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by

Hemanath Swarna Nantha

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The Financial and Political Opportunity Costs of Orangutan Conservation in the Face of Oil-Palm Expansion

ABSTRACT

This paper examines the opportunity costs of conserving the forest habitats of the endangered orangutan (*Pongo pygmaeus* spp.) of Indonesia and Malaysia in the face of a highly profitable alternative land use, the conversion of these habitats for the production of palm oil. It shows that one component of the financial opportunity cost of conserving orangutan habitat, the business opportunity cost (profits foregone), was high in both Malaysia and Indonesia in the case of oil-palm development. It is argued that this would be difficult to offset under the payments-for-ecosystem-services (PES) approach. However, the government opportunity cost of conservation in Indonesia, such as the land-tax revenue foregone by local governments by conserving rather than leasing out orangutan habitats for agricultural use, are sometimes lower than the business opportunity cost of conservation. It is suggested that targeting government opportunity costs to conserve unleased forests could potentially offer lower-cost opportunities for conserving orangutan habitats. If, however, political and institutional realities are taken into account, there might exist another type of opportunity cost of conservation— a political one— that could impede the success of the PES approach. Some oil-palm companies in Borneo offer financial inducements in the form of kickbacks and other types of political donations to government officials to obtain land for growing oil palm. This 'government decisionmaker's opportunity cost' has not been addressed in the PES literature, which typically compares potential ecosystem payments with the commercial profits that would have to be sacrificed as a result of conserving forests. The impact of this political opportunity cost on oil-palm expansion is discussed. It is suggested that solutions to this conservation problem cannot be restricted to the monetary valuation method but must also involve alternative political economic interventions.

JEL Classifications: B50, Q51, Q57, Q58

Keywords: Biodiversity conservation, firm behaviour, opportunity cost, orangutan, payments for ecosystem services, political ecology.

The Financial and Political Opportunity Costs of Orangutan Conservation in the Face of Oil-Palm Expansion

1. Introduction

The problem of conserving the orangutan, where oil-palm expansion is the threatening factor to the species' survival, is one of mutual exclusion (e.g, Czech, 2000): the orangutan requires large areas to survive, but the forests it occupies are among those being allocated on a large scale to private companies for producing commodities with market exchange value such as palm oil. These land allocations are often justified in the name of 'public interest' or 'economic development'.[1] Partly because of their public-good characteristics, orangutan populations and habitats have no prices and their conservation does not generate a comparable or reliable flow of monetary returns. These environmental goods are unattractive from the growth-oriented development perspective of the governments concerned.[2]

Palm oil, in contrast, has numerous direct uses, is in demand domestically and internationally, and is relatively cheap. The oil palm yields 7 to 11 times more oil per hectare and is produced at a lower production cost than other major edible oil crops including soybean (Murphy, 2009). The market price of crude palm oil delivers a sizeable profit margin for palm-oil producing firms, and is also competitively lower than the prices of alternative vegetable oils, helping the commodity capture a dominant share of the global vegetable-oils market (Morel and Morel, 2012, p. 15). Palm oil ranks third among all major agricultural commodities in terms of total export value (FAOSTAT, 2013). The value of crude palm oil exports in 2011 for Malaysia was US$17.5 billion and US$17.3 billion for Indonesia (FAOSTAT, 2013). The central Indonesian

[1] For the basic laws and legal principles in Indonesia which "[open] the way for plantation companies to acquire land for plantations by arguing that the plantations are in the public interest", see Colchester et al. (2006, pp. 51-56, 63). For the Malaysia case, see Fann (2012) and Xavier (2002). As in Indonesia, Malaysian land acquisition laws give "incontestable power to state governments to seize private land for development by private companies and individuals" (Fann, 2012) "as long as [the] proposed development was in the opinion of the state authority beneficial to the economic development of the country or to the state concerned or to the public or any class of the public" (Xavier, 2002, p. 206).

[2] A general view held among Indonesian cabinet ministers on Indonesian forests. According to Emil Salim, a former economist and Indonesia's minister of the environment from 1978 to 1993, these politicians feel that protected forests and conservation "[do] not increase the revenues" and that "a healthy environment" is "not tangible" (Arnscheidt, 2009, p. 130).

government collected taxes on palm oil exports that amounted to US$5.7 billion in 2012 (McClanahan, 2013). Since the oil-palm sector generates significant foreign exchange earnings and is a lucrative source of revenue for governments (PEMANDU, 2013; Varkkey, 2012a), it is viewed as strategically important to the Indonesian and Malaysian economies.[3] Other cited social benefits include rural infrastructure development and employment where the oil palm is grown (World Growth, 2011, p. 11). This does not detract from the fact that under the currently corporatized and market-led (neoliberal) model of oil-palm development (McCarthy and Cramb, 2009), cropland expansion is fuelled by the desire for private benefits, i.e., the pecuniary returns accruing to oil-palm investors and governments. Maintaining the conditions for the existence of viable orangutan populations by terminating further palm oil expansion into their forest habitats, as proposed by Wich et al. (2012), is seen to inflict considerable financial opportunity costs.[4]

In response to this situation, it has become a popular conservation paradigm to compensate owners for the right to use land, in the form of payments for environmental benefits, so that the conversion of forests to other land uses is prevented (e.g., Venter and Koh, 2012). It is believed that forests would be retained if the compensatory payments at least equal the value of this private opportunity cost (plus transaction costs) that is faced by the agents with the power to determine land use. This is the payments-for-ecosystem-services (PES) strategy, which "attempt[s] to put into practice the Coase theorem" (Engel et al., 2008), which stipulates that if private property rights are extended to forest habitats and if these can be exchanged between negotiating damage-causing agents and affected agents, negative externalities could be reduced and social welfare maximised (Farley and Costanza, 2010, p. 2063; O'Neill, 2007, p. 63).[5]

[3] The oil palm sector features in both Indonesia and Malaysia's national economic plans as among several key economic areas for boosting GDP growth. Indonesia's Masterplan for the Acceleration and Expansion of Indonesia's Economic Development (MP3EI), for the period 2011 to 2025, and Malaysia's Economic Transformation Programme (ETP) for 2010 to 2020, aim to increase palm-oil production as part of a broader goal to raise national per-capita incomes to US$15,000, the lower bound for being considered a developed nation.

[4] The oil-palm industry has, for example, been quick to claim the loss of a profitmaking opportunity. In response to the Indonesian government's announcement in May 2011 that it will impose a two-year moratorium on the allocation of new concessions on peatland and primary forests, "[r]epresentatives of oil palm plantations, the pulpwood industry and others from the private sector have expressed concern… [and] claim it would affect their viability and hence negatively affect government tax revenues, job creation, welfare of the labor force and infrastructure development" (Brockhaus et al., 2012, p. 31).

[5] Its framework assumes Pareto-efficiency, perfect competition and no transaction costs, and takes political and institutional conditions (including property rights allocations) as given.

Accordingly, studies have sought to discover whether the value of carbon credits, such as those that would become available under the mechanism for reducing emissions from deforestation and degradation of forests (REDD), could offset the financial returns accruing to land owners from establishing oil-palm plantations in the lowland forests of Sumatra and Borneo where orangutans are found (Butler et al., 2009; Fisher et al., 2011; Tata et al., 2010; Venter et al., 2009; Wich et al., 2011). These studies and other studies done by conservation scientists have largely concentrated on the profit component of the private opportunity costs of conservation (see Green, 2012, pp. 96-99). However, this and other land-use-influencing financial opportunity costs that have consequences for conservation are insufficiently evaluated in the PES literature. These are consequences that become apparent once the problem's political ecology (power relations), ecological economics (the scale of economic activity) and institutional economics (firm behaviour) are considered (Gerber et al., 2009; Lisi and Klitgaard, 2011).

This paper contributes by decomposing the financial or appropriated opportunity costs of conserving the orangutan given oil-palm development into three components, analysing each and considering the implications. The focus is on oil-palm expansion driven by large, well-capitalised enterprises which are presently the main agents of tropical deforestation and environmental impacts in Indonesia rather than smallholders (Lee et al., 2014; Rudel et al., 2009). Section 2 examines and compares the magnitudes of the opportunity costs of conservation to businesses and governments. It is proposed that the opportunity cost of conserving the orangutan need not be uniformly high in all instances as is usually presumed if, for example, the level of government vested with the power to plan and approve land use is considered (e.g., local governments). Compensating government opportunity costs could thus, in principle, offer a lower-cost route to securing habitat conservation under the PES strategy in selected instances. The possibilities for doing this are explored in Section 3. But compensating government bodies may not work on its own. Political pressure would still be exerted by oil-palm companies and by politicians and bureaucrats seeking personal rents and rents for political parties. This is argued in Section 4, which introduces the government decision-maker's opportunity cost as another type of financial opportunity cost component. This opportunity cost is not formally recognised and treated as such in the economics literature, but confronting this opportunity cost is unavoidable if the opportunity-cost compensation strategy is to have its desired impact. In Section 5, an explanation is offered as to why oil-palm expansion continues to encroach on forests and

orangutan habitats by linking the problem of the government decision-maker's opportunity cost to the cost-shifting and expansionary tendencies of private oil-palm enterprises. The final section summarises the findings and draws out some general implications for the opportunity-cost approach to conservation and orangutan conservation in general.

2. The Business and Government Opportunity Costs and the Issues With These

Taking the market framework and assuming that the best possible alternative use for maximising pecuniary returns on habitat areas is palm-oil production, the most visible private opportunity costs in conserving orangutan populations and habitats are the profits that accrue to business enterprises from converting forest lands to produce and sell palm oiland the revenue that goes to governments from taxing this commercial sector's activity.

Government opportunity cost is the amount of income foregone by government, and is not part of the social opportunity cost as is defined in welfare economics. The standard welfare economic definition of private benefits and costs does not make a distinction between the benefits and costs of firms and of governments. To quote Pigou (from Pearce and Sturmey (1966, p. 152), "the marginal private net product is *that part of total net product* of physical things or objective services due to the marginal increment of resources in any given use or place which accrues in the first instance—*i.e.*, prior to sale—to the person responsible for investing resources there". In oil palm production, governments that lease lands to private companies can be considered co-investors in the said economic activity since governments provide the factor land and appropriate rent from the use of this factor, whereas private companies supply the capital and labour and claim right to the remaining portion of the economic surplus.

In Malaysia and Indonesia, these two components of financial opportunity cost appear, at least at first sight, to be the core factor determining land-use decision-making and which influence the perceived opportunity cost of conserving forested land, for example, habitat for orangutan. In official and pro-palm-oil promulgations, wider social benefits such as rural development are argued to follow from the realisation of private and government returns from oil-palm expansion. This is not inconsistent with the causal relationship implied in Pigou's welfare economic definition (in Pearce and Sturmey, 1966, p. 152): "the marginal social net product is the total net product of physical things or objective services due to the marginal increment of resources in any

given use or place, *no matter to whom any part of this product may accrue*". The latter clause is a reference to marginal private net product, or benefit.

The following subsections examine the magnitudes and types of business and government opportunity costs that are relevant to the case of the orangutan in Borneo.

2.1 The business opportunity cost to oil-palm enterprises

The pre-tax profits obtainable by a private enterprise from growing oil palm in Malaysia and Indonesia, whether these enterprises are a private agribusiness or a government-linked corporation, are presented in Table 1.[6] It is assumed here that all lowland orangutan habitats are suitable for oil-palm conversion. The average values presented in the table are assumed to apply for both normal-soil and peat-soil forests (orangutans inhabit both). Depending on palm oil prices, oil palm can still be profitably grown on peat swamps even though cultivating oil palm on peat lands might be less profitable than on dry land mineral soils (see Tisdell and Swarna Nantha, 2011, p. 2435; Varkkey, 2013, pp. 679-680). The commercial, productive lifespan of an oil palm is about 20 to 25 years, after which duration the crop is replanted. A 25-year plantation project was assumed in the Malaysian case calculated for this study (Swarna Nantha and Tisdell, 2009), whereas Venter et al. (2009) and Butler et al. (2009) assumed a 30-year productive plantation for Indonesian cases.

[6] See Appendixfor details of the methodology, data and spreadsheet used by this author for calculating the returns for the Malaysian case. These results were published in Swarna Nantha and Tisdell (2009) as part of the work for this thesis. It is cited here for comparison with results from other coeval sources cited in Table 1.

Table 1: Estimated commercial pre-tax profits and net present values (NPV) for crude palm-oil production in Indonesia and Malaysia. These estimates are based on the assumption of a typical plantation project run by a private enterprise**.**

Average profits (US$/ha/year)		**NPV (US$/ha)**	
Swarna Nantha and Tisdell (2009)[a]	Venter et al. (2009)	Swarna Nantha and Tisdell (2009)[a]	Butler et al. (2009)[b]
Malaysia	Indonesia	Malaysia (at 5%/10% discount rate)	Indonesia (at 10% discount rate)
567-923	637-903	7,806-11,858/4,446-6,459	3,835-9,630

[a] The average profit range calculated here for Malaysia is based respectively on the 10-year (2000-2009) and 5-years (2005-2009) average crude palm oil prices of US$470.10/tonne and US$599.80/tonne.

[b] This study assumed two price scenarios, one based on a high-yield constant price of US$749/tonne and low-yield variable prices which range from US$488/tonne to US$463/tonne during the project's lifetime based on World Bank price forecasts (see Butler et al., 2009, pp. 68-69).

To make headway in forestalling oil-palm development on orangutan habitat areas that have already been leased out to companies, habitat retention activities as a viable alternative must be able to at least generate for private owners or lessees of the land in question a yearly pre-tax profit of between US$567 and US$923 (or an average of US$745) per hectare, or an NPV of between US$3,835 and US$11,858 (an average of US$7,847) per hectare over the 20-to-30-year duration of an oil-palm plantation project.[7] The total business profit that would be foregone by retaining a viable orangutan habitat given the above values may be calculated as follows. Foregoing the establishment of a 1,000 hectare (10 km^2) plantation area on orangutan habitat would mean foregone average pre-tax profits of US$745,000 per year, or an NPV of US$7,847,000. Sustaining a minimum, demographically and genetically healthy population of Bornean orangutans requires a habitat of at least 500 or 1,000 km^2 (Marshall et al., 2008). The foregone oil-palm profits from conserving a habitat that large is correspondingly 50 to 100 times the profit and NPV value just stated, assuming no economies of scale. These are vast sums for a single orangutan population, and the habitat area of each of the 17 major orangutan habitats exceed 1,000 km^2 (Husson et al., 2009, pp. 79-80; Wich et al., 2008, p. 335).

[7]These sums may be higher or lower, depending on the per-hectare yield of a plantation, on market price levels, and input and other factor costs such as fertilisers and labour. Well-funded plantation companies heavily use fertilisers, which commonly comprise between 49% (Cramb and Ferraro, 2010) and 60% (PalmOilHQ, 2009) of production costs. In fact, "[o]il palm is by far the largest fertiliser-consuming crop in Malaysia" (The Star, 2011), if not also in Indonesia. Fertiliser costs compete with labour costs as the biggest production cost component in palm-oil production.

Findings on whether these opportunity costs could be offset for orangutan habitats are mixed. Wich et al. (2011) evaluated the above- and below-ground carbon stock on two orangutan habitats in Sumatra, Batang Toru (600 km^2) and Tripa (140 km^2). Monetised ecosystem-services (i.e., carbon) values are said to match or better the foregone returns from cultivating the oil palm and other commercial activities (Wich et al., 2011, pp. 62-65). Contraryevidence from Fisher et al. (2011) indicates that the profits from both logging and subsequent conversion to palm-oil production would exceed revenues from carbon markets and other ecosystem-service payments in the lowland forests of Borneo. This study concludes that the "conservation community faces a massive funding shortfall to protect the remaining lowland primary forests in Southeast Asia" (Fisher et., 2011, p. 329), including major orangutan habitats.

A number of points should be made about the foregoing. First, all of the studies mentioned in this section used pre-tax profits figures. In reality, what belong to shareholders of firms are after-tax profits, which depend on the total taxes charged and on how well firms evade taxation. At a minimum, these firms would be required to pay corporate taxes if they are registered in the countries where they conduct their plantation activities (e.g., Indonesia requires foreign firms to register local subsidiaries to acquire leasehold rights for such land uses). The other major tax is export tax (see next subsection). As a whole, Malaysian oil-palm planters claim that the total tax levied on the oil palm plantation sector is between 40% and 46% of profits, if not more (Adnan, 2010, 2013). Hence offsetting foregone returns to businesses by using as a basis pre-tax profit figures may be overcompensating. Overcompensation could occur even after compensations are given, such as when with the passage of time, it emerges that the worth of the foregone returns for the oil-palm project's lifetime that were offset had declined due to unfavourable market (cost and price) and non-market (e.g., tax) conditions. Second, it is not clear whether oil-palm companies and investors will shift their focus from their 'core competencies' in the oil-palm sector to partake in carbon-related trading or payments as ways to receive compensations for opportunity costs. There are informational and transaction costs, due, for example, to the procedural complexity of engaging in the REDD mechanism,[8] and risks that are associated with

[8] "Local actors in a forest in Indonesia will only receive compensation payments for their REDD activities following a long and successful process of planning, calculation and negotiation" (McCarthy et al., 2012b, p. 538). REDD project proposals require approvals before being implemented, various other documentations regarding the size of the emission reduction and distribution of benefits, and involves a multitude of actors and requires a diversity of expertise.

uncertainties in REDD carbon markets (are they as high-volume, lucrative and predictable as palm-oil markets, and do they reliably pay?). Demand for carbon credits are not high since there is no international cap on carbon emissions, carbon-credit prices are low, and there are allegations of fraudulent sales of carbon credits (Pye, 2012, pp. 355-356). Risk-averse players may thus stick to the oil-palm business. Third, more transparent dealings under REDD schemes may not be preferred, because greater rents could be appropriated from opaque dealings (see section 3.4). Fourth, oil-palm planters may be unwilling to participate in offset agreements if they believe that this might set a precedent that makes it more difficult and costly for them to acquire forest lands for oil-palm development in the future.

2.2 The opportunity cost to governments

Virtually all orangutan habitats and forests in Borneo are on public lands, and significant decision-making power with regards to the use of these lands lies with governments. In theory, these lands are to be administered for the public interest, meaning the greatest benefits from their use should accrue to the current public owners while ensuring that these lands are efficiently used and are conserved for the good of future owners (e.g., FAO, 2003, p. 9).

Governments allow the conversion of forests for palm-oil production, and in the process extract tax revenues for funding government operations. These taxes can be categorised according to whether they are levied nationally or locally. The national-level governments of Indonesia and Malaysia levy export taxes on the quantity of palm oil sold and shipped overseas by oil-palm companies. These are charged according to tonnage, and it is immaterial whether additional tax earnings come from improved yields on existing lands or from the establishment of new plantations. At the local level, there is the land tax. Local-level governments look to constantly increase land tax collections as these are claimed to be a major source of revenue for some of the decentralised district governments of Indonesia (Colchester et al., 2009., p. 29). These district governments therefore might encourage the use of forest lands, issue land titles and charge fees for title applications and annual land taxes on titleholders. Revenues from these area-based taxes would increase with the leasing of more lands, but not with increased palm-oil output on existing croplands. Sabah and Sarawak's state governments also charge sales tax on the crude palm oil that growers sell from within those states.

Since these various levels of governments have the power to allocate the right to convert forests for agriculture and also derive earnings from doing so, these governments would therefore be important leverage point for influencing decision-making on whether orangutan habitat are conserved or converted. The relevant opportunity costs that would require offsetting as far as government opportunity costs are concerned are the tax earnings foregone from conservation.

The rates of annual land taxes (or quit rents) charged by district governments in Indonesia for agricultural purposes vary between and within the said states and provinces, category of land use, and the size of the land. This tax is usually charged at a flat rate over the agricultural hectarage concerned in Indonesia (Colchester et al., 2009, p. 22). The rate is reported to be 0.5% of the assessed value of land (see, e.g., IBFD, 2013, p. 16). In two cases in Sumatra, district governments have required plantations to pay IDR20,000/ha and IDR100,000/ha (or US$2.13/ha and US$10.63/ha) (Colchester et al., 2006). Rotheli (2008, p. 19) reported from a study of four plantations in Sumatra and Kalimantan an annual land tax amounting to an average US$11 and US$18 per hectare. The average of all these values for Indonesia would be US$10.44/ha. In Malaysia, a source cites that four districts in Sabah charge oil palm plantations operated by corporations an annual land tax of RM3.7/ha (US$1.16/ha), as of 2010 (The Star, 2010). The annual land tax that oil-palm growers in Sarawak pay is RM5.00 or US$1.55/ha (Adnan, 2010).

Given these estimates, the annual land tax that local or state governments could earn from a 1,000 hectare (10 km^2) plantation is US$10,440 in Indonesia, US$1,160 in Sabah, and US$1,550 in Sarawak. If suitable land for oil-palm development is set aside for conserving a minimum viable orangutan habitat of 500 to 1000 km^2, the amount of annual land tax by sub-national governments foregone would be between US$522,000 and US$1,044,000 in Indonesia and between US$58,000 and US$155,000 in Malaysia.

The Sabah state government collects a crude palm oil sales tax of 7.5% on crude palm oil sale when prices exceed RM1,000/tonne (about US$313/tonne) (the present market price for crude palm oil is US$830) (Adnan, 2010). The Sabah government estimates an earning of RM708.75 million (US$210 million) in 2009 from this tax, which constituted 28% of the state's 2009 revenue (The Sabah State Government, 2009). The Malaysian federal government currently extracts a 4.5% export duty on every tonne of crude palm oil exported for the current market

price (MPOB, 2013), which scales up to a maximum of 8.5% when prices exceed RM3,450 (US$1,078). The Indonesian central government also has a scaling tax rate. It levies a 9% export tax at the current market price range of US$801-850 (Standard Chartered Research, 2012, p. 32), with a maximum rate of 22.5% for prices above US$1,251. At the current price of US$830, oil palm exporters will have to pay US$74.70 for each extra tonne of palm oil exported, or by US$261.50 if a hectare's worth of oil is considered (the average yield of 3.5 tonnes per hectare is assumed). Provincial governments in Indonesia receive a share of these revenues if crude palm oil is exported from that province. The provincial government of West Kalimantan, which produces palm oil but does not have a seaport for exporting the product (palm oil produced in this province is exported overseas by other provinces with seaports) has appealed to the central government for a share of the export returns in spite of this (see LITBANG, undated).

Another notable tax, at the national level, is the corporate tax that domestically-registered oil palm companies pay in Indonesia and Malaysia. Indonesia's corporate tax is a flat rate of 25% and Malaysia's varies between 20 to 25%, depending on the level of net profits (see Adnan, 2010 for the full list of taxes charged to oil-palm producers in Malaysia).

Land taxes (and sales taxes, in the case of Sabah, Malaysia) are linked directly to the state and district governments that have the most discretionary power in deciding on the allocation of land for conversion. From the estimates presented above, the government opportunity costs in terms of land and export taxes foregone in Indonesian and Malaysian Borneo are smaller than the business opportunity costs of oil-palm companies. Even if export and corporate taxes at the national levels are included, the government opportunity cost in per-hectare terms is still lower than the business opportunity cost. Despite this, government revenue from oil palm is considerable and may be of value to small, autonomous local governments. Furthermore, it should be noted that halting the expansion of oil-palm plantations on further habitat areas need not adversely affect export or corporate tax earnings in the near term if yield improvements are made on already-planted lands, or if non-forested lands are cultivated. Evidence indicates there are ample opportunities to do so (see Section 5).

3. A Joint Consideration of Business and Government Opportunity Costs in Conserving Orangutan Habitats

We consider for our purposes here the geographic distribution of the Bornean orangutan. Wich et al. (2012) classified these habitat areas according to whether they are in protected areas, were leased out to logging concessionaires or to industrial timber and palm plantation companies, or lie outside concessions, that is, are unleased. The areas expected to be affected by oil-palm expansion are those that have been leased out as industrial oil-palm plantation concessions,[9] and unleased conversion forests that could be leased out in the future for oil-palm or pulpwood cultivation in the future. Together, these areas constitute about 30.4% of the entire orangutan distribution (Table 2).[10]

Table 2. The area of the Bornean orangutan's distribution in unleased conversion forests and in forests that have been leased out for industrial-scale oil-palm plantations (derived from Wich et al., 2012, p. 5).

Location	**Leased and largely undeveloped industrial oil-palm concessions (km^2)**	**Unleased conversion forests (km^2)**	**Total (km^2) and percentage (%)**
Kalimantan (Indonesia)	29,025	13,593	42,618 (90.4%)
Sabah and Sarawak (Malaysia)	No data (Sabah), 631 (Sarawak)	3,913 (Sabah), 0 (Sarawak)	4,544 (9.6%)
Borneo (total)	*29,656*	*17,506*	*47,162* (100%)

There are two immediately obvious implications of the above information. The first is that out of the 47,162 km^2 of the Bornean orangutan landscape at risk of being deforested for the establishment of plantations, the majority (90.4%) is in Indonesian Borneo. This means that conservation intervention would have to concentrate on Indonesia and the relevant monetary returns in the Indonesian case. Second, the areas where business opportunity costs are relevant

[9] About 79% of the Kalimantan leaseholdings were undeveloped and still forested in 2010 (Carlson et al., 2013, p. 283; Wich et al., 2012, p. 5).

[10] In comparison, approximately 29% of the orangutan distribution is in logging concessions, 6% in industrial timber production concessions, 22% in protected areas, and 13% are forests that could be allocated for logging (currently unleased production forests) (Wich et al., 2012, p. 5).

for offsetting schemes are those that have already been leased out, since the right to use the land belongs to concessionaires and it is the behaviour of these parties that has to be influenced. For the areas that are not yet leased, their future leasing to developers could in principle be prevented by paying the amount of the government opportunity costs to the appropriate governments (but see Section 4). Business opportunity costs would apply in almost two-thirds or 62.9% (29,656 km^2) of the at-risk areas, whereas government opportunity costs would apply to slightly more than a third or 37.1% (17,506 km^2) of these areas.

A large portion of the unleased conversion forests identified above (47%) are in Central Kalimantan, and a significant proportion of these are peat swamp forests which hold vast stocks of carbon.[11] Thus, aside from the fact that these areas are orangutan habitat, peatlands are considered of conservation importance for limiting global carbon emissions to mitigate climate change.[12] Central Kalimantan's peatland area has declined by almost half between 1990 and 2010 (Miettinen et al., 2012, p. 125), and continues to be deforested, albeit at a lower rate. Significant orangutan and carbon storage gains could be made by offsetting at least the government opportunity costs (e.g., the land tax receipts) in Central Kalimantan. This could be coupled with a compensation for any possible earnings from export duties that might be foregone by the local governments concerned. A similar offsetting of government opportunity costs could be carried out in other unleased orangutan habitats areas. Compensatory payments could be avoided for forests that would not be leased out for conversion whether payments are made or not. But it needs to be determined whether all the habitats in these unleased areas are worth the cost, i.e., are the targeted orangutan aggregations or populations worth saving (many of the habitats in the unleased areas appear to be small and not so contiguous, from the map provided by Wich et al., (2012)).

As for the habitat areas that have been leased as industrial oil-palm concessions, two options are available. One is to assume, as is usually done, the higher business opportunity costs for offsetting purposes. However, just as the case might be in dealing with governments for acquiring unleased habitat, the lease-holding companies must be willing to enter into an

[11] Compare the map of the orangutan's distribution that fall under 'no concession' in Central Kalimantan in Wich et al. (2012, p. 6) with the map of the extent of peatlands in that province in Miettinen and Liew (2010, p. 399).
[12] Indonesia was the third largest emitter of greenhouses gases after the United States and China due mostly to deforestation and the burning of its dryland and peat swamp forests (Edwards and Laurance, 2011).

agreement in the first place. They are unlikely to do so if they have a strong intention to develop the land for oil palm, i.e., if these are genuine land acquisitions for the stated production purposes. But land-use changes do not necessarily take place on all of the vast land banks that are held by private and state companies. Plantation permit holders sometimes speculatively procure land-use licenses with the hope of selling these rights to a new acquirer for a profit.[13] In such cases, the basis for the compensation amount to obtain such rights may well diverge from the oil-palm gains to businesses or governments. In other cases, the forest leaseholder may be an oil-palm company that is a member of the Roundtable of Sustainable Palm Oil (RSPO). Accredited members of the RSPO are required to preserve forests areas identified as of high conservation value in their land holdings. These companies may find it burdensome to retain these forests since it affects profitability; they have to continue to pay to local governments land taxes for their leasehold permits (charged at a flat rate according to hectarage), whether or not these lease-holdings are planted or unplanted (Colchester et al., 2009, p. 22). Environmental NGOs have tried to acquire the rights for the forests from these types of companies and Colchester et al. (2009) report of a case in Indonesia in which an NGO had obtained forest land this way. It had negotiated with the local *bupati* (the regency or head of the district government)and obtained rights to hold the forested land at a lower tax rate. Such opportunities, however, may be rare. Land that is allocated for agricultural development is a "major source of revenue that local governments would tend to want to maximise" (Colchester et al., 2009, p. 29). It is also unclear what the fate of the saved forest may be once the 'green acquirer's' leasehold expires; nothing stops governments from reallocating these to investors interested in conversion.

The second option is more radical and requires a change in political will for it to occur on the required scale. It involves the withdrawal or cancellation of the leases on non-performing plantation concessions, an action that is fully within the right of the local governments if companies fail to develop a minimum area of the leased forests or convert it within a certain period (Colchester et al., 2009, p. 29; McCarthy et al., 2012b, p. 532). As noted, large areas of forests within the orangutan's distribution are yet-to-be-developed land banks. If reacquired by governments, it could be leased out to conservation-related acquisitions, which could be subject

[13] McCarthy et al. (2012b) term this supposedly widespread phenomenon in the outer islands of Indonesia (Borneo, Sulawesi, etc.) as 'virtual land grabbing', a "situation where, behind a façade of land acquisition for a stated purpose, there lies an agenda to appropriate subsidies, obtain bank loans using land permits as collateral, or speculate on future increases in land values" (p. 523).

to the same land taxes (or discounted ones, if the argument could be sold that conserving the orangutan habitat would also provide desired environmental services locally). However, governments may prefer to deal with plantation developers for fiscal and political reasons (see Section 4). Where forest habitat areas revert to the state once companies have exceeded the permitted three-year period for preparing their lands for conversion (prior to the land's final leasing), local governments have in the past chosen to cancel the permits of laggard firms and reallocate parts of these forests to other companies that are more ready to convert these lands (Colchester et al., 2009, p. 31). For local governments, "any "idle land" would be seen as potentially untapped revenue to be realised when offered to another company" (Colchester et al., 2009, p. 29).

While it may be that there is the potential for lowering the opportunity cost of conservation if a combination of opportune interventions are made with oil-palm companies and/or with different governments at administrative levels, it is open to question whether all of the affected orangutan habitat areas could be saved only by the approach of targeting the business and government opportunity costs as has been outlined. The opportunities for buying out land-use rights for sufficiently large orangutan habitat areas are likely to be limited. Conservation funds are no doubt scarce. Costs of transaction involved in approaching and negotiating with different companies or different local governments could also be significant, not to mention the costs of coordinating the conservation of large blocks of orangutan habitat that straddle multiple government jurisdictions. There may also be the problem of preventing an enterprise from foregoing the use of habitat in one jurisdiction and acquiring another elsewhere. This is a possibility if different, locally autonomous governments have similar conversion forests and infrastructure, and compete to lure private investment (interjurisdictional competition) (Bardhan and Mookherjee, 2006, pp. 165-166), which has been observed in the case of oil-palm expansion in Indonesian Borneo (McCarthy et al., 2012a, pp. 558-563). The effect of such competition could be negative for total stocks of orangutan habitats if governments undervalue these habitats and release more than they otherwise would for conversion (e.g., Burgess et al., 2012), or if, because of the refusal of one local government to lease land, deforestation is concentrated on a large and important habitat located in another jurisdiction.

This paper has so far discussed two opportunity costs in conserving the orangutan. It presumes two transacting agents in the act of habitat conversion, namely, the business enterprise, which aims to maximise profits for the welfare of its shareholders, and the benevolent government, which seeks to increase tax revenues as a means of maximising the general utility of its citizens, for example, by providing public goods and services. Under the idealised conditions of mainstream economic theory, optimal conversion levels may be achieved in two ways. On the government's side, the limiting force would be the prudence of the politicians and bureaucrats in the management state resources by the careful weighing of the social benefits against social costs, for example, by using cost-benefit analysis. On the firm's side, rising production costs characterised by the 'U'-shaped long-run average cost curve would inhibit continued land expansion by a firm.

But optimal equilibrium is not evident from the rapid rate of land allocation for oil-palm expansion on Sumatra and Borneo, which threatens high social costs in terms of the loss of orangutans, biodiversity, and carbon sequestration capacity. Neoclassical environmental economics attributes this to the omission of unpriced environmental assets and damages in government cost-benefit calculations. Public choice theory on the other hand suggests that the public use of cost-benefit analysis would not produce the optimal outcome envisioned in ideal markets if the principal–agent problem also occurs (O'Neill, 2007, p. 62). Evidence of this principal–agent problem in oil-palm expansion is presented in the next section. It is argued that this power-related problem gives rise to another important private opportunity cost in land-use decision-making— the foregone utility of the political-bureaucratic decision maker himself/herself.

4. The Government Decision maker's Opportunity Cost

This refers to the gain, other than formal remuneration, that an individual politician or bureaucrat extracts from using his/her official authority to facilitate the opening of forest habitat for oil-palm expansion.[14] This action becomes possible when there is a principal–agent problem between a population and its elected power holders, such that the power holder's decision-

[14] While the objective of benevolent governments may be to improve social welfare, it is fair to assume that there may be politico-bureaucratic agents acting on their behalf who might be interested in improving their own welfare above the collective goal they were employed to serve (Banerjee, 1997, p. 1290; O'Neill, 2007, p. 74).

making cannot be properly held accountable by the population. The agent (the power holder) then is in the position where he/she can violate the norms that dictate his/her behaviour to gain at the expense of the principal's (the population's) interest (Alam, 1989, in Quinn, 2011, p. 47). This can happen especially when the salary of the politico-bureaucratic actor, and the cost of being caught and punished for his/her infraction, are low (Khan, 2006, p. 220). The opportunity to gain arises from dyadic (two-person) interactions such as those involved in patronage politics, in which the government decision-maker act as patron to businesses, the decision-maker's rent-seeking clients, that seek from him/her resources that would otherwise not be available to these clients.

Political patronage has been shown to be a "a central feature" of the Indonesian oil-palm sector (Varkkey, 2012b).It is a business norm for Indonesian, Malaysian and Singaporean plantation companies to trade favours through forging long-term *quid pro quo* relationships with the regents and governors of local governments as well as with central-government ministries and politicians in Indonesia. These relationships are often established and fostered through well-connected intermediaries consisting of former bureaucrats, politicians and military men who are hired by and act as advisors and brokers on behalf of the company when required (Varkkey, 2012b, p. 318). The firm's goal is to obtain "licences and property rights for the opening of plantation land" (Varkkey, 2012b, p. 322) and at a lower transaction cost, such as by bypassing the elaborate procedures in applying for these licences (Varkkey, 2013, pp. 684-685). These commercial interests influence the allocation of property rights and licences for publicly-owned lands through "private consultations with decision makers" that bypass "accountability mechanisms" (Varkkey, 2013, p. 682). These decision-makers tend to be local government officials, who, following Indonesia's decentralisation programme after 1999, obtained "enormous discretionary powers"over "key aspects of plantation licensing" at the district level (McCarthy et al., 2012a, pp. 557-558) and therefore essentially hold *de facto* property rights over publicly-held forest resources. These politico-bureaucratic actors gain materially by "helping their clients maximise profitability in the oil palm plantation sector" (Varkkey, 2012b, p. 326). In return, firms channel kickbacks and other non-monetary resources to the cooperating politico-bureaucratic actors. Not only is easy access to land obtained in this way for oil-palm cultivation both in Indonesia and in Malaysia (Varkkey, 2013, pp. 684-687; Jomo et al., 2004, p. 123), the political connections that are established have helped companies operating in Indonesia to evade

legal punishment for causing long-term social costs such as the transboundary haze problem that is triggered by the use of fire to clear forests (Varkkey, 2012b, p. 324), the collapse of carbon-rich peatlands that contribute to climate change (Varkkey, 2013), and the destruction of orangutan habitat, which is an infringement of national laws on species protection (Wich et al., 2012, p. 8). While from the ecological economic standpoint this political relationship weakens the decision-maker's incentives to limit land allocation for conversion based on biophysical considerations, the programme of expanding the oil-palm area is legitimised socially by the discourse on the developmental benefits such as income and employment opportunities and infrastructure development.

The previous sections implied that local governments allocate state forest lands to improve government operating revenue. While this may be true in some cases, note that district governments in Indonesia, in spite of greater autonomy following Indonesia's political decentralisation, still heavily rely on the fiscal grants from the central government to cover most of their budgetary expenditure.[15] These grants are also intended to offset the differences in the fiscal resources available to different local governments, and hence, according to Fadliya and McLeod (2010, p. 18)

> "hardly any local governments [would] have any monetary incentive to increase their own source revenues, because each additional rupiah they collect will be fully offset by an induced equal reduction in the total transfer entitlement. In view of this it is surprising that so much effort is expended by local governments in raising their own revenue… and that there are so many complaints from them about the constraints they face in trying to do so."

This appears to correspond with the claim (Marcus Colchester, pers. comm., 10 Dec 2013) that land-use decisions involving oil-palm plantation in Kalimantan are rarely made only to optimise state revenues, but are made by agents of the state and especially by local politicians to further their careers; favour their political allies (often large companies who back them); generate substantial monies for electoral politics; and generate substantial personal income and status. Others confirm that state-based actors personally do receive "significant funds", including

[15] The average district government in Indonesia obtained, in 2008, more than 90% of its fiscal resources from the centre (various allocations including the sharing of petroleum revenues) and raised slightly more than 6% on its own through local taxation (own revenue) (Agustina et al., 2012, p. 4). Bird and Slack (2004, p. 37) noted the land tax rates in Indonesia were very low to begin with, a point that was observed in subsection 2.2.

"shares or land in agribusiness developments within their districts" for granting land permits and licenses (McCarthy et al., 2012a, p. 558). The monies received by local governments in formal revenues from land use are "trivial compared to the huge sums being received by state parties and politicians" informally (Marcus Colchester, pers. comm., 10 Dec 2013).[16] Since political-bureaucratic actors "thrive or flounder depending upon their control of rents derived from [this] resource sector" (McCarthy et al., 2012b, p. 527), land-use outcomes are likely to be critically linked to whether these private benefits are reaped or not.

Matters are thus complicated for REDD-based compensation schemes or for other PES-type interventions. It is generally accepted that negotiations and payments for offsetting legitimate financial opportunity costs of conservation would be carried out transparently with individuals and businesses where formal business profits are involved and with governments where state revenue is involved. This leaves out the informal opportunity cost of the government decision-maker. If "an accurate understanding of the monetary gap" between conserving forest habitats and the financial benefits from converting them "is critical if... the conservation community is to know the full extent of the funding needed for conservation" (Fisher et al., 2011, p. 330), then PES initiatives cannot turn a blind eye to the government decision-maker's opportunity cost which is systemic to the case at hand. Any attempt to 'offset' the government decision-maker's opportunity cost through these initiatives would no doubt be seen as controversial as it would be an acceptance of the skewed power structure that gives rise to the decision-maker's questionable opportunity cost. It might also reinforce a political economy that is not aligned with the goal of conserving the environment. To do so would in any case be impractical in that it would be difficult to identify who exactly to compensate since the individual decision-makers who gain understandably would not step forward to claim compensation. The number of local-level actors to influence would be large. The monetary sums that are involved that would induce a change in behaviour are unknown, but are likely to be higher than formal returns foregone by local

[16] Likewise, in some cases in Malaysia such as in Sarawak and Sabah, it is reported that the exploitation of forests "for personal aggrandisement or political patronage has taken precedence over government revenues" (Jomo et al., 2004, p. 255). In a national coordination meeting organised by the Indonesian Ministry for the Environment in 1999 to discuss future environmental policy, participants reported that regional governments were more interested in increasing regional government revenue without sufficient attention to the environment, and that "the regional government interpreted the term 'regional income'… in a way that did not benefit the common people, namely as 'money that flows to the cashier of the regional government' instead of taking into account the 'rise and fall of the income and the welfare of the people'… this was interpreted as a case of favouring a certain group – this time, the officials themselves" (Arnscheidt, 2009, p. 240).

governments. Moreover, since the conditions of patron–client negotiations over resource allocations are opaque and differ from open, free-market-type exchanges (Eisenstadt and Roniger, 1995, pp. 212-213), the determination of the sum of the compensation payments would be vulnerable to extortionary pressures or be higher than what it might be otherwise.

In summary, the issue of patronage networks and corruption in the natural resource sector of Southeast Asia is not new. But the modern attempt of addressing the conservation of orangutan habitats by concentrating on the value of environmental benefits and compensating private opportunity costs accordingly ignores the institutional configurations (such as the one described here) that could stymie the envisioned conservation outcomes. More than just a matter of channelling payments, the solution to this problem would require greater political control, economic democracy, and accountability and changes to fiscal, governance and property rights structures. In addition to the behaviour of and incentives for politicians and bureaucrats in charge of land-use decision-making that are at odds with the principles of ecological sustainability, the behaviour of and incentives facing private firms involved in the upstream end of palm-oil production are also important to consider for understanding why these firms court individual government decision-makers. In finding a solution to conserving most major orangutan populations, therefore, clarification is also required on the link between patronage politics and the desire for business enterprises to continue to expand the oil-palm cropland on forests when alternatives are available.

5. Oil-Palm Expansion as a Cost-Shifting Activity by Agribusinesses

The dominant oil-palm growers in the Indonesian and Malaysian oil-palm sector are large-scale, well-capitalised commercial enterprises. Prior to 1990, most plantations in Indonesia were state-owned enterprises and there were very few estates owned by private businesses or smallholders. However, as the 1980s progressed, the influence of the resurgent *laissez-faire* or neoliberal economic model led both Malaysia and Indonesia to privatise state-held companies, withdraw state-led oil-palm development initiatives, and allow private companies to spearhead oil-palm development (McCarthy and Cramb, 2009). In Indonesia, these enterprises replaced the government-supported, smallholder projects as the leading driver of deforestation in Indonesia after the Asian financial crisis in the late 1990s (McCarthy et al., 2012a, p. 557; Rudel et al.,

2009, pp. 1400-1402). Of all the lands under oil palm in Malaysia at the end of 2012, 62% were estates held by private companies, 14% were held by independent smallholders and the remainder were managed by government agencies (MPOB, undated).[17] In Indonesia, although the official statistics for 2010 state that private estates made up 50% of total planted area and that smallholders occupied 42% of these areas (see Obidzinski et al., 2012), it is not clear whether the areas attributed to smallholders are fully held by smallholders or partly by private companies.[18]

The capitalist mode of production characterises the operation of industrial-scale palm-oil producing companies; the goal of these large competitive enterprises "is not ecological sustainability but, rather, sustained (and maximal) accumulation of capital (money invested to make more money) for its own sake" (Burkett, 2006, p. 112). Firms seek continued growth in output in response to demand to enrich their shareholders (and/or possibly to benefit the firm's management layer if stockholder power is relatively weak, a variant of the political agency problem referred to previously; Galbraith, 1973, Ch. 9). Exchange value becomes a reference to the firm's action, such as in deciding whether to produce more oil palm, or to invest in conserving more orangutan habitats or producing more ecosystem services (wherein social use values dominate for the latter which are not fully capturable by exchange values). The profit-maximisation goal of firms may therefore not be compatible with ecological sustainability in the sense of maintaining natural conditions that further the development of present and future human generations (Burkett, 2006, p. 112).

In the oil-palm industry, "maintaining low production costs" is a key "to the continued profitability of oil palm producers" (McCarthy and Cramb, 2009, p. 113). If there are two alternative routes to increasing output and improving profits, a firm unencumbered by regulatory concerns is likely to prioritise the route that incurs the least marginal private costs, regardless of the social costs that might be created. In his work on firms and environmental externalities, Kapp

[17] The proportions vary according to region in Malaysia and Indonesia. For instance, in Sarawak, Malaysia, 81% of the oil-palm area is under private ownership (Toh, 2013, p. 68).

[18] This is because many of the Indonesian smallholder schemes are joint-ventures with private enterprises where these supported smallholders are given plots of lands in conjunction with the establishment of private estates. Under these joint-venture smallholder schemes, private enterprises typically hold 70 to 80% of the cropland in contrast to the 20 to 30% that are given out to these supported smallholders (the 'nucleus' and 'plasma' scheme; see McCarthy et al., 2012a, pp. 557-558). Colchester and Chao (2011, p. 5) believe that half of these areas in Indonesia that are categorised as belonging to smallholders are actually under these types of schemes linked to private estates, while the other half are those under independent smallholders. If so, then the total amount of planted area that are actually under agribusiness control would be larger, possibly two-thirds of all the planted area in Indonesia.

(1963) forwarded the thesis that business enterprises typically improve profits by avoiding or shifting away costs at the expense of others or the environment. Earlier in Section 3 it was seen that even firms with the best intentions such as those that might initially keep patches of wildlife habitat within their oil-palm landholdings have been unwilling to do so when this affects profitability. According to Kapp (1974, p. 60)

> "Even if an individual firm intended to and would be in a financial position, as many oligopolists obviously are, to avoid the negative effects of their applied technology, it could do so only by raising its costs; that is by deliberately reducing its profit margin and its profit earning capacity. Thus, a system of decision-making, operating in accordance with the principle of investment for profit, cannot be expected to proceed in any other way but to try to reduce its costs whenever possible by shifting them to the shoulders of others or to society at large."

Vatn (2012, p. 43) states that because of this decision-making logic, "externalities [or social costs, in Kapp's terminology] are a 'wanted' outcome of production for profits, not just 'accidental side-effects' as is the standard [welfare economic] perspective".[19] An argument will be made here that that private companies demonstrate cost-shifting behaviour in the case of oil-palm cropland expansion in Indonesia and Malaysia.

Even as the oil-palm cropland area is expanding rapidly in Sarawak, Sumatra and Kalimantan, in increasing order, reports have claimed that private companies both in Malaysia and Indonesia are underinvesting in improving yields produced per hectare on existing croplands. Some private producers in Indonesia have recorded yields of between 6.5 to 8 tonnes or crude palm oil per

[19] 'Social costs' (Kapp, 1963, pp. 13-14) refer "to all those harmful consequences and damages which other persons or the community sustain as a result of productive processes, and for which private entrepreneurs are not held accountable". Social cost is for Kapp that part of what is called total social opportunity cost in welfare economics that remains after private costs are paid (Swaney, 1987, p. 1758). Kapp distinguishes it from Pigou's'externalities' term, which he rejected, because the problems are "unexceptional, pervasive and systemic and not "outside the system", as the word externality implies" (Spash and Villena, 1998, p. 10; Swaney, 1987, p. 1789). Social costs "may be 'external' to business enterprises, but shouldbe considered, according to Kapp, 'internal' to the economy asa whole and should be dealt with as such" (Tsuru, 1993, p. 80). To be called social costs, "harmful effects and inefficiencies must have two characteristics. It must be possible to avoid them and they must be part of the course of productive activities and be shifted to third persons or the community at large" (Kapp, 1963, p. 14). The avoidability of habitat replacement caused by oil-palm expansion will be touched upon shortly.

hectare but the average for all private estates there is approximately 4.1 tonnes per hectare (FAS, 2009). The yield gap between subsistence smallholder properties and private estates was reported as "inexplicably low" (FAS, 2009), in spite of the "tremendous advantages" that private companies have in raising yields given their access to finance, fertilisers, higher-yielding seed varieties for replanting schemes, the ability to better manage croplands and to use a more efficient and motivated workforce (FAS, 2009; Standard Chartered Research, 2012, p. 2, 15).

The reason proffered is that in Malaysia and Indonesia, private producers are satisfied with their per-hectare level of profit margins and thus are not motivated to manage their plantings intensively by investing more in optimal fertiliser application, in mechanisation or in higher wages for field workers to improve harvest levels (FAS, 2009, 2012). Gross profit margins (the difference between sales price and production costs, divided by sales price) would be 20% at the lower-range crude palm oil price of US$500 per tonne and 52% at the current US$840 per tonne. [20] Despite the "extremely healthy annual gross margins estimated by the MPOB [Malaysian Palm Oil Board] at 60-80 percent" during the 2011-2012 period, "the palm oil industry [in Malaysia] has been loath to increase their labor-related outlays" to stem "large-scale yield losses through unharvested/unprocessed [oil palm] fruit bunches" (FAS, 2012).[21] Oil-palm companies do not appear at the moment to want to bear a higher production cost by taking some of the mentioned measures to improve yields and give up maximum profitmaking in the short term. Meanwhile, they continue to build up land banks of mostly forested areas and convert these in anticipation of future growth in palm-oil demand.

Additional forest conversion is avoidable and not a necessity in the near term, according to Wicke et al. (2011). This study showed that projected demand for palm oil, up to the year 2020, can be met without further oil-palm-related deforestation in Indonesia and Malaysia under

[20] Production costs in Indonesia, inclusive of labour, are on average between US$250 and US$300 per ton of crude palm oil (FAS, 2010). Another source (Standard Chartered Research, 2012, p. 19) suggests a range of US$300 and $400 in Malaysia and Indonesia and assumes the US$400 figure— as is done here— in estimating the gross profit margins of a well-managed private estate. In the last five years, between October 2008 and October 2013, monthly crude palm oil prices hovered between close to US$500 and US$1250 per tonne and averaged US$840 per tonne, which is also approximately the current market price.

[21] A waste that is estimated to amount to around 5% of total harvest, or 5 million tonnes of fruit, or equivalent to approximately US$1 billion in export revenues (ITA, 2012, p. 5).

various scenarios involving improving yields and using already degraded lands.[22] This is not the path the oil-palm companies are taking, nor are the Indonesian and Malaysian governments seriously taking note of these forest-saving measures and encouraging oil-palm firms to prioritise intensification over extensification to increase palm-oil output. This reluctance by governments may be explained by cost-shifting that is enabled by accommodative political patronage.

Firms would choose to obtain new lands and expand plantations, using cheaper seed varieties, if this was a lower-cost way to increase output than by the replanting existing lands with more expensive, higher-yielding seed varieties, which would also necessitate taking offline a portion of their planted lands and enduring a drop in profit, or by increasing the use of expensive fertiliser or increasing the intensity of management and labour activity per unit area on existing lands (e.g., more frequent and timely harvesting of fresh fruit bunches etc.; see Donough et al., 2009, on what is involved in implementing oil-palm best management practices). Moreover, it may be less costly to convert new forest land because the returns from selling the logged timber from these lands could "generate up-front capital, offset plantation investment costs" or surplus profits (Obidzinski et al., 2012).

More significantly, the cost of obtaining new land may be low in the absence of markets for land and when the release of more public lands depends on the discretion of government decision-makers. Under patronage politics in the oil-palm sector, what the firms may have to contend with to induce the release and allocation of land would be the amount of bribes that must be paid to the relevant individual government decision-makers. The per-hectare cost of obtaining extra land would be lower the larger the area obtained is for a given amount of kickback per decision-maker. It is also claimed governments in Indonesia have in many cases given forested land to investors almost for free (Deininger, 2011, p. 221, 240; 2013, p. 3) to foster the development of the oil-palm industry and expand palm-oil expansion, ostensibly on grounds of the social benefits that this would presumably generate. Considering that private oil-palm companies have been reluctant to improve yields on existing lands but have accumulated vast amounts of new lands

[22] Two points can be raised here. First, degraded lands are sometimes occupied by communities without formal rights to these lands but who rely on these lands for subsistence. Plans for diverting large-scale oil-palm developments should be cognizant of this and not deprive such people of their means of subsistence. Second, the extent of the absorption of potential expansion by degraded lands and by intensification can be questioned: should all of this future expansion be accommodated, such as in the case where expansion is purely for the purpose of profit accumulation?

(whether for speculation or for real conversions), the cost of extensifying plus the cost of paying off government decision-makers could well be lower than the cost of intensification. In other words, the net profit for firms, after deducting the cost of influencing government decision-makers, may be higher than the net profit obtained by increasing yields on existing lands to produce the same additional amount of output. Extensification may be preferred by the oil-palm enterprise if it entails higher profits than intensification, since, according to Kapp's thesis, "[i]f it is cheaper to shift costs than to employ technology that is superior from a social perspective, the rational manager will do so, or be weeded out from the ranks of managers by the forces of competition" (Swaney and Evers, 1989, p. 12). If government decision-makers do not factor in scarcities or long-run social costs in the allocation of land for whatever reason, or if government decision-makers in different jurisdictions competitively bid down this cost of procuring land as they do in Indonesia (see McCarthy et al., 2012a, p. 558, 561), the cost to the firm of obtaining from government decision-makers additional amounts of land, and larger proportions of it relative to what must be allocated to smallholders, may be relatively low or even constant, thus keeping a lid on the industry's production costs. The long-run average cost curve for the firm might thus be L- rather than U-shaped over a certain range of land area obtained (Figure 1).

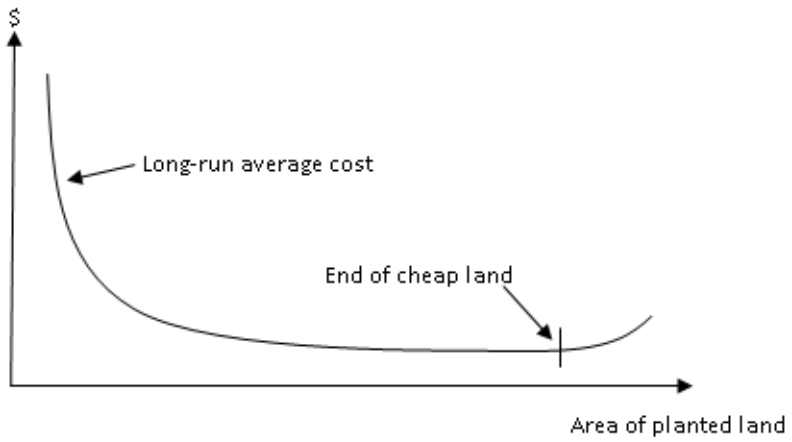

Figure 1: The long-run average cost curve for an oil-palm company where land can be obtained at low cost, whether because it is physically abundant or because it could be obtained relatively inexpensively as a result of political corruption. Costs would rise once there is scarcity of suitably fertile land.

This would correspond with the contention that firms generally experience constant or falling marginal costs, and therefore falling average costs of production with rising output, and that what would inhibit the firms' continued expansion of production is not the internal conditions of the firms' production but limited or falling demand for their product (i.e., a downward-sloping demand curve) (Sraffa, 1926, in Hill and Myatt, 2010, pp. 104-105). The limited evidence reviewed here seems to suggest that this might be the case in the oil-palm sector in Indonesia, assuming that land is still available for conversion at no increasing cost and that the market price for palm oil is sufficiently high. If true, the objectives and motivations of capitalistic enterprises combined with the rent-seeking behaviour of the corrupt politico-bureaucratic actors would drive, at the aggregate level, oil-palm expansion beyond the scale that might be compatible with the goal of conserving many orangutan habitats or forested lands, even if it was possible to increase palm-oil output without necessarily having to further enlarge the oil-palm planted area at the expense of forest land. 'Equilibrium' under this institutional configuration would be marked by a wasteful use of resources, i.e., avoidable losses in orangutan forests and avoidable negative externalities.

The presumed benefit of foreign exchange earnings that accrue to the nation can also be questioned (Cypher and Dietz, 2009, p. 375, 470). The hard currency earned through exports no doubt will have to be shared with the agribusinesses, and the net earnings to governments might be modest when judged against environmental costs such as the loss of wildlife and ecosystem services and riverine pollution. The national benefits may be lower still if profits are repatriated to overseas parent companies. This last point raises questions about the distribution of the gains from the use of public-owned resources. Varkkey (2012b, p. 315) observed that two-thirds of Indonesia's total oil palm planted area was controlled by Malaysian and Singaporean investors. The eight largest oil-palm cultivating companies in the world, in terms of market value— from Wilmar, Sime Darby, Kuala Lumpur Kepong to Genting Plantations— are based in either in Malaysia or Singapore, but hold substantial land banks in Indonesia (see Goh, 2009; Toh, 2013, p. 74). These companies have very concentrated shareholdings where in most cases, the substantial shareholders are a small number of wealthy individuals or families (e.g., Wilmar, 2012; p. 186; Genting Plantations, 2012, p. 131; Golden Agri-Resources, 2012, p. 153; Kuala Lumpur Kepong, 2012, p. 151). Boyce (2002, p. 43) hypothesised that when the rich and

powerful exploit environmental resources as a result of unequal political power relative to citizens, they would have a high rate of environmental time preference, i.e., a preference to extract large natural resource rents and transfer these out of the country, "while shunning more costly methods which would mitigate the associated environmental impacts". The case discussed here appears to support this hypothesis.

6. Discussion and Conclusion

The opportunity cost of foregoing oil-palm development across the orangutan's distribution is a major barrier to conserving many of the remaining viable orangutan populations. Where large-scale conversions involving profitmaking enterprises are involved, the private benefits that would have to be foregone to conserve large areas of orangutan habitat drive the oil-palm expansion process, such as in Borneo, where this process is most rapid. This paper has argued that the conversion of forests, including orangutan habitats, to oil palm plantations is influenced by three important factors:

1. The profit planters can obtain from oil palm
2. Public or government revenue earned from this
3. The rents that public officials and politicians can reap from allowing this conversion

These constitute the appropriated opportunity costs of conserving orangutan habitat in the face of oil-palm expansion. These prevent proper account being taken of social opportunity costs. All three factors have a direct causal relationship to the said commercial activity— oil-palm growers invest capital and wage labour, while governments, through the agency of bureaucrats and politicians, provide land for the establishment of oil-palm plantations. Naturally, (2) and (3) depend on (1), the private profitability of oil-palm plantations, which is the source of the former two financial opportunity costs. Of these, (1) has been the most investigated in the conservation literature; (2) is rarely mentioned and has not been quantified and analysed to the extent that has been done for (1); and (3) has not been squarely addressed as a major land-use-influencing opportunity cost on its own.

By distinguishing between (1) and (2), this paper examined some lower-cost opportunities for conserving orangutan habitats. While oil-palm enterprises might demand a high compensation

for not converting leased orangutan habitat that is at least equivalent to the foregone oil-palm profits, governments can in theory annul these leases under certain circumstances but may be reluctant to do so for the political reasons already mentioned. It was also shown that there are forested areas on Borneo where the orangutan is distributed but which are not under any leases. If viable orangutan habitats occur in these areas, these could be leased under PES schemes for conservation purposes from the relevant local governments at comparably affordable land-tax rates. This would be consonant with the objective of local-level governments in Indonesian Borneo of raising their own revenues for providing public services in their jurisdictions. However, evidence indicates that the bulk of local-government funding in Indonesia comes from central government allocations, and local governments would have a reduced incentive to increase their own revenues by local taxation since the central government would moderate its grants to local governments in response (Fadliya and McLeod, 2010).

When it comes to other types of government revenues, such as sales taxes in Malaysian Borneo and export taxes at the national levels in Indonesia and Malaysia, the size of these earnings does not necessarily depend on the continued physical expansion of the oil-palm cropland. Since these taxes are quantity-based rather than area-based, earnings from these sources could still be sustained or increased if palm-oil yields from existing planted lands could be raised. There are opportunities for doing this. These export revenues collected at the central government level could be shared with the relevant local governments. A possible taxation system for inducing oil-palm firms to increase yields on their plantations could be implemented. White (2007) suggests that it is legally possible for local governments in Indonesia to implement environmental taxes to induce more environmentally-responsible behaviour while also generating much-needed increased revenue for providing essential government services. An environmental tax could be charged by local governments in Indonesia or Malaysia on large oil-palm companies operating in their respective jurisdictions that are not optimising yields on their mature croplands. This will need to be combined with more direct controls such as restricting the area convertible to oil-palm. As improved yields result in a fall in earnings from this tax, increased export taxes at the national level, for example, would compensate for the lowered earnings from the environmental

tax (the success of taxes that are meant to alter behaviour can be measured by how little revenue it generates (Forstater, 2003, pp. 394-395)).[23]

This brings us to the other private opportunity cost of conservation related to institutional configurations that are not easy to surmount, and which are currently not taken into account by the usual PES approach of compensating foregone private benefits. Recall that wealthy businesses and politicians commit to one anothers' interests through patronage networks in the oil-palm sector in Indonesia. There is the view (e.g., Marcus Colchester, pers. comm., 10 Dec 2013) that as far as Indonesia is concerned, the material gains obtained by individual government decision-makers through this type of relationship is often a more important factor in swaying decisions regarding oil-palm expansion than the imperative of improving government revenue. Where this situation exists, the opportunity cost of conserving orangutan habitats and forests would be higher still. There is the belief that "conservation scenarios still need ways to offset the legal opportunity cost of companies that already obtained rights to convert forests to oil palm" (Tata et al., 2010, pp. 5-6). The question is then whether PES schemes should pay for land leases obtained through political patronage. Although the leases themselves may be legal, the process through which they were obtained need not be so. Extortionary demands could be made on PES schemes given corrupt institutional configurations, whether on the side of industry or governments. For example, unprincipled governments could threaten to release orangutan habitat to get compensation but may do it only for the compensation.

While yield levels could be improved on existing planted lands that are held by oil-palm companies both in Indonesia and Malaysia and palm-oil output increased while avoiding the clearance of forests (Wicke et al., 2011), profit-maximising private companies appear reluctant to voluntarily bear the higher costs involved in increasing yields as long as the opportunities to avoid this is available to them (the illegal procurement of more land), even if this creates negative externalities such as a reduction of orangutan populations, a loss of biodiversity and the release of carbon from the exploitation of peat forests. Without external control, these enterprises

[23] While this could be introduced by district governments to improve the generation of own-revenues where underperforming oil-palm estates exist so that the returns justify the cost of implementing such taxes, not all district governments might have enough of such a tax base. Also, given that corruption is widespread across many levels of government in Indonesia (White, 2007, p. 62), it is uncertain whether all local governments have the political will or incentive to implement this type of tax and whether profit-maximising firms will accept the consequent rise in private cost. This requires investigation.

would seek ways to continue to increase the cropland area as long as profits could be made at the expense of the environment. Lower-cost extensification over public lands is made possible by patronage politics, which corrupts the management of public resources, and is a problem that is not easy to counter. For instance, politicians receive rewards through rent-seeking activity which may not be forthcoming through the signing of PES agreements. Intervention to mitigate oil-palm expansion on orangutan habitat is likely to be made harder at the local level for this reason, as well as for other reasons that relate to coordination, as was discussed earlier. Intervention from higher administrative levels, such as the central government, may be required, as indicated by McCarthy et al. (2012a, p. 564).

In light of this, together with indirect controls such as taxes, legislation and enforcement may be needed to impose quantitative regulatory control— a capping of the amount of area that can be converted, subject to a participatory evaluation of genuine opportunity costs, which should be based on the fundamental needs of local or domestic citizens (e.g., following Max-Neef, 1992). In other words, to guard against environmental externalities, it might be necessary "to face political decisions based on evaluations arrived at outside the market under conditions of possible disagreements and lack of unanimous consent", "even if some industries may be worse off or fail to give their consent initially as was the case with regard to the aforementioned cases of legislation" (Kapp, 1974, p. 68).

A number of questions are invoked by the findings made here about business, government and political opportunity costs of conservation. Given that these opportunity costs are partly connected to the pursuit of maximising profits and economic growth (and are at odds with maintaining the remaining viable orangutan habitats), are these the most relevant opportunity costs to refer to in deciding the allocation of orangutan habitats or its broader forest ecosystem, if the aim is attain environmental sustainability and/or social equity? The issue of the fairness of the economic distribution is also intertwined with the issue of the appropriate scale of oil-palm expansion.[24] Can the conservation of orangutan populations and commercial land uses in the orangutan landscape be appraised and planned anew, with full disclosure of land-use allocations

[24] This linkage is, for example, made by Daly (2009).

plans and participatory deliberation,[25] and with reference to a more suitable set of opportunity costs, i.e., the basic needs of local populations and the nation rather than the exigency of private accumulation (Sweezy, 1989; Foster, 2005)? The questions of how such outcomes should be designed and structured, might it involve land reform, e.g., a reacquisition and reallocation of land-use rights, and the impacts on the macroeconomy, becomes important. These issues, which are related to institutional change, should be the new investigative focus of ecological economics (Lisi and Klitgaard, 2011).Looking ahead, conserving many orangutan populations will require more than just market incentives. The present examination of opportunity costsfor instance might suggest the need for regulatory controls such as land zoning. It might also suggest looking into alternative modes or methods of production that are economically fairer to local human populations (Cumbers, 2012) and which make lesser demands in terms of spatial growth and which respect socially-sanctioned ecological constraints (Swarna Nantha, forthcoming). Thus, besides the "new environmental pragmatism [which] is about recommending monetary valuation and supporting a neo-liberal market approach for environmental policy" (Spash, 2013, p. 355), the findings of this paper offers support to Spash's conviction that "deep ecological economics" analyses and approaches ought to also be on the agenda when scientists and policymakers consider ways to best fulfil economic and environmental goals in public policy.

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[25] It is claimed that the Indonesian government possesses concession maps showing which companies operate where in the forest landscape, but "does not release the most accurate information publicly" (WRI, 2013).

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Appendix: The calculation of palm-oil profits for the Malaysian case, and the spreadsheets used for this containing production costs, revenues, profits, and NPV values

Methodology

A number of steps were taken and assumptions were made in estimating the profit and net present values for the Malaysian case.

The chosen duration of the oil-palm project is from the beginning of the year 2002 to the end of 2026, following the average 25-year duration of a typical plantation project. The productivity or yield of the oil palm falls after this period, and palms are usually cleared and replanted at this point. The period 2002-2026 was chosen because precise production costs for the years beginning from 2002 were available, which was obtained from the internal publications of the Malaysian Palm Oil Board (MPOB).

The revenue stream consists of palm-oil revenues per hectare. This was calculated based on the average annual prices of palm oil from IMF statistics (IMF, 2013), and since future prices are unknown, two price scenarios were modelled, as mentioned in the notes of Table 3.1 in Chapter 3. These two price scenarios are the 10-year (2000-2009) and 5-year (2005-2009) average crude palm oil prices of US$470.10/tonne and US$599.80/tonne.

The quantity of palm oil used is the amount palm oil produced per hectare. This was calculated using yield data that was supplied to the author in documents emailed by MPOB. The average fresh fruit bunch (FFB) yield during the 25-year productive span of the oil palm was used. Fruiting begins from the third year when the oil-palm tree produces a little more than 5 tonnes per hectare. The yield is highest around the 12^{th} and 13^{th} years (more than 22 tonnes per hectare). Finally, the yield declines to about 18 tonnes per hectare on the 25^{th} year (see spreadsheet below). The average FFB yield for the typical Malaysian plantation is between 18 and 19 tonnes per hectare per year. Multiplying the oil palm extraction rate of 19.30% to the FFB gives the quantity of crude palm oil yield per hectare for each year.

In the cost stream are two types of costs, the cost of establishing oil palm on a hectare of land, and the annual cost of producing palm oil from the cropland (e.g., growing and harvesting costs). The upfront cost of establishment tends to be large. Here it is assumed to have been offset by the sale of the timber clearfelled from the forest plot chosen for development; timber profits are obtained from Tay et al. (2002) (RM7,715), and Wahid and Simeh (2009, p. 7) provide establishment costs on normal to deep peat soils in Malaysia from a 2007 source, which amounts to an average value of RM6,956 when adjusted for the year 2002 (based on the Malaysian average inflation rate of 2.44% between 2002 and 2009). Then, the usual production costs related to maintaining the oil-palm plantation and harvesting it are used for each year beginning year 1. These yearly production cost is based on the production cost data for the years 2002 to 2006 obtained from the MPOB. The production costs for the subsequent years are assumed to increase at the same rate as the increase in production cost between 2002 and 2006.

The following pages of this Appendix show the calculation tables used in *Microsoft Excel 2007* to calculate the annual profits and NPVs for the Malaysian case.

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Per-hectare revenue, production cost, profit and NPV for crude palm oil production in a typical Malaysian palm oil estate over a project period of 25 years (i.e., from the establishment of a plantation till the end of the economic life-span of an oil palm). Profits are pre-tax.

Period	Year	Stage	Production cost (US$/ha)[a,b]	CPO price (US$/T)[c]	FFB yield (T/ha)[d]	Average annual OER (%)[e]	CPO Yield (T/ha) (FFB x OER) (T/ha)[f]	Revenue (US$/ha)	Profit (US$/ha)	Cumulative profit (US$/ha)	NPV calculations (US$/ha)
1	2002	Project begins	664.17	356.74	0	0	0	0.00	-664.17	-664.17	
2	2003		768.06	410.37	0	0	0	0.00	-768.06	-1,432.22	Discount rate:
3	2004	Production starts	726.99	434.72	5.25	19.30	1.01	440.48	-286.51	-1,718.73	0.05
4	2005		711.12	367.69	9.70	19.30	1.87	688.35	-22.77	-1,741.51	
5	2006		761.11	416.81	14.18	19.30	2.74	1,140.71	379.60	-1,361.91	NPV (cost):
6	2007		805.73	719.12	17.21	19.30	3.32	2,388.59	1,582.86	220.95	14,588.88
7	2008		852.16	862.91	19.45	19.30	3.75	3,239.23	2,387.08	2,608.03	
8	2009		898.59	632.7	21.58	19.30	4.16	2,635.16	1,736.57	4,344.60	NPV (revenue):
9	2010		945.01	470.10	22.16	19.30	4.28	2,010.56	1,065.55	5,410.15	22,394.60
10	2011		991.44	470.10	22.4	19.30	4.32	2,032.34	1,040.89	6,451.05	
11	2012	Peak harvest (peak palm productivity)	1,037.87	470.10	22.51	19.30	4.34	2,042.32	1,004.45	7,455.49	Net NPV
12	2013		1,084.30	470.10	22.85	19.30	4.41	2,073.16	988.87	8,444.36	(NPV revenue - NPV cost):
13	2014		1,130.73	470.10	23.28	19.30	4.49	2,112.18	981.45	9,425.81	*7,805.72*
14	2015		1,177.15	470.10	22.02	19.30	4.25	1,997.86	820.70	10,246.51	
15	2016		1,223.58	470.10	21.53	19.30	4.16	1,953.40	729.82	10,976.33	
16	2017		1,270.01	470.10	21.17	19.30	4.09	1,920.74	650.73	11,627.06	
17	2018		1,316.44	470.10	20.97	19.30	4.05	1,902.59	586.15	12,213.22	
18	2019		1,362.87	470.10	19.76	19.30	3.81	1,792.81	429.94	12,643.16	
19	2020		1,409.30	470.10	20.17	19.30	3.89	1,830.01	420.71	13,063.87	
20	2021		1,455.72	470.10	20.67	19.30	3.99	1,875.37	419.65	13,483.52	
21	2022		1,502.15	470.10	20.31	19.30	3.92	1,842.71	340.56	13,824.08	
22	2023		1,548.58	470.10	19.67	19.30	3.80	1,784.65	236.06	14,060.15	
23	2024		1,595.01	470.10	19.36	19.30	3.74	1,756.52	161.51	14,221.66	
24	2025		1,641.44	470.10	18.19	19.30	3.51	1,650.37	8.93	14,230.58	
25	2026	Project ends	1,687.87	470.10	18.06	19.30	3.49	1,638.57	-49.29	14,181.29	
	Total		*28,567.39*					*42,748.68*		*14,181.29*	

Note: Bolded data are data from the sources mentioned below; the rest are calculated values

[a] Cost data was obtained via e-mail correspondence with the Malaysian Palm Oil Board (MPOB).
These were in Malaysian Ringgit (at current prices) but have been converted here to US$ (US$1 = RM3.38, as of 30 November 2009)

[b] Costs for periods 1 to 3 are taken from 'Cost at immature stage' column, and all other cost figures that follow are from the 'Cost at mature stage' column

[c] Prices fixed at a base year of 2005. From IMF. 2008. Primary commodity prices. Available from: http://www.imf.org/external/np/res/commod/index.asp

[d] The normal yield profile for an average palm oil project in Malaysia lasting 25 years is used (information procured via email contact with the statistical division of the MPOB)

[e] The average OER for the years 1995 to 2006; obtained from MPOB's online database (http://161.142.157.5/v1/input.asp?pid=prd)

[f] CPO yield before the yield at peak harvest (between period 4 and 7) have been adjusted to increase linearly from zero to the peak harvest yield

Assumptions:

1. The sale of timber that would be clear-felled from the area to be developed is assumed to have covered the upfront cost of establishing the plantation.
2. Average CPO market price for the period 1998-2008 (the last ten years) is assumed for all future periods of the project.
For sensitivity analysis of the IRR (see below), the average CPO price for 2003-2008 (last five years) is used.
For price trend in the last four years, see http://econ.mpob.gov.my/upk/daily/bh_day08.gif))
3. Establishment/production costs per hectare are assumed to rise into the future at the same average rate
as it has risen between 1995 and 2006 (available data set for production costs).
4. Taxes and levies are not included in the model.

Summary:	In US$/ha/yr	In RM/ha/yr
Average annual revenue per hectare:	1709.95	5779.62
Average annual cost per hectare:	1142.70	3862.31
Average annual profit per hectare:	567.25	1917.31

IRR

	CPO average price	IRR	Average annual profit per hectare (US$/ha/yr)
IRR Calculation for 10 year average price case:	470.10	35%	593.7
IRR Calculation for 5 year average price case:	599.80	36%	949.2
IRR Calculation for average 2008 price case:	862.90	40%	1670.4

Cost and price data

Period	Year	Cost (RM/ha) Immature stage	Cost (RM/ha) Mature stage	CPO price (US$/T)
	1995	**608.41**	**597.72**	**537.62**
	1996	**655.32**	**653.76**	**467.15**
	1997	**608.41**	**615.05**	**490.43**
	1998	**723.85**	**649.97**	**600.85**
	1999	**703.23**	**681.11**	**377.28**
	2000	**667.61**	**657.12**	**261.14**
	2001	**638.99**	**537.42**	**238.40**
1	2002	**695.01**	**600.65**	**356.74**
2	2003	**803.73**	**649.92**	**410.37**
3	2004	**760.75**	**695.80**	**434.72**
4	2005	**796.16**	**744.14**	**367.69**
5	2006	**935.76**	**796.46**	**416.81**
	2007			**719.12**
	2008			**862.91**
	2009			**632.7**

Average CPO prices last 10 years:	US$/T	470.1
Average CPO price for last 5 years:	US$/T	599.8
Average price for 2008 when record prices were se	US$/T	862.9

Oil extraction rate (OER, %), fresh fruit bunch (FFB, tonnes/ha), CPO yield (tonnes/ha/yr)

OER:		CPO Yield:	
Average (1995-2006):		Average (2002-2006):	
19.30		3.75	
		Average (1991-2006):	
FFB:		3.58	
Average (1995-2006):			
18.64		(Source: MPOB)	
Year	OER	FFB	CPO yield
1995	**18.93**	**18.51**	3.50
1996	**18.95**	**18.71**	3.55
1997	**19.10**	**19.03**	3.63
1998	**15.98**	**18.92**	3.02
1999	**19.26**	**18.60**	3.58
2000	**18.33**	**18.86**	3.46
2001	**19.14**	**19.21**	3.68
2002	**17.97**	**19.90**	3.58
2003	**18.99**	**19.74**	3.75
2004	**18.60**	**20.00**	3.72
2005	**18.88**	**20.15**	3.81
2006	**19.60**	**20.00**	3.92

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