

BIOFUEL INDUSTRY IN INDONESIA: SOME CRITICAL ISSUES

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FUEL PRICE AND ENERGY CRISIS

The politics of energy is always a delicate matter to any government, including the current Indonesian government. Mismanagement can trigger the fall of a government, as is the case with the Suharto regime, who decided to increase the fuel price in mid-1998. It came as no surprise, therefore, that only very few circles accepted President Susilo Bambang Yudhoyono's decision to raise the fuel price twice, in March and October 2005, by 126 per cent.

As predicted, the unpopular decision led to inflation up to 17.95 per cent for the period of February 2005 – March 2006 with a long chain of effects. Prices of basic commodities soared, with the price of rice uncontrollably moved up from Rp 3,500 per kg in August 2005 to Rp 5,000 in August 2006. Communities destituted by the hiking prices are forced to consume *nasi aking*, rice of very low quality normally used as feed in poultry and sold at Rp 1,000 per kg. After decades, severe malnutrition broke out, this time worse than ever, as shown in the cases found in the provinces of East and West Nusa Tenggara.

The National Socio-Economic Survey (SUSENAS) published by the Central Bureau of Statistics in March 2006 reveals that the number of those living below the poverty line had increased by 17.75 per cent from previously 35.05 million before the fuel price hike to 39 million, after the hike.¹ Open employment also increase from 10.9 million in February 2005 to 11.9 million in November of the same year. The rural sector noted that nominally daily wages of farm workers moved up from Rp 11,552 in February 2005 to Rp 13, 510 in March 2006, but real wages moved down from Rp. 2,599 menjadi Rp. 2,558.²

Opponents of the policy see no strong ground for the fuel price hike. It is rather an agenda in the whole process of liberalisation of the oil and gas industry, which has been taking place after law No. 22/ 2001 was made effective. The law introduces the new model of governance and trade, in which the government reduces its control and renders everything to be based on market mechanism. It also ended the role of State-owned Companies in the sector, to the consequence that Pertamina put an end to its role as the single player at the downstream sector to provide fuel to domestic consumption in November 2005. At the same time, the law allows private players, including Multinationals, who were previously allowed only to operate in the upstream sector (exploration and exploitation), to enter the downstream sector, the oil and gas retail.³ In practice, market mechanism hardly works when domestic oil price remains lower than the international price due to government subsidy. An end to subsidy is a necessary condition to a working market mechanism, to the creation of a level playing field for all (Pertamina and private companies). The government, thus, decided to eliminate the fuel subsidy and as a consequence, to set higher oil prices.⁴

Concerning subsidy, the government also argued that any increase in oil price at the international market would logically entail an increase in oil subsidy, which would become heavier burden to the national balance. If the oil price at the international market is assumed to be 60 US\$ per barrel, the government would have to spend 115 trillion for the subsidy.

Against the government, Economist Revrisond Baswir of Gajah Mada University, however, argues that oil price increase in the international market has its benefit. The soaring international oil price was one of the factors contributing to the increased surplus in Indonesia's oil-and-gas export/import balance, from US\$ 6.5 billion in 2004 to US\$ 9.8 billion in 2005. Indonesia also gained surplus in its oil-revenue and subsidy balance, which was Rp 12.8 trillion and 9 trillion in 2004 and 2005, respectively.⁵

¹ Susenas March 2006 set the poverty line at a monthly income of Rp. 152.847 per capita, which is slightly higher than the February 2005 parameter, Rp. 129.108 per capita (Kompas, 2 September 2006).

² K. Suhariyanto, "Dibalik Angka Kemiskinan," Kompas, 14 September 2006.

³ Royal Dutch Shell, for instance, opened its first gas station in Tangerang on 1 November 2005, an opening step in realising its plan to open 400 gas stations nationwide. Petronas and Chevron have also expressed their interest to build their shares in the oil-and-gas retail sector.

⁴ Jaringan Advokasi Tambang (JATAM), "Kenaikan Harga BBM Dikendalikan Pihak Asing," Press release, 28 July 2005. <http://www.jatam.org/content/view/260/80/>

⁵ Revrisond Baswir, "Sesat Pikir Kompensasi BBM," Kompas, 22 Oktober 2005.

Debate on fuel price hike evidently reveals the poor consumption-based governance in the energy sector, on the one hand, and high dependency on fossil fuel, the reserve of which keeps decreasing, on the other. Both have led to energy crisis nationwide with a long chain of effects.

Since the 1998 crisis, the economy slowly recovers and improves. The GDP grows by 4.1% in 2003, an increase of 3.7% from the previous year.⁶ As for the year 2005, it reached 197.18 billion.⁷ As GDP grows, energy consumption increases. With the population totaled 217.59 million, the energy consumption was at 137.4 Mtoe in 2000 and 168.0 Mtoe in 2004, showing an annual increase of 5.2%, which is much higher than the annual increase of the period 1995-2000, 2.9%.⁸

Energy consumption may be classified into household, transportation and industry categories. In 1999, energy consumption in the household category was the highest, making up 41% of the market, followed by the industry sector (37%) and transportation (22%). The growth of industry, however, is projected to reverse the trend. In 2025, industry is predicted to take over as the highest energy-consuming sector, making up 44% of the market share, followed by transportation (31%) and household (26%).⁹

Relying heavily on oil, coal and gas, Indonesia is highly dependent on fossil fuel. Daily national oil consumption reaches 1.3 million barrel and is predicted to increase by 1.5% annually,¹⁰ a trend that will not easily be coped with due to difficulties in finding substitute to oil. Coal consumption is predicted to soar due to its use for electricity generation and household use. National coal consumption reached 31.1 Mmst (Million short tones) in 2002¹¹ and is predicted to grow by 12.7% annually.¹² National consumption of gas was noted to reach 1.20 Tcf (trillion cubic feet) in 2002 and is predicted to increase at an annual rate of 2.8% due to its use in fertilizer production and electricity generation. National demand for electricity has climbed up from 92.400 GWh in 2002¹³ to 104.05 TWh in 2004¹⁴ and 105,000 GWh in 2005¹⁵. Currently, 54% of the energy supply comes from coal and 40% from gas.¹⁶

The growing energy consumption, however, is a fact that goes against the very limited fossil resources. Producing 1.4% of the world's oil, Indonesia preserves only 9×10^9 BOE of the world's oil reserves.¹⁷ Daily oil production, currently 1.1 million barrel, tends to decline by 1.2% annually, due to a set of causes, which are the shortage in oil fields, various conflicting interests in exploration for new fields, inconsistencies in regulation, and the poor investment climate. Indonesia began importing oil in 2002.¹⁸ Short of reserves, with annual production at 500×10^6 BOE, Indonesia is predicted to be able to cater its energy demand from its own resources only for the next 18 years.¹⁹ As for coal, Indonesia preserves 19.3×10^9 Ton, but with production rate at 130×10^6 Ton, it will only suffice up to the next 147 years.²⁰ Gas reserve is estimated to be 188 TSCF. With production hit 3.0 TSCF (2005), Indonesia is to use up its gas reserve in the next 62 years.

The contrast between consumption and reserve finally put Indonesia in an energy crisis, manifested in a set of phenomena. Firstly, fuel turns a scarce commodity due to diminishing supply. In 2005, gas stations in Malang and Sumenep, East Java found their supply at a critical level, after Pertamina decided to reduce its supply by half.²¹ Scarcity also hit the rural areas where households rely on kerosene.²² Secondly, fuel (oil and gas) price hike put considerable pressure on communities. Two hike in 2005 unavoidably dragged up prices of other commodities, particularly basic commodities, and caused inflation

⁶ Energy Information Administration, "Indonesia: Country Analysis Briefs," July 2004.
<http://www.eia.doe.gov/cabs/indonesia.html>

⁷ IEA Energy Statistics, Energy Indicators for Indonesia, 2004
http://www.iea.org/Textbase/stats/indicators.asp?COUNTRY_CODE=ID

⁸ Asia Pacific Energy Research Centre, APEC Energy Demand and Supply Outlook 2006, Tokyo 2006
www.ieej.or.jp/aperc/2006pdf/Outlook2006/Whole_Report.pdf

⁹ Agus Sugiyono, "Energy Supply Optimization with Considering the Economic Crisis in Indonesia," in Proceeding of the 8th Scientific Meeting, Indonesia Student Association in Japan, Osaka, September 1999. p.
<http://www.geocities.com/Athens/Academy/1943/paper/d9903.htm>

¹⁰ Tempo Interactive, "Oil production to continue decreasing until 2009," 18 December 2006

¹¹ Energy Information Administration, Op. Cit.

¹² Asia Pacific Energy Research Centre, Op. Cit.

¹³ Energy Information Administration, Op. Cit.

¹⁴ Dicky E. Hendarto, "Energy Conservation and Diversification Status in Indonesia: Based on Koneba's Experience,"

¹⁵ IEA Energy Statistics, Op. Cit.

¹⁶ Asia Pacific Energy Research Centre, Op. Cit.

¹⁷ Dicky E. Hendarto, Op. Cit.

¹⁸ Departemen Pertambangan dan Energi, 2005

¹⁹ Dicky E. Hendarto, Op. Cit.

²⁰ Dicky E. Hendarto, Op. Cit.

²¹ Kompas, 20 Juni 2005

²² Suara Merdeka, "Ribuan Buruh Kehilangan Nafkah," 28 September 2005

at around 17,95% during the period of February 2005 – March 2006.²³ This condition was predicted to contribute to the growing number of people living below the poverty line.

Table 1. Fuel price hike for Industry 2005

Fuel	1 January	1 March	1 July	1 August	%*
Premium	2,100	2,870	4,060	4,640	14.3
High Speed Diesel	2,100	2,700	4,740	5,480	15.6
Diesel Oil	2,050	2,660	4,560	5,240	14.9
Kerosene	2,200	2,790	4,940	5,490	11.1
Fuel Oil	1,600	2,300	2,900	3,150	8.6

* percentage as of July

Source: US Department of State, Indonesia: Energy Highlights August 2005, 2005

Thirdly, despite the growingly stable supply, fuel temporarily turns scarce due to problems in distribution. Problems in transportation caused delayed supply to regions, where people had to wait in long lines to buy fuel at prices higher than that set by the government.²⁴

Finally, the state-owned electricity producer and retailer, PLN, could not keep up adequate supply in many regions, due to technical and operational problems. Power supply in Java and Bali was reduced to 560MW, to the effect that supply to a number of regions on the islands was cut off for on 24 and 25 November 2006. Surabaya was in total blackout on 22 November 2006 following the low supply from Gresik power plant and implosion in the gas pipeline in Sidoarjo.²⁵ A year before, 18 August 2005 PLN cut out supplies to a number of cities on Java, including Jakarta, which interfered with both international and domestic flights to and from The Sukarno-Hatta airport, halted the operation of electricity-powered trains as well as activities in hospitals in the city.²⁶

The energy crisis is an irony to Indonesia, one of the world's fossil fuel producers. Yet, it is a logical consequence of heavily export-oriented policy and behavior in the sector. The high production of coal and gas, both with huge reserves, is prioritised for export, instead of domestic consumption.

DOMESTIC DEMAND VS GLOBAL MARKET

In response to the energy crisis and the incessant controversy over the fuel price hike policy, SBY and his government turned to development of renewable energy, especially biofuel. A Blueprint of biofuel sector development was formulated in July 2006, with two ambitious goals, to overcome the energy crisis and to support poverty program. The government projects that 10% of the national energy consumption must be catered for from biofuel, or 4 million kiloliter, by 2010, when the total energy consumption is predicted to reach 40 million kiloliter.²⁷ As to poverty reduction, President SBY stated in a National Meeting on Development and Utilisation of Biofuel (*Rapat Kerja Nasional Pembangunan dan Pemanfaatan Biofuel*) in Jakarta, biofuel development projects are expected to provide employment for 3 to 5 million people in the next five years.²⁸

The government projected the annual biofuel production to reach 720,000 kiloliter by 2010, to steadily increase to 1.5 million kiloliter by 2015, and afterword to 4.7 million kiloliter.²⁹ To reach the targets, the government is to invest Rp 200 trillion within the next five years, half of the amount is allocated for the growing of biofuel commodities (with a priority on CPO, jathropa, cassava, and sugar-cane ethanol). The other half is for development of factories and the supporting infrastructure.

Despite being criticized of overly ambitious, SBY government seems serious in making biofuel development its priority policy. The government pledged various incentives including supportive fiscal policies and the provision of 6.5 million hectares of land for production. Of the total acreage, 3 million hectares is for expansion of palm oil plantation, 1.5 million hectares for each of jathropa and cassava,

²³ K. Suhariyanto, Op. Cit.

²⁴ See note 22 (uara Merdeka, "Ribuan Buruh Kehilangan Nafkah," 28 September 2005)

²⁵ US Embassy Jakarta, "Indonesia: Energy Highlights October – November 2006," 2006.
<http://www.usembassyjakarta.org/econ/Energy%20Highlights%20Nov%2006.pdf>

²⁶ Wikinews, "Indonesian blackout caused by lack of generation capacity," 20 August 2005.

http://en.wikinews.org/wiki/Indonesian_blackout_caused_by_lack_of_generation_capacity

²⁷ Tempo interaktif, 7 Agustus 2006.

²⁸ Tempo interaktif, 7 Agustus 2006.

²⁹ Bill Guerin, "Jakarta eyes palm oil for fuel," Asia Times, May 18, 2006. www.atimes.com/atimes/Southeast_Asia/HE18Ae02.html

5000,000 hectares for sugar cane plantation. At the downstream sector, the government directs state enterprises, especially PLN and Pertamina to be standby buyers.³⁰

Biofuel industry development immediately creates its domestic market, which is enticing for many investors. Private companies have also entered the business, partly lured by the prospective domestic market, but mostly by the immense opportunity in the international biofuel market.

Global production of biofuel has grown in the last five years. In 2003, it reached 32 billion liters, of which 30 billion liter of bioethanol with Brazil and US being the largest producers and 2 billion liters of biodiesel, produced mainly by EU countries,³¹ and is estimated to have reached 35 billion liters in 2006.³² Biofuel production is closely related to the high price of oil in the global market, the growing demand for more energy and the demand for substitute energy of low carbon emission. The current producing (which are also mostly consuming) countries, however, face the problem of limited land, which does not allow for massive growing of biofuel plants. This has triggered and will continue to drive, a global trade of biofuel in the future.

Despite its growth, the global biofuel trade volume is still small. A large portion of bioethanol produced is meant for domestic consumption and only 10% is traded internationally, at a volume counted at 2,323 million liters in 2005³³ with US and EU being the main markets.

The global trade volume of biodiesel is even smaller. While bioethanol production has begun in 1970s, initiated by Brazil, massive production of biodiesel started only in the 1990s. Requiring far more land than bioethanol, biodiesel production also faces the problem of limited land, which ultimately leads to its tiny trade volume, besides market domination by EU countries. Biodiesel trade, however, has recently invigorated. EU is importing 3.5 million ton of crude and refined palm oil from Malaysia and Indonesia for one year. US imported 45 million gallons of palm oil from Ecuador in 2006 and planned an increase to 100 million gallons in 2007.³⁴

The US Biofuel Market

The United States is noted as one of the world's largest producers and markets of biofuel. It started biofuel development in 1970s and initiated corn-based ethanol in 1980s. In 2005, it used 4.4% of its corn for ethanol production. Currently, it produces 11.8 million tons of bioethanol.³⁵ US has also developed soya-based biodiesel production, though in smaller volume, and produced 76 million liters of biodiesel in 2004.

With limited domestic capacity for biodiesel production, US counted an import of 720 million liters of ethanol in 2005, a large portion being from Brazil, to furnish 5% of its domestic consumption. The figure accounts for 31% of the overall global import of bioethanol. It also imported more than 283 million liters of biodiesel in 2005, noting an increase of 94.5 million liters from the previous year.³⁶

Developing biofuel to reduce its dependency on fossil fuel, the US government issues supportive policies, such as Farm Security and Rural Investment Act (2002), the American Jobs Creation Act (2004) and Energy Policy Act (2005). It has also developed bioethanol-based machinery and devices since 1980 to promote the use of biofuel.

EU Biofuel Market

The European Union is also a major producer and market of biofuel. It produced 3.9 million tons of biofuel in 2005, 0.7 million tons of which is bioethanol and 3.2 million tons biodiesel,³⁷ noting a 60% increase, in overall, from the previous year.

³⁰ Pertamina enjoys government subsidy in oil retail. To be a stand-by buyer, the company is likely to demand government subsidy, without which it is bound to suffer losses. (Suara Karya, 22 November 2006).

³¹ Stephan Slingerland and Lucia van Geuns, Drivers for an International Biofuel Market, Clingendael International Energy Programme, 9 December 2005. http://www.clingendael.nl/publications/2005/20051209_ciep_misc_biofuelsmarket.pdf

³² Annie Dufey, "Biofuels production, trade and sustainable development: emerging issues," International Institute for Environment and Development, November 2006. <http://www.iied.org/pubs/pdf/full/15504IIED.pdf>

³³ US make up 31% of the global market, importing 720 million liters in 2005. See also the section The US Biofuel Market, next page.

³⁴ Annie Dufey, *Ibid*.

³⁵ European Commission, Biofuel in The European Union: An Agricultural Perspective, 2006.

http://ec.europa.eu/agriculture/publi/fact/biofuel/2007_en.pdf

³⁶ UNCTAD, The Emerging Biofuels Market: Regulatory, Trade and Development Implications, UN: New York and Geneva, 2006.

http://www.unctad.org/en/docs/ditcted20064_en.pdf

³⁷ European Commission, *Op. Cit*.

EU bioethanol is produced of 0.4% of its total cereal production, 0.8% of sugar cane, and its biodiesel from 27% of its total rapeseed production.³⁸ Major biodiesel producing states are Germany, France and Italy, while Spain leads in bioethanol.

EU produces more biodiesel than bioethanol, thus importing 250 million liters of the latter during the period of 2002-2004.³⁹ Major bioethanol importers are Germany, Italy and France. Since biodiesel production outside EU is still very limited, its trade outside EU may not be significant. Inter-state trade within EU, however, is possible.

To push up consumption and production of biofuel, EU takes a number of policies and strategies. In 2001, European Commission issues a policy on promoting the use of biofuel in transportation to reduce gas emission and other environmental impact in transportation, strengthening energy security (secured supply), technological innovation, and agricultural diversification. May 2003, EU approved a draft policy on diversification of energy supply and reduction of GHG emission. Directive 2003/30/EC set the target for biofuel consumption in the transportation sector to be 2% of the use of gasoline and motor diesel in 2005 and 5.75% in 2010. Directive 2003/96/EC, issued to complement Directive 2003/30/EC, lays the official framework for taxation on biofuel and other conventional fuels.⁴⁰ 2005, Uni Eropa released Biomass Action Plan, which recommends a revision to Directive 2003 and in February 2006, issued Biofuel Strategy, which is a plan of coordinated actions to promote large scale, sustainable production of biofuel and its use in EU and developing countries.⁴¹

REGULATORY FRAMEWORK AND DEVELOPMENT STRATEGY

As a legal basis to the biofuel development program, the government issued Presidential Instruction (*Instruksi Presiden RI*) no 1/2006 regarding "Provision and Utilisation of Biofuel as Alternative Fuel" on 25 January 2006. Practically an instruction to a number of ministries⁴², governors and mayors/district heads to take actions to accelerate the program, the Presidential Instruction states that the government is to provide a policy package of incentives and tariff for biofuel development and to set a simple model of biofuel trade to be incorporated into fuel trade system, both to be facilitated by Energy and Mineral Resources Ministry; the Forestry Ministry is to issue permit on the use of non-productive land for development of biofuel commodities; the State Ministry for Cooperatives and Small and Medium Enterprises is to facilitate cooperatives and small/medium enterprises to take part in biofuel commodities development, processing and trade. Governors and mayor/district heads are instructed to facilitate land provision for biofuel commodity development in their province/district.

In implementation, Minister of Energy and Mineral Resources issued a Ministerial Regulation regarding "Requirements and Guidance on Biofuel Trade Permit" on 10 October 2006, which provides that Organisations involved in biofuel trade should be business enterprises granted permit from Department of Energy and Mineral Resources. The permit will be in force for 20 years and may be extended based on the company performance. The permit requires that company should own or operate biofuel trade facilities; guarantee continuous biofuel supply, with priority of fulfilling domestic demand; take the responsibility of maintaining the standard quality of the traded biofuel down to consumer level (end-user).⁴³ It requires that companies that market their products in retail should have their own name and brand, while biofuel exporting companies should operate with recommendation from the Department of Energy and Mineral Resources.

To strengthen the institutional aspect, the government assembled a National Team on Biofuel through Presidential Decree No.10/2006 dated 24 July 2006. The Team was commissioned to draft a blue print and roadmap for biofuel development program that accommodates the objectives of reducing poverty and unemployment. Steering Committee of the Team is co-headed by Chief Economic Minister and Chief Welfare Minister and has 6 working groups (Policy and Regulation; Land provision; Planting and Production; Market and product price; Facilities and Infrastructure; and financing. A number of State enterprises are member of the Team, among others are PT Rajawali Nusantara Indonesia (Plantation) in

³⁸ UNCTAD, Op. Cit.

³⁹ UNCTAD, Ibid.

⁴⁰ UNCTAD, Ibid.

⁴¹ Annie Dufey, Op. Cit.

⁴² Coordinating Minister of the Economy; Energy and Mineral Resources Minister; Agriculture Minister; Forestry Minister; Industry Minister; Trade Minister; Transportation Minister; State Minister for Research and Technology; State Minister for Cooperatives and Small and Medium Enterprises; State Minister for State Enterprises; Home Affairs Minister; Finance Minister; and State Minister for State Enterprises.

⁴³ Perihal standard dan mutu biofuel yang akan diperdagangkan di dalam negeri kemudian diatur secara spesifik dalam Keputusan Direktur Jenderal Minyak dan Gas Bumi no. 13A83 K/24/DJM/2005.

the Planting and Production working group; PT PLN in Market and product price; Bank Rakyat Indonesia, Bank Mandiri, Bank BNI, and PT Danareksa in Financing.

The working groups may also mirror the main factors in the biofuel development program. The *first* is land provision for biofuel commodity production, which does not seem to be a serious problem due to the vast available land. Data from the National Team on Biofuel show that 12 million hectares of land is ready for use, with distribution as the following⁴⁴:

Table 2. Distribution of land for biofuel by province

Provinces	Hectarage
South East Sulawesi	212,123 ha
North Sulawesi	34,812 ha
Nusa Tenggara Timur	101,830 ha
Maluku	2,304,932 ha
Papua	9,262,130 ha
West Kalimantan	514,350 ha
Central Sulawesi	251,856 ha
South Kalimantan	65,638 ha
Total	12,947,671 ha

Source: National Team on Biofuel Development Program

Land provision is complemented with seed supply. For instance, big oil palm companies, such as PPKS Medan, PT Socfin, PT Lonsum, PT Dami Mas, PT Tunggal Yunus, PT Bina Sawit Makmur and PT Tania Selatan make available 147 million seeds per year to be planted in 700,000 hectares of land.

Several research and development institutes such as Lemigas (Oil & Gas Institute) ITB, Agriculture Department and BPPT have also been carrying out researches in biofuel technology. Lemigas has been experimenting on the use of biodiesel in diesel automotive vehicles since 1996. ITB focuses on developing technologies in extracting jathropa oil and converting it into methylester. Centre for Studies in Mechanisation in Agriculture, under Agriculture Department, focuses on mixing biodiesel and automotive diesel oil (ADO) for stationary machineries. BPPT, developing biodiesel since 2000, focuses on developing processing technologies and biodiesel product engineering.⁴⁵

Second is biofuel production and market. In 2006, the government set a plan to build eight biodiesel refineries with annual production capacity of 3000 to 6000 tonnes, at a total cost of IDR 65 billion, and to be financed from the National Budget. The government also plans to set up special regions of biodiesel production. So far Dumai, in the province of Riau, has been explicitly designated to be a center of biofuel production. It is considered strategic for being near to oil palm plantations in the region and for its sufficient seaport facilities. A private company has also planned to build its refinery in Dumai, with annual production capacity of 350,000 tonnes.⁴⁶ Biofuel markets, both domestic and international, are opening up huge opportunities. Domestic biofuel market is to develop to at least the size that fulfills the target the government has set, that is 10% of the national energy consumption by 2010. The opportunity for export will increase in accordance with the soaring demand from developed countries, especially the US and EU.

Third is financing. The government plans to spend IDR 51 trillion in five years to develop (including extend acreage of) oil palm, rubber, and cocoa plantations to create job opportunities and increase production. Two third of the fund is to be allocated to oil palm plantations.⁴⁷ The biofuel development program has also attracted private investors, both domestic and international. By early 2007, sixty agreements on biofuel development projects between various parties, including 14 foreign investors and 26 domestic investors had been signed.⁴⁸ The combined value of the projects is estimated at USD 9 to 10 billion. Meanwhile the banking sector is pouring an estimated IDR 34 trillion into the sector.⁴⁹

Priority on Palm Oil?

To achieve the target of fulfilling 10% of the national energy consumption from biofuel, 7% of which from palm-oil based biofuel, by 2010, the government reserves 24.4 million hectares of land through to 2010,

⁴⁴ Unfortunately, data on land distribution in terms of biofuel commodities (oil palm, jathropa, sugarcane and cassava) are not yet available.

⁴⁵ Soni Solistia Wirawan & Armansyah H. Tambunan, "The Current Status and Prospects of Biodiesel Development in Indonesia : a review" paper Presented on the Third Asia Biomass Workshop, November 16, 2006, Tsukuba, Japan.

⁴⁶ Kompas, 7 Desember, 2006.

⁴⁷ Laurens Rademakers, Indonesia to spend a massive US\$ 22 billion by 2010 to promote biofuels, 13 July 2006

⁴⁸ www.depperin.go.id, Prospek dan Permasalahan Industri Sawit, 29 Januari 2007, (7/5/2007)

⁴⁹ www.depperin.go.id, Prospek dan Permasalahan Industri Sawit, 29 Januari 2007, (7/5/2007)

of which 5 million hectares is allocated for plantation extension, 2 million hectares for revitalization of oil palm plantations, 9 million hectares for soil rehabilitation and 8 million hectares for agrarian reform.⁵⁰ The government also includes oil palm industry in the list of prioritized industry sectors – in the same list are textile and forestry – to enjoy the incentive of being freed from VAT tax of 10%, as stipulated by the amended Government Regulation No.148.

Though it is not formally stated, palm oil seems to be a prioritized commodity in the biofuel development program, for the following set of considerations.

1. Oil palm is the most productive oil commodity, with one hectare of oil palm producing 5,000 tonnes, or 6,000 liters, of crude oil, far higher than that of soya and corn, one hectare of which produces around 446 and 172 liters, respectively.⁵¹

2. Palm oil can be processed into a high variety of products to be used in various industries, among others food and cosmetics industries. The global consumption of palm-oil-based vegetable oil reached 30 million tons in 2004 and has been growing by an average of 8% annually. By comparison, global consumption rate of soya and sunflower oil were only 25 tons and 11.5 tons, with average annual growth of 3.8% and 2.2%, respectively. The high demand of palm-oil-based products pushes up the price of CPO, which rose from USD 480 to USD 527.5/ton in August 2006⁵² and is predicted to keep climbing up in the coming years. Producing 13.8 million ton of CPO in 2005, Indonesia becomes the world's second largest producer, after Malaysia with 15.36 million tons,⁵³ Indonesia is in the good position to make maximum benefit from the industry.

3. The sector is labour-intensive. A 210-hectare plantation may require 105,000 workers, with monthly wages ranging from IDR 500,000 to 1.5 million.⁵⁴

4. As stated by Chief Executive of National Team on Biofuel, every two hectares of oil palm plantation can earn for its owner, that is farmer, IDR 4 million per month, or IDR 2 million/hectare/month, which is equivalent to USD 440/bulan, a drastic increase from currently USD 75/month.⁵⁵

Table 3. Basic data on National Oil palm industry and projection to 2010

Item	2005	2010
Area	5.6 million ha	6,6 million ha
Production	13.5 million tons	18 million tons
Worker	3.5 million people	4-4.5 million people
Productivity	3.4 tons per ha	
Contribution to export	US\$ 4.7 billion	
Contribution to GDP	1.6%	
The growth in recent 10 year	8% per year	

Source: www.depperin.go.id, Prospek dan Permasalahan Industri Sawit, 29 January 2007 (7/5/2007)

5. Jathropa is also prioritised, besides palm oil, for biofuel industry development, as evident in the fact that the government (National Team on Biofuel Development) allocates 1.5 million-hectare area each for development of the commodities, out of the overall 5.25 million hectares for biofuel.⁵⁶ Yet, jathropa development just started and will take some years to be fully commercial, while oil palm is already at its commercial stage and biofuel only adds to its many uses, thus opening new lucrative market. In the short term, therefore, palm-oil based biofuel is more prospective.

6. CPO-based biofuel is more attractive to investor for being large scale in nature, in terms of plantation area, and, therefore, allowing little possibility of relying heavily on farmers for supply of its raw material. Of the total oil palm area in Bangka-Belitung, private plantation companies directly manage the most of it and only 11% by smallholder and independent farmers.⁵⁷ To facilitate large scale development, South

⁵⁰ www.depperin.go.id, Prospek dan Permasalahan Industri Sawit, 29 Januari 2007, (7/5/2007)

⁵¹ Rhett A. Butler, Kenapa kelapa sawit menggantikan hutan hujan? Kenapa biofuels menggerakkan penggundulan hutan?, indonesian_mongabay.com,

⁵² Akhmad Sirodz, "Risiko Merusak Lingkungan: Kebijakan Monokultur Kelapa Sawit Skala Besar dan Resikonya", *Kaltimpost*, 21/02/2007. <http://www.kaltimpost.web.id/berita/index.asp?IDKategori=Opini&id=199275> (akses 06/03/2007)

⁵³ Syamsul Rahman, Prospek Pengembangan Produk Sawit, *Opini Tribun*, 09/01/2007

⁵⁴ Puspiptek, "Meneg: Indonesia Selalu Siap Energi Alternatif", 8/07/2006.

http://www.puspiptek.net/Html/Detail_Berita.asp?Judul=Meneg%20Ristek:%20Indonesia%20Selalu%20Siap%20Energi%20Alternatif?KRT (akses 11/03/2007)

⁵⁵ Sulung Prasetyo, "Biofuel" Perangi Kemiskinan tapi Rusak Lingkungan", *Sinar Harapan*, 19/02/2007,

<http://www.sinarharapan.co.id/berita/0702/19/ipt01.html> (akses 10/03/2007)

⁵⁶ "Pemerintah Siapkan 5,25 juta Hektare Lahan untuk Biofuel", <http://www.rrionline.com/modules.php?name=Artikel&sid=24571>

⁵⁷ http://biosvr01.biotrop.org/berita_detail.php?id_berita=2994

Sumatra provincial government, as a support to the biofuel development program, plans to allocate additional 800,000-hectare area for oil palm plantations by 2010.⁵⁸ BPPT recommends that biodiesel processing industry should take large scale development in the future, to produce at least 150,000 ton per year.

7. Regarding commodity supply for biofuel development, a study by BPPT finds out that oil palm is more potential than jathropa in terms of land productivity, preparedness of the plantation sector, continuity of supply, and price stability. Jathropa, however, is more potential in terms of three factors: non-harmful to food security, insensitivity to international price, and low CFPP.⁵⁹ The same study recommends integration of oil palm processing and biodiesel production in order to create competitive price.

The above considerations explain the tendency to prioritise CPO-biofuel development.

PLAYERS: INVESTORS AND OPERATORS

Biofuel sector development in Indonesia involves farmers, plantation workers, investors, plantation companies, and refinery plants. The growing number of investors and the flourishing of new plantation and refinery plants will significantly influence where the national biofuel industry will be heading.

National banks, both state-owned and private, are fueling the biofuel industry development by providing credits with special interest rate for biofuel development projects. Major investors are **PT Bank Negara Indonesia Tbk (BNI)**, **Bank Republik Indonesia (BRI)**, **Bank Mandiri**, **Bank Bukopin**, **Bank Daerah Sumatra Barat**, dan **Bank Daerah Sumatra Utara**. Chief of The National Committee on Biofuel (Ketua Timnas Bahan Bakar Nabati) Alhilar Hamdi stated that the bank interest rate for factory development is 14-15% and for smallholder 10%.⁶⁰

Investors in Indonesian biofuel sector

Investors	Investment, etc.
PT Bank Negara Indonesia Tbk (BNI)	2006, BNI disbursed Rp 3.35 trillion credit to 50 debtors for biofuel development, with a total land of 411,000 ha. As for 2007, the bank is to allocate 50% of its planned corporate credit of Rp 10 trillion to the agribusiness sector, starting with Rp 1.2 trillion credit to six companies to develop plantations in East Java, East Sumba and Lampung. ⁶¹ BNI has also signed MoU with the six companies, which are Sampoerna Agro, Sungai Budi Group, Rekayasa Group, Sinarmas Group, Musimas Group, and Bio Energi Indonesia. ⁶²
Bank Republik Indonesia (BRI)	In 2006, BRI allocated Rp 4 trillion (US\$ 439 million) for agribusiness sector, including biofuel plantation development ⁶³ . It projects to disburse a total credit of Rp 12 trillion for smallholders and Rp 11 trillion for factory development by 2010. ⁶⁴
Bank Mandiri	To support the government program in revitalizing the agriculture sector and biofuel sector development, Bank Mandiri provided a total credit of Rp 11.08 trillion in 2006. ⁶⁵ The bank has signed MoU with four companies, namely Sinar Mas Group, Incassi Raya, Permata Sawit, and Satria Group, with a total credit value of US\$ 432 million, or Rp 3.9 trillion. ⁶⁶
Bank Bukopin	2006, Bank Bukopin provided Rp 1 trillion for the agriculture, including biofuel, development. ⁶⁷
Bank Daerah Sumatra Barat	Bank Daerah Sumatera Barat offers a total credit of Rp 980 billion for the agriculture, including biofuel, development. ⁶⁸
Bank Daerah Sumatra Utara	Bank Daerah Sumatera Utara offers a total credit of Rp 500 billion for the agriculture, including biofuel, development. ⁶⁹
Kreditanstalt für Wiederaufbau (KfW)	The German development bank has expressed its commitment to

⁵⁸ <http://www.kompas.com/kompas-cetak/0701/15/daerah/3240063.htm>

⁵⁹ Agus Kismanto, 2006, "Integrated Biodiesel Plant & Palm Oil Mill", http://ec.bppt.go.id/.../ako_Integrated_Biodiesel_Plant_Palm_Oil_Mill_Read-Only_.pdf

⁶⁰ www.indofinanz.com, "Dua BUMN Alokasikan Kredit Pengembangan Biofuel," 9 Januari 2007

⁶¹ www.indofinanz.com, "BNI bentuk Divisi Khusus Tangani Biofuel," 10 Januari 2007

⁶² Kompas, "Kredit Biofuel Mengalir BNI dan Bank Mandiri menandatangani MOU dengan 10 perusahaan," 10 Januari 2007

⁶³ The Jakarta Post, "BRI sets aside Rp 4 trillion for agricultural sector, biofuel lending," 28 November 2006

⁶⁴ www.indofinanz.com, see Note 42.

⁶⁵ The Jakarta Post, Banks to lend Rp 25 trillion for plantation, biofuel projects, 21 December 2007

⁶⁶ Kompas, Kredit Biofuel Mengalir BNI dan Bank Mandiri menandatangani MOU dengan 10 perusahaan, 10 Januari 2007

⁶⁷ The Jakarta Post, Op. Cit.

⁶⁸ The Jakarta Post, Ibid.

⁶⁹ The Jakarta Post, Ibid.

	invest Rp 2 trillion in biofuel development projects in Indonesia. ⁷⁰
Japan Bank for International Cooperation (JBIC)	JBIC has expressed its commitment to provide unlimited credit for biofuel development in Indonesia, with a semi-commercial loan interest of 12%. ⁷¹
China National Offshore Oil Corporation (CNOOC) and Hong Kong Energy	In cooperation with Sinarmas Group, CNOOC and Hong Kong Energy develop 8-year-term biofuel projects worth US\$ 5.5 billion in Papua and Kalimantan. ⁷² The projects require 1 million hectares of land.
Chinese Government	Chinese and Indonesian governments, in July 2005, signed MoU on Malindo project, which is part of North Kalimantan (to Malaysian border) regional development and includes developments of large scale infrastructure network and a 1,800,000-hectares plantation along the Indonesia-Malaysia border. ⁷³
Genting Biofuel, a Malaysian company, in partnership with Merauke District Government and PT Pembangkitan Jawa Bali (PT PJB)	Genting Biofuel invests US\$ 3 billion in biofuel development in Jayapura.
REI Harizon	The biofuel company is to invest US\$ 500 million (Rp 4.55 trillion) to support biofuel development in Indonesia. ⁷⁴
The United States Agency for International Development (USAID), through its Agribusiness Market and Support Activities (AMARTA) programme, in partnership with Development Alternatives Inc.	USAID provides a three-year investment of US\$ 13.75 million for equipment and technical facilitation in the agribusiness sector, especially in cocoa, coffee, high yielding horticulture (fruit and vegetable), fishery, spices, animal husbandry and biofuel. ⁷⁵
Other international investors are ⁷⁶ : <ul style="list-style-type: none"> - Mitsubishi, Itochu, Mitsui (Japanese) - PT Platinum Energy Biofuel (US) - Greenergy Pvt Ltd (Indian) - EN3 Co Ltd (South Korean) - Petrobras (Brazilian) 	

Interested in biofuel development in Indonesia, foreign banks have also expressed commitment or signed agreement with the Indonesian government to provide credit with special loan interest for biofuel development projects. Among others are Kreditanstalt für Wiederaufbau (KfW) and Japan Bank for International Cooperation (JBIC).

Foreign companies invest in Indonesia through partnership with local companies. One of the biggest investors, China National Offshore Oil Corporation (CNOOC) and Hongkong Energy, in partnership with Sinar Mas Resource and Technology (SMART) develop a biofuel project worth US\$ 5.5 billion in Papua and Kalimantan. The 8-year project is to produce palm-oil-based biodiesel and sugarcane- and cassava-based bioethanol.

The high investment that biofuel development requires has also led to partnership among Indonesian companies. Each hectare of a palm oil plantation requires Rp 30 million in investment, sugarcane Rp 15 million, jathropa Rp 3 million and cassava Rp3.5 million.⁷⁷ A growing number of companies, however, has begun, or at least planned, to invest in estates and biofuel refinery. Among them are Sinar Mas, Raja Garuda Mas, and Indofood. The first two are well known as pulp and paper producers through their subsidiaries APRIL and APP, respectively, while Indofood is an instant noodle producer.

Biofuel Companies in Indonesia

Companies	Products, production capacity, etc.
PT Anugrah Inti Gemanusa (subsidiary of a chemical company PT Eterindo Wahanatama)	- Product: biodiesel - Location: Gresik (East Java) - Capacity : 70,000 tonnes / year - Operation commencement: 2006 - Export market: Asia, Australia, and Germany. ⁷⁸
PT Wahana Abdi Tirta	- Product: biodiesel - Capacity: 30,000 tonnes / year ⁷⁹

⁷⁰ Bisnis Indonesia, KfW & JBIC danai biofuel, 22 Februari 2007

⁷¹ Bisnis Indonesia, Ibid

⁷² Raja Suhud, "Pemerintah Harus Bangun Infrastruktur Pendukung Proyek BBN," 10 Januari 2007, Media Indonesia Online

⁷³ Marianne Klute, "Green Gold Biodiesel: Players in Indonesia," Watch Indonesia

⁷⁴ Kompas, "Sumsel Tambah 200.000 Ha Lahan Sawit," 15 Januari 2007

⁷⁵ The Jakarta Post, "USAID to help agribusiness to tune of \$13,75m," 22 Desember 2006

⁷⁶ Marianne Klute, Op. Cit.

⁷⁷ Departemen Dalam Negeri, "2010, Biofuel Gantikan Premium; Hemat Devisa 10 Miliar Dolar AS," 25 Juli 2006

⁷⁸ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

PT Sari Dumai Sejati	- Product: biodiesel - Location: Bengkalis (Riau) - Capacity: 100,000 tons / year - Operation commencement: 2009 ⁸⁰
PT Indo Biofuels	- Product: biodiesel - Location: Dumai (Riau) - Capacity: 150,000 tons / year - Operation commencement: 2009 ⁸¹
PT Artha Trans Jaya	- Product: biodiesel - Capacity: 1,200 ton / year ⁸²
PT Asianagro Agung Jaya (subsidiary of Raja Garuda Mas, owned by Sukanto Tnoto [APRIL])	- Product: biodiesel - Location: Marunda (Jakarta) - Capacity: 100,000 tons / year - Operation commencement: 2009 ⁸³
PT ReKayasa Industri (in partnership with Pertamina in Balongan)	- Product: biodiesel - Capacity: 5,000 tons per year ⁸⁴
PT Musimas	- Product: Biodiesel - Capacity: 100,000 tons / year - Operation commencement: 2007 ⁸⁵
PT Karya Prajona Nelayan	- Product: biodiesel - Capacity: 100,000 tons / year - Operation commencement: 2007 ⁸⁶
PT Agra Paracitra	- Converting 18.000 hectares of land for estates in Aceh ⁸⁷
PT Energi Alternatif Indonesia	- Product: biodiesel - Location: Jakarta - Capacity: 300 tons / year ⁸⁸ - Other activity: biodiesel retail in Jakarta since 2004 ⁸⁹
BPPT	- Product: biodiesel - Location: Serpong (Banten), two plants - Capacity: 1,450 tons / year (combined) - Operation commencement: 2006 ⁹⁰
Riau Provincial Government (in partnership with BPPT)	- Product: biodiesel - Location: Riau - Capacity: 3,000 tons / year - Operation commencement: 2006 ⁹¹
PPKS Medan	- Product: biodiesel - Location: Medan - Capacity: 300 tons / year ⁹²
ITB (Bandung Institute of Technology)	- Product: Biodiesel - Location: Bandung - Capacity: 300 tons / year ⁹³
PT Bio Energi Nusantara	- Product: biodiesel - Location: Serang - Capacity: 150 tons / year - Operation commencement: 2008 ⁹⁴
PT RAP	- Product: biodiesel - Location: Jakarta - Capacity: 180 tons / year ⁹⁵
Incassi Raya	- Plan to open new estates in West Sumatra and West Kalimantan with a combined acreage of 32,000 hectares. ⁹⁶
PT Karya Prajona Nelayan	- Product: biodiesel - Capacity: 100,000 tons / year

⁷⁹ <https://rafflesia.wwf.or.id>, PPB Oil Siapkan US\$117 Juta Per Tahun, 1 Agustus 2006

⁸⁰ <https://rafflesia.wwf.or.id>, PPB Oil Siapkan US\$117 Juta Per Tahun, 1 Agustus 2006

⁸¹ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

⁸² <https://rafflesia.wwf.or.id>, PPB Oil Siapkan US\$117 Juta Per Tahun, 1 Agustus 2006

⁸³ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

⁸⁴ <https://rafflesia.wwf.or.id>, PPB Oil Siapkan US\$117 Juta Per Tahun, 1 Agustus 2006

⁸⁵ <https://rafflesia.wwf.or.id>, PPB Oil Siapkan US\$117 Juta Per Tahun, 1 Agustus 2006

⁸⁶ <https://rafflesia.wwf.or.id>, PPB Oil Siapkan US\$117 Juta Per Tahun, 1 Agustus 2006

⁸⁷ Marianne Klute, Op. Cit

⁸⁸ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

⁸⁹ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

⁹⁰ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

⁹¹ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

⁹² Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

⁹³ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

⁹⁴ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

⁹⁵ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

⁹⁶ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

	- Operation commencement: 2007 ⁹⁷
PT Musimas	- Product: biodiesel - Capacity: 100,000 tons / year - Operation commencement: 2007 ⁹⁸
Satria Group	- Developing a 10,000-hectare plantation for biofuel commodities in Central Kalimantan ⁹⁹
PT Sampoerna Agro	- Product: cassava-based bioethanol - Location: Gunung Kidul (Yogyakarta) - Capacity: 100,000 tons / year - Plantation acreage: 12,000 hectares - Smallholder scheme ¹⁰⁰
Medco Ethanol Lampung (a joint venture between PT Medco Energi [85% stakes] and PT Trada Bioenergy Indonesia [15%])	- Product: bioethanol - Location: Lampung - Capacity: 60,000 kiloliter / year (180 kiloliter / day) - Operation commencement: October 2006 ¹⁰¹ - Export market: Singapore and Japan - The company has made additional investment of US\$ to boost its production capacity to 360 kiloliter/day by 2008.
PT Medco Methanol Bunyu	- Product: ethanol - Location: East Java - Capacity: 170,000 barrel / year (500 kiloliter / day) - Investment: US\$100 million - Operation commencement: 2010 ¹⁰²
PT Indocement Tunggal Prakarsa Tbk (in partnership with Bogor Institute of Agriculture/IPB in research and development of Jathropa in ex-mining areas)	Starting with the planting of jathropa in an estate of 30 hectares in the Sub-district of Klapanunggal, Bogor, West Java ¹⁰³
PT Titan	- Product: Jathropa-based biodiesel ¹⁰⁴
Astro Agrowisata	Investing in biodiesel and palm oil plantation ¹⁰⁵
Bio Energi Indonesia	Investing US\$ 900,000 in development of palm oil plantation in the district of Tulangbawang ¹⁰⁶ and in biodiesel production. ¹⁰⁷
Sungai Budi Group	Investing in palm oil plantation and biodiesel ¹⁰⁸
PT Eterindo Jawa Timur	- Product: CPO-based biodiesel - Capacity: 120,000 tons / year ¹⁰⁹
PT Astra Agro Lestari	- Product: biodiesel (CPO-based) - Location: Kalteng and Medan - Capacity: 5.000 tons / year ¹¹⁰ (Kalteng), 1,500 tons / year ¹¹¹ (Medan). - Operation commencement: 2006 - Palm oil production target 2007: 12% (to 950,000) from previous year's production (857,000) ¹¹² - To open a jathropa plantation of 5,000 ha in East Kalimantan in 2007 ¹¹³
PT Bakrie Sumatera Plantation (in a joint venture with PT ReKayasa Industri, BSP controls 70% of the shares)	- Product: biodiesel - Capacity: 60,000 – 100,000 tons / year - Operation/Production commencement: 2008 - Investment: US\$25 million ¹¹⁴ - The company, through its subsidiary PT Agrowiyana, is investing Rp 675 billion to open two new palm oil plantations with a combined acreage of 25.000 hectares in Jambi: 15,000 hectares in the subdistricts of Koto VII and Koto Ilir (Tebo district) and 10,000 hectares in the

⁹⁷ Departemen Perindustrian

⁹⁸ Departemen Perindustrian

⁹⁹ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹⁰⁰ Kedaulatan Rakyat, Ketela Diolah Jadi Bioethanol, 20 Februari 2007

¹⁰¹ The Jakarta Post, Lampung on target to become major biofuel center, 30 Januari 2007

¹⁰² Bambang Dwi Djanuarto, Medco Akan Bangun Pabrik Etanol di Jatim, Bisnis Indonesia, www.bfuel.biz

¹⁰³ PT Kreatif Energi Indonesia, Indocement akan garap bahan bakar alternatif, 8 Maret 2007

¹⁰⁴ Kedaulatan Rakyat, Ketela Diolah Jadi Bioethanol, 20 Februari 2007

¹⁰⁵ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹⁰⁶ The Jakarta Post, Lampung on target to become major biofuel center, 30 Januari 2007

¹⁰⁷ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹⁰⁸ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹⁰⁹ Yeni Kurniawi, 15 Perusahaan Investasi, Bangun Pabrik Biodiesel, Harian Global, 26 July 2006

¹¹⁰ <https://rafflesia.wwf.or.id>, PPB Oil Siapkan US\$117 Juta Per Tahun, 1 Agustus 2006

¹¹¹ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

¹¹² Suli H. Murwani, Astra Agro Cari Pendapatan Alternatif, Bisnis Indonesia, www.bfuel.biz

¹¹³ www.indofinanz.com, Astra Agro Rambah Bisnis Biofuel, 11 Oktober 2006

	<p>Sub-district of Limun, Sarolangun district.</p> <ul style="list-style-type: none"> - The company is starting another plantation of 45,000 hectares in Central Kalimantan, with the first planting to begin in the 4th quarter of 2006. - PT Agrowiyana operates a 11,842 hectares palm oil plantation in the district of Tanjung Jabung, under the PBSN/Perkebunan Besar Swasta Nasional-schemes, smallholding (PIR), and Farmers Cooperative (KKPA).¹¹⁵
PT Rajawali Nusantara Indonesia (RNI)	<ul style="list-style-type: none"> - Product: Sugar-based bioethanol - Location: Cirebon, East Java - Operation/Production commencement: 2009 <p>- RNI operates a sugarcane plantation of 54,600 hectares and 11 sugar factories with a combined production of 235,000 tons.</p> <ul style="list-style-type: none"> - Plan to invest US\$ 58 million for three bioenergy factories to produce bioethanol and for electricity generation, starting in 2009 - The first factory is established through partnership with PT Indo Acidatama in the production area of the sugar producer PT Jatitujuh, Cirebon, to produce bioethanol, with a capacity of 100 kiloliter / day. The investment is US\$ 20 million. - The second factory is established through a partnership with South Korean company PT Choi Biofuel Indonesia in the production area of sugar producer PT Kebon Grati Agung in East Java. The investment is US\$ 20 million. - The third, established in partnership with Russian company PT PSA Automatika and located in the production area of PT Jatitujuh, Cirebon, is a power generator plant, which is to process waste from sugar processing into electricity of 20 megawatt.¹¹⁶
PT Perkebunan Nusantara VII	- Product: biodiesel and bioethanol ¹¹⁷
PT Perkebunan Nusantara IV	<ul style="list-style-type: none"> - Product: biodiesel - Location: Medan - The company owns 120,058 hectares plantation for biofuel¹¹⁸
PT Sumi Asih dan Platinum	<ul style="list-style-type: none"> - Product: bioethanol - Location: Bandar Lampung - Capacity: 30,000 tons / year¹¹⁹
PT Luhur Prakarsa Maju Dinamika	Investing in North Lampung ¹²⁰
PT Mulindo Raya Industrial	<ul style="list-style-type: none"> - Product: bioethanol - Capacity: 10,000 tons / year
PT AGB energy	Developing a 300,000-hectare oil palm and jathropa plantation in North Maluku ¹²¹
PT Permata Hijau Sawit	<ul style="list-style-type: none"> - Product: biodiesel - Location: Medan (North Sumatra) - Capacity: 198,000 tons / year - Operation commencement: 2010¹²²
Indofood Agri-Resources dan Sugar Group (Both are subsidiaries of Salim Group)	Both companies are affiliated to Salim Group, who invests in different biofuel commodities. ¹²³
PT Sinar Mas Agro Resources and technology (SMART) (a subsidiary of Sinar Mas Group).	<p>Product: palm oil-based biodiesel, sugar- and cassava-based bioethanol</p> <p>Location: Sumatra, Kalimantan, Papua</p> <ul style="list-style-type: none"> - SMART currently owns 98,000 hectares palm oil plantation and plans to plantations of combined acreage of 67,000 hectares in Kalimantan and Sumatra.¹²⁴ - It partnership with CNOOC dan Hongkong Energy is estimated to results the world's largest biofuel project, requiring news estates with combined acreage of 1 million

¹¹⁴ M Munir Haikal, Bakrie Sumatera Emisi Obligasi US\$120 juta, Bisnis Indonesia, www.bfuel.biz

¹¹⁵ PT Rajawali Nusantara Indonesia, Bakrie realisasi lahan sawit 25.000 ha, 17 Maret 2006

¹¹⁶ The Jakarta Post, RNI to invest \$5^m in bioenergy, 12 Februari 2007

¹¹⁷ The Jakarta Post, Lampung on target to become major biofuel center, 30 Januari 2007

¹¹⁸ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹¹⁹ The Jakarta Post, Lampung on target to become major biofuel center, 30 Januari 2007

¹²⁰ The Jakarta Post, Lampung on target to become major biofuel center, 30 Januari 2007

¹²¹ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹²² Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹²³ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

	hectares in Kalimantan and Papua. ¹²⁵ The project is to produce CPO-based biodiesel and sugar- and cassava-based ethanol ¹²⁶
PT Wilmar Bioenergi Indonesia (Subsidiary of Wilmar Holdings - Singapore)	- Product: biodiesel - Location: Dumai (Riau) - Capacity: 252,000 tons / year - Operation/production commencement: 2009 ¹²⁷ - Investment: US\$ 100 million ¹²⁸ - The company owns a 150,000-hectare plantation in Riau and East Kalimantan ¹²⁹ .
Indonesia Malaysia (Indomal Group)	- Indomal Palm Oil Centre project - Location: Sula district, North Maluku ¹³⁰ - Investment US\$ 1 million ¹³¹
Darmex Oil (Subsidiary of American Fuchs Lubricants Company, one of the biggest palm oil producers, US-based)	- Product: CPO-based biodiesel - Capacity: 85,000 tons / year - Operation commencement: 2010 ¹³²
PT London Sumatra Indonesia (PT Lonsum) (50,1% of shares controlled by Singapore TR AC)	Produces mainly CPO, operates a plantation of 90,295 hectares, a large portion of it is not yet ready for harvest ¹³³
PT CSM Corporation (South Korean company, in partnership with a local government-owned company, and granted 50 years investment term, which can be extended when considered necessary)	- Product: cassava-based bioethanol - Location: Lampung Utara - Capacity: 1.5 million kiloliter / year - Investment: IDR 90 trillion - The company owns cassava estates of 20,000 hectares in Way Kanan and 5,000 hectares in Tulangbawang, both in Lampung, and invests Rp 10 trillion in its bioethanol refinery. ¹³⁴
PPB Oil Palms Bhd – Malaysian The largest CPO producer in Malaysia.	- To invest MR 400 million (US\$ 117 million) per year to expand its oil palm plantation in Indonesia through to 2010. - Projects to establish two to three CPO refineries with production capacity of 60 to 120 ton per hour. PPB operates oil palm plantation with a combined acreage of 363.238 hectares, 78% of which are located in Indonesia. - Plan to acquire additional 45,000 hectares of land in Central Kalimantan to expand its oil palm plantation. ¹³⁵
Kuala Lumpur Kepong Bhd In joint venture with PT Jabontara Eka Karya	Operates a 14,300-hectare of oil palm plantation in East Kalimantan ¹³⁶
Kulim (M) Bhd	63,305-hectare oil palm plantation in East Kalimantan ¹³⁷
Asiatic Development Bhd In joint venture with PT Sepanjang Inti Surya Indah, PT Sepanjang Inti surya Mulia, PT Sepanjang Inti Utama and PT Sawit Murni	98,300-hectare oil palm plantation in West Kalimantan. ¹³⁸
Delloyd Ventures Bhd In joint venture with PT Rebinmas Jaya	Oil palm plantations in Bangka and Belitung, with a combined acreage of 34,000 ha. ¹³⁹
TSH resources Bhd In joint venture with Andalas Agro	17,000-hectare oil palm plantation in West Sumatra. ¹⁴⁰
Fima Corporation Bhd In joint venture with PT Nunukan Jaya Lestari	18,000-hectare oil palm plantation. ¹⁴¹
Golden Hope Start operation in Indonesia in 1995, in joint venture with local companies.	- Obtains right of cultivation over 60,000 hectares of land in the districts of Ketapang and Sanggau, West Kalimantan, 16,755 hectares of which is already planted.

¹²⁴ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹²⁵ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹²⁶ Kompas, Kredit Biofuel Mengalir: BNI dan Bank Mandiri Menandatangani MOU dengan 10 Perusahaan, 10 Januari 2007

¹²⁷ Komara Djaja, Development of Biofuel/Green Energy in Indonesia: Plan and Strategy

¹²⁸ Republika, Diteken, Proyek biofuel 12,4 M Dolar AS, 10 Januari 2007

¹²⁹ The Jakarta Post, Rp 13 trillion earmarked for biofuel development, 26 September 2006

¹³⁰ Raja Suhud, Pemerintah Harus Bangun Infrastruktur Pendukung Proyek BBN, 10 Januari 2007, Media Indonesia Online

¹³¹ Republika, Diteken, Proyek biofuel 12,4 M Dolar AS, 10 Januari 2007

¹³² Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹³³ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹³⁴ Lembaga Ilmu Pengetahuan Indonesia, Penanaman Lahan Sawit Manfaatkan Lahan Kritis, 9 Mei 2006

¹³⁵ The Jakarta Post, What's next if RI takes top spot in CPO production this year?, 13 Maret 2006

¹³⁶ Departemen Pertanian Republik Indonesia

¹³⁷ Departemen Pertanian Republik Indonesia

¹³⁸ Departemen Pertanian Republik Indonesia

¹³⁹ Departemen Pertanian Republik Indonesia

¹⁴⁰ Departemen Pertanian Republik Indonesia

¹⁴¹ Departemen Pertanian Republik Indonesia

	Of the area planted, 8,014 hectares in Ketapang and 8,741 hectares in Sanggau. - Owns two CPO refineries in Sanggau, with the capacity of processing 30 tons of kernels per hour to produce 20 tons of CPO per hour. ¹⁴²
Perusahaan-perusahaan Inggris: - PT Indo Biofuel Energi (Jambi) - PT Sinar Alam Permai - PT Mentari Subur Abadi - PT Swadaya Bhakti Negara Mas (Sumatra Selatan)	A number of refineries with a total capacity of 695,000 tons / year are expected to start operation in 2010 ¹⁴³

Palm oil-based biodiesel has been the most attractive and will lead in the biofuel production in Indonesia. Major players, such as PT Bakrie Sumatra Plantation, PT London Sumatra, PT Astra Agro Lestari, SMART and Darmex, are already important players in the oil palm sector. Meanwhile, Malaysian palm oil companies expand in Indonesia also in part either to enter into or to strengthen their biofuel production. The trend comes naturally, considering, firstly, that the existing oil palm players, already producing 43,6% of the world's CPO, see themselves directly related and ready to venture into the prospective palm oil-based biodiesel production, which is still on the same line of business.

Secondly, the trend enjoys significant support from the government. Indonesian VP has stated that the government plans to convert 500,000 ha of land per year for oil palm estates, starting with Kalimantan. Regional governments follow suit, with East Kalimantan government planning to convert 1 million hectares for oil palm plantation, to be completed in 15 years.¹⁴⁴ Jambi provincial government has also made plan of the same kind. The government support is seen as a go-ahead for private companies to develop palm oil-based biofuel in potential areas.

Finally, the soaring demand for palm oil-based biofuel may be the most determining factor. Malaysia and Indonesia, both producing 85% of the world CPO, have agreed to allocate 40% of their production for alternative energy¹⁴⁵ to supply the global market.

Three Domestic Palm Oil Behemoth

Below are major companies in the oil palm plantation sector, which are likely to be major suppliers of palm-oil-based biofuel: PT Bakrie Sumatra Plantation, PT Astra Agro Lestari, SMART dan PT London Sumatera.

PT Bakrie Sumatera Plantation

Bakrie Group started ventures in the plantation business by acquiring NV Hollandsch Amerikaanse Plantage Maatschappij, a rubber plantation company founded in 1911, from Uniroyal Inc. (USA) in 1986, and changing its name into United Sumatera Plantation. In 1990, the company was renamed once again into Bakrie Sumatra Plantation (BSP or UNSP - its trading code at the Jakarta Stock Exchange) and henceforth represents the group's plantation division. The group entered the oil palm plantation business in 1990, first through its subsidiary PT Bakrie Pasaman Plantation, located in Pasaman, West Sumatera, then the acquisition of PT Agrowijaya, located in Jambi, by UNSP the following year. PT Bakrie Pasaman Plantation began operating its own CPO mill in 1996 and another one, Kilang Vecolina (in Karawang, West Java), in 2000.

By 31 December 2005, PT Bakrie & Brothers Tbk. Holds a controlling stake at UNSP (54.17%), followed by Marco Polo Capital Ltd. (9.38%), HSBC Fund Services (7.83%), and Indonesian Public (28.62%).¹⁴⁶ Subsidiaries of UNSP are PT Bakrie Pasaman Plantation (oil palm plantation), PT Agrowiyana (oil palm plantation), and PT Agro Mitra Madani (CPO Mills, located in Jambi and operating since 2004).¹⁴⁷

Prior to the biodiesel boom in 2004, PT Bakrie Sumatera Plantation had 32,712 ha of oil palm plantation and in 2006 saw its production jumped 74% from the previous year. To enter biofuel sector, the company plans to add 25,500 ha to expand its plantation acreage in Jambi and to partner with PT Rekrayasa Industri to build a second biodiesel refinery projected to start operation in 2008, with a capacity of

¹⁴² Kamsari, Elnusa dan Nippon Oil Bangun Pabrik Biofuel Ramai-Ramai Serbu Biofuel, 2006

¹⁴³ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹⁴⁴ Kompas, 8 Mei 2006

¹⁴⁵ Kompas, Indonesia-Malaysia Pasok Biofuel untuk Pasar Eropa, 22 Agustus 2006

¹⁴⁶ www.jsx.co.id

¹⁴⁷ www.jsx.co.id

60,000 – 100,000 tons / year. The investment worths US\$ 25 million. Bakrie group, then, will operate two palm oil refineries, one in West java and the other in Jambi.¹⁴⁸

PT Astra Agro Lestari

PT Astra Agro Lestari Tbk is a company under Astra Group and focuses on the agribusiness/plantation sector, namely oil palm, rubber, tea and cocoa. Since 2005, the company has been focusing more on oil palm plantation, which contributes 98% of its total revenues, selling out non-oil palm plantations and converting rubber plantations into oil palm plantations. AAL is one of the largest CPO producers in Indonesia, operating 31 oil palm plantations in Sumatra, Kalimantan and Sulawesi, with a total acreage of 201,412 ha, plus 16 CPO mills located in its plantations, and one refinery in Medan, which produces oleine.

By 31 December 2005, AAL counted the total outstanding shares of 1.574.745.000, with PT Astra Internasional Tbk becomes the sole shareholder, controlling 79.68%, while the rest is traded in the stock exchange. Following the biofuel boom, AAL has set to drag up its palm oil production by 12% to 950,000 tons, from the previous year's 857,000 and start palm oil-based biodiesel production in 2007.¹⁴⁹ The company has also decided to open a jathropa estate of 5,000 ha in East Kalimantan this year.¹⁵⁰

SMART

Established as PT. Maskapai Perkebunan Sumcoma Padang Halaban pada in 1962, the company was renamed PT. Sinar Mas Agro Resources and Technology (SMART) Corporation in 1991 and is part of Sinar Mas Group. Sinar Mas Group is Indonesia's third largest palm oil producers, after Raja Garuda Mas and Kumpulan Guthrie Berhad, with total plantation acreage of 208 ha (109 ha under SMART). Till August 2006, 74.6% of the shares were controlled by PT. Purimas Sasmita, a subsidiary of Golden Agri Resources Ltd, another company of Sinar Mas based in Mauritius, but listed in the Singapore Stock Exchange. The remaining 25.4% are traded in the stock exchange.

SMART is known for expanding through either acquisition of or significant investment in oil palm plantation companies, among which are PT Maskapai Perkebunan Leidong West Indonesia (100%; 1,879 ha), PT Perusahaan Perkebunan Panigoran (100%; 1,666 ha), PT Kunci Mas Wijaya (100%), PT. Inti Gerak Maju (49%), PT Tapian Nadenggan (49%), PT. Kresna Duta Agroindo (located in Jambi), PT. Pilinti Perkasa Alam (located in Riau, later renamed PT. Ivo Mas Exim), PT. Sangatta Andalan Utama (100%; 5,700 ha) and PT Matrasawit Sarana Sejahtera (100%; 16,650 ha).

SMART is in partnership with China National Offshore Oil Corporation (CNOOC) and Hongkong Energy to finance a biofuel project, the largest in the World to date, which requires 1 million hectares of land to develop oil palm, sugarcane and cassava estates in Kalimantan and West Papua.

¹⁴⁸ Marianne Klute, Green Gold Biodiesel: Players in Indonesia, Watch Indonesia

¹⁴⁹ Suli H. Murwani, Astra Agro Cari Pendapatan Alternatif, Bisnis Indonesia, www.bfuel.biz

¹⁵⁰ www.indofinanz.com, Astra Agro Rambah Bisnis Biofuel, 11 Oktober 2006

CRITICAL ISSUES

Deforestasi

Indonesia is among the 44 countries that are collectively home to 90% of the world's forest. Indonesian forest makes up 120,35 million hectares of its total land, which is 1,919,440 kilometer square. The country now notes the highest deforestation rate in the world, at an annual average of 2%, which means that it loses 1.8 million hectares every year, from 2000 to 2005.¹⁵¹ *Potret Keadaan Hutan Indonesia*, a joint study by Forest Watch Indonesia and Global Forest Watch, reveals that Indonesia loses no less than 2 million hectares of its forest every year, a deforestation rate twice as high as that in the 1980s.¹⁵² Some major findings of the study are cited in the box below.

Box 1. A Portrait of Indonesia's Forest

Within the last 50 years, Indonesia's forest-covered areas decreased by 40% from 162 million to 98 million hectares.

Half of the currently remaining forest-covered area has undergone degradation and is fragmented by road networks and other economic activities such as development of plantations and industrial timber estates.

Nearly 9 million hectares of land, most of which were previously natural forests, have been allocated for industrial timber estates. Yet, only 3 hectares of the land cleared are used for industrial timber estates.

By the end of 1997, 7 million hectares of forest were allowed to be cleared for development of oil palm and/or rubber plantations, but only 4 million hectares were actually planted.

In the last 15 years, more than 20 million hectares of natural forest have been cleared.¹⁵³

Biofuel development program is foreseeably to affect forest destruction even worse, especially since the priority is put on development of CPO-based biofuel. The government plans to impose an obligation that biofuel companies have their own oil palm plantations,¹⁵⁴ in order to prevent supply for biofuel industry from interfering with CPO supply for food. The obligation, however, is to encourage large-scale area extension for oil palm plantation to meet production target. To meet biodiesel production target of 700,000 kiloliter (or 2% of diesel oil consumption) in 2009 requires 200,000-hectare oil palm plantation. The production target is expected to be 4.7 million kiloliters (5% of diesel oil consumption) in 2025, which will require an increase in oil palm area to 1.4 million hectares,¹⁵⁵ which is more than twice as large as Bali. Currently, 80% of oil palm area is located in Sumatra, with a high concentration in Riau (5.5 million hectares, which is 25% of the total area). The rest are located in North Sumatra, South Sumatra, Jambi, and West Kalimantan. State and private oil palm plantations take a share of 65%, while the rest are small growers/farmers.¹⁵⁶ A combined 4 million hectares of forest in Sumatra and Kalimantan have been cleared for oil palm plantations.¹⁵⁷

A soaring demand for CPO-based biofuel will lead to increase in oil palm production area. Large-scale area extension is taking place in Kalimantan (mainly in West Kalimantan), and is likely to take place in East Kalimantan, Sulawesi and Papua. The allocation of a combined 1 million hectares land in Papua and Kalimantan for plantation is to put further threat to the existing forest areas in both islands. Forest destruction may occur at higher scale.

The existing regulations prohibit forest clearing for plantation development for biofuel commodities. Such projects should make use of non-productive areas. State Minister for the Environment Rachmat Witoelar stated that the government would not allow clearing of natural forest for oil palm plantations and such projects should make use of idle lands, which is estimated to be 18 million hectares. According to the National Bureau of Statistics (BPS), in 2002, there was 22 hectares of critical land. Utilisation of the existing critical land for biofuel commodity production, especially jathropa and cassava, will not pose threat to food security.¹⁵⁸ According to Dr. Robert Manurung, even 10% of the critical lands could produce around 10.3 million kiloliter of biodiesel per annum, which is nearly 70% of the current diesel oil demand. Another 10% of critical land used to produce cassava could contribute to production of bioethanol at an amount that fulfill 10% of the annual demand of gasoline.

¹⁵¹ Clara Rondonuwu, *Kerusakan Hutan di Indonesia Tercepat di Dunia*, <http://www.media-indonesia.com/berita.asp?id=132103>, 3 Mei 2007, (19/5/07)

¹⁵² http://www.dephut.go.id/intranet/INVENT/R_GFW02.htm

¹⁵³ http://www.dephut.go.id/intranet/INVENT/R_GFW02.htm

¹⁵⁴ "Pemerintah Wajibkan Industri Biofuel Miliki Lahan Sawit", <http://www.antara.co.id/arc/2007/7/24/pemerintah-wajibkan-industri-biofuel-miliki-lahan-sawit/>

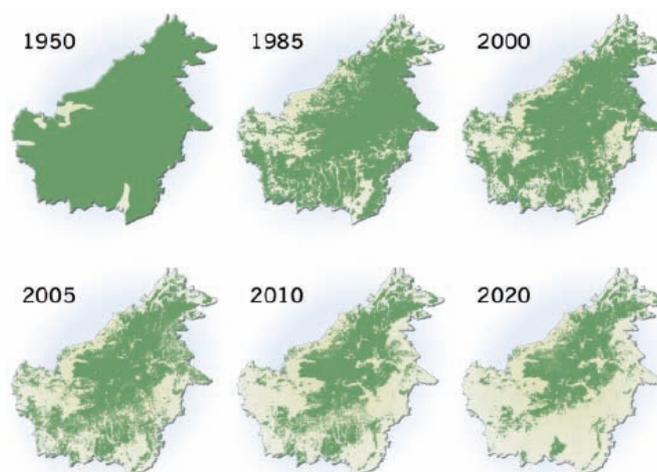
¹⁵⁵ PEACE, 2007, *Indonesia dan Perubahan Iklim: Status Terkini dan Kebijakannya*, http://www.peace.co.id/.../ClimateChange_Full.BH.pdf

¹⁵⁶ <http://www.rri-online.com/modules.php?name=Artikel&sid=24571>

¹⁵⁷ ISIS Press Release 11/12/06, *Biofuels: Biodevastation, Hunger & False Carbon Credits*

¹⁵⁸ Widodo, "Perspektif Pengembangan Biofuel di Indonesia", <http://www.indeni.org/content/view/113/76/>.

**Forest destruction in Kalimantan 1950-2005 and projection to 2020
(UNEP/GRID-Arendal, 2007)¹⁵⁹**



Utilisation of critical land pieces for production of biofuel commodities may not come into realization, first of all due to weak law enforcement. Also, production of commodities such as jathropa and cassava looks less prospective and less attractive due to problems related to lack of knowledge and experience in planting (maintaining pest control, etc.) and processing (technologies) such commodities. Oil palm, by contrast, has long been developed in Indonesia and is ready to become an option. Biofuel industry development, with a focus on CPO-based biodiesel raises concern over its negative effects on Indonesia's forest.¹⁶⁰ Such concern is very much reasonable, seeing the impact of oil palm plantations. A study by Greenomics reveals that large-scale oil palm plantation in East Kalimantan causes the province an annual economic loss of IDR 210 trillion and ecological loss of IDR 14.7 trillion.¹⁶¹

Box 2. Deforestation: The Brazil Case

In 1990, Brazil's forest was 520,027,000 hectares. In 2005, it was 477,698,000 hectares,¹⁶² a decrease of 8.14%. From 2000 to 2005, Brazil lost 3.466 million hectares of its forest annually, the highest deforestation rate in the world.¹⁶³

Soya production has its effect on the forest.¹⁶⁴ The steadily increasing demand for soya as a biofuel commodity speeds up the Amazon forest. Since 1998, Brazil has expanded acreage for soya production to 30 million acres to make itself the world's second largest exporter of the commodity.¹⁶⁵

To increase production, soya farmers either clear the forest themselves or buy land from local farmers and and cattlers who have cleared the forest for settlement near or within the forest. Big soya farmers preserve strong lobbying power to direct infrastructure development to fulfill their interests, such as road widening and canal building, which later proven destructive to the Amazon forest.¹⁶⁶

Since 2005, however, deforestation has begun to decrease. The year noted forest clearing of 18,900 square km, a significant reduction from 26,129 squares km in the previous year¹⁶⁷. The decrease is a direct impact of the Brazilian government's aggressive effort to implement the Environment Law, besides the declining price of soya.¹⁶⁸

¹⁵⁹ PEACE, 2007, *Indonesia dan Perubahan Iklim: Status Terkini dan Kebijakannya*, http://www.peace.co.id/.../ClimateChange_Full.BH.pdf

¹⁶⁰ PEACE, 2007, *Indonesia dan Perubahan Iklim: Status Terkini dan Kebijakannya*, http://www.peace.co.id/.../ClimateChange_Full.BH.pdf

¹⁶¹ "Memimpikan Kesejahteraan dari Kelapa Sawit", <<http://timpakul.hijaubiru.org/sawit-11/>>

¹⁶² Mongabay.com, "Tropical Rainforest-Brazil", Last update 5/02/2006, <http://rainforests.mongabay.com/20brazil.htm> (akses 5/03/2007)

¹⁶³ Rhett A. Butler, "World Deforestation Rates and Forest Cover Statistics 2000-2005", update 17/11/2005, <http://news.mongabay.com/2005/1115-forests.html> (akses 5/03/2007)

¹⁶⁴ Rhett A. Butler, Soybeans may worsen drought in the Amazon rainforest, 18 April 2007, (14/5/2007)

¹⁶⁵ <http://news.mongabay.com/2006/1026-amazon.html>, Brazil claims soy and beef not responsible for Amazon deforestation, 26 October 2006, (14/5/2007)

¹⁶⁶ Rhett A. Butler, Soybeans may worsen drought in the Amazon.

¹⁶⁷ Rhett A. Butler, Amazon deforestation slows in Brazil for 2005, <http://news.mongabay.com/2005/1205-amazon.html>, 5 December 2005, (14/5/2007)

¹⁶⁸ Rhett A. Butler, Amazon deforestation slows in Brazil for 2005, <http://news.mongabay.com/2005/1205-amazon.html>, 5 December 2005, (14/5/2007)

Food security

Biofuel industry development will affect food security in terms of supply, access, and utility. The use of land, water and other resources in biofuel commodities instead of food will directly affect food supply. Short of supply will drag up food prices to the effect of narrowing access to food for low-income families. Still, fuel price hike, as always, will tend to have direct effects on stability in food security. And when conditions relative to health, such as access to water and medical services worsen, nutrition-related problems are likely to emerge within communities.¹⁶⁹

Regarding food resilience, the government policy is to focus on development of five main commodities, namely rice, corn, soya, sugarcane and meat. Since corn, soya and sugarcane are also biofuel commodities, competing demand for the commodities is foreseeable and mismanagement could lead to food scarcity in certain regions.¹⁷⁰

Box 3. Food Security: the Experience of China

Any increase in the price of fossil fuel is always a big pressure on the economy of China. A newly industrialised country hungry for energy, it turns to biofuel as an alternative source, focusing on corn-based ethanol.

Demand of corn for bioethanol competes with that for food and animal feed and when supply cannot catch up with the overall demand, domestic corn price shot up by 500% to USD 30/ton in 2005.¹⁷¹ Also an effect of bioethanol development was the daunting fact that 400 towns in China are in constant threat of water scarcity, predicted to reach a worrying level in 2030.¹⁷²

The Chinese government embarked on tight monitoring of corn supply for biofuel in 2006 to stabilise corn prices and to protect the growth of food industry. It eventually chose to prioritise food availability for its 1.3 population. *Shanghai Youth Daily* later reported that the Chinese government is starting encouraging production of other biofuel commodities, such cassava, sorghum, sugarcane, and sweet potato.¹⁷³

In his speech "Guidance in Biofuel Development" at Presidential Palace, 9 January 2007, President SBY indicated three strategic but critical commodities: food, energy and water. Generally speaking, food problem in Indonesia is rooted in three interrelated issues: level of food production, food prices, and poverty which affects purchasing power of the majority of the population.

Food production has been low for years, which prompts import. From 2001 to 2005, rice import totaled 4.3 million tonnes or 861,000 tonnes per year (Table ...), 60% of which was from Thailand and Vietnam and a small portion from the US.

Table 4. Rice Import By Main Country of origin, 2001-2005, tons

Importing Country	2001	2002	2003	2004	2005	Total
Taiwan	0	3,542	9,601	10,600		23,743
China	24,728	126,768	54,440	111	1	206,048
Thailand	189,656	418,698	492,114	129,421	126,409	1,356,298
Myanmar	25,441	111,687	41,399	2,500		181,027
Vietnam	142,512	561,729	506,013	58,810	44,773	1,313,837
India	2,047	405,032	108,797	923	327	517,126
Pakistan	26,110	32,281	49,071	0		107,462
United States	177,889	13,393	107,608	16,767	2,184	317,841
Other	56,350	132,250	59,463	17,735	15,923	281,721
Total	644,733	1,805,380	1,428,506	236,867	189,617	4,305,103

Source: Statistik Indonesia, 2005/2006

Shortage in rice, which is a major staple for the majority of the population, is a direct consequence of low production. In 2005, the domestic rice production was totalled 54 million tonnes, half of which was produced in Java, while corn and cassava were 12 and 19 million tonnes, respectively.

¹⁶⁹ United Nations, Sustainable Bioenergy: A Framework for Decision Makers, April 2007

¹⁷⁰ Seminar Nasional Pangan Indonesia, Meningkatkan Komitmen Melawan Kerawanan Pangan dan Gizi Menuju Indonesia Sehat 1020

¹⁷¹ Antoaneta Bezlova, Biofuels eat into China's food stocks, Beijing

¹⁷² Biofuel may not be the ultimate energy panacea as water resources become scarce, 11 Februari 2007

¹⁷³ Yingling Liu, China Moving Away from Grain for Ethanol Production, April 27, 2006

[Http://www.worldwatch.org/node/3919](http://www.worldwatch.org/node/3919)

Table 5. Production of Some Food Commodities, 2005, ton

Province	Rice	Corn	Cassava
NAD	1,388,863	93,604	51,896
North Sumatera	3,423,762	711,341	479,883
West Sumatera	1,907,390	157,147	114,199
Riau	421,364	36,421	41,668
Jambi	579,635	29,679	39,780
South Sumatera	2,319,95	75,566	179,952
Bengkulu	441,76	84,089	79,934
Lampung	2,119,658	1,439,000	4,767,631
Kep. Bangka Belitung	18,727	2,715	19,000
Kep. Riau	312	592	3,349
DKI Jakarta	12,863	58	744
West Java	9,787,217	587,186	2,068,981
Central Java	8,424,096	2,191,258	3,478,970
DI Yogyakarta	670,703	248,960	920,909
East Java	9,007,265	4,398,502	4,023,614
Banten	1,861,776	29,751	144,110
Bali	762,684	81,884	155,808
Nusa Tenggara Barat	1,367,869	96,458	92,991
Nusa Tenggara Timur	460,084	552,439	891,031
West Kalimantan	1,016,858	119,501	228,951
Central Kalimantan	491,088	2,117	70,407
South Kalimantan	1,598,835	48,082	77,903
East Kalimantan	497,969	11,238	93,885
North Sulawesi	432,624	195,305	68,463
Central Sulawesi	722,070	67,101	46,834
South Sulawesi	3,381,543	719,139	466,746
South East Sulawesi	339,847	73,154	256,468
Gorontalo	167,152	310,111	12,211
West Sulawesi	253,076	17,343	56,717
Maluku	37,239	14,262	94,995
North Maluku	57,934	9,860	142,680
Papua	60,797	6,204	34,272
West Irian Jaya	24,311	3,286	26,513

Source: Statistik Indonesia, 2005/2006

The low production and supply, especially of rice, has pushed up food prices to unaffordable level for low-income communities. Data from National Bureau of Statistics reveal high percentage of low-income households relying on subsidised rice: more than 50% in rural areas and 25% in urban areas (Tabel..). Provinces with high percentage of poor families tend to note high percentage of families relying on subsidised rice, as the case with East Nusa Tenggara (82%). Even in rice producing regions, the percentage is relatively high. Poverty and weak purchasing power are also significant part of food problem.

Table 6. Households Relying On Subsidised Rice (2005) and Poverty Level (2004)

Province	Percentage of Households Relying On Subsidised Rice (Raskin)		Percentage of Poverty Level
	Urban	Rural	Rural
NAD	37.8	37.63	32.66
North Sumatera	13.38	21.33	17.19
West Sumatera	8.04	22.68	9.67
Riau	18.4	30.85	18.36
Jambi	14.57	29.8	10.46
South Sumatera	28.41	36.21	21.33
Bengkulu	24.68	48.8	21.16
Lampung	25.1	57.74	22.81
Kep. Bangka Belitung	15.38	18.46	10.06

Kep. Riau	16.23	49.12	
DKI Jakarta	7.61		
West Java	27.67	49.36	13.08
Central Java	46.93	75.45	23.64
DI Yogyakarta	23.82	66.73	23.65
East Java	31.21	60.94	24.02
Banten	6.03	24.04	11.99
Bali	21.71	47.4	8.71
Nusa Tenggara Barat	21.81	32.86	21.09
Nusa Tenggara Timur	37.53	81.93	29.77
West Kalimantan	10.59	33.22	14.15
Central Kalimantan	12.73	36.99	12.2
South Kalimantan	12.8	29.2	8.33
East Kalimantan	10.83	33.68	18.68
North Sulawesi	23.46	38.59	11.76
Central Sulawesi	21.81	54.09	23.33
South Sulawesi	17.82	26.27	18.65
South East Sulawesi	21.2	59.43	25.39
Gorontalo	26.43	43.6	32.7
Maluku	26.04	41.31	39.86
North Maluku	20.51	65.42	13.1
Papua	14.97	45.5	49.28

Source: Statistik Indonesia, 2005/2006; Statistik Kesejahteraan Rakyat 2005.

Biofuel industry development is to affect food supply. Firstly, conversion of land use from food production to biofuel commodity production is predictable to reduce food supply in the short term. Biofuel plants, which are water- and nutrient-hungry, are affecting soil productivity in the long run. Oil palm plantations already cause water scarcity. An environmental study by Riau University (Universitas Riau) finds out that one oil palm consumes 12 liter of water daily¹⁷⁴ or 360 liter per month. A one-hectare estate, with 143 oil palms,¹⁷⁵ planted at a distance of 9 meter to one another, would consume 51,480 liter per month. Home to 1.8 million hectares of oil palm plantations, or 235 oil palms, Riau has begun to face water scarcity, the first case occurred in Bengkalis, a district of 4,000 population, during the first three month of 2005. Water scarcity in the province is predicted to worsen in the next 10 to 15 years,¹⁷⁶ as 95% of 4.3 million hectares of Riau's forest have been converted into oil palm plantations and other economic use. It would be even more serious for the eastern regions, which are known to be only marginal in food production, thus vulnerable in terms of food supply. Agriculture Departement reportedly has set that production of *Jathropa Curcas* would be concentrated primarily in the eastern regions, such as West nusa Tenggara, East Nusa Tenggara, Sulawesi and Papua, while in Java and other western regions only when it is considered feasible.¹⁷⁷ In the eastern regions, *jathropa* is to be planted in intercrop with corn/maize, as a way of anticipating short supply of food.¹⁷⁸ However, intercropping is possible only in the first three years. When *jathropa* reaches its production years, corn needs to be reduced, which means reduction in food production and supply.

Table 7. Area of Plantation and Temporary Uncultivated Piece of Land, 2004, Hectares

Province	Dry land	Temporary uncultivated piece of land
NAD	1,064,108	437,518
North Sumatera	689,187	241,193
West Sumatera	506,314	299,839
Riau	609,944	566,408
Jambi	609,199	302,147

¹⁷⁴ Akhmad Sirodz, "Riskan Merusak Lingkungan-Kebijakan Monokultur Sawit Skala Besar dan Resikonya", KaltimPost, 21/02/2007, <http://www.kaltimpost.web.id/berita/index.asp?Berita=Opini&id=199275> (akses 6/03/2007)

¹⁷⁵ WARTA Penelitian dan Pengembangan Pertanian, "Perkebunan Kelapa Sawit Dapat Menjadi Basis Pengembangan Sapi Potong", Volume 25 No.5 Tahun 2003, halaman 2, <http://www.pustaka-deptan.go.id/publication/wr255031.pdf> (akses 13/03/2007)

¹⁷⁶ Kompas, "Propinsi Riau Menuju Krisis Air Bersih Akut", 23/03/2005, <http://www.kompas.com/kompas-cetak/0503/23/daerah/1636827.htm> (akses 7/03/2007)

¹⁷⁷ Perkembangan Program Aksi Energi Alternatif: Pengembangan Jarak Pagar", <http://www.deptan.go.id/ditjenbun/program%20aksi%20penyediaan%20energi%20alternatif.htm>

¹⁷⁸ Prajogo U. Hadi, dkk, 2006, Prospek Pengembangan Sumber Energi Alternatif, Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Badan Penelitian dan Pengembangan Pertanian, Departemen Pertanian, <pse.litbang.deptan.go.id/.../LHP_PUH_2006.pdf>

South Sumatera	619,707	722,183
Bengkulu	249,382	158,802
Lampung	816,661	86,792
Kep. Bangka Belitung	198,769	224,508
DKI Jakarta	2,917	168
West Java	797,595	13,318
Central Java	768,615	4,896
DI Yogyakarta	96,234	675
East Java	1,143,608	9,867
Banten	250,000	24,406
Bali	129,124	425
Nusa Tenggara Barat	241,840	56,094
Nusa Tenggara Timur	691,729	857,266
West Kalimantan	970,072	2,211,335
Central Kalimantan	888,175	951,968
South Kalimantan	332,423	276,311
East Kalimantan	1,027,195	3,984,761
North Sulawesi	347,679	48,327
Central Sulawesi	605,878	400,921
South Sulawesi	782,525	198,405
South East Sulawesi	284,358	256,733
Gorontalo	155,686	82,790

Source: Statistik Indonesia, 2005/2006

In general terms, land for biofuel is defined as *unproductive* pieces of land, which are not appropriate for production of economically high-value commodities, critical land, and uncultivated land. It may also mean *temporarily uncultivated* piece of land, geographical distribution of which shown in Table Another category is "tegal/kebun/ladang/huma", which is of lower economic value than paddy field or plantation. The following Table shows that the land acreage for biofuel in provinces in Sulawesi is nearly equal to temporarily uncultivated land, which may imply that the chance for acreage extension for food production would vanish, if the temporarily uncultivated pieces of land were to be used for biofuel commodities, the chance for acreage extension for food production is closed.

Table 8. Area for Biofuel Commodity in Some Provinces

Provinces	Hectarage	%	
		Dry land and Temporary Uncultivated Piece of Land	Previously uncultivated/idle land
South East Sulawesi	212,123	39.20	83
North Sulawesi	34,812	8.79	72
Nusa Tenggara Timur	101,830	6.57	12
Maluku	2,304,932		
Papua	9,262,130		
West Kalimantan	514,350	16.17	23
South East Sulawesi	251,856	46.55	98
South Kalimantan	65,638	10.78	24

Social Problems

Plantations for biofuel commodities usually invoke land conflict, especially when it concerns oil palm plantations controlled by large corporations. Though exact data are difficult to obtain, there are indications that land conflict is prevalent. Chief of national Land Agency Joyo Winoto (March 2007), quoting data collected from NGOs, stated that 2006 alone noted 1,423 cases of land conflict, 322 land disputes, and 1,065 court cases. At other occasion, he stated that 2,810 large cases of land conflicts and disputes nationwide, most of which started in 1970s and 1980s (small cases not included).¹⁷⁹ Meanwhile Sawit Watch noted 450 cases of conflict related to oil palm plantations in Indonesia in 2006.¹⁸⁰

¹⁷⁹ <http://serikat-tani-nasional.blogspot.com/2007/06/kuasa-negara-derita-petani.html>

¹⁸⁰ Sawit Watch, Palm oil for biofuels increases social conflicts and undermines land reform in Indonesia, 26 Januari 2007; "Seperti Hantu di Tanah Sendiri", *Kompas* 16/6/2007.

Documentation by the Consortium on Agrarian Reform (Konsorsium Pembaruan Agraria/KPA) in 2001 counted around 1.500 agrarian conflicts over 2,136,603 hectares, affecting no less than 236,761 households.¹⁸¹ Director of Rapid Agrarian Conflict Appraisal (RACA) Institute Boedhi Wijardjo, quoting data from FSPI, stated that 1,744 conflicts occurred in 25 provinces in 2001, over a combined 5.26 hectares of land and altogether affecting 258,022 households.¹⁸² Land conflict, thus, is already prevalent nationwide.

Agrarian Conflicts in Some Provinces

North Sumatra. Between 1970 and 1990, 500,000 hectares of land were converted into plantations, affecting 250,000 households. Post May 1998, the province counts 554 cases of land conflicts at all levels, 97% of which between local communities and large plantations.¹⁸³

West Java. 150,000 hectares of land are still under conflict. Data from LBH Bandung noted that during the period of 1984-2003, 40 cases of agrarian conflict occurred, 17 were triggered by the granting of Right to Cultivate (Hak Guna Usaha/HGU)¹⁸⁴ More than 1,000 conflicts have occurred, 80% of which are between plantations and the local, low-income communities.¹⁸⁵

South Sumatra and Bangka-Belitung. Walhi Sumsel (Walhi South Sumatra Chapter) carried out advocacy in at least 18 cases of land conflict, mostly between oil palm plantations and local communities, none has been settled, and a number of cases communities and local government, which are related to regional planning and the Industrial Timber Estate (HTI) development program. Of the 18 cases, 10 are in Musi Banyuasin, 4 in Ogan Komering Ilir, four others in Musi Rawas, Muara Enim, Lahat, and Bangka-Belitung. According to Executive Director of Walhi Sumsel Sri Lestari Kadariah, cases handled by her organisation make up just a small number of the total. Data from BPN (central office) show that 2,000 cases occurred in South Sumatra and Bangka-Belitung in 2007.¹⁸⁶

Lampung. Since 1999, 327 cases of land conflict emerged in the province, only 193 of which have been settled.¹⁸⁷

Conflict between oil palm plantations and local communities over land ownership is the dominant case, with small farmers Victims as usual victims. Responding to protests from communities, plantation companies carry out Community Development programs,¹⁸⁸ but response with violence is still normal. Further, profile of forest conflicts 1997-2003 by CIFOR and FWI forest-related conflicts shows that the number of forest conflicts occurred in 2000 rose eleven-fold from 1997.¹⁸⁹ Of 359 cases nationwide, 39% were related to Industrial Timber Estates, 27% to forest concessions (HPH) and 34% to protected areas. The post-New Order period notes an increasing number and frequency of conflict with a tendency towards violence.

To the current list of unsettled agrarian conflicts, the biofuel industry development, therefore, is potential of adding more cases and victims, evicting local communities from their land and depriving them from their livelihood. UN Permanent Forum on Indigenous Issues has warned that oil palm plantation expansion in West Kalimantan to cater the global biofuel industry could be a threat to survival of at least five million of the local population in the province.¹⁹⁰ The biofuel development program could have its disastrous social impact.

Domination by large players

The biofuel sector development by design belongs to large corporations and the existing data may provide a kind of warning that the sector is unlikely to bear positive effect on farmers and other players with weak economic position. Development of oil palm plantations, for instance, shows stark imbalances in economic value distribution among players, with the plantation companies take nearly 80% of economic benefit, leaving only, 15% to the central government, 4.5% to local government, and only 0.5% to farmers.¹⁹¹

¹⁸¹ Sadikin, tt., "Agenda Persiapan Pelaksanaan Pembaruan Agraria: Catatan dari Kasus Kabupaten Banyumas, Tabanan dan Lampung Tengah", http://rumahkiri.net/index2.php?option=com_content&do_pdf=1&id=19

¹⁸² <http://www.korantempo.com/news/2002/4/24/Nasional/48.html>

¹⁸³ <http://www.sinarharapan.co.id/berita/0309/29/nas02.html>

¹⁸⁴ <http://www.sinarharapan.co.id/berita/0309/29/nas02.html>

¹⁸⁵ <http://www.pikiran-rakyat.com/cetak/2007/052007/24/0104.htm>

¹⁸⁶ <http://www.prakarsa-rakyat.org/artikel/news/artikel.php?aid=16079>

¹⁸⁷ http://www.okezone.com/index.php?option=com_content&task=view&id=15428&Itemid=67

¹⁸⁸ Bill Guerin, Jakarta eyes palm oil for fuel, 18 Mei 2006

¹⁸⁹ <http://www.cifor.cgiar.org/acm/download/pub/wk/warta15.pdf>. Laporan lengkap pada <http://www.cifor.org/scripts/news/scripts/publications/detail.asp?pid=1614>.

¹⁹⁰ "Ekspansi Lahan Sawit Ancam 5 juta Penduduk Kalbar",

http://members.bumn-ri.com/ptpn13/news.html?news_id=20343

¹⁹¹ Dr. Daroni, SIP, SP, MP, Ketahanan Pangan dan Kelapa Sawit, 26 Desember 2005

Table 9. Area dan Production of Palm Oil Plantation By Producer Category (1985, 2005)

	1985		2005	
	Ha	Tons	Ha	tons
State	335,195	861,175	677,041	3,768,261
Private	143,603	339,241	3,003,080	4,922,088
Farmer	118,564	43,016	1,917,037	4,019,651
Indonesia	597,362	1,243,430	5,597,158	12,620,000

Source: Soeherman et.al (2006)¹⁹²

Private companies hold significant control over land and oil palm production (Table 9). Private control of land enlarges by 20% in twenty years (1985-2005), while control by farmers enlarge on by 15% in the same period. *Investor Daily* notes that seven business groups, among them are Malaysian companies, have controlled more than 100,000 hectares each, and altogether control 1.741 million hectares.

Tabel 10. Seven Major Palm Oil Plantation Company in Indonesia

Group	Area (thousand hectares)
Raja Garuda Mas	467
Wilmar Group	250
Salim Group/Indo Agri (termasuk Lonsum)	224.1
Kumpulan Gurthrie Bhd (Malaysia)	288.9
Sinar Mas	208
Astra Agro Lestari	189
PBB Oil Palm (Malaysia)	114.4
TOTAL	1,741

Foreign corporations in the biofuel sector do not only invest but also directly involve themselves in operations. Chinese investors invest USD 7.5 billion in infrastructure projects and USD 8.6 billion in energy sector, directly controlling 600,000 hectares of oil palm plantations, while domestic companies 1.2 million hectares.¹⁹³

It remains to see in the future how the biofuel sector development will benefit farmers. Biofuel is to increase income, but at the same time it also push up living expenses. The soaring biofuel demand is to put pressure on land use for food production, and ultimately to drag up food prices. Biofuel production and distribution need to be carried out in large scale to be efficient. In this matter, only large players with strong financial power can cope with this economic of scale, and farmers will find it impossible to compete with large producers.¹⁹⁴

It is even dubitable that the program "Independent Energy Producing Village" (*Program Desa Mandiri Energi/DME*) will really benefit farmers and villagers. Persient Susilo Bambang Yudhoyono declared the Program on 21 Pebruari 2007, when visiting Tanjung Harjo village, Ngaringan Subdistrict, Grobogan, Central Java.¹⁹⁵ Three objectives were set: firstly, that villages can furnish their energy demand, to solve their dependence on fossil fuel, especially kerosene. The Program was set also to provide employment opportunities and to reduce poverty in underdeveloped villages. There are two types of DME, firstly, those furnishing their energy demand from non-oil and non-biofuel sources, such as microhydro, solar power, and biogas; the other type are those relying on biofuel, mainly from CPO- and Jathropa-based.

In implementation, seven departments have taken part in DME projects: Energy and Mineral Resources Department, Agriculture Department, Department of Manpower, Department of Home Affairs, State Ministry for Development of Disadvantaged Regions, State Ministry of State-owned Enterprises, and Department of Maritime Affairs and Fisheries. The government projects to realise 2,000 energy-independent village by the end of its tenure in 2009, starting with 200 village nationwide in 2007. Currently, there are 140 energy-independent villages in 81 district, 100 of which use biofuel and 40 non-biofuel resources. As for financing, the government plans to allocate fund from the National Budget through departments to the 81 districts. Additional financing is expected from each district's Regional Budget. Villages selected for energy-independent program are those who have not enjoy electricity supply from the existing network, but preserve potential for local energy production.

In relation to poverty reduction, the Program is to prioritise disadvantaged villages (*Desa Tertinggal*), which make up 45% of the current 70,000 villages. Considering the high number of disadvantaged

¹⁹² Tulus Tambunan, Indonesia Crude Palm Oil: production, Export Performance and Competitiveness, September 2006

¹⁹³ <http://news.mongabay.com>, Kenapa kelapa sawit menggantikan hutan hujan? Kenapa biofuels menggerakkan penggundulan hutan?

¹⁹⁴ United Nations, Sustainable Bioenergy: A Framework for Decision Makers, April 2007

¹⁹⁵ <http://www.presidensby.info>

villages, creation 2,000 energy-independent villages by 2009 is a low target, only 6%. The Program has been implemented, among others, in East Nusa Tenggara (NTT), Kota Baru (South Kalimantan), Bulungan, Ogan Komering Ilir Timur (South Sumatra), and Grobogan, Central Java. Grobogan district has used 1,200 hectares of its area for jathropa development/estates and 7 hectares for jathropa seedling estates. With assistance from Department of Forestry, the total land for jathropa will be 8,000 hectares.

Energy-independent village program is to be carried out in partnership between farmers and companies, either state-owned or private, in smallholder scheme. As stated by Minister for Energy and Mineral Resources Purnomo Yusgiantoro, jathropa-based development of energy-independent village is to be founded on six smallholder groups, each operating 50 hectares, thus 300 hectares in overall. Every smallholder group will be equipped with oil extracting and refining tools as well as equipment for briquet production from Jathropa pulp. In terms of employment, each smallholder group requires estate workers and at least three workers to process jathropa bean into crude oil. The six groups establish one Nucleus, which requires at least 5 workers for refining. A Nucleus-smallholder unit is to require at least 35 workers.

The Roadmap of Jathropa Curcas development, however, indicates that by 2007 one million hectares will be used for jathropa development, which requires 20,000 skilled workers and 1 million non-skilled workers, nationwide. The hectareage requires 20,000 stakeholder groups and around 3,333 Nucleus-Smallholder Units. As the planted area increases to 10 million hectares in 2009, the number of Nucleus-Smallholder unit will multiply significantly. Calculation by Hadi et al. (2006)¹⁹⁶ indicates that every hectare of farmer's estates will absorb 108 man days (from land preparation to pos-harvest), with each worker being annually paid IDR 1.7 million. An area of 5,000 hectares, therefore, requires 539,000 man days, with labor cost of IDR 8.5 billion annually.

Roadmap of Jathropa Curcas Development

	2005	2006	2007	2008	2009
Market	100% seedling	Seedling and 0.3 substitution for kerosene	2% substitution for kerosene	12.5% substitution for kerosene	25% substitution for kerosene
Production	3,000 tonnes of beans	150,000 tonnes of beans 50,000 KL oil	1 million KL oil	5 million KL oil	10 KL oil
Industry	25 centers for seedling	100 processing units	1,000 processing units	5,000 processing units	10,000 processing units & downstream industries
Skilled manpower	250 persons	2,000 persons	20,000 persons	50,000 persons	100,000 persons
Agriculture	1,000 ha in Java 1,000 ha in NTT & NTB 500 ha in other regions	100,000 ha nationwide	1 million ha nationwide	5 million ha nationwide	10 million ha nationwide
Non-skilled manpower	2,500 persons	100,000 persons	1 million persons	5 million persons	10 million persons
Research	Selection of seeds Development of processing units	Optimising of processing units	Intellectual property rights processing	Downstream product development	Optimising downstream products

Source: <JARAKPAGARBUMN_Read_only_.pdf>

The Energy-independent Village program is based on partnership between farmers (as commodity producers) and biofuel companies, for the time being still limited to state enterprises, such as PT Perkebunan Nusantara (Persero), Perum Perhutani, and PT Rajawali Nusantara Indonesia (Persero). Perum Perhutani and PT RNI are involved in facilitating jathropa development in energy-independent village program in Grobogan district, Central Java.

PT RNI, PT PN, and PT Rekayasa Industri started biofuel operations.¹⁹⁷ PT PN started in 2006, with jathropa development in 15,000 hectares of non-productive land, and projects to produce 42,000 kilo liter of jathropa oil annually. PT RNI produced 4,600 kl jathropa oil in 2006, 10,000 kl in 2007 and

¹⁹⁶ Prajogo U. Hadi, dkk, 2006, Prospek Pengembangan Sumber Energi Alternatif, Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Badan Penelitian dan Pengembangan Pertanian, Departemen Pertanian, < pse.litbang.deptan.go.id/.../LHP_PUH_2006.pdf >

¹⁹⁷ JARAKPAGARBUMN_Read_only_.pdf <

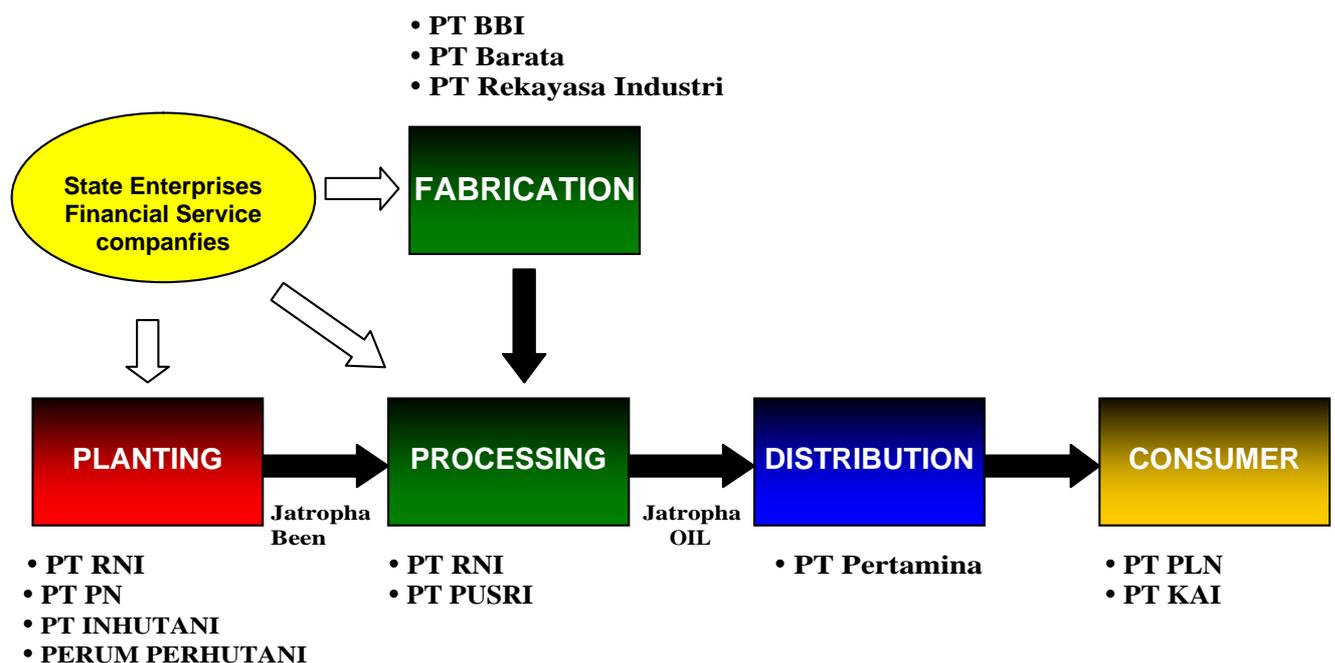
20,000 kl (projection in 2008). A pilot project in seedling and planting was done in a 500-hectare area in Jatitujuh, West Java and another 250-hectare area in Grati, East Java. In 2008, seedling/planting is planned to take 7,000 hectares. PT Rekayasa Industri is developing jathropa biodiesel processing machinery for annual production capacity of 5,000 kl, all components based on domestic resources.

In Tanjung Harjo village (Grobogan), PT RNI has operated a factory processing jathropa oil at a daily capacity of 3 tonnes of jathropa bean.¹⁹⁸ The factory supplies jathropa oil not only as a substitute to kerosene used in low-income families, but also to other industries, such as PT RNI's sugar factory in West Java, sugar factory of PTPN XI and PLN in Central Java. The Energy-independent village program, thus, is meant to supply energy to communities as well as industries. In this case, energy-producing villages will expect to first fulfill their energy demand, which is relatively limited, sell the surplus, which will be predictably high and even higher when the program hits a massive scale, to industries.

With jathropa oil price being projected to be at IDR 3,000/liter, thus lower than that of kerosene, which is IDR 5,491/liter, communities may benefit from biofuel and such benefit is real only if the price is kept lower than kerosene price. Farmers as commodity producers, however, may not have the opportunity for maximum benefit. Observing that jathropa-based biofuel companies cannot but rely on farmers for supply of the commodity, Hadi et al (2006)¹⁹⁹ recommend partnership between companies and farmers. Companies provide quality seeds, production equipments, training, and certainty in commodity buying. Reality in the oil palm sector shows that credit to farmers many times excessive burden. Conversion of traditional farms into oil palm estates cut farmer's monthly income by IDR 500,000 to 700,000.²⁰⁰ Implementation program designed by Agriculture Department indicates that farmers (farmer association, group, or cooperatives) may produce crude jathropa curcas oil (CJCO), while companies produce biofuel in partnership with farmers.²⁰¹ Farmers become merely commodity producers, and at best CJCO suppliers, rather than jathropa-based biofuel producers.

Alliance of state enterprises involved in jathropa biofuel development in the energy-independent village program shows a strong indication towards the above mentioned tendency. Most of the state enterprises are facilitating commodity production and only Pertamina in distribution. In relation to this, how much the energy producing villages or local farmers benefit from the biofuel sector will depend very much on profit margin set at every stage along the supply chain. Farmers have always been the weakest party in the distribution chain of agricultural products, and the same case is very likely to recur the biofuel sector.

Chart. SOE Alliance in Jathropa-based biofuel development²⁰²



¹⁹⁸ http://members.bumn-ri.com/nusindo/news.html?news_id=18881

¹⁹⁹ Prajogo U. Hadi, dkk, 2006, Prospek Pengembangan Sumber Energi Alternatif, Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian, Badan Penelitian dan Pengembangan Pertanian, Departemen Pertanian, <pse.litbang.deptan.go.id/LHP_PUH_2006.pdf>

²⁰⁰ "Memimpikan Kesejahteraan dari Kelapa Sawit", <<http://timpakul.hijaubiru.org/sawit-11/>>

²⁰¹ Perkembangan Program Aksi Energi Alternatif: Pengembangan Jarak Pagar", <http://www.deptan.go.id/ditjenbun/program%20aksi%20penyediaan%20energi%20alternatif.htm>

²⁰² JARAKPAGARBUMN_Read_only_.pdf <

The above chart indicates that industrial perspective, instead of agricultural perspective, is dominant in the biofuel sector development. In this perspective, energy-independent village program is a way of preparing support for state enterprises in anticipating future competition with private companies. Data from Investment Coordinating Board reveal that 49 private companies have been granted investment approval in the biofuel sector, with a total investment of IDR 12.47 trillion and combined production of 96.49 million ton.²⁰³ A large portion of private investment is directed into CPO-based biofuel, but investment realisation might depend on the price of CPO, that is, increase in CPO price tends to defer realisation. It should be noted that it is more costly to produce biodiesel than biofuel. State enterprise PTPN XII has decided to process *Jatropha curcas* into biofuel rather than biodiesel, considering that biodiesel requires additional cost for calcium hydroxide and methanol, and will ultimately raise the overall production cost.²⁰⁴ Biofuel companies, therefore, will have to ensure stable price. As for stability of *Jatropha* supply, they are to rely on farmers.

CONCLUSION

Against the backdrop of energy crisis, the Indonesian government launched biofuel industry development. The whole project is expected not only to provide alternative energy resources, which are environmental friendly, but also to boost economic growth, to create more job opportunity in order to reduce unemployment, and ultimately to help eliminate poverty. To facilitate development, the government has provided significant support, assigning the allocation of millions of hectares for plantation development for biofuel commodities and opening the sector for the private sector and foreign investment. In implementation, biofuel industry development is put under Department of Energy and Mineral Resources.

The euphoria for biofuel development, however, has appeared to miss its stated purposes as well as neglecting its negative impact, both short-term and long-term. First of all, the project is perceived solely from the point of view of energy provision, while practically it makes use of the very agricultural resources of food production. Using arable land for biofuel commodities will ultimately lead to shortage in food supply at local level.

Economically, the project, especially CPO-based biofuel development, has been biased towards big business. Since producing commodities for biofuel absolutely should take a massive scale (economy of scale), only big players with enormous capital reserve have the chance to make the best benefit out of it, leaving only narrow opportunity to small players. Even the government's policy to promote *Jatropha Curcas* development by farmers through energy-independent village program (*Program Desa Mandiri Energi*) has a strong tendency towards treating farmers only as commodity suppliers of weak bargaining position, as already experienced by farmers and smallholders in the palm oil sector.

To facilitate economy of scale, the government assigns the allocation of millions of hectares for plantation expansion as well as opening of new new plantations. The palm oil sector has shown that plantation development triggers conflict and human rights violation. Opening of a plantation usually provokes conflict due to unfair practice in land takeover from local communities. In operation, conflict with farmers, especially smallholders, after plantation companies violate agreement on land use, operational cost and prices. Conflict with workers over labor rights, especially wage and freedom to organise. Conflict are normally solved with violence, which violates human rights. Plantation development is likely to lead to forest clearing, which is certain to affect communities who depend on forest for livelihood.

Ecologically, forest clearing for plantation will increase frequency of forest fires, putting serious pressure on local ecosystem and biodiversity loss is certain when the forest is replaced with monoculture estates. Monoculture estates emit even more carbon, thus seriously adding to the the global problem of climate change. A study by Wetland International and Delft Hydraulics reveals that every hectare of oil palm plantation emits 70 to 100 ton of carbon on yearly basis, which is ten times as high as the use of fossil fuel.²⁰⁵ Also, the life-cycle of oil palm is more than 150 years, but normally it is cut down after 25 years and when it is 30 feet high. Oil palm plantation are normally left with high level of acid.²⁰⁶

Considering the level of seriousness of the above problems, it is surprising that the biofuel industry development is left barely unregulated from the beginning.

²⁰³ "Izin investasi biodiesel capai Rp 12,47 triliun", <www.bisnis.com/pls/bisnis/bisnis.cetak?inw_id=537234>.

²⁰⁴ "Wagub DIY buka Sosialisasi Agribisnis Jarak Pagar", <http://www.pemda-diy.go.id/berita/article.php?op=Print&sid=3261>

²⁰⁵ Sulung Prasetyo, "Biofuel" Perangi Kemiskinan, tapi Rusak Lingkungan, Sinar Harapan

²⁰⁶ Rhett A. Butler, "World Deforestation Rates and Forest Cover Statistics 2000-2005", update 17/11/2005, <http://news.mongabay.com/2005/1115-forests.html> (akses 5/03/2007)