



The impacts of oil palm plantations on forests and people in Papua

A case study from Boven Digoel District

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Photo by Agus Andrianto/CIFOR.
Worker at oil palm plantation. Papua, Indonesia.

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1 Introduction

In 2010, Indonesia was estimated to have 7.8 million ha of oil palm plantations, making it the largest oil palm grower in the world. From these plantations, the country produced an estimated 27 million tons of crude palm oil in 2012 (USDA 2012). The expansion of oil palm plantations in Indonesia has been driven by rising global demand for vegetable oils. Palm oil imports by China, India and the European Union countries have increased from 15 million tons to 19.7 million during 2007–2012. Global imports of palm oil increased from 30.5 million tons to 39.4 million during the same period (Rosillo-Calle et al. 2009; USDA 2012). Driven by population growth and increased demand, palm oil consumption is predicted to be around 77.2 million tons by 2050 (FAO 2006), a 265% increase from the 2000 figure (Kruse 2010).

While making a significant contribution to national economies, the expansion of oil palm plantations is a cause for environmental concern. Gibbs et al. (2010) show that during 1980–2000 nearly 60% of new agricultural land in Southeast Asia came at the expense of intact forests. Koh et al. (2011) highlight the adverse impact of oil palm expansion on biodiversity and carbon emissions in Southeast Asia. While these two studies use data from long-established oil palm plantations in Sumatra and Kalimantan, it is not clear whether this impact pattern is true of new expansion regions such as Papua. In particular, little information is available on how plantation development is planned and managed in the key forest regions remaining in Indonesia (Manurung 2001; Development Alternatives 2009; personal communication with Papua Province Bureau for Plantation Estates, 2011).

Interest in investing in oil palm plantations in Papua has been slow to develop, but in 2008 it was on the rise. In 2012, applications for plantation investment totaled 1.5 million ha, with preliminary proposals for another 2 million ha (Obidzinski et al. 2012). In Boven Digoel District, about 200,000 ha is earmarked for allocation to five oil palm plantation companies (Jakarta Updates 2011).

Drawing on findings from field research in Boven Digoel District, this paper examines the key issues associated with oil palm plantation development in Papua. Specifically, the paper analyses the social, economic and environmental impacts of plantation development. The paper first reviews oil palm development in Papua. Subsequently, it provides background information on the research sites and

methods applied. The paper then presents findings and discusses land acquisition processes and impacts associated with oil palm plantations. In the final part, the paper summarizes findings and identifies options for policy makers to improve the governance of oil palm development in forest frontier Papua.

2 Oil palm plantation development in Papua

As lands for plantations in Sumatra and Kalimantan became scarce, Papua has emerged as the leading candidate to accommodate oil palm expansion (Suebu 2009). Oil palm estates have been slow to develop in Papua, which is administratively divided into two provinces, Papua and West Papua. In 2007, Papua Province had an oil palm estate area of 29,736 ha spread throughout the districts of Jayapura, Keerom and Merauke; and West Papua had 31,374 ha in the districts of Manokwari and Teluk Bintuni (Dinas Kehutanan Provinsi Papua 2007).

Table 1. Oil palm development in Papua Province 1985–2010.

Company	Plantation location	Concession area (ha)	Productive plantation developed (ha)
Sumber Indah Perkasa	Lereh, Jayapura	6,510	3,755
Sinar Kencana Inti Perkasa	Lereh, Jayapura	15,544	10,189
Perkebunan Negara II Arso	Arso, Keerom	57,000	Not reported
Paloway Abadi	Arso, Keerom	5,000	200
Sakti Persada Nusa Permai	Arso, Keerom	1,000	200
Purni Papua Perkasa Raya	Skamto, Keerom	5,500	200
Korino Raya	Skamto, Keerom	5,500	200
Bumi Irian Perkasa	Skamto, Keerom	5,500	200
Tunas Sawa Erna	Boven Digoel	14,500	8,700
Total		116,054	23,644

Source: Interview with staff of the Papua Province Estate Crops Service Office, April 2010.

By 2010, concession areas granted to oil palm companies in Papua Province had increased to about 143,000 ha (Table 1). In the same year, in West Papua Province, around 13,850 ha and 32,546 ha of new oil palm plantations had been established in Manokwari District and Sorong District, respectively. In 2010, six companies in this province submitted applications and secured recommendations from the governor to expand estates on a total area of 208,668 ha in the four districts of Teluk Bintuni, Maybrat, Sorong and South Sorong (Dinas Kehutanan dan Perkebunan Provinsi Papua Barat 2011). High investment costs and difficulties with the acquisition of land from local communities have been cited as the main problems limiting the growth of plantation development (Development Alternatives 2009; GRM International 2009).

In order to support investment in the oil palm sector and speed up its development, the Papua provincial government has taken steps to simplify the application process for concession licenses through the one-stop service system. Following the introduction of these incentives, in late 2010, 25 companies applied for new oil palm concessions, covering 1.5 million ha in Papua Province. Another 2 million ha of plantation proposals were at the initial stages of review by the provincial government.¹

3 Research sites

3.1 Boven Digoel District

Boven Digoel District was formerly part of Merauke District in Papua Province and was established as a separate district in 2002. The district covers 26,838,800 ha. Before it was subdivided, in 2000, Merauke district government allocated 460,000 ha for plantations, mostly comprising forested areas, intended for 12 companies. However, of the 12 companies, only Tunas Sawa Erma (TSE) established plantations and continues to operate in 2013. The other companies have not yet begun operations, even though the Ministry of Forestry granted them permission to use the convertible production forests.

The 2010 census put the total population of Boven Digoel District at 55,822 (BPS Boven Digoel 2011). Since 2008, Boven Digoel has been divided into 20 administrative subdistricts, with 112 villages. Jair

¹ Interview with staff of the Papua Province Estate Crops Service Office, April 2010.

Table 2. Forest areas and other land uses in Boven Digoel District in 2009.

Land use	Area (ha)	Remarks
Nature reserves, conservation areas	2,859	
Protection forest	50,031	
Production forest	1,580,049	About 1,675,650 ha of these three types of forest land use have been allocated to seven natural forest concessionaires. Only two concession companies, with access to an area of 707,450 ha are active. The two forest concession companies belong to the Korindo Group, the same group as Tunas Sawa Erma (TSE).
Limited production forest	23,181	
Convertible production forest	847,633	
Areas for nonforestry purposes	36,968	By 2009, all 34,000 ha of oil palm plantations controlled by TSE were of this forest land use type.
Total	2,540,721	

Source: Dinas Kehutanan Boven Digoel (2009).

Subdistrict, where the TSE plantation is located, covers 5732 km², and had a population of 19,922 in 2010.

At the time of the research in 2010, the district had yet to develop a definitive land use plan for Jair, Subur and Ujung Kia subdistricts. Therefore, spatial policies still refer to the Ministry of Forestry's Designation of Forestlands and Coastal Areas. The extent of forest area and land for other uses in Boven Digoel District is set out in Table 2.

Boven Digoel is well known for its rich forest resources and biodiversity, of both flora and fauna (Conservation International 1999; Bappenas 2003).² More than 90% of the district's indigenous people live in villages (BPS Boven Digoel 2010). They

² A 1999 survey conducted by Conservation International found 164 species of mammal, 330 reptiles and amphibians, 650 birds, 250 freshwater fish, 1,200 marine fish and 150,000 insects.

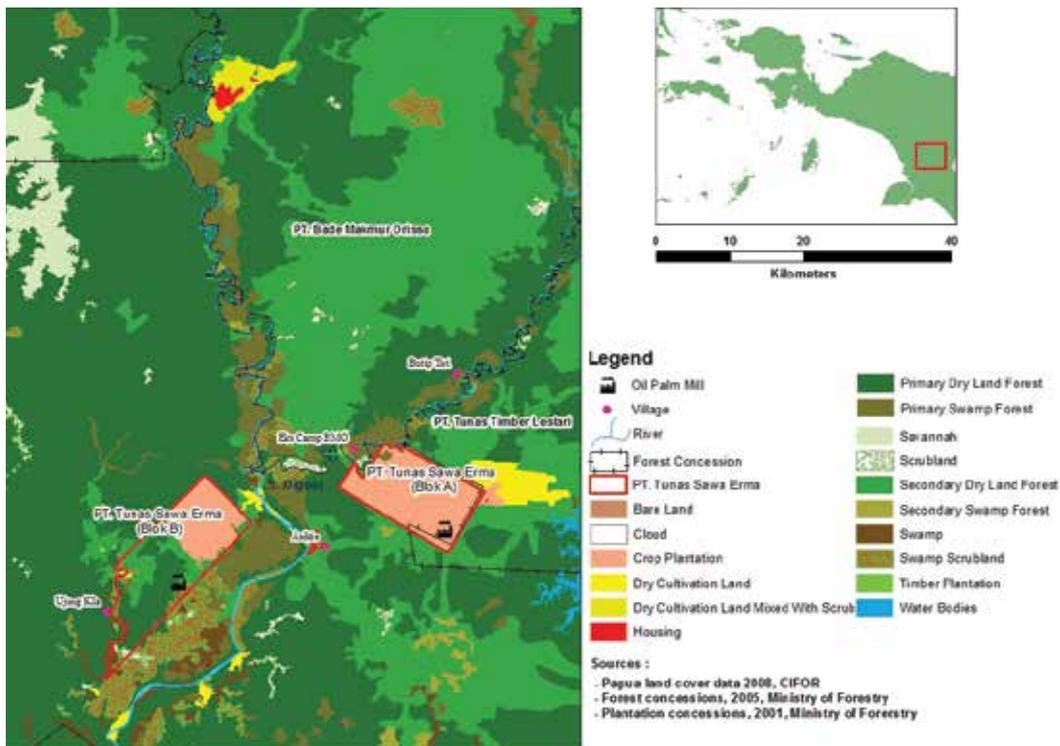


Figure 1. Research site around the Tunas Sawa Erma oil palm plantation in Boven Digoel District, Papua Province.

make a living from hunting and collecting forest products, and have recently begun farming and gardening. The district has 2044 smallholder farmers, with plantations covering 1531 ha; the main crop in smallholder plantations is rubber. According to Dinas Kehutanan Boven Digoel (2009), production, limited production and convertible production forests covering 1.68 million ha have been initially allocated to seven forest concessionaires, but only two forest concessionaires are active, operating over 707,450 ha.

3.2 Tunas Sawa Erma and surrounding communities

TSE is a subsidiary of the Korindo Group, which started its oil palm plantation business in 1998 in Boven Digoel District. The site of the TSE oil palm plantation was included in what had previously been a natural forest concession managed by the same company. TSE started logging operations in 1993, covering an area of 244,000 ha (Korindo 2012). The company chose not to create a new entity to develop the plantation for reasons of efficiency and convenience (interview with TSE staff, April 2010).

The TSE oil palm plantation, where research was conducted, is located close to a selective logging concession and some villages (Figure 1).

The company's oil palm plantations span three administrative areas: (i) Butiptiri Village, Jair Subdistrict; (ii) Getentiri Village, Jair Subdistrict; and (iii) Ujung Kia Village, Kia Subdistrict. The lands around Getentiri and beyond have long been considered suitable for tree crops such as oil palm (Lavalin International 1987).

The plantation consists of two estates: (i) Palm Oil Project (POP) A in Butiptiri Village, and (ii) POP B in Getentiri Village. POP A is located west of the Digoel River and south of the Uwim Merah River (Kali Kouh). According to the plantation permit, the POP A estate covers 14,783 ha, administratively located in Butiptiri Village in Jair Subdistrict. Two other villages close to POP A are Asiki and Bade Makmur Orisa Villages, which was formerly the logging concession company camp. The POP B estate is located east of the Digoel River. According to the plantation permit issued by the Ministry of Forestry, POP B estate covers 19,486 ha.³ Administratively, this estate is located in Getentiri Village, Jair Subdistrict, and Ujung Kia Village, Kia Subdistrict. In total, the company controls 34,270 ha of land for oil palm plantations.

³ See the Ministry of Forestry Ministerial Decree No. 171/Kpts-II/1998 on Conversion of Forestland.

4 Research methods

This research draws on both primary and secondary data. Secondary data include official information from government agencies, corporate reports and public documents related to historical and statistical data on forest resources and plantation development, legal frameworks for investment and land acquisition processes and company licenses. Primary data were collected using Landsat satellite imagery analyses, household surveys, focus group discussions and key informant interviews. Household surveys examined individual perceptions of social, economic and environmental impacts of oil palm plantations.

For the purposes of the survey, the population was divided into three groups, based on their involvement in oil palm plantation operations: (i) workers (permanent staff and contract workers); (ii) customary landowners; and (iii) the wider public (those who do not belong to either of the previous groups). Respondents in each group in the household survey were selected using a snowball sampling method. Respondents in the employee group included workers from each division in the company's estates,⁴ POP A and POP B, with corresponding samples from each estate, taking into account the type and duration of work, ethnicity and gender. Team leaders and team members were selected as respondents based on consultations with staff in the company's planning division.

Respondents in the landowner group were selected from every clan whose customary lands had been converted into oil palm plantations (see Box 1). These customary owners live in Butiptiri, Ujung Kia, Asiki and Getentiri Villages.

Respondents in the public group included migrants to and natives of Butiptiri, Asiki and Getentiri Villages whose lands had not been affected by the oil palm project. Respondents in this group also included people living in Ujung Kia Village, where land had been earmarked for the expansion of oil palm plantations in POP B. Respondents were selected based on group landownership, occupation and gender.

After the household surveys had been completed, focus group discussions were conducted for each group (employees, landowners and the public). The aim of the focus group discussions was to

Box 1. Approach to selecting respondents amongst customary landowners.

Obtaining accurate information from customary landowners about the conversion of communal lands to plantations required a cautious approach because of the sensitivity of the topic. The first necessary step was to meet with customary leaders and village heads to explain the purpose and objectives of the survey. Once the leaders had understood the explanation and accepted the project, the village head explained it to the landowners and asked them if they would be willing to engage in interviews. Failure to go through this stage is considered a violation of customary laws and may be subject to customary penalties.

After the landowners had agreed to participate, we could then explain the purpose of the survey in detail and reach an agreement about the individuals who would be selected from various clans as respondents. We also needed to agree on when the interviews would take place. Respondents included those clan members who know about the communal lands and had been appointed to represent the clan. Other clan members also attended the interviews, as they wished to listen and provide corrections and additional information.

collect information to complement the survey data, particularly in relation to the history and processes of land acquisition, and to gather participants' assessments of the impacts of the plantations. Participants in the focus group discussions were drawn from respondents to the household survey, as they were the most knowledgeable about the history of the plantations.

To obtain further information, we conducted in-depth interviews with staff and senior staff from TSE management, subdistrict government officials, district government officials, nongovernment organizations, the police and the Catholic Church. To complement the data and clarify some findings, we held a meeting in Tanah Merah with representatives from various institutions such as the District Forestry and Agriculture Services, the regional planning and development agency (Bappeda) and TSE.

To assess the impacts of oil palm plantations on forest cover change, geographic information system (GIS) analysis was used to interpret Landsat images taken in 2000, 2005 and 2008. The images illustrate the site before plantation operations, plantation projects

⁴ A division comprises several blocks, in which the head of the division organizes and leads activities.

at the mid-point in their life cycle, and the most recent period available. Ground truthing surveys were partly made in conjunction with the household surveys to collect further information about the forest conditions and plantation development.

5 Research findings

5.1 The legal and institutional framework for land acquisition and oil palm development investments

TSE started its plantation development project in 1995 and has experienced several changes in policies governing oil palm development investment and land acquisitions over the years. In the initial steps, to acquire lands and licenses, the company was guided by Law No. 12/1992 on Plant Cultivation Systems and Law No. 1/1967 on Foreign Investment. The Minister of Agriculture's Decree No. 786/Kpts/KB.120/1996 on Estate Crops Business Licenses, further operationalizes Law No. 12/1992, which stipulates that plantation business licenses be issued by the Minister of Agriculture and remain valid as long as the company is in operation. Before the license is issued, the decree requires the company to have a deed of company establishment, a work plan for the plantation business, a location permit from the district head and a recommendation letter from the governor. In order to get a permanent plantation business license, the company must secure business use rights and approved environmental impact assessment (EIA) documents.

TSE is subject to government policies limiting the size of lands controlled by a single company or a group of companies, aimed at promoting the efficient use of land and providing greater opportunities to prospective investors. The National Land Agency established a maximum area for estate crops plantations of 20,000 ha per province or 100,000 ha throughout Indonesia.⁵ However, a special provision in the ministerial instruction states that the maximum size of plantation investment in Papua may be doubled. Thus, TSE is eligible to obtain a plantation area up to 40,000 ha in this province, or 200,000 ha if held in combination with other companies or in other provinces.

To begin the process of land acquisition, investors need to secure a location permit issued by the district head or governor, depending on the location of the proposed area.⁶ The location permit is intended to provide investors with guidance so that the proposed land use is in line with public interests, prevailing spatial land policies and land suitability. The location permit is required by investors acquiring land of more than 25 ha. The location permit is valid for 2 years for an area of 25–50 ha, and 3 years for areas over 50 ha. It authorizes an investor to acquire via purchase or lease from local landowners, who in return are entitled to negotiated compensation. A location permit may be issued if district authorities deem the investor eligible to acquire land and the proposed location is classified as suitable for the intended crops. These considerations are based on meetings with various institutions and stakeholder consultations, which take place before the permit is issued. Landowners, especially, should be informed of the investment plan, likely impacts and how the land acquisition will take place. During these consultations, the parties involved negotiate the forms and levels of compensation that should be provided to landowners.

The State Minister for Agriculture's Decree No. 21/1994 on the Procedure for Land Acquisition in the Framework for Investment states that compensation should be paid to those holding the right to transferred land, the amount of which should be based on negotiation and agreement of both parties. Once the compensation has been provided, landowners should sign a land transfer statement, witnessed by relevant parties, including authorities from the national land agency.

In 1999, 4 years after TSE began operations, the Minister of Forestry and Estate Crops issued a new decree⁷ requiring oil palm plantation developers to acquire a business use permit within 3 years of obtaining the plantation business license, and to ensure there was no burning during land preparation. TSE is also subject to government policy requiring plantation companies to establish partnerships with local business enterprises.⁸

⁵ The Head of the National Land Agency's Instruction No. 5/1998 on the Granting of Location Permits to Regulate Large-scale Land Acquisitions.

⁶ The State Minister for Agriculture's Regulation No. 2/1999 on Location Permits.

⁷ The Minister of Forestry and Estate Crops' Decree No. 107/Kpts-II/1999 and No. 645/Kpts-II/1999 on Estate Crops Business Licenses.

⁸ See Article 3 of Government Regulation No. 44/1997 on Partnerships.

In 2002, as Indonesia's 1999 decentralization law took effect, the Minister of Agriculture issued a new decree on estate crops business licenses.⁹ The revised decree highlights the role of the governor and district head, who are authorized to issue plantation business licenses for areas located either across districts or within the district, respectively. It also requires an oil palm plantation company to engage local farmers in developing the estates through various schemes. In addition to the requirements stipulated in earlier decrees, the revised decree also requires the company to secure approval from the Ministry of Forestry if the proposed plantation is located in the state forestland zone known as 'conversion production forest.'¹⁰ The company's plan for development of the estate should also be set out in a written statement in a notary deed.

Finally, TSE's operation is subject to another decree on plantation business licenses issued by the Ministry of Agriculture in 2007, when the company was in the midst of establishing the estate in one block and acquiring land for further expansion. The 2007 decree requires oil palm plantation companies to allocate at least 20% of the total plantation area to local communities. This can be done by providing credit, financial grants or through benefit sharing. The plantation allocated to communities may be established in conjunction with the company's own estates.¹¹

The decree also further reinforces the company's obligation to implement EIA, to exclude the use of fire in land preparation and to establish partnerships with local communities. The EIA regional commission (*Komisi Amdal Daerah*) will assess, coordinate and approve the EIA documents. Selected government institutions and other stakeholders, including representatives of local communities, form part of the commission. Although TSE started

9 The Minister of Agriculture's Decree No. 357/Kpts/HK.350/5/2002 on Guidelines for Estate Crops Business Licenses, issued on 23 May 2002.

10 Law No. 41/1999 on Forestry indicates that forests may be converted for nonforestry purposes such as plantations, transmigration and agricultural settlements under certain conditions. Government Regulation No. 10/2010 on the Procedure for Changing Forest Status and Functions, states that forests can be converted to accommodate development needs, while ensuring that the remaining forest cover is sufficient. It further stipulates that forest conversion can only take place in convertible production forestlands, regardless of whether the lands are forested or nonforested (Article 19).

11 Article 11 of Minister of Agriculture Regulation No. 26/Permentan/OT.140/2/2007 concerning guidelines for estate crops business licenses.

operations in 1995, it only had its EIA document approved by the Governor of Papua in May 1998. The approved document included the company's environmental impact assessment, management and monitoring plans for the plantation, and for the processing mill.¹²

The Papua Special Autonomy Law, issued in 2001, further regulates how investors operate in this province. The law highlights the need for investors to create opportunities for local communities to engage in plantation operations and to recognize and respect customary land rights. Oil palm investors are further required to offer employment to local communities. The Papua Special Autonomy Law also stipulates that development activities must take into account sustainability and conservation principles, protecting biodiversity and important ecological processes.¹³ The governor emphasizes that investors wishing to develop oil palm plantations in Papua should set aside high-conservation value forests and develop a plan to maintain them — although little further detail is provided on this.

Papua Province Special Regulation No. 23/2008 on the Communal and Individual Rights of Customary Communities over Lands requires the securing of local consent for plantation investments and other large-scale development projects. It recognizes the existence of customary communities, as long as they are functioning social units where customary law is in effect and traditional social structure is maintained.

The Governor of Papua's Decree No. 50/2001 provides the legal basis for customary landowners to obtain compensation. Compensation is paid by the company for forest degradation and loss of forest resources. Based on this decree, compensation must be paid on timber harvested from customary lands at the rate of IDR 25,000 (USD 2.8) per cubic meter for Merbau timber species and IDR 10,000 (USD 1.1) per cubic meter for other timber species. The Governor of Papua's Decree No. 184/2004 increased the amount of compensation to IDR 50,000 (USD 5.6) per cubic meter for Merbau, while the fee for other timber species remains the same.

12 Papua Governor's Letter of Agreement No. 17/ANDAL/RKL,RPL/BA/V/1998 confirming the approval of the company's environmental impact assessment for oil palm plantation development, using a transmigration model or PIR-Trans, and for processing plants.

13 Article 63 of the Papua Special Autonomy Law No. 21/2001.

5.2 How have land acquisition and oil palm plantation development taken place?

According to the work plan and approved EIA, TSE had originally planned to establish an oil palm plantation through a scheme called PIR-Trans (Dinas Kehutanan Provinsi Papua 2007). The PIR scheme involves the development of plantations in newly opened areas using a large plantation as the 'nucleus,' which aids and guides the surrounding smallholder plantations (the 'plasma') in a single, mutually beneficial system. The Soeharto government introduced PIR-Trans with the aim of increasing non-oil production, enhancing farmer's incomes, assisting regional development and facilitating transmigration programs.¹⁴ Under the PIR-Trans scheme, a private company takes responsibility as the nucleus, rather than a state-owned plantation company (Badrun 2011). TSE, however, failed to establish the plantation through the PIR-Trans scheme, as the local population rejected the transmigration program. The company then developed the plantation independently of this scheme.¹⁵

TSE originally proposed to establish an oil palm plantation of over 70,000 ha (Wakker 2001). The request for such a large area was possible at the time, since no regulation had yet been issued to control the size of plantations. As the proposed area for plantation was located in state forestland, it took 2 years for the company to get an in-principle permit from the Ministry of Forestry, issued on 6 February 1997.¹⁶ A year later (27 February 1998) the company obtained a forestland release approval from the Minister of Forestry covering only 34,270 ha of forestland (Dinas Kehutanan Provinsi Papua 2006). The minister took the decision after a series of consultations and boundary establishment.¹⁷ The size of the approved area happened to coincide with the maximum area for plantations as regulated by the Head of National Land Agency's Instruction No. 5/1998, which was issued in October 1998.

14 PIR-Trans is based on Presidential Instruction No. 1/1986 on Estate Crop Establishment through the People's Core Plantation Scheme Linked with Transmigration Programs, issued in March 1986.

15 Interviews with staff of Papua Provincial Forestry Service, the head of Boven Digoel District Forestry Service, Head of Boven Digoel District Agriculture Office and with TSE staff.

16 An in-principle permit is a form of preliminary approval granted by the Ministry of Forestry for the conversion of forestlands for nonforestry development.

17 Interviews with staff of the Boven Digoel District Forestry Service, March 2010.

They proceeded to develop the plantation in two phases. The first phase, in POP A estate, began in 1997 with an area of 14,783 ha. The second phase, in POP B estate, began in 2006, with an area of 19,486 ha. What follows are descriptions of the landowners' responses to the land acquisition processes on the two estates, informed by our survey conducted in March 2010.

5.2.1 Land acquisition for POP A estate

Landowners reported that little information was made available to them regarding the acquisition of land for POP A.¹⁸ The approval of some landowners had not even been sought, particularly those living in Papua New Guinea. The landowner leaders and community members knew only that a natural forest concession company, TSE, had begun clearing the forest on the site of the current oil palm plantation in 1993. The clearing stretched from Camp 3¹⁹ to the current boundary of the oil palm plantation. It was also reported that some forests were cleared in 1995, and some of the landowners became involved as members of the logging survey team.

Landowners and other community members also reported being aware that in 1997, the head of Butiptiri Village was invited to Merauke several times to obtain advice from the Merauke district head about the company's offer. The district head reportedly asked him to persuade the landowners to release their land. However, on returning to the village, the village head admitted that he had not received clear information about the company's plans or the proposed compensation. Although the owners of customary lands were not satisfied with the information they got from the village head, they did not dare to inquire further nor complain to the company. The people said they became afraid to discuss the land issue after a military post was established in Butiptiri Village a few months later.²⁰

18 A focus group discussion was held on 27–28 March 2010 attended by owners of customary lands in POP A and POP B estates, village heads and officials from subdistrict government institutions, including the Forestry and Agriculture Service. The outcome of the discussion was also verified with senior TSE staff who are familiar with land acquisition processes.

19 Camp 3 refers to a location at km 3 that was formerly the TSE basecamp.

20 The presence of military posts around the company's concession, which raised fear among local communities, has also been described by Fatubun (2011). A local NGO named Sekretariat Keadilan dan Perdamaian (SKP) Merauke found that in November 2008, 12 military posts were in place around the concession.

Similarly, the head of Jair Subdistrict was known to have gone to Merauke at the request of the district head. Following that visit, the villagers observed that a team from the District Forestry Service and Ministry of Forestry conducted field measurements and several owners were called to Merauke to provide their fingerprints for a document they did not read. This may have been part of the process of submitting a statement confirming the surrender or release of the customary land for commercial enterprise.²¹

The local government of Merauke and the company identified five clans owning customary land in this area, covering 14,000 ha. The clans received compensation from the company in the amount of IDR 1 billion (USD 100,000). The communities later argued the money paid to them was not compensation for the land, but merely a fee for asking permission. A monthly disbursement of funds from the compensation deposit may be made upon the signing of three parties: the village head, subdistrict head and the company.²² At first, the five clans withdrew cash from the bank account each month, but they soon discovered that the village head had been withdrawing money illegally for his own interests. Consequently, the remaining funds were divided equally among the five clans on 22 July 2007.²³

5.2.2 Land acquisition for POP B estate

The company began working in POP B estate in 2005. At this stage, the Papua Special Autonomy Law had come into effect and the new district of Boven Digoel had been created out of the original Merauke District. This required the company to take a different approach to engage communities in the land acquisition process. The company approached villagers in Getentiri and Ujung Kia and identified the clans that owned the lands in the plantation development site. The Auyu Jair tribe is the customary owner in both villages. In Getentiri Village, the tribe is made up of 11 clans with traditional lands covering more than 7000 ha. In Ujung Kia Village, 25 clans own more than 12,000 ha.

Initially, the people in Getentiri responded positively to the company's investment plan for POP B estate. The villagers and district officials expressed their hope that the investment would transform the

'old cemetery'²⁴ into a vibrant district capital. In responding to the proposed investment, 11 clans held a group meeting,²⁵ as well as a meeting with the company's public relations department. As a follow-up to the meetings, company employees came to the village on 23 January 2005 with equipment to construct a log pond.²⁶

On 10 and 11 August 2005, the landowners held a meeting to finalize and submit their terms and conditions to the company in relation to the use of their communal lands for oil palm plantations. On 25 August 2005, a ceremony called *Upacara Derma Adat* was held in Getentiri to officially establish the oil palm plantation. During this event, the landowners read out their conditions. A TSE senior manager confirmed the company had received the people's statement and would provide compensation for the forgone timber and other forest products due to forest clearance. He also stated the company would provide other benefits as well once the plantation was fully established and generating profit. The customary landowners accepted these terms (Photograph 1).

Once the land in POP B estate had been cleared (Photograph 2), the company applied for a business use permit from the National Land Agency. As one of the requirements for the application, the company submitted a document showing the customary landowners' agreement on the transfer of land to the company, signed by the company, landowners, local police chief and local military commander.²⁷ The landowners state they were not fully aware they were signing a land transfer agreement. Rather, they thought it was a land lease agreement. It is not entirely clear how such a misunderstanding might have arisen. By March 2010, the POP B oil palm plantation covered over 7600 ha, in five divisions.

24 The phrase used by the head of the village to describe Getentiri.

25 Because the land is owned by clans, any decisions are made collectively.

26 The log pond, located beside the Digoel River, was planned to store the timber harvested during clearance of the POP B estate. The timber would then be transported to the Korindo plywood mill in Asiki. Later, the log pond was used as a port, where pontoon boats transport trucks containing oil palm fruit harvested from the POP B estate to the oil palm mill in POP A estate.

27 The title of the document is 'Surat perjanjian bersama pelepasan hak ulayat atas tanah adat Marga Misa pada areal pembangunan perkebunan kelapa sawit Blok B PT Tunawa Sawaerma di Kampung Getentiri' [A letter of agreement on the transfer of Misa Clan's customary rights over land located in Block B of TSE's oil palm plantation area], signed 23 May 2007.

21 National Land Agency Decree No. 21/1994.

22 Interviews with the TSE company director and customary landowners, March 2010.

23 Interviews with heads of the clans, March 2010.

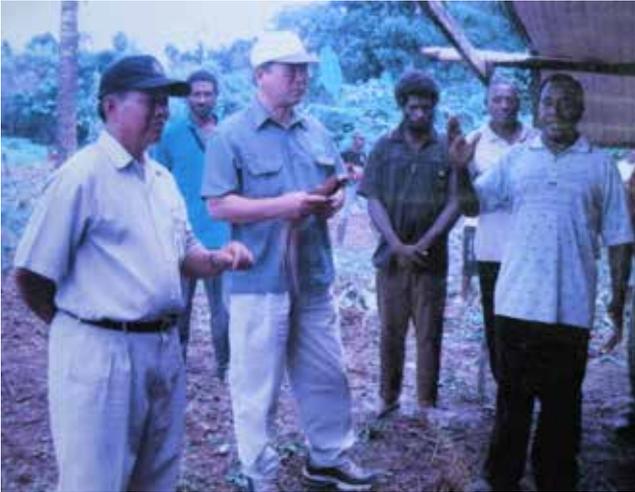


Photo 1. The ritual presentation of a bird of paradise to Tunas Sawa Erma managers in POP B estate, Getentiri Village, Boven Digoel, in 2006. (Photo by Agus Andrianto)



Photo 2. Land cleared in POP B estate, 2006. (Photo by Agus Andrianto)

The remaining area earmarked for oil palm plantation development in POP B estate stretches from the western side of the Womut River to the Kia River. The land is mostly owned by the Auyu Jair tribe.²⁸ In contrast to Getentiri, the land acquisition process in Ujung Kia met some resistance. On 22 March 2006, the 25 clan landowners in Ujung Kia rejected the plantation proposal.²⁹

The slow progress with POP B was influenced by the perception among the landowners that plantations already established on customary lands in Butiptiri and Getentiri Villages did not meet the villagers' expectations for livelihood improvement. Communication problems between TSE and the Ujung Kia community might have contributed to this situation. Despite the reluctance of local communities, the company continued to approach them and as a token of good will constructed a road across the Womut River, leading to a rubber plantation near Ujung Kia Village.³⁰

However, the tensions between the villages and TSE continued. In 2007, the district head postponed the issuance of the forest clearance license to TSE.³¹ By March 2010, TSE had only managed to establish POP B plantations in Getentiri, covering 7657 ha (TSE 2010).

28 Interviews with the head of Ujung Kia Village and owners of customary lands in Getentiri.

29 Interviews with TSE employees and community leaders in Ujung Kia, April 2010.

30 Based on the focus group discussion in Ujung Kia Village, and interviews with district government representatives.

31 Focus group discussions in Asiki Village, April 2010.

TSE staff recognize that the land acquisition process has been long and drawn out. The company not only has to comply with the government's official laws and regulations, but it also has to accommodate customary laws.³² Another challenge is that village administrative boundaries, which are similar to the customary land boundaries, have not been officially and definitively mapped, instead being agreed upon only by the village chiefs. The ambiguity of administrative areas complicates not only the establishment of commercial estates but also the creation of new villages.³³

5.3 The environmental and socioeconomic impacts of oil palm plantation development

5.3.1 Impacts on forests

The site of the TSE plantation was formerly primary forest with high timber stocks.³⁴ The company's operations impact on forest cover change can be verified through the analysis of a time series of satellite images (Table 3). The company started clearing the forest in POP A estate in 1997, and by

32 Interviews with TSE staff, April 2010.

33 Unclear boundaries in relation to formal and customary jurisdiction are a fundamental problem at all administrative levels across Papua. See, for example, conflict over boundaries occurring between the district governments of Merauke and Boven Digoel, and between the district governments of Asmat and Yahukimo.

34 Interviews with staff of the District Forestry Office of Merauke and Boven Digoel.

Table 3. Changes in land cover in the Tunas Sawa Erma plantation area based on analysis of Landsat images taken in 2000, 2005 and 2008.

Land cover class	Area (ha)		
	2000	2005	2008
Tunas Sawa Erma (POP A) (14,783 ha)			
Primary dryland forest	2,630	704	704
Primary swamp forest	1,696	1,307	1,278
Secondary dryland forest	2 635	3,018	551
Shrubland	124	256	133
Swamp shrubland	0	255	
Cultivation land			90
Estate crop plantation	7,525	9,067	11,853
Tunas Sawa Erma (POP B) (19,486 ha)			
Primary dryland forests	18,727	18,697	8,696
Secondary dryland forests	81	111	3,161
Primary swamp forests	296	296	270
Swamp	174	174	26
Swamp shrubland	19	19	151
Cultivation land	434	434	476
Estate crop plantation	0	0	6,951
Total area	34,339	34,339	34,339

POP = Palm Oil Project.

Source: Tropenbos Indonesia (2010).

2000 had established oil palm plantations covering 7525 ha (Table 3). In the next 5 years, the company increased the area of plantations by 1500 ha. From 2005 to 2008, the company established an average of 900 ha of plantations per year, bringing the total area to 11,853 ha.

TSE began to develop the second plantation estate, POP B, in 2006. Landsat images show that in 2005 this area still contained more than 19,000 ha of primary forest, but that in 2008 primary forest cover decreased to less than 9,000 ha, with about 3000 ha of secondary forest and 6951 ha of oil palm plantation.

As expected and foreseen in Indonesian law, the establishment of oil palm plantations often results in deforestation. In the POP A estate of TSE, the development of plantations led to the clearance of about 12,000 ha of forest. In the 2000–2008 period,

the deforestation rate was 1200 ha per year. Similar rates were observed during the development of POP B. Figure 2 presents an illustration of the oil palm development and changes in forest cover over time.

5.3.2 Perceptions of environmental impacts

Household surveys indicate that local communities observed a range of environmental impacts (Table 4). All three respondent groups (workers, landowners and the public) reported significant impacts due to forest loss in their vicinity. They claimed the plantation had reduced their income from forest products, and their ability to collect wood for housing and fuel. Landowners in particular reported experiencing these impacts because of their high dependence on forest resources for their livelihoods.

The worker group noted that oil palm plantation development might be associated with plant pests such as rats, caterpillars and grasshoppers. The increasing pest problem was also felt by the local villagers who reported declining production or crop failure.

Over 60% of customary landowners and the population at large reported reduced water quality in the vicinity of plantations. Both these groups

Table 4. Environmental impacts of Tunas Sawa Erma oil palm plantations.

Environmental impact	Respondents (%)		
	Workers	Landowners	Public
Decreased water quality	34	75	65
Decreased water quantity	36	62	52
Decreased forest cover	77	100	81
Increase in plant pests	47	50	14
Increased air pollution	30	75	33
Increased soil erosion	18	33	48
Decreased soil stability	18	20	5
Increase in human disease ^a	39	50	48

a Common ailments include malaria, headaches, respiratory disorders, diarrhea and skin diseases.

Source: Interviews with 97 respondents, March–April 2010.



Figure 2. Landsat images taken in 2000 (left), 2005 (middle) and 2008 (right).

use river and lake water for drinking, bathing and fishing. The company reported a program for regularly monitoring water quality, in accordance with the criteria set up by the Papua Province Agency for Natural Resources and Environment. However, it is unclear how effective this monitoring has been in preventing or reducing the levels of pollution.

5.3.3 Social and economic impacts

5.3.3.1 Plantation workers

As of April 2010, the TSE oil palm plantations in Boven Digoel employed 3398 workers. The number of permanent company employees was 1447, most of whom are Indonesian, with fewer than 20 employees each from South Korea and Malaysia. The permanent company employees hold positions such as office administrators, security guards, equipment operators, mechanics, checkers and foremen; of these, 248 (17%) are indigenous Papuans.³⁵ Around 1951 workers are employed on a contractual basis, recruited by team leaders. The contract workers are engaged in maintenance and harvesting; of these, fewer than 200 (about 10%) are indigenous Papuans.

The company recruited workers in large numbers from across Merauke District, including former workers of now defunct logging concessions.³⁶ They are engaged in survey, harvesting and land clearing activities. Those working in nursery and planting are transmigrant farmers from Muting, Jagebob and Tanah Miring Subdistricts (Merauke District), recruited in 1998. They are mostly from Java. In addition, workers from the ethnic groups Bugis, Toraja, Ambon and Kei were also recruited. Papuans

Table 5. Distribution and numbers of workers at Tunas Sawa Erma plantations in Boven Digoel in 2010.

Workers	Number	Remarks
POP A estate		
Permanent estate employees	834	Worked in 60 teams, in 8 divisions and lived in 16 camps
Permanent palm oil mill employees	145	
Contract workers	1,477	
Total	2,456	
POP B estate		
Permanent estate employees	468	Worked in 21 teams, in 5 divisions and lived in 5 camps
Contract workers	474	
Total	942	
Total POP A + B	3,398	

POP = Palm Oil Project.

Source: TSE 2010.

who work for the company on a contractual basis come from Merauke and Boven Digoel Districts.

The influx of new workers took place in 2010 and 2011, when the research was undertaken.³⁷ By 2010, the total number of migrant workers was estimated to be over 3200,³⁸ which accounts for 89% of the total number of workers. The numbers and distribution of workers are shown in Table 5.

TSE outsources most of the labor under a contract system to nonpermanent employees. Team leaders directly recruit and supervise contract workers. Wages

35 TSE monthly human resource report for March 2010.

36 Logging concession companies no longer operating include Prabu Alaska, Digul Daya Sakti Unit I, Digul Daya Sakti Unit II, Rimba Megah Lestari, Dharmali Mahkota Timber and Tunggal Yudhi Unit II (Mrk).

37 Interviews with TSE company staff, April 2010.

38 This figure excludes workers' family members (wives and children). During the survey, two groups of new migrants, about 60 people in total, were found to have come from the Moluccas and Sulawesi.

Table 6. Impact of plantation employment on workers' livelihoods.

Impact	Percentage of respondents (n = 47)
Increased income	60
Reliable income source	68
Capacity to invest	21
Increased purchasing power	49
Increased consumption	56
Access to public facilities	17

Source: Primary data.

are paid based on workers' productivity, according to targets set by the company. The team leader gets a fee or premium based on his team's performance. In addition to receiving a wage, workers have free access to company facilities, including barracks, water, bathrooms, electricity and a medical clinic. Workers can pay for their daily needs from the company canteen on credit, with the loan later deducted from their wages. The company does not cover workers' relocation costs.

The survey responses indicate that workers, whether permanent employees or contract workers, have seen an increase in their monthly income as a result of being employed at the plantation (see Table 6). The workers also reported greater financial security as a result of stable monthly income. Permanent company employees are paid a salary according to the government-set provincial minimum wage. In 2010, the monthly minimum wage paid by TSE was IDR 1,316,500 (USD 150). Employees also received additional amounts based on overtime, depending on the type of work and length of time involved. Government taxes, union fees and advances owed to the canteen are then deducted from the salary.³⁹

Contract workers must also supply their own field work equipment. The limited amount left in the pay packet after deductions explains why only about 50% of the respondents in this group reported increased consumption and improved purchasing power. Only the team leaders (20% of respondents), were able to save some of their income and invest in other economic activities such as opening a kiosk, raising livestock or buying land in their home region (see Table 6).

39 Based on the team leader's report.

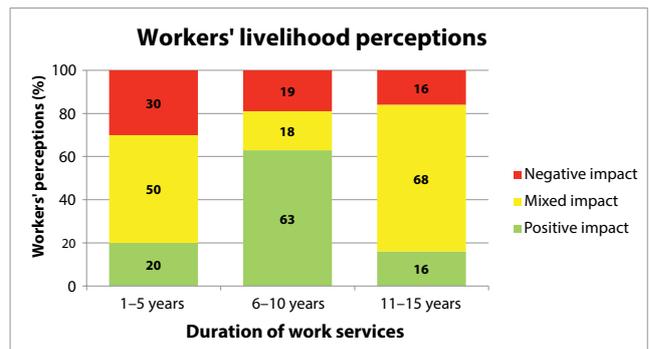


Figure 3. Workers' perceptions of the impact of plantation employment on their livelihoods, based on years of service.

The impact of long-term plantation employment is presented in Figure 3. Workers' positive perceptions of the impact of plantation employment on their livelihoods increased significantly between years 1-5 and years 6-10, but positive perceptions dropped sharply for years 11-15. This drop is because, after working for nearly 15 years, their physical condition begins to decline, which means lower income, but family expenditures continue to increase. At this point, many workers often realize they cannot earn enough to secure their families long term. Most workers say that contract employment in oil palm plantations does not provide enough for long-term planning or retirement. They continue to work on the plantations because they do not have other alternatives.

Workers who had lived at the plantation for a long time noted that conditions had improved significantly in the time since the plantation was established. In particular, they credited the plantation development with the following: public roads are maintained around the estate; electricity is available in the barracks, markets and offices (police, bank, army) around the plantation; medical facilities, including a clinic, paramedics, health workers and doctors, are available; education and sporting facilities are available; and relative stability is maintained (see also ICG 2007). The sharp contrast between improving infrastructure in the plantation area and lack of it in more remote areas means that many villagers come to the plantation camp to sell farm produce and bushmeat, meet people and seek entertainment.⁴⁰

Oil palm plantation development has also had an important indirect impact. With billions of rupiah

40 Field observations and interviews during March and April 2010.

paid in wages each month, more money is circulating in the local economy. Shops and various small-scale businesses thrive around the plantation, which has led to increased availability of goods.⁴¹

5.3.3.2 Customary landowners

In Jair Subdistrict, the site of the TSE oil palm plantations, the indigenous people belong to the Awyu and Mandobo ethnic groups. Under traditional law, the tribes are separated by the Digoel River and the

Uwim Merah River. Those living to the west of the river are the Djair Awyu, and those to the east of the rivers are the Mandobo (Susanto 2004; Hughes 2009).

Of the groups surveyed, the landowners were the most directly affected by the development of the oil palm plantations (Table 4). Traditionally, these people depended on forest products, for both household consumption and cash income. Even in 2010, with the establishment of the plantations,

Table 7. Three villages affected by oil palm plantations.

Clan with traditional ownership	Name of the land area	Status in 2010	Lost forest products and services
Butiptiri Village			
Gembenob-Arteka	Iwantaryop	In POP A estate, 14,461 ha had been converted into oil palm plantations. IDR 1 billion had been paid to the community as compensation. Other items given to the community include chainsaws, motor boats, cows, scholarships and housing for clan leaders.	Plants and plant products: Gambir Gaharu tree Rattan Wood Sago Lawang (<i>Cinnamomum</i>) tree bark
Ekoki-Gembenob	Kali dagon		
Irowop Kawab	Kuip		
Mikan Kereke	Kali tak		
Ekoki-Guwe	Kali kutop		
	Keritouwop		
	Bian		
	Iwantarowop		
Getentiri Village			
Habanggi	Tratinggi	In POP B estate, 7656.9 ha had been converted into oil palm plantations.	Nibung Natural medicines
Wohing	Simde		
Ketahabang 1	Sia	Compensation for timber felled is set at a rate of IDR 10,000/m ³ . Compensation for the loss of sago plantations is set at a rate of IDR 5000 per clump.	Animals and animal products: Crocodile skins Fish
Ketahabang 2	Ahang		
Misa	Uho		
Wehu 1	Isru	Other items provided include scholarships, chainsaws and motor boats.	Birds of paradise Cassowary Pigs Tortoises Shrimp
Wehu 2	Gimio		
Kahong	Hupkio		
Imma	Yuhutari		
Keis 1	Thobesi		
Keis 2	Amamato		
	Wuho		
	Irhubusu		
	Karobsu		
	Syurahabang		
	Kesang ki mame		
	Tetmegi kibi me	Other services: Clean water	
	Miminihi ketabang		
	Uho kasang kima		
	Sahbang pi gage		
	Uho biakopo		
	Gehabang		

continued on next page

⁴¹ Field observations and interviews during March and April 2010.

Table 7. Continued

Clan with traditional ownership	Name of the land area	Status in 2010	Lost forest products and services
Ujung Kia Village			
Yere	Womut	The company’s plans to expand plantations in this area (POP B) have been prevented by the landowners’ refusal to relinquish their lands.	Mostly undisturbed
Saki	Teging		
Wohohu	Ketang		
Hiya	Bovi	Primary forest covers more than 8,000 ha, and secondary forest covers more than 3,000 ha.	
Kekuma	Kadima		
Hutabu	Nausi		
Usimiki	Yebuma	A 7 km road from the POP B estate towards Ujung Kia Village is being constructed.	
Usibo	Haibu		
Sripi	Ugubo		
Inga	Akiu	Landowners have received compensation for timber production.	
luka	Batang		
Uriyong	Usung Honiya		
	These lands cover an estimated area of 11,000 ha from the Womut River to the Kia River.		

POP = Palm Oil Project.

Source: Focus group discussion in Boven Digoel, 2010.

customary owners continued to enter the forest to harvest sago and hunt animals — for sale and some domestic consumption. They use materials from the forest in house construction: rattan for fastening, *nibung* palm as girders and sago leaves for roofing (Photograph 3). With the arrival of the logging and plantation companies, the landowners became involved in timber and plantations, with most of them working as surveyors for the Korindo Group (TSE’s parent company) or in other unskilled positions. Whilst working for the company, the indigenous people continued their traditional activities such as harvesting sago, gathering forest products and hunting.

Information on three villages in the plantation area, obtained from the household survey and focus group discussions in March 2010, is presented in Table 7. The responses indicate that the indigenous people’s expectations associated with oil palm plantations had to do with access to consumer goods and modern lifestyles (e.g. better houses, electronic goods, motorcycles). However, access to consumer goods and improved communications came at a price, as forest clearance to make room for plantations meant a loss of sago groves.

The survey responses and focus group discussions indicated that despite increasing change in the landscape due to oil palm, the landowners still operate under their old system of ownership boundaries. The owners note the diminished access to forest resource and the food and income they



Photo 3. Traditional house constructed from wood, rattan, nibung palm and sago leaves. (Photo by Agus Andrianto)

Table 8. The impact of plantations on the public.

Issue	Impact assessment (%)
Loss of access to forest products	29%
Loss of access to customary lands for farming	11%
Improved job opportunities	60%
Improved transportation	89%

Source: Primary data.

derive from them. They have now moved from self-sufficiency to dependence, fulfilling their daily food needs with subsidized rice.

Some owners have begun planting rubber, which was introduced in the area by Dutch missionaries. Rubber gardens hold promise for the local economy due to ease of management and relatively high market prices for rubber in recent years. The major obstacles still in place are limited transport infrastructure and lack of storage.

5.3.3.3 The public at large

Respondents in the 'public at large' group were migrants and indigenous people outside the plantation. Overall, this group stated they had benefited from the presence of the oil palm plantations (Table 8). In particular, they cite year-round road transport which means uninterrupted flow of people and goods. Some respondents said they took advantage of newly constructed roads to move to the town of Asiki to work in trade. Others traveled to town to sign up for contract work for TSE in plantation operations and construction in other sites.

However, in addition to positive aspects of the plantations, respondents also observed negative effects such as loss of access to forest products; water contamination due to plantation sewage, fertilizers and herbicide run-off; and air pollution from vehicles and mills.

5.3.3.4 Other impacts

In addition to direct impacts discussed above, respondents also noted indirect effects of the oil palm plantations. As the plantation area expands, the influx of migrants from different regions and with various education backgrounds and employment history (see Table 9) has affected the interaction between landowners and Papuan and non-Papuan workers.

Papuan workers report that exposure to migrants has broadened their thinking and encouraged them

Table 9. Respondents' education levels and employment history.

Group	Education level	Main occupations	
		Before plantation	After plantation
Landowners	No school education	Hunter	Hunter
	Elementary education	Gatherer Farmer	Gatherer Farmer Farm laborer Timber collector Transporter (boat)
Workers			
Papuan	Some elementary education	Gatherer	Company employee
		Worker in logging concession	Contract laborer Hunter
Non-Papuan	Elementary–junior high school	Farmer	Farm worker
		Driver	Trader
		Worker in logging concession Unskilled laborer	
Public			
Papuan	No school education	Gatherer	Gatherer
		Hunter	Hunter
		Unskilled laborer	Farmer Laborer
		Farmer	
Non-Papuan	Junior high school–university	Trader	Farmer
		Government employee	Trader
		Service provider	Government employee
		Farmer	Service provider

Source: Primary data.

to be more open, as they have encountered a range of people from outside their indigenous tribes. In particular, indigenous people began paying more attention to educating their children, hoping that they would become civil servants or at least company employees. Papuan workers also noted that they had become more motivated and disciplined in working in the plantations. However, they acknowledged some resentment toward migrant workers, because opportunities for permanent employment or to become machine operators tend to go to workers

Table 10. Palm oil production in POP A and B, 2005–2010.

Year	POP A			POP B	Remarks
	Fresh fruit bunches (ton)	Crude palm oil (ton)	Kernels (ton)	Fresh fruit bunches (ton)	
2005	248,613	42,606	8,012		Mature plantations in POP A cover 10,864 ha; the FFB productivity rate is 2.4 ton/ha/month.
2006	160,635	43,015	7,738		
2007	233,304	55,904	11,052		
2008	243,154	58,120	12,306		Mature plantations in POP B cover 3,183 ha; the FFB productivity rate is 0.9 ton/ha/month.
2009	254,890	65,575	13,505	10,825 ^a	
2010 ^b	79,275	20,087	4,336	6,859	

FFB = fresh fruit bunches, POP = Palm Oil Project.

a Production for June–December 2009.

b Production until March 2010.

Source: TSE 2010.

from outside Papua, as they have the requisite education and skills. Ultimately, however, both Papuan and migrant workers are highly aware that they are working in the ‘Korindo system,’ which is highly disciplined in terms of rewards and penalties, determined strictly by job performance, with little consideration for social or ethnic background.⁴²

The increased interaction and openness of attitudes among landowners has led to an exchange of experiences between groups. For example, community landowners in Ujung Kia learned from the experiences of Getentiri and Butiptiri Villages what the impact of the plantations could be. They observed that oil palm plantations carry both benefits (such as infrastructure development) as well as costs (diminished income from forest resources). As a result, they engaged in prolonged negotiations with the investing company.

The plantations and migrant workers have brought technology into previously remote villages and expenditures as well as consumption have increased amongst the local people. Many people in Butiptiri, Getentiri and Ujung Kia Villages now have TV sets, tape recorders, satellite dishes, motorbikes and mobile phones, etc., the ownership of which brings a feeling of pride and increased social status. However, limited access to electricity restricts the usefulness of these items.

42 They compare their working conditions with other companies, where the rules on work time and output are more flexible. They feel that the TSE rules are very strict.

The growing consumer culture is leading to an increased sense of ‘want’ amongst indigenous people. As literacy among local landowners improves, they realize the value of oil palm investment on their lands (Table 10) and want more compensation. This leads to constant renegotiation of contracts and requires the company to show good faith. As part of their efforts, TSE provides assistance to indigenous communities in the form of access to health workers and medicines, as well as teachers and scholarships for school children. Landowners have received additional aid in the form of chainsaws, outboard motors, cattle and the construction of five housing units.

5.4 TSE contributions to state tax revenues

TSE has made a significant contribution to state and regional revenues through the payment of taxes, retribution and other levies. While the exact amount paid by the company to the government is not available, Table 11 illustrates the extent to which the company contributes to the economy. Limited transparency on the part of both government institutions and the company and repeated changes in taxation rules have contributed to the difficulty in collecting more precise financial data.

Through the regionally generated revenue scheme (*Pendapatan Asli Daerah*), the regional government earns some revenue from TSE as it levies tax on the company’s vehicles. The tax is levied annually by the provincial government at the rate of 2–10% of the sale value of the vehicle, and at 0.1–0.2% for heavy equipment. The company owns at least 50 vehicles and

Table 11. Type and percentage of taxes levied on Tunas Sawa Erma.

Type of taxes	Object of taxes	Percentage of levy	Period of collection
Vehicle tax, <i>Pajak Kendaraan Bermotor</i>	Heavy machinery and vehicles	0.1–10.0%	Annual
Property tax, <i>Pajak Bumi dan Bangunan</i>	Taxable sale value of company land — 34,000 ha	40.0%	Annual
Corporate income tax, <i>Pajak Penghasilan Perusahaan</i>	Taxable enterprise	28.0%	Monthly
Personal income tax, <i>Pajak Penghasilan</i>	Taxable income — about 1,450 employees	10.0%	Monthly
Increment value tax, <i>Pajak Pertambahan Nilai</i>	Crude palm oil production — more than 60,000 ton/year	10.0%	Per transaction

Source: Law No. 28/2009 on Regional Taxes and Levies, Law No. 36/2008 on Income Tax, and researcher's analysis of the government's levy on the potential objects owned by the company.

20 pieces of heavy equipment. The company also pays periodic levies on road-worthiness vehicles testing.

Shared revenues received by the regional government include property tax, personal income tax and corporate income tax. Based on Government Regulation No. 25/2002, the national government set the rate of property tax for estate crops, forestry and mining concessions at about 40% of the taxable sale value of land and buildings. Of the property tax revenues, the national government retains 10% and the remaining 90% goes to the district and provincial governments: 64.8% to the government of Boven Digoel District, 16.2% to the government of Papua Province and the remaining 9% of the revenues to the government of Boven Digoel for operational cost for collecting the tax.⁴³ Of the revenues deriving from personal and corporate income tax, Boven Digoel District receives 12% while Papua Province receives 8%. The rest of the revenue goes to the central government.

TSE is also expected to contribute to the state revenues through the value added and sales tax, levied on crude palm oil production, which is estimated to be around 60,000 tons per year. All of the revenues deriving from this tax go to the central government.

While it is unclear what proportion of the revenue received by the Boven Digoel District government is derived from oil palm plantations, data from the Ministry of Finance show a significant increase in funds derived from taxes shared by the central government. In 2009 Boven Digoel

District government received IDR 40 billion, in 2010 IDR 41.5 billion and in 2011 48.7 billion (Kementerian Keuangan 2012).

6 Discussion

Establishing oil palm plantations in less developed areas such as Papua can stimulate the local economy, generate employment and improve local infrastructure. The efforts by the Indonesian government to promote agricultural investment has encouraged oil palm developers to open plantations in remote regions with poor infrastructure and limited labor,⁴⁴ and unpredictable political, social and security situations (see also ICG 2007).

TSE has been a pioneer, initiating forestry and agricultural investment in this remote region of Papua. This has been instrumental in bringing about changes in the economy and livelihoods in Boven Digoel. Although the investment and management costs are high and the company has faced many challenges operating in such a remote location, TSE has maintained operations and made a significant contribution to state revenues through tax receipts. The company has appreciated the ease of investment and relishes the full support of both central and local governments.

6.1 Land acquisition processes

The Indonesia government support for oil palm investment in Boven Digoel hinged strongly on the expectation that the PIR-Trans scheme would

⁴³ Article 12 of Law No. 33/2004 on Revenue Sharing between National and Local Governments.

⁴⁴ Interviews with TSE staff, April 2010.

advance the local economy and positively transform local livelihoods. The scheme had been running for about 10 years, when TSE proposed its plantation establishment plan in 2005. The company was able to draw lessons from both successful and failed attempts to implement the scheme in many parts of the country. Two earlier PIR-Trans programs initiated by a state-owned corporation in two districts of Papua, Manokwari and Keerom, seemed to succeed in building oil palm plantations in partnership with transmigrants and local Papuans, although the development was not problem free (Li 2011; Kesaulija et al. 2014).

TSE's limited progress with implementing the PIR-Trans scheme in Boven Digoel has been largely due to local people's limited understanding of oil palm and lack of readiness and capacity to embrace oil palm as a full-time subsistence activity. As a result, the original PIR-Trans scheme was suspended and the company continued under the developer scheme, without involving local communities.

As a result of the abandonment of PIR-Trans, it is unclear what other scheme the company may realistically use to ensure community involvement in plantation operations. In addition to the practical difficulties in this context and unclear plans by the company to address them, the government legislation is also quite vague about the investor's obligation to allocate land for smallholder plantations.⁴⁵ It is not clear, for example, when exactly the company should establish plantations for local people and what sanctions will be applied for failing to meet the requirements.

6.2 The impact of oil palm development on forests

It has become common practice in many parts of Indonesia to develop oil palm plantations through prior deforestation, using land designated as convertible production forest (Casson et al. 2007; Koh and Wilcove 2008; McCarthy and Cramb 2009). The same pattern can be found in districts across Papua, where 83% of oil palm expansion has occurred at the expense of forest (Obidzinski et al. 2012). This study confirms the practice of oil palm developers contributing to deforestation. The development of TSE's oil palm plantations is estimated to have contributed to

the loss of 19,680 ha of forest or 47% of the total deforestation occurring in Boven Digoel District in 2000–2008. An aerial interpretation analysis made by Tropenbos Indonesia (2010), reveals a similar level of deforestation in Keerom District, Papua Province, where numerous oil palm plantations have been developed. In contrast, Sarmi District remains relatively well forested, since the district government has rejected the expansion of oil palm plantations in its jurisdiction.

The trend of converting forested areas for oil palm is likely to continue since it is legal.⁴⁶ Extensive areas of forestlands categorized as convertible production forest have been earmarked for nonforestry purposes (FWI/GFW 2010). In Boven Digoel District, forests under that category cover about 850,000 ha, and Papua Province has 6 million ha of such forests (Suebu 2009). At the national level, this type of forestland covers 17.9 million ha, as of April 2011, although not all this will be converted and only 4 million ha is available for nonforestry purposes (Soepijanto 2011). The Ministry of Forestry is responding to the continued decline in forests through a strategy to maintain permanent forests on up to 85% of existing forestlands by 2030 (Ministry of Forestry 2011).

The decision to use forested lands for oil palm plantations rests with the national as well as local authorities, motivated by the desire to support economic development and to generate income through timber utilization permits. Oil palm investors have an economic interest in developing forested lands, in that they obtain early returns from land clearance; although some argue that oil palm developers have less interest in the value of timber and that working out timber rights is more a burden than a benefit. They argue that developers' primary concern is to access land suitable for plantations (Fairhurst et al. 2010).

However, our analysis shows that TSE has earned significant revenues from timber felling, aiming to finance a sizeable portion of its plantation development by offsetting the plantation investment costs. By clear-cutting 22,000 ha of forest the company is expected to earn about IDR 232 billion (USD 26 million) in profit. This calculation is based on the estimated price of timber (IDR 600,000 or USD 67.5/m³) and the timber potential in

⁴⁵ Ministry of Agriculture's Decree 26/2007 on Guidelines for Estate Crops Business Licensing.

⁴⁶ Article 19 of Government Regulation No. 10/2010 on the Procedure for Changing Forest Status and Functions.

POP A (260,000 m³) (Dinas Kehutanan Provinsi Papua 2006) plus the timber reserves in POP B (130,000 m³) (Dinas Kehutanan Boven Digoel 2009). This revenue is sufficient to cover the cost of developing at least 10,000 ha of oil palm plantations, as the development cost per hectare is IDR 24,181,000 or USD 2,700/ha.⁴⁷ A previous study by Manurung (2001) shows that establishing oil palm plantations is financially profitable and that additional profits can be gained from clear-cutting timber in forested areas. However, the price of palm oil does not reflect the true environmental and social costs.

The possibility of establishing plantations on forested land, as stipulated in the government regulation,⁴⁸ warrants further analysis, as it has implications for the continued conversion of forests to plantations. Such a policy is likely to encourage investors to continue clearing forests for oil palm development as long as a profit can be made from the sale of the timber (Caroko et al. 2011). This constitutes a serious disincentive for government authorities, parliament and the private sector to prioritize the use of degraded lands for plantations in order to promote low-carbon development.

Another trend in forest degradation that demands attention is the increased demand for wood in plantation areas. In Boven Digoel District, the increasing area of plantations and number of workers, including an influx of migrant labor, have undoubtedly resulted in increased demand for wood for housing and fuel. Assuming that one household requires 2 m³ of firewood per month or 24 m³ per year, it is estimated that at least 82,000 m³ is required to meet the household energy needs of the 3400 workers employed by TSE on the POP A and B estates. It is therefore important that the company or other stakeholders take steps to anticipate further degradation of forest resources, by promoting the planting of trees for firewood or the use of waste from oil palm plantations.

Despite the profits to be made from timber extraction, TSE is a serious investor intent on establishing a successful oil palm plantation. The

company does not appear to have cleared the forests excessively, compared with numerous cases in other regions of Indonesia where oil palm developers cleared forests aggressively in the first year of operations and were not serious about building estates (Kartodihardjo and Supriono 2000; Wakker 2005; Casson et al. 2007; Reinhardt et al. 2007; Hunt 2010; Schwarz 2010). Our analysis shows that the company converted the forests to plantations within the area released by landowners and in accordance with its capacity to grow more plants (see Table 3). The company has made a significant achievement in terms of the plantation area developed. In 2000–2008, the company established almost 11,853 ha, around 1500 ha of plantations a year in POP A. Within the period of 2005–2008, the company was able to establish 7000 ha of plantations in POP B, or 3500 ha a year. In total, as of 2008, the company had established 18,800 ha of plantation — at the rate of 2000 ha per year.

This average growth of planting should be used by the government as a reference of the maximum areas granted to investors when issuing timber utilization permits. The government progressively releases forest areas for oil palm development and grants investors a clearance permit covering 40,000 ha of the proposed total concession.⁴⁹ The next permit, covering another 40,000 ha, can only be granted after the company is evaluated in terms of its attempt to acquire business use rights and the extent to which oil palm plantations have been established. The government should reconsider granting such a large area where the company's capacity to grow plants has not been demonstrated. By limiting the areas granted, the government will have the opportunity to select serious investors willing to establish plantations, avoid the loss of large forested areas, and better monitor oil palm development with the limited resources it has.

6.3 Other environmental impacts of oil palm development

The development of oil palm plantations has also caused other changes in environmental conditions in plantation areas, especially to water and air quality. Contaminated water results from the use

⁴⁷ The Directorate General of Estate Crop's Decree No. 60/Kpts/Rc.110/4/08 on the Standard Cost of Establishing Estate Crops as Part of the Revitalization Program in Dry Lands in 2008.

⁴⁸ Article 19, Section 3 of Government Regulation No. 10/2010 on the Procedure for Changing Forest Status and Functions.

⁴⁹ See Ministry of Forestry Decree No. P.22/Menhut-II/2009 stipulating the size and manner in which forest areas can be converted to estate crop plantations. The maximum area permitted for conversion in regions other than Papua and West Papua Provinces is half of this.

of insecticides and pesticides, and from sewage and residential waste in and around the palm oil mills. The plantation drainage system is connected to small rivers and swamps often used by the local communities for fishing, drinking water and bathing. Communities living around the plantation have a growing concern about water contamination. Local people are worried that in a few years they will no longer be able to find fish or get clean water for their daily use.

The areas surrounding the TSE plantation are rich in non-timber forest products, such as resin, rattan, sago and nutmeg. The forests are also home to diverse wildlife species. However, conversion of forests to plantations has destroyed large areas of natural habitat and threatens the survival of many species. TSE should manage a program to restore the ecological condition of the area surrounding the plantation and protect wildlife habitat.

Local government agencies and civil society groups should actively monitor the environmental impacts of plantation operations in order to assess the extent to which environmental management and monitoring plans are being implemented. Strict monitoring of the implementation of environmental regulations and best management practices are particularly important in light of the fact that the company is expected to continue the expansion of plantation estates. In 2009, the company earned more than IDR 53.5 million (at a crude palm oil price of USD 700/ton) (see Table 10). With this kind of revenue, the company can be expected to maintain and eventually expand the current plantation operations. In 2010, another company under the same group obtained a license for oil palm plantation in Merauke District. The trend toward oil palm expansion is visible in many parts of Papua such as Jayapura, Keerom and Sarmi Districts.

6.4 Social and economic impacts on households and communities

In addition to stimulating the local economy and generating revenues for the state, oil palm plantations contribute to the creation of jobs. The government sees the estate crops industry and oil palm plantations in particular, as a major source of employment. Oil palm plantations in Indonesia are highly labor intensive and employ one person per 2–3 ha (Deiningger et al. 2011; Li 2011). The Ministry of Agriculture estimates that oil palm provided employment to 2.8 million in 2005, which then

increased to 3.7 million in 2012 (Ditjenbun 2013). The oil palm industry is estimated by the Indonesian Trade and Industry Chamber (Kadin) to absorb 5 million workers (Agroindustri 2010).

The Governor of Papua has also made it provincial policy since 2008 to encourage oil palm plantations to generate employment for local people and to provide adequate income.⁵⁰ TSE claims to have contributed to the improvement of local livelihoods in Boven Digoel District through job creation. In 2010, the company employed 3398 workers, an average of 0.2 workers per hectare or one person to 5 ha, which is similar to the labor ratio in established plantations (Marti 2008). For example, in 2011, the oil palm plantation company, Smart, employed about one person to 4 ha, if smallholders are considered, or one person to 9.2 ha, if only casual plantation workers are considered (Smart 2012).

The level of labor absorption on the TSE estates, however, is lower than the national ratio of one worker to 2 ha claimed by the Ministry of Agriculture (Departemen Pertanian 2007). Another study, of a state-owned oil palm plantation company in Sumatra revealed an employment rate of one person for every hectare of company land in 2005 (Yarsi 2006). The employment ratio on the TSE estates is also much lower than the labor ratio of five people per hectare claimed by the Indonesian Palm Oil Board (Li 2011). Estimations of oil palm plantations' contributions to employment, however, vary greatly, depending on the efficiency of the unit, the stage of production (Li 2011) and mode or scale of production.

Two-thirds of the workers employed by TSE in Boven Digoel District are in temporary unskilled jobs. More than 50% of respondents stated that plantation workers enjoy working for the company because it provides a better income than they earned previously. However, only 20% of this group of temporary workers were able to make any savings. The remaining 80% of workers state that their monthly income is only enough to meet daily needs. This explains why only a small number of workers continue to work on the plantation for more than 10 years, and only 16% of workers stated that their livelihood had improved as a result of plantation employment.

50 See Governor of Papua's Oil Palm Development Policy No 6 "*Investasi yang Mensejahterakan Masyarakat*" (investments that prosper local communities).

The limitations of oil palm employment in improving local livelihoods must be kept in mind by government agencies when considering new plantation investments or the expansion of existing estates. Despite the fact that oil palm plantations are able to absorb labor in large numbers, it does not follow that the livelihoods of the plantation workers are automatically improved. If one of the goals of government policies is to reduce poverty and increase the welfare of migrant workers through oil palm plantation development, then it is important to review the current labor arrangements and compensation levels.

Indigenous people's way of life is still very much dependent on forest products, i.e. collecting sago, hunting and fishing. These activities are incompatible with a regular work schedule on plantation sites. However, traditional livelihoods are facing increasing pressure as the lands previously available for hunting and gathering are shrinking in size, partly due to the land transfers for plantations. Local people are therefore increasingly faced with a dilemma of how to secure their livelihoods in the changing natural environment, while still being unable to take advantage of the income-generating opportunities on plantation estates.

This dilemma is the primary reason why traditional landowners continue to ask plantation companies, including TSE, for additional compensation. This subsistence-driven need to revise land transfer agreements sometimes merges with genuine grievances over unfair agreements signed in the past. To avoid willful deception in the terms of these agreements, there should be scope for communities to be provided legal counsel to help negotiate and conclude fair deals. All stakeholders need to work toward a satisfactory solution to this dilemma, to help customary landowners partake in plantation jobs as well as preserve as much of the natural environment as possible for livelihood purposes.

7 Conclusions

Oil palm plantations play a major role in opening up isolated regions, contributing to state and regional revenues, stimulating the local economy, creating employment and improving infrastructure. As shown in this paper, plantation development has had a positive impact on opening up areas such as Jair Subdistrict and Boven Digoel District in Papua Province, creating jobs, improving workers' incomes

and stimulating the local economy. Villages adjacent to the plantations are also found to have better infrastructure and public facilities than other villages in the region.

The development of oil palm plantations has contributed significantly to deforestation in the district. This study confirms the common practice of clearing forests when developing oil palm plantations. During 2000–2008, the company caused the loss of 19,680 ha of forest or 47% of the total deforestation in Boven Digoel District. The company also earned significant revenues to offset plantation investment costs from felling timber during the clear-cutting phase.

This study also reveals other negative environmental impacts, such as the loss of forest cover, degraded water quality, air pollution and soil erosion, which all three respondent groups (workers, landowners and the public) experienced, with different levels of impact. The decline in water quality makes it difficult for the local population to find clean water for drinking and bathing. The conversion of forest to plantations has also caused animal habitat loss. These negative impacts stress the importance of having a properly developed, implemented and monitored environmental protection plan.

The company's achievements in establishing the plantation, however, deserve recognition. TSE converted natural forests to plantations cautiously, within the area released by landowners and in accordance with its capacity to grow more plants. As of 2008, the company had established plantations on 18,800 ha (at the rate of 2000 ha per year), showing the company's serious commitment to developing the plantation business. This annual rate needs to be taken into account by government authorities when considering the extent of areas to be granted to oil palm plantation investors.

TSE contributes to local employment through job creation. As of 2010, the company employed 3398 workers, an average of 0.2 workers per hectare or one person to 5 ha. This employment rate is important, but labor conditions, such as job status and the extent to which the employment has contributed to improved incomes should also be considered. Despite the relatively large number of jobs created by TSE, the livelihoods of plantation workers were not necessarily improved. When employed by the company, indigenous people are not fully prepared to transition from a subsistence society to an open economy, or to follow the company's working patterns, and are unable to compete with migrants

for jobs. If one of the goals of government policies is to reduce poverty and increase the welfare of migrant workers through oil palm plantation development, then it is important to review the current labor arrangements and compensation levels.

The trade-offs between the costs and benefits of oil palm development in forest frontiers are constantly changing and need to be assessed very carefully if an acceptable formula is to be found that results in tangible benefits for local economy and local livelihoods but without excessive environmental implications.

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Oil palm plantations can be a significant contributor to rural livelihoods in Indonesia. The government seeks to capitalize on this commodity and strengthen Indonesia's position as the global leader in palm oil production by expanding plantation estates. As the land for new plantation investment in Kalimantan and Sumatra becomes scarce, plantation developers are looking east to acquire land in Papua Province. The rising interest in oil palm plantations in Papua presents potential opportunities but also poses challenges.

Drawing on research findings from Boven Digoel District, one of the key areas for oil palm expansion in Papua, this paper illustrates the dilemma of plantation development in the region by examining the social, economic and environmental impacts.

Plantation development in Boven Digoel District has opened up isolated areas, stimulated the development of infrastructure, generated employment and improved worker incomes. However, the indigenous communities' reliance on forests for subsistence and their lack of familiarity with oil palm as a cash crop has proven to be a major barrier to effective engagement of the local population. In addition, the decision by the company not to implement an outgrower scheme has led to limited community involvement, rising tensions about land acquisition processes and resentment about low compensation payments.

The development of oil palm plantations has also resulted in deforestation and other negative environmental impacts, such as poor water quality, air pollution and soil erosion. Reducing environmental damage and creating better conditions for the productive engagement of local communities are major challenges for plantation investment in forested frontier regions such as Papua.



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