

A new equation for oil palm



Never before have food, energy, and climate been so closely linked. Firstly, the world population continues to grow and will reach 9 billion by 2050. In order to feed the growing population, food production is estimated to have to increase by 70% (FAO, 2011). Although the exact amount of additional land required to meet the demands for food is unsure, the FAO estimates it will be around 70 million hectares in 2050. It is also said to be possible. However, these figures do not yet take into account the need for land necessary to satisfy the growing demand for biomass, for purposes other than food. The International Energy Agency (IEA) estimates that land requirements for biofuel production under the IEA Alternative Policy scenario will amount to 52.8 million hectares in 2030 (IEA, 2006). Hence, competition for the remaining land base increases. Finally, the recent crisis has demonstrated that under certain conditions (high oil prices, government support) the use of crops for biofuels can expand rapidly. This is particularly the case where crops can be used for both food and fuel. The most well known crop in this respect is oil palm.

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INVESTMENTS IN OIL PALM PRODUCTION are becoming a major driver for land conversion processes in Indonesia. As most of the biofuel demand is driven by the USA, Europe, China and India, the resulting land use change in Indonesia is referred to as Indirect Land Use Change (ILUC). In addition to land use changes, the on-going oil palm expansion in Indonesia has a profound impact on the local socio-economic and environmental circumstances. On the one hand, oil palm can be a route out of poverty for many rural people, provide significant export earnings, provide cooking oil and an ingredient in the processed food industry. On the other hand, it also poses problems by displacing people from their land, and is said to be a major driver of deforestation and its associated biodiversity losses. Recently, oil palm expansion meets with new controversies as oil palm is increasingly competing for land with staple foods.

It is against this background that we are conducting a multi disciplinary research in Riau province, Sumatra, entitled "Sliding from greasy lands". It is part of the wider Agriculture beyond Food programme, funded by the Dutch KNAW. This multidisciplinary research programme aims to provide scientific insights into the possibilities and opportunities, threats and limitations to judge a future of an agriculture beyond food. In this programme, technical, social, economic, environmental and legal scientists from Dutch and Indonesian Universities collaborate. Although our research comprises various components, here we will focus on the way demand for oil palm is shaping land use for food or fuel in the context of an oil palm driven changing population.

Palm oil and food security in Indonesia

"Food security will become a great challenge for ASEAN", the Indonesian head of state President Yudhoyono said in his opening speech at the 18th ASEAN Summit held in Jakarta, May 7-8, 2011: "The competition for energy, food and clean water will become part of the global competition," he said, warning that scarcity of resources of daily needs could occur globally when the world population grows from seven billion to nine billion by 2045 (ANTARA, 2011).

Despite this recognition, oil palm has been the most expansive perennial crop in Indonesia. In 2010 around 8.4 million hectares of land was occupied by oil palm plantations, producing around 19.8 million metric tonnes of palm oil (Directorate General Estate Crop Ministry of Agriculture, 2010). Together with Malaysia, Indonesia controls over 85% of the world market. The export of crude palm oil (CPO) and its derivatives provides an increasing contribution to the national income (Badan Pusat Statistik, 2011d). So far, almost 80% of the palm oil in Indonesia is being used as an important ingredient in the processed food industry and is by far the main cooking oil for the population. It is also an official regulation that around 80% needs to be used for the food industry, not fuel. With an estimated population of 238 million in 2010 and a population growth of 1.55% per year, maintaining food security at affordable prices is important to national security. Biofuel production, however, is strengthened by the commitment to reduce 26% of national GHG emissions by 2020. For this purpose, a national energy policy has been developed. Biofuels should have a share of at least 5% of the national energy mix in 2025. This rapid development of oil

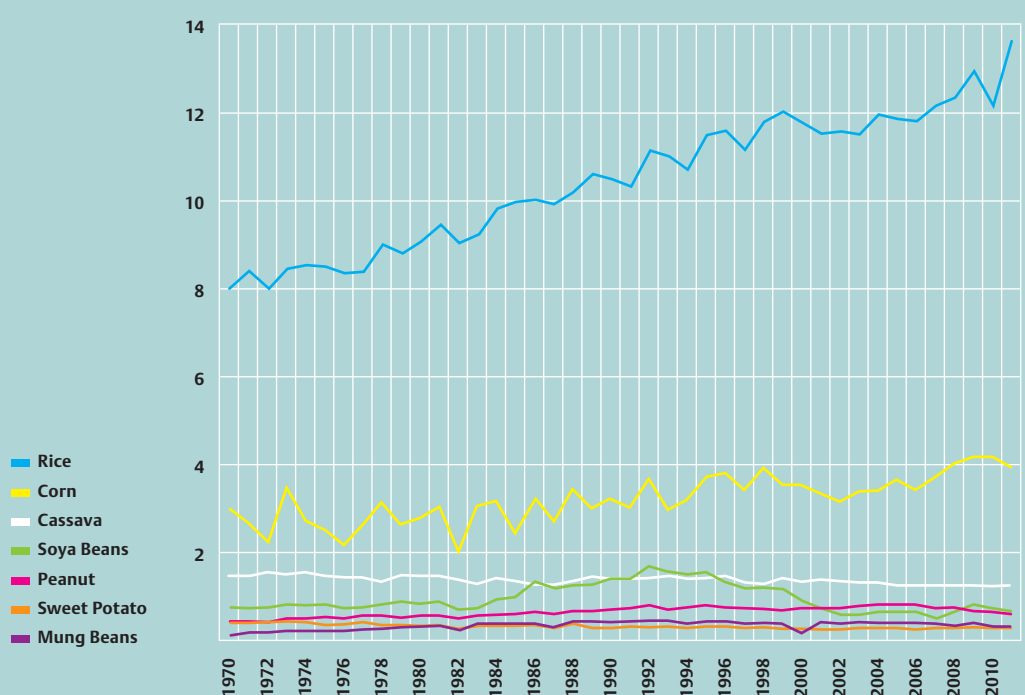
1: New oil palm plantation established on previously peat swamp forest. It has been replanted several times due to peat fires.

palm as a biofuel has raised concerns over land acquisitions to enable the growth of the oil palm sector to meet these demands. Balancing the need for large land areas to plant oil palm for biofuel purposes in combination with the need to add more land to feed a growing population, most notably rice cultivation, is an important challenge for the Indonesian government.

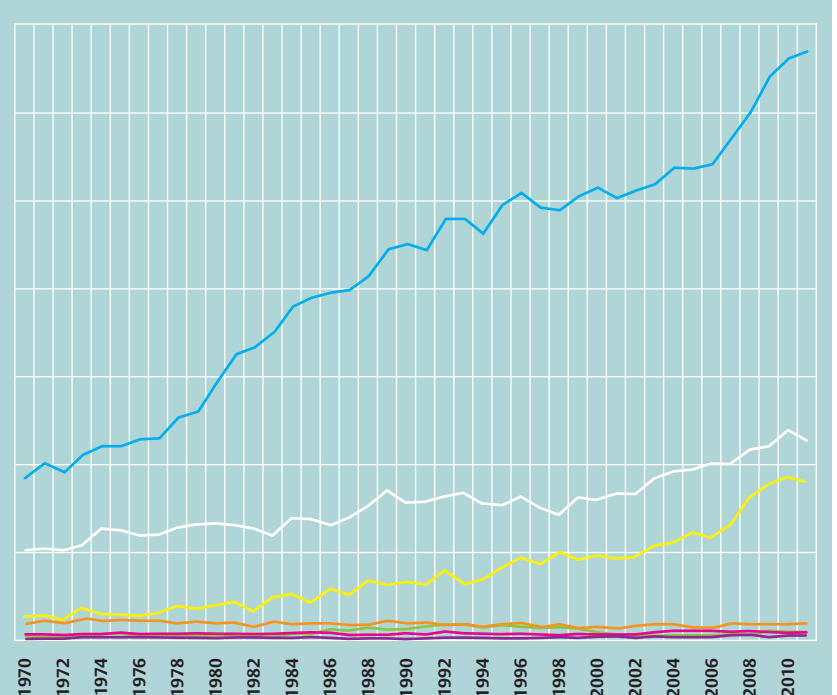
Indonesian rice polices

Rice has always been the main staple crop for more than 90% of the Indonesian population. At 139 kg of rice per capita per year, the Indonesian population is by far the world leader in rice consumption. This record, and the fact that the Indonesian population growth is 1.55% per year, makes food self-sufficiency in rice a hot political issue. Securing enough rice at affordable prices is critical to national security; this has been long reflected in Indonesian food policies. The National Food Logistics Agency (BULOG) is the most important national agency with the mandate to decrease vulnerability for price fluctuations. It manages issues of food security, buffer stock operations, and domestic food price stabilization through its monopoly over imports and distribution. This is even more important as the global rice market appears to be very thin. Less than 5% is traded internationally, and mainly comes from three countries: Thailand, India and Vietnam. Therefore, rice prices are very vulnerable to small changes in supply and demand (World Bank Jakarta, 2010). In addition to these volatilities in the market, the sustainability of rice production is also increasingly threatened by the irregularities caused by processes of climate change. For instance,

2. Area harvested for food commodities in Indonesia from 1970-2011* (millions ha) (Badan Pusat Statistik, 2011b) * = prediction for 2011



Production of food commodities in Indonesia from 1970-2011* (millions tons) (Badan Pusat Statistik, 2011b) * = prediction for 2011



Food, energy and climate policies in Riau Province, Indonesia

in 2010, the rice production did not meet the national target because of extreme weather and rainfall. BULOG imported 1.3 million tonnes of rice. By March 2011 the government issued a Presidential Instruction on rice production security. The Jakarta Post reported (29 September 2011) that the Indonesian government has provided an additional USD 116.58 million to BULOG, to purchase rice from farmers and to increase rice stocks in the world market. In total about 1.5-2 million tonnes are expected to be imported, mainly from Vietnam and Thailand. Despite these rather costly measures, the Indonesian Government continues to aim at self-sufficiency in rice and other food crops through domestic production. Figure 2 shows that out of all food crops, rice contributes around 63% to the total area harvested for food commodities. In terms of production, the share of rice in the total food crop production in 2011 is 59%. (Badan Pusat Statistik, 2011b). The increase in rice production is mainly due to the expansion of the rice area in combination with an increase in productivity. Major improvements along these lines are needed to achieve a more food secure Indonesia under current population growth figures. This can, however, not be met by productivity improvements; there will be a high need for finding more suitable lands.

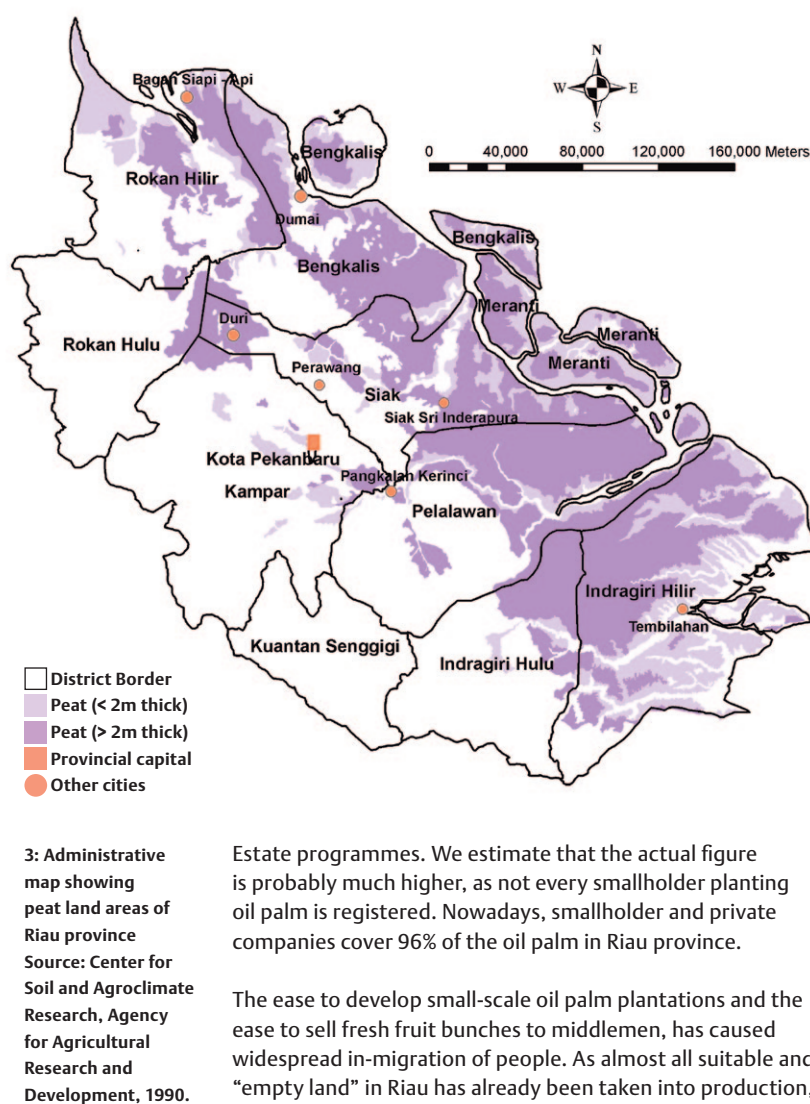
This is where Indonesia faces pronounced land use challenges, especially on the outer islands, which are believed to be able to absorb many of the land use needs. The possible expansion of rice cropping areas will have to compete increasingly with other, more attractive commercial crops, oil palm in particular. To what extent, in what form and how such competition impacts at field level, is shown in the next paragraph where we briefly explain some of the first findings from our on-going research in Riau, Sumatra.

Food versus fuel in Riau; findings from the field

Riau province is located in the centre of Sumatra along the Strait of Malacca (Figure 3). It has a total area of 8,867,267 hectares. The population of the province is around 4.7 million, with a population density of 50 persons per km². Around 49.3% of the labour force is employed in the agricultural sector. This includes cash crop cultivation, estate crop, live stock production, fishery, and forestry, both on large scale as well as small-scale enterprises (Badan Pusat Statistik Propinsi Riau, 2010).

Riau province is the major producer of palm oil in Indonesia. Oil Palm expansion has significantly contributed to (indirect) land use change in Riau. In 1975 the registered oil palm plantations only occupied 1,066 hectares or around 0.01% of the total area (Directorate General of Estate Crops, Ministry of Agriculture, 2010). By 2010, oil palm plantations occupied around 2 million hectares, equal to about 21% of the total land area in the province (Dinas Perkebunan Provinsi Riau, 2010). Many plantations were established by converting forest areas. The plantations consist of both large scale state-owned and private plantations and smallholder plantations. The smallholder plantations involve around 380 thousand families. The plantations produce about 5.9 million tonnes of fresh fruit bunches annually, which is processed in 144 palm oil mills in the province (idem). The production in Riau accounts for approximately 24% of the total national palm oil production (Directorate General Estate Crop Ministry of Agriculture, 2010). In 2010, these impressive figures led to the classification of Riau province as one of the oleo-chemical industry clusters, together with North Sumatera and East Kalimantan. The establishment of this cluster means that related downstream processing industries will continuously grow and develop. Oil palm related economic activities comprise roughly 18% of the regional GDP, generating USD 8.4 billion, only from export of crude palm oil (CPO) and its derivatives. Employment figures for the oil palm sector in Riau are estimated at 690,000 or 14% of the total population in the province (Dinas Perkebunan Provinsi Riau, 2010).

Most of the oil palm has been planted by large scale companies or as part of government sponsored programmes. In order to regulate oil palm expansion, it could only be planted in combination with a processing unit. Therefore, smallholder involvement in large scale agricultural activities was mainly confined to the so-called plasma system, associated with nucleus estate developments from the early 1980s onwards. Each plasma smallholding covered 2 hectares, the smallholder being a kind of sub-contractor able to access the central processing facilities. This completely changed, however, when the regulation to plant oil palm only in combination with a processing mill, was abandoned in 1995. Oil palm has been taken up by independent smallholders ever since, even when this regulation was abandoned again in 2005. It is estimated that nowadays about 377,183 registered families have their own small-scale oil palm plantations, occupying an additional 996,199 hectares in Riau (Dinas Perkebunan Provinsi Riau, 2010). These are mainly the former sub-contractors/outgrowers as part of the Nucleus Plasma



Estate programmes. We estimate that the actual figure is probably much higher, as not every smallholder planting oil palm is registered. Nowadays, smallholder and private companies cover 96% of the oil palm in Riau province.

The ease to develop small-scale oil palm plantations and the ease to sell fresh fruit bunches to middlemen, has caused widespread in-migration of people. As almost all suitable and “empty land” in Riau has already been taken into production, or comprises protected areas, Indirect Land use Change processes are increasingly targeted at these protected areas, and this time caused by small-scale producers. By using satellite images and GIS methodologies in combination with grassroots-level fieldwork, we are evaluating the extent of land conversion processes caused by small-scale migrants and local people, and whether land conversion is carried out for food or fuel production.

Oil palm induced forest frontier migration in Riau: the final blow for forests?

The ability to plant oil palm by smallholders themselves has made the small-scale oil palm plantations (usually less than 5 hectares) a highly attractive land use. Combined with relatively high financial returns, oil palm development increasingly attracts large numbers of job seeking migrants to Riau. Our research shows that not only Sumatrans migrate to Riau, large numbers of Javanese come to Riau to develop their own oil palm plantation. This influx of migrants has significantly contributed to population growth in the province (Badan Pusat Statistik, 2011a). Where the development of oil palm in Riau province has already contributed significantly to land use change, this on-going process of large numbers of migrants is causing additional stress on “remaining” land in the province. For instance, in 2010, WWF Indonesia estimated that of the 83,000 hectares in Tesso Nilo National Park, some 28,000 had been converted into small-scale oil palm plantations and settlements. Looking at the type of people involved in this conversion, 96% appeared to be migrants (WWF Indonesia, 2010). Our research shows that the two largest groups of migrants consist of migrants from Sumatra and from Java. This enormous boost in demand for land to plant oil palm causes tremendous pressure on remaining forested peat land, both form large scale and small-scale palm oil producers. In fact, around 60% of licenses for oil palm plantations from 2000-2005 involved peat land areas (Center for Soil and Agroclimate Research, Agency for Agricultural Research and Development, 1990; Ministry of Forestry of the Republic of Indonesia, 2005). This is a very environmentally unfriendly development, as the required drainage of water to make the land suitable for oil palm increases peat decomposition and submergence, leading to tremendous GHG emissions. In addition, the soil is far from suitable for oil palm plantations.

Fuel instead of food: migrants versus local people

Our initial findings show that oil palm expansion in Riau has caused enormous population growth, mainly through in-migration. For them, the objective to convert forest into cropping land is for a cash income. Forest areas are often not claimed by local communities, and changing regulations at national level have often made it unclear where protected forest areas begin and end. Although migrants seem to be mainly involved in forest conversion for oil palm plantation our fieldwork has shown another controversial development

among the local people, who engage in wet rice cultivation as part of their agricultural system. Due to low profit margins of rice cultivation, a combination of rather low farm gate prices in combination with high input prices and the increased risks in the context of changing climatic conditions, local farmers are increasingly converting their rice fields into small-scale oil palm plantations. Provincial statistics show that this process started as early as 2002, when oil palm plantations started to boom. Between 2002-2009, around 15% of all small-scale wet rice fields in Riau were converted into other uses, such as fish pond, mining, rubber plantation, coconut plantation – but oil palm plantation is by far the major reason for conversion (40%) (Dinas Tanaman Pangan dan Hortikultura Provinsi Riau, 2010). As a result, the provincial government of Riau has become a major importer of food commodities. Recent interviews we held with government officials in Riau revealed that regulations (such as hefty fines) are being developed to prevent the continuous conversion of rice fields into oil palm or other land uses.

Conclusions and further research

This research hopes to contribute to an understanding of the impact that global demand for fuel and food has on food security and sustainable management of natural resources at a local level. Our ongoing study in Riau province increasingly shows that the growing global demand for palm oil both for food and fuel has triggered complex processes of land use change at the local level, usually not covered under the ILUC studies. Together with our Indonesian counterparts, we are now identifying the magnitude of these informal, indirect land use changes caused by migrants and local people. If the processes taking place in Riau are representative for development processes in oil palm producing areas elsewhere in Indonesia, it is clear that the new equation of food, energy, and climate change holds. The Indonesian land-based economy will have to face pronounced land use challenges, especially on how to balance food security issues with biofuel targets to reduce GHG emissions.

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