveness in the world market. It also supports the greenhouse gas emissions reduction programme and Indonesia's commitment to reducing emissions, as described in a letter of intent between Indonesia and Norway on REDD+ (Dirjenbun 2011b).

It is clear that corporate actors joining an association like GAPKI or the KMSI have a powerful influence on the government's decision to issue regulations that would force all oil palm companies to adopt the new standard. Several executives of GAPKI, for instance, urged companies to boycott or quit the RSPO, alleging that the organisation has departed from its original objective and mission (The Jakarta Post 2010b). Through its website, GAPKI expressed concern over decisions made by Unilever on the temporary suspension of future purchase of CPO from Sinar Mas. It further questioned the credibility of RSPO as a multistakeholder forum that promotes sustainable palm oil.

Questions remain as to whether ISPO will gain credibility in the international arena as its rival, the RSPO has. The RSPO is increasingly accepted, as indicated by the increased volume of certified palm oil. This new standard could face obstacles to gaining international acceptance since Indonesia is seen as a country that faces governance problems. ISPO credibility thus depends on the extent to which the new standard can provide solutions to key issues, including greenhouse gas emissions reductions, use of peat lands and high-conservation value forests.

6. Implementation and performance of biofuel policies

6.1 Realisation of intended targets

In 2007, when Indonesia's biofuel policies went into effect, investment in the biofuel sector was significant. In addition to private sector actors, banks and government institutions were also involved in supporting growth of the sector (Timnas BBN 2006). However, in late 2007, 17 biodiesel companies were reported by the Indonesian Association of Biofuel Producers (APROBI) to have reduced their production or temporarily suspended operations. In 2008, only five mills continued operating. As a result, the production of biodiesel fell by 60% (Sugiyono 2008). This decline was caused by a drop in oil prices and a spike in the price of crude palm oil (CPO), which made palm oil-based biofuels uncompetitive. The price of CPO continued to rise on international markets, reaching a peak in March 2008 at US \$1146 per metric tonne. In April 2011, the price of CPO was nearly at the same level.¹⁸

Despite the fact that Indonesia is the largest producer of CPO, palm oil-based biofuel development in this country has been constrained by the tendency for most CPO production to be channelled towards the domestic food market and exports. About 25.7 % of CPO produced in Indonesia is consumed as cooking oil and other edible fats, while approximately 6% is used for biofuels. About 73% of all CPO produced is exported.

In 2007, eight palm oil-based biodiesel refineries were in operation in Indonesia with a combined annual processing capacity of 765 000 tonnes of CPO. Because of the increase in CPO prices, in mid-2007 the initial blending target was temporarily reduced from 5% to 2.5% and the refineries were reported to be operating on a fraction of their production capacity. Despite these difficulties, Indonesia's biodiesel sector has endured and over the years has shown a modest growth in production (Table 6). However, the development of biofuels has fallen far short of expectations in terms of the rate of production growth and contribution to the national economy.

One of the reasons biofuel production did not meet targets was the failure to significantly reduce petroleum subsidies, which distort the energy market and make biofuels uncompetitive. The high international price for CPO, which is beyond the government's control, has also discouraged biofuel production. Investors are encouraged to export their CPO products for higher profit. Government also seem to promote the export of CPO, for it benefits from high taxes on export revenues. The government sets a variable tax on exported CPO depending on its sale price (Minister of Finance decree No. 233/PMK.011/2008).

The government charged a tax of 25% of CPO market price as of March 2011 on exported CPO. The value of CPO exports increased from US \$6.7 billion in 2009 to US \$9 billion in 2010, although the volume of CPO exported in both years was the same: 11 million tonnes. This is a significant increase compared to CPO value in 2005, which was only US \$1.6 billion. Such increased revenue is likely to have discouraged actors involved in the oil palm industry from investing in the domestic biofuels industry.

The implementation of the European Commission's Renewable Energy Directive will also make it tough for Indonesian producers to export to Europe. The directive sets out sustainability criteria for biofuels and mandates that only biofuels that reduce greenhouse gas emissions by 35% (with an emissions saving of at least 50% from January 2017 and 60% from January 2018) compared to petroleum use are acceptable.

The Ministry of Energy and Mineral Resources estimates that, in June 2008, the biofuel industry employed 1040 people in processing and distribution (Legowo 2008). The ministry also claims that about one million jobs had been created in the plantation sector. This employment growth is however associated with the oil palm sector as a whole and not solely with the production of feedstock for biofuels. The Ministry of Agriculture indicated that during 2005– 2009 annual new employment from the estate crop sector, primarily oil palm plantations, was about 430 000 (Dirjenbun 2011a).

¹⁸ See Index Mundi's website showing monthly palm oil prices at <http://www.indexmundi.com/commodities/?commodity=palm-oil&months=300>.

Table 6. Crude palm oil required to meet biodiesel targets in Indonesia

	2006	2007	2008	2009	2010	2011
Biodiesel production (kilolitre)	24 000	35 000	110 000	350 000	400 000	400 000
CPO requirement (metric tonne)	24 742	36 082	113 402	360 825	412 371	412 371

Source: Adapted from Slette and Wiyono (2011) and APROBI (2010). It is assumed that 1 metric tonne of CPO is required to produce 0.97 kilolitres of biodiesel

While not limited to biofuel feedstock development, the Director General of Estate Crops claimed that farmer's incomes have increased from US \$920 per household, per 2 ha, per year in 2005 to US\$ 1607 in 2010, or an annual increase of 12.24% (Sinar Tani 2011).

The Ministry of Energy and Mineral Resources reported that by 2009, they had developed 612 energy self-sufficient villages from the 2010 target of 1000, 183 of which are based on biofuel feedstocks such as jatropha, oil palm, sugarcane and cassava (DESDM 2010a). In 2010 another 50 energy self-sufficient villages were established, 33 of which have developed biofuels (DESDM 2010b).

In terms of plantation area targets, the achievements are difficult to verify. This is because feedstocks such as oil palm, sugarcane and cassava are intended for various purposes, not only for biofuels. While plantation of biofuel feedstocks have expanded, little information is available about the commitment of specific areas for biofuel production, or the proportion of the existing feedstock plantations that is devoted to supplying the biofuel industry. Nevertheless, demand for lands for establishing biofuel feedstocks, especially oil palm which requires a relatively extensive area, have been in competition with demands for land for other purposes. The expansion of biofuels has also been affected by the government's plans to build infrastructure, settle communities and produce food for a growing population. Other competing demands for land include plans for implementing reducing emissions from deforestation and forest degradation (REDD+) schemes; the International Finance Corporation's plan to promote forest plantations on degraded lands; and large conservation organisations' ambitions to establish more protected areas. Presidential Instruction No. 10 issued in May 2011, which is part of the government's commitment to implement

REDD+, for example, deserves further examination. The instruction directed various government institutions to postpone for two years from May 2011 the issuance of new licences for forestry and agriculture businesses, including oil palm plantations, planned to be established on primary forests and peat lands.

While not all oil palm plantations are associated with biofuels, the following figures are given to provide indications of the size of plantations. In 2006, when various policies on biofuels were issued and started to take effect, the total area planted with oil palm in Indonesia was about 3.59 million ha. By 2009, this had increased to 4.5 million ha (BPS 2010), an increase of 920 000 ha in 3 years. This is similar to the estimated 300 000 ha annual growth in plantations claimed by many (EIA and Telapak 2009). Given that the CPO produced from these plantation is for various purposes, the 1.5 million ha target for oil palm feedstock for biofuels set by Timnas BBN was overly ambitious. In its strategic plans, the Ministry of Agriculture Directorate General of Estate Crops projected that around 3.79% of the total CPO produced during 2010–2014 will be allocated for biofuels. It therefore plans to allocate 925 000 tonnes of CPO in 2011 for biofuels and 1 million tonnes in 2014 (Dirjenbun 2010).

Timnas BBN's target to establish 1.5 million ha of jatropha plantation by 2010, and 3 million ha by 2015 seems too ambitious, particularly when compared to the area of jatropha plantations reported by the Ministry of Agriculture. Following the issuance of the Presidential Instruction No. 1 regarding the supply and use of biofuels in 2006, jatropha plantations grew from 2600 ha in 2005 to 9310 ha in 2009, an annual growth of 46.46%. By 2014, it is projected that jatropha plantations will reach 21 000 ha, which could produce 8000 tonnes of jatropha oil to supply domestic biofuel

needs (Dirjenbun 2010). However, while Timnas BBN projected that *jatropha* will produce around 7.5 million tonnes oil by 2010, the Ministry of Agriculture set a target of only 15 000 tonnes by 2010 or 35 000 tonnes by 2014 (Dirjenbun 2010).

6.2 Implementing biofuel policies at the subnational level

As well as addressing national government institutions, Presidential Instruction No. 1/2006 mandated governors and district heads to implement biofuel policies at the local level by promoting their use and facilitating the acquisition of lands intended for biofuel feedstocks. Ministry of Agriculture Regulation No. 26/Permentan/Ot.140/2/2007 on guidelines for the establishment of estate crop plantations gave governors the authority to issue plantation business permits for investors where the proposed concessions lie across district boundaries. District heads are also authorised to issue such permits for concessions within their districts. The ministry's regulation adheres to the presidential instruction, indicating official desire to ensure that any licencing for estate crop enterprises, including oil palm plantations, should be used to fulfil the biofuel need.

Most stakeholders in three provinces surveyed, West Kalimantan, Papua and West Papua, had a good understanding of policies promoting the use of biofuels. Most local government officers were also aware of their own functions in the development of biofuel feedstocks. However, their perception of biofuel feedstocks was skewed towards *jatropha*. This is understandable given that the government intensively promoted the establishment of *jatropha* in Java, Kalimantan, Nusa Tenggara, Papua, Sulawesi and Sumatra, as part of its programme on energy self-sufficient villages. Some plantations, mostly small scale, are claimed to be successful; however, others ended in failure. One of the success stories, for example, came from Papua where around 500 farmers in Biak-Numfor and Jayapura had established 500 ha of *jatropha* by the end of 2010, supported by Eco-Emerald.¹⁹

A series of interviews and field observations indicates, that farmers in various regions have been

unsuccessful in planting *jatropha*. For example, despite government support and investor interest, community-based *jatropha* projects covering 50 000 ha in East Nusa Tenggara ended in failure in 2006 (Vel Jacqueline 2007, Ama 2008). GFA Consulting (2007) found the failure could largely be attributed to low quality seeds and poor irrigation. In addition, farmers were reluctant to plant *jatropha* because prices were too low to offset the cost, and few buyers were interested (Anggal 2008). The reluctance to plant *jatropha* among farmers in certain regions of Papua has posed a challenge for local government and Timnas BBN in reaching the 2010 1.5 million ha target for *jatropha* plantation.

There are no clear linkages between the increase in oil palm plantation area and the biofuel programme targets, as mandated in the Timnas BBN plan. For example, in December 2009, West Kalimantan province had 325 oil palm companies, covering 3.6 million ha (Dinas Perkebunan Kalimantan Barat 2010). Between January 2007 and January 2010, 19 new companies applied for forestland conversion permits covering 260 000 ha in order to develop oil palm plantations. Four of them obtained forest conversion permits from the Ministry of Forestry, some are still awaiting approval, and others are completing the boundary delineation process (Dinas Kehutanan Kalimantan Barat 2010). Despite the fact that some of these applications were made after the issuance of national biofuel policies, there is no clear indication that these plantations are intended for biofuel production. Invariably, the companies involved explain that CPO has multiple uses (food, cosmetics, energy) and the ultimate decision about the end-use depends on market conditions.

In Papua, local governments responded positively to the national biofuel policy by issuing a local regulation in 2008 supporting sustainable development of oil palm plantations. The regulation adopts seven principles. One of the seven specifies that all CPO produced from oil palm plantations established in the province will be used to fulfil global biofuel needs. In interviews with various government institutions, no satisfactory answers were provided as to whether and how this policy has been implemented. Implementation of the plantation development plan has been very low in Papua province. Existing oil palm plantations cover only about 180 000 ha in this province which is much less than in other provinces. However, 70 investors are

¹⁹ Based on interviews with field staff of Eco-Emerald in Jayapura, June 2010.

waiting for approval of their proposed concessions in Papua, covering 3.5 million ha.²⁰ While all of them follow the procedure and requirements set in the ministry of agriculture's regulation mentioned earlier, it is unclear how the investors would be obliged to allocate CPO produced from their plantation for biofuel needs. It remains to be seen the extent to which they are supporting national biofuel policies.

6.3 Unintended consequences

This section describes the unintended consequences of biofuel development and the expansion of oil palm estates, and identifies possible policy gaps that may have undesirable outcomes.

Uncompetitive prices and high subsidies for biofuel development

In Indonesia, biofuels cannot yet compete with petroleum-based fuel. It is often assumed that biodiesel could be competitive and profitable when international CPO prices are on par with crude oil (Anonymous 2008). However, in 2008, although crude oil prices rose dramatically to US \$145 a barrel (Amadeo 2011), biofuels were still more expensive than petroleum-based fuels and required heavy government subsidies. The difference between the market price of biofuels and the cost of their production is considerable in Indonesia. Pertamina, the state-owned oil enterprise assigned to purchase biofuel products, has to spend IDR9000 to produce 1 litre of biodiesel, which is sold at IDR4300 per litre (Reuters 2008). The government subsidy only covers IDR1000, and the remaining IDR3700 must be paid by Pertamina. This creates a deficit that the company is ill-equipped to absorb. According to the Ministry of Energy, in 2008, Pertamina's losses due to biofuel blending totalled IDR774.5 billion (US \$70 million) (Sasistiya and Liem 2009). Dillon *et al.* (2008) estimated that total government allocations for biofuel development, including Pertamina's losses, between 2006 and the first half of 2008 were IDR1500 trillion (US \$1.6 billion). Actual subsidy levels are likely to have been about IDR1793 billion (US \$197 million), comprising Pertamina's losses and interest rate subsidies for plantation renewal, as well as training, research and development relating to biofuel feedstock cultivation.

²⁰ Based on interviews with officials at Dinas Perkebunan dan Peternakan and Investment Promotion Board of Papua Province, 5–8 April 2011.

Environmental impacts

Deforestation is one of the key issues facing the oil palm industry, especially in Indonesia, where lowland rainforests contain high levels of biodiversity (Spencer 2007, Koh and Wilcove 2008). While it is generally agreed that oil palm plantations have contributed to deforestation in Indonesia (Zakaria *et al.* 2007, MoE 2009), the extent and whether or not oil palm is the primary cause is still open to debate. It is not clear whether oil palm is the prime driver of deforestation or whether it is following in the footsteps of logging and resettlement schemes. A total of 22 million ha of forest was allocated for conversion to oil palm plantations up to 2007 (Dillon *et al.* 2008). Out of this, only 2 million ha were actually cleared and planted with oil palm. The remaining 5 million ha were developed on lands that have been allocated for non-forestry purposes including agriculture and infrastructure etc. This would indicate a relatively limited impact of oil palm on forest. However, it is important to note that 14 million ha have been cleared 'in the name of oil palm' by unscrupulous companies using concessions for alternative purposes (e.g. logging) (Casson *et al.* 2007). The Indonesian Oil Palm Research Institute (IOPRI) calculated that 3% of all oil palm plantations in the country are established in primary forests, while 63% are in secondary forests and scrub. Thus, 66% of all existing productive oil palm plantations were established from forest conversion (MoF 2008a). Gibbs *et al.* (2010) estimate that worldwide during 1980–2000 more than 55% of new agricultural land came at the expense of intact forests and only 28% came from disturbed forests. In southeast Asia, nearly 60% of new agricultural land came from intact forests and more than 30% from disturbed forests.

Research carried out in Boven Digoel district, Papua shows strong correlations between oil palm plantation development and deforestation. In 2000, the concession area contained 21 000 ha of primary forest. In 2005, this area had declined to 19 000 ha, and by 2008 had decreased further to 9000 ha. At the same time, the oil palm plantation area increased from 7500 ha in 2000 to almost 12 000 in 2008 (Andrianto *et al.*, in preparation).

Article 19 of Government Regulation No. 10/2010 stipulates that forests that can be converted into plantations, including oil palm plantations, shall be within the 'convertible production forestlands' zone. It further stipulates that those forests can be forested

or not. This regulation seems to provide a legal basis for clearing forests, contradicting the country's commitment as voiced by the president at the G20 meeting in Pittsburgh on 25 September 2009. That commitment is to reduce emissions from land use, land use change and forestry by 26% in 2020 from forecasted business-as-usual levels, and by 41% with international assistance. The subsequent regulation is likely to undermine efforts to reduce deforestation and to prioritise degraded lands or grassland areas for estate crop plantations, as many studies have recommended. It will also undermine efforts to rationalise forestlands, bringing back forested land into the forest category, and prioritising the release of nonforested lands for conversion.

The current policy governing ceilings on concession areas should also be reviewed, and the ingrained perception of abundantly available land in Papua should also be reconsidered. It is possible that an oil palm company, for example, can be granted a plantation license covering up to 100 000 ha, with the clearance permit given progressively starting at 20 000 ha (or 40 000 ha in Papua). Without proper plans and adequate monitoring, land-grabbers would be encouraged to exploit and clear relatively large areas, which often cause deforestation, while being able to establish plantations of only limited size.

The conversion of natural forests has been associated with biodiversity loss, causing declines in populations of iconic species such as orang-utan and Sumatran tiger (Brown and Jacobson 2005, Koh and Wilcove 2008). Oil palm is considered a poor replacement for natural tropical forest. Recent studies indicate that it ranks behind planted forest, agroforest and community woodlots in terms of the number of species it is able to support (Fitzherbert *et al.* 2008).

Forest conversion is also causing global environmental problems, especially greenhouse gas emissions. Deforestation and land conversion contribute 15%–25% of global carbon emissions (PEACE 2007). Biofuels are considered 'carbon neutral', but the carbon dioxide (CO₂) sequestered during growth of the feedstock is equivalent to the CO₂ emitted when burning the fuel. Oxfam (2008) estimated that by 2020, emissions associated with Indonesian and Malaysian palm oil production would total around 4.6 billion tonnes of CO₂. Beer *et al.* (2007) have shown that nitrous oxide (N₂O), a greenhouse gas with a warming potential 296

times that of CO₂, is often released with the use of fertilisers.

Oil palm plantations and the palm oil milling process can cause serious pollution problems if not correctly managed. Air pollution can arise during the conversion of land to oil palm plantations, as burning is the cheapest and most efficient means of clearing land of vegetation (Zakaria *et al.* 2007).²¹ Also, soil disturbance during land clearing and planting causes erosion. Oil palm plantations have been associated with elevated concentrations of sediment, agrochemicals and nutrients in rivers and streams (Wakker 2004; Hayashi 2007; Kesaulija *et al.*, in preparation), causing adverse effects on fish and other animals and contaminating drinking and washing water.

Recent research in West Kalimantan found that poor water quality may be associated with fertiliser pollution. The conversion of peat forests into oil palm plantations significantly reduces the land's capacity to store water. Consequently, some areas may suffer from water surplus and other areas may suffer water shortages (Anshari *et al.* in preparation). Access to clean water is a fundamental human right and an essential prerequisite for good health and access to food. Although oil palm plantations are established in areas of relatively high rainfall, some have reported that local rivers have far less water than before the plantations existed. There are also reports of increased flooding during the rainy season, with plantations apparently limiting the ability of catchment areas to retain water (Marti *et al.* 2008).

Environmental impact assessment (EIA) policies highlight the need to assess thoroughly all environmental impacts likely arising from projects such as oil palm plantations. However, most plantation companies tend to neglect what they have promised in their environmental management and monitoring plans. Government institutions responsible for monitoring and evaluating progress are also poor at enforcing environmental obligations, partly due to limited funds and expertise (Spooner 1998).

The latest national statistics estimate that by the end

²¹ Since 1997, burning for land preparation has been banned in Indonesia. In June 2002, Indonesia signed an anti-haze treaty with the ASEAN countries, but that does not prevent fires and haze from occurring every year in the dry season.

of 2010 oil palm plantations will cover 7.8 million ha (Dirjenbun 2009). Bisinfocus (2006) estimated an annual rate of expansion of 400 000–500 000 ha during 2006–2020 compared to an average of 300 000–400 000 ha during 2000–2006. As land suitable for oil palm becomes increasingly scarce in Sumatra, most of the future expansion will occur in Kalimantan and Papua. Expansion may become more closely linked to biofuels, considering that the Ministry of Energy is proposing to allocate 14 million ha of conversion forests in Kalimantan, Maluku and Papua for biofuel feedstock cultivation (Timnas BBN 2007, Legowo 2008).

Social impacts

Large-scale oil palm plantations have frequently been associated with negative social impacts on rural communities and indigenous people. Marti *et al.* (2008) found many cases of human rights abuses by plantation companies, especially during land acquisition and plantation development. Other studies indicate that most conflicts between plantation developers and communities occurred due to a lack of recognition of customary rights, breached agreements, broken promises and disregard for the local environment (Colchester *et al.* 2006, Down To Earth 2007, German *et al.* 2010). Sawit Watch reported that by 2010 the number of conflicts in the area of oil palm plantations was 630,²² while the Land National Agency reported 3500 cases of related conflicts.

It is generally assumed that oil palm cultivation is an important source of income for rural communities and migrant workers. Independent oil palm smallholdings generate high returns, making them highly competitive with rubber and much more profitable than rice production (Feintrenie *et al.* 2010, Rist *et al.* 2010). This is indeed the case for people above a certain threshold of income and skill, since oil palm cultivation requires a certain amount of experience. Hence, oil palm development in Kalimantan is likely to be more beneficial for the local communities who have already had some exposure to oil palm rather than for indigenous Papuans who have no experience of it (Kesaulija *et al.* in preparation). While oil palm appears to be a means to improve income, the way oil palm is introduced and taken up affects social relations and land ownership in rural areas in ways that may

ultimately work against the well-being of poor people (McCarthy 2010).

In some cases, oil palm can lead to a worsening of livelihood conditions (Marti *et al.* 2008, Kesaulija *et al.* in preparation). Orth (2007) shows that oil palm development in Central Kalimantan has adversely affected the shifting cultivation practices of the local Dayak communities, threatening their food security.

The lack of enforcement of EIA policies also creates adverse social impacts. The approved EIA document specifies how any company is expected to take measures to empower local people living around the plantation by, for instance, providing public facilities and education support. However, the failure of company's to make good on these commitments, partly due to lack of monitoring of EIA implementation by proper authorities, often result in poor relations and even conflicts between the company and local communities. It is also surprising to know that oil palm plantation companies often run their businesses without approved EIA documents, particularly in Papua and West Kalimantan (Zakaria *et al.* 2007, FoE 2010).²³

Article 74 of Law No. 32/2009 concerning environmental protection and management reinforced the importance of monitoring and supervision of EIA implementation. While it remains to be seen whether it will be effectively implemented, government officers are granted greater authority to monitor the implementation of environmental safeguards, to enter plantation areas unexpectedly, and to stop any wrongdoings.

Social problems often emerge during the preparatory stages and land acquisition process for plantations, especially in Papua. They sometimes include people's resistance to the company's investment and compensation plans. Such resistance leads to demonstrations and efforts to block the company's launch of operations. Even though regulations are in place to prevent such conflicts, there are weaknesses in the regulation. The Minister of Agriculture/ Head of the National Land Agency Regulation No. 2/1999 concerning location permits, for instance, sets out landholder consultation stages. Investors are required to disseminate information on possible

22 Based on a research interview, dated 30 July 2010.

23 This was also acknowledged by staff at the Agency for Environmental Management and Control in Papua, during a series of research interviews in May 2010.

impacts, clarify investment plans, collect relevant social and environmental data and allow landholders to suggest alternative actions and determine levels of compensation for the loss of their land. The regulation notably omits the possibility that the landholders might reject the proposed plans for the use of their land. They are only granted the opportunity to negotiate the terms of the transfer of their rights, including the mechanism of the transfer, that is, by a sale–purchase (acquisition) transaction, payment of compensation, by way of land consolidation or by some other process agreed upon by the landholders and the investor.

Investors are also obliged to hold a public hearing concerning the plantation plan, before EIA documents can be prepared. The public is allowed 30 days for comments and suggestions. Through its regulation, the Head of the National Land Agency, also stipulated that transfer of land from customary land owners to companies shall be displayed in a written form in front of the head of the local Land Office. However, in practice, local communities often do not have a say in the process. The government agency which is supposed to serve as a neutral facilitator or mediator often sides with the investors.

7. Conclusions

The picture that emerges from this analysis of biofuel development in Indonesia is one of ambitious targets and promotion policies that have failed to be realised. In 2006, Indonesia adopted targets for biofuel production, supported by fuel blending policies and investment incentives. The objective of these measures was to reduce Indonesia's dependency and expenditure on petroleum-based fuels, which amounts to 30% of the national budget. In addition, biofuels were viewed as an avenue for economic development in rural areas.

These expectations are yet to be realised. In 2007–2008, due to a global spike in food prices, the government abandoned its early targets for development of the biofuel industry. The government allowed Pertamina to reduce the biofuel content of blended fuel in 2007 and 2008, with most biofuel processing facilities operating well below their installed capacities. Frequently, biofuel refineries operated irregularly; temporarily suspending operations when facing unfavourable market conditions. Several plants ceased operations all together. As the prices crude palm oil (CPO), the main feedstock for biodiesel, decreased in 2009, the Indonesian government revived hopes for a profitable biofuel sector by implementing a subsidy scheme for blended fuels. These measures ensured a modest level of biofuel production but it was still well below the established targets.

In general, the government has fallen far short of its biofuel targets. One reason is the failure to significantly reduce fossil fuel subsidies, which distort the energy market and make biofuels uncompetitive. Another reason, beyond the capacity of government to control, is the high international price of CPO, which discourages biofuel production and lure relevant actors to promote CPO export. The sustainability criteria of the EU Renewable Energy Directive make it difficult for Indonesia's producers to export CPO to Europe.

Various sectoral policies on energy have provided a strong basis for the development of biofuels in

Indonesia. The establishment of a taskforce and presidential instructions to government agencies to accelerate the procurement and use of biofuels have been constructive in producing a road map and outlining the role of relevant actors. However, coordination is poor among government agencies in making sure that the supply and use of biofuel feedstocks are in line with the roadmap. Given that palm oil is intended for various purposes and the price of CPO is volatile, it is impossible to ensure the portion of palm oil allocated to fulfilling the biofuel target, and to identify that certain plantations are allocated for biofuels. While oil palm plantation permits continue to be issued, there are no clear attempts to ensure that they correlate with the plan to produce biofuels.

Some extra-sectoral policies exert influence on how oil palm plantations perform, in terms of their capacity to adopt environmentally sustainable and equitable principles to benefit local stakeholders. Good policies governing land allocation and measures for mitigating undesirable impacts are essential, since the government is attempting to fulfil biofuel production targets primarily through large-scale plantation expansion. Challenges also lie in how different interests are accommodated in the spatial planning process and the conversion of forests to nonforestry lands. In addition to meeting the government's plans to build infrastructure, settle communities and produce food for a growing population, there are also other competing demands for land. These include plans for reducing emissions from deforestation and forest degradation (REDD), the International Finance Corporation's plan to promote forest plantations on degraded lands, and large conservation organisations' ambitions to establish more protected areas. This will undoubtedly affect the expansion of biofuels.

Oil palm can be beneficial for local livelihoods. It can spur local development and create numerous jobs, but it requires a certain level of prior knowledge and experience. Some evidence suggests that using palm oil for biofuel has had an adverse impact on

food security, because it results in rising prices for key staples in Indonesia. There is also evidence that oil palm plantation development contribute to deforestation and biodiversity loss. Oil palm development has also been found to adversely influence the quality of air, water and soil. Due to these destructive practices, there are serious doubts whether biodiesel produced from palm oil can be carbon-neutral. Historically, large-scale land acquisition for oil palm plantations has also been associated with the marginalisation of local communities, land grabbing practices, and adverse changes in community livelihood support systems.

While numerous comprehensive policies have been put in place, the fundamental problem lies in how they are implemented. Cases of adverse social and environmental impacts of oil palm demonstrate the need to take adequate measures to implement and monitor environmental impact management plans, and to sanction those who fail to adhere to regulations. In the process of land allocation and acquisition, it is also necessary to review regulations governing concession size and conversion of forests. The current regulations allowing forest conversion, without detailing conditions or area, will undoubtedly lead to deforestation. Investors are encouraged to establish plantations at the expense of forests. The size of plantation concessions must be

limited and the perception that Papua has vast tracts of unused land must be changed.

Many actors shape biofuel and oil palm development. Policy proposals and investment recommendations often come as a result of extensive lobbying and informal agreements among stakeholders with political influence. However, criticism from environmental groups and research institutions have reduced the size, or put on hold, some projects. Many of these investments are political in character or are driven by speculation on land and commodity prices.

It is important that oil palm plantation development for biofuels is reconsidered and planned carefully. The government should prioritise the use of nonforest lands for plantations. Policies designating areas for plantation should seek to exclude forested land. The availability and preparedness of the local labour force must be an important consideration. Where the local population cannot provide sufficient labour and there is an influx of migrant workers, social and land conflict become inevitable. In cases where labour import is necessary, tenure safeguards must be implemented for local communities. Finally, steps must be taken to enable fair community engagement in plantation ventures, whereby the government has an active role in supervising and enforcing contract agreements, benefit sharing and dispute resolution.

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This paper reviews the effectiveness of the legal and institutional frameworks for promoting and regulating biofuel development in Indonesia. It provides an overview of the development of the oil palm biodiesel sector since 2006, following the implementation of dedicated biofuel policies and regulations. The paper examines production targets and evaluates their implementation. It also discusses possible reasons for the limited realisation of biofuel targets and explores the unintended consequences of legislation.

Findings suggest that biofuel development in Indonesia suffers both structural problems (e.g. insufficient land for feedstock, biofuel market instability, inadequate incentives) and political barriers (e.g. unclear land allocation policies, conflict over land, local power structures that require the investment of time and resources). Feedstock plantations, notably oil palm, are associated with a number of problems, such as deforestation and shifts in land ownership structures – largely as a consequence of inadequate laws and enforcement. To ensure the sustainability of biofuel development in Indonesia more effective collaboration across administrative structures and improved enforcement of environmental protection and land regulations are needed.

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