Case of Biofuel in Asia:
Palm oil based biofuel in Indonesia, Malaysia and Papua New Guinea [1]

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IPCC reports that in 2004, the contribution of transport to total energy-related Green House Gases (GHG) emissions was about 23 % and have increased by around 27 % since 1990 (IPCC, 2007, p. 49). Those significant contributions to GHG emissions from the transport sector are mainly caused by a dominant fossil fuel usage. Fossil fuel, mainly gasoline and diesel fuel, is a carbon-intensive fuel, emitting high levels of CO2 and non-CO2 GHGs. Besides the obvious problem of GHG emissions, fossil fuel also causes some other problems to many countries/societies, such as dependence of import, resource scarcity and price uncertainty, which highly contributes to the overall problems of economics, politics and security.

For many countries / societies, biofuel has become the nearest and most easily achieved solution to the problem. Firstly, biofuel is a less carbon-intensive fuel. The GHG reduction potential of biofuels is very large. The total mitigation potential of biofuels in the transport sector by2050 is expected to range from 1800 to 2300 MtCO2 at 25 US$/tCO2, based on scenarios with a respective replacement of 13 and 25% of transport energy demand by biofuels (IPCC, 2007, p. 343). Secondly, for countries / societies which has a substantial potential and capacity for agricultural production, the production of biofuel can be quickly and easily achieved, avoiding the problems caused byfossil fuel import dependence and price uncertainty. This is particularly true for those countries

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who has an existing production of biofuel feedstock crops, such as sugarcane, palm oil or corn.

There are some serious debates, however, on whether the wider use of biofuel contributes to the mitigation of GHG's emission, or in the contrary, biofuels are actually net carbon emitters. The contrarians would argue, that most of the biofuels production processes is not efficient enough to cut emissions by more than it takes to produce the fuel (Grunwald, 2008). The widespread biofuel production has also raised some other serious concerns and problems. For one thing, the widespread conversion to biofuel feedstock crops plantation and production, in many places, is causing serious environmental problems, such as deforestation, soil degradation and pollution from fertilizer usage. Deforestation, especially when coupled with forest burning, such as one that often appears in Indonesia, can actually highly contribute to the increase of GHG emission. Secondly, in most cases, these biofuel feedstock crops are also food crops. This condition has inadvertently created some conflicts, between provision of food and provision of energy, which in the end can cause a dangerous scarcity of food supply. Many analysts have argued that the current significant increase in global food commodity prices is partially caused by the competition of usage of feedstock for biofuel.

To contribute to this discussion, I will shortly address the case of biofuel in Asia, especially the case of palm oil and palm oil-based biodiesel in Indonesia, Malaysia and Papua New Guinea.

Palm Oil in Indonesia, Malaysia and Papua New Guinea

Palm oil is the second most consumed edible oil, and is expected to exceed soybean in less than a decade. Besides as edible oil, palm oil has a wide range of other usage and is widely used in the market to produce shampoo, cosmetics, candles and many other

products. Oil Palm or *elaeis gueneensis* originate from Central Africa. It was firstly introduced into Southeast Asia in the 19th century, but not until 1960's was widely mono-culture planted in Malaysia, 1980's in Indonesia and 1990's in Papua New Guinea.

Currently, Indonesia and Malaysia together are the biggest crude palm oil (CPO) producer and exporter in the world. In 2007, Indonesia's CPO export contributes 43 % of the total international market, while Malaysia contributes another 42 %. Altogether, 85 % of total market, exceeding of up to 35 Million Mt of CPO, is produced in these two countries alone. In 2007, the total area planted with oil palm in Indonesia and Malaysia exceed up to 13 Million Ha, in Indonesia mostly in the islands of Sumatra, Kalimantan, Sulawesi and Papua. And in Malaysia, there is vast development in the region of Sabah and Serawak. There is also a dramatic expansion of oil palm plantation in Papua New Guinea beginning in 1990's. Currently, the size of area planted with oil palm in Papua New Guinea, is less than 1 million Ha., but with a big potential of expansion in the future. Apart from Malaysia, Indonesia and Papua New Guinea, oil palm projects are also developed in countries, such as Vietnam, Thailand, Burma, Cambodia, the Philippines, India and many others.

This expansion of oil palm plantations and palm oil production is significantly contributing to the economic developments of those countries mentioned above. The industry employs millions of people and generates billions of dollars in turnover for big private companies and small-medium scale farmers. It is also a vital source of government revenue through tax and government-owned enterprises dividend. The current international CPO price, which exceed above US$ 800/MT, is giving a tremendous opportunity for palm oil producing countries to highly benefit from it. These high prices is also driving a rapid expansion of oil palm plantation. It is estimated that in Indonesia, in 2007 alone, the total new area opened and planted with oil palm is up to 1 Million Ha.

However, besides the benefits that comes from the current high CPO price, the expansion of oil palm plantation is highly contributing to frightening environmental damage, especially from uncontrollable deforestation. It is estimated that currently in Indonesia, 2,2 Million Ha. of rain forest vanished or is seriously damaged every year. According to UN Food and Agriculture Organisation (FAO) statistics, in the 1990s Indonesia's forest cover declined by 13 Million Ha (12%), Malaysia by 2,4 Million Ha (12%) and Papua New Guinea by 1,1 Million Ha (4%) (Wakker, 2004). In those countries, deforestation is mainly caused by logging (legal and illegal) and land conversion to mono-culture plantation. In relation with forest conversion to oil palm plantation, it is estimated that 48 % of currently productive oil palm plantation in Indonesia and Malaysia, involved forest conversion. This forest conversion is critically threatening the biodiversity in the region, such as the threat of extinction of many animals and plants. The current population of wild Sumatran Tiger in the island of Sumatra, Indonesia, is only slightly above 300, and continuously decreasing, mainly caused by the lost of its habitat.

Biodiesel from Palm Oil in Indonesia, Malaysia and Papua New Guinea

IPCC report considers that a large drawback of biodiesel fuels is the very high cost of feedstock, since they are the same highly developed crops used for foods and food processing (IPCC, 2007, p. 343). But it is also stated that the least expensive oil feedstock for biodiesel is palm oil. Oil palm is a highly productive plant, 1 Ha of oil palm plantation can produce up to 4,2 MT of CPO per year, with relatively low cost of production. The conversion of CPO to Biodiesel is also highly efficient, where the ratio is almost 1:1 (Prihandana, 2007). In Indonesia, the current market price of 1 liter of biodiesel produced from palm oil can be less then US$ 1, or less then US$ 0.26/Gallons. In 2007, it is estimated that Indonesia and Malaysia had produced more then 500.000 MT feedstock of CPO to biodiesel. In early August 2008, the Indonesian and Malaysian

government agreed to allocate 6 Million MT of CPO to be converted to biodiesel. Papua New Guinea has also started an initiative to develop palm oil based biodiesel. There is no information on biodiesel production and consumption in PNG. However, there is a widespread use of straight vegetable oil (SVO) or mixture of SVO and petro-diesel.

In 10 August 2005, the Malaysian federal government launched a **National Biofuel Policy**, primarily aimed at reducing the country's fuel import bill, promoting further the use of biofuel , as well as to shore up the price of palm oil especially during periods of low export demand. In 25 January 2006, Indonesian government, through presidential decree had also launched a new **National Energy Policy**. The policy formulated the Indonesian energy plan until 2025, where is called Energy Mix 2025. It is aimed to reduce the usage of petroleum, and convert to other alternative energy. The use of biofuel is targeted to be more then 5% from the total energy consumption in 2025 (Datuk, 2006). Increased interest in palm and coconut oil as biodiesel feedstock as well as increasing prices of fossil fuels is accelerating biofuels development in Papua New Guinea (PNG). The government is working on a strategy for positioning PNG as a major biofuels producer (APEC, 2008).

As most likely in other regions, biofuel in Asia is conflicting between positive and negative impacts. Understanding the fact that palm oil based biodiesel has future obstacles, since it is also a food crop, Indonesian government initiated the development of Jatropha Crops (*Jatropha curcas*) as the future primary feedstock for biodiesel. Jatropha is a drought resistant crop that can be produced in most part of Indonesia, especially in the dry south eastern part of Nusa Tenggara Islands. It is a strong and highly productive plant, easily maintained and it is not a food producing plant. Many analysts believe that diversifying biodiesel feedstock to Jatropha can stimulate the economy of a less fertile and dry area of Indonesia, can ease the burden of competition

between food supply and energy supply in palm oil, and along with it, ease the pressure on protected rain forests around the country.

References:

APEC, 2008 : *Papua New Guinea Biofuel Activities*, Asia-Pacific Economic Cooperation, http://www.biofuels.apec.org/me_papua_new_guinea.html

Datuk, A.Y., 2006 : *Kebijakan Energi Nasional Melalui Perpres No. 5 Tahun 2006 : Tinjauan, Rekomendasi dan Catatan dari Perspektif Lingkungan*, Institut Riset Sosial dan Ekonomi (INRISE), Jakarta, Indonesia.

Grunwald, M., 2008 : *The Clean Energy Scam*, Time Magazine, April 7, 2008, p. 28 – 33.

IPCC, 2007 : *Climate Change 2007 : Mitigation of Climate Change, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA., 851 pp.

Kartodiharjo, H., H. Jhamtani, 2006 : *Politik Lingkungan dan Kekuasaan di Indonesia*, Equinox Publishing, Jakarta, Indonesia

Pratomo, N., Y.W. Gede , 2008 : *Laporan Penelitian Pengembangan Biofuel dari Minyak Kelapa Sawit di Indonesia : Petani Lahan Kecil, Buruh & Ancaman Ketahanan Pangan*, Institut Riset Sosial dan Ekonomi (INRISE), Jakarta, Indonesia.

Prihandana, R., Roy H., 2007 : *Energi Hijau : Pilihan Bijak Menuju Negeri Mandiri Energi*, Penebar Swadaya, Jakarta, Indonesia.

Wakker, E., J de Rozario, 2004 : *Greasy Palms : The Social and Ecological Impacts of Large-Scale Oil Palm Plantation Development in South East Asia* , Friends of The Earth, London, UK

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