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Income Inequality of Oil Palm Plasma Farmers in South Sumatra, Indonesia

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Abstract

One of the critical policies to encourage oil palm development in Indonesia is the Nucleus Estate Smallholders Project. This project involves engaging farmer organizations in operating and managing oil palm plantations. However, there are gaps in the organizational performance of plasma farmer cooperatives, which consequently affect oil palm productivity and farmers' welfare. This paper analyzes the income gaps among oil palm plasma farmers who are associated with state and private companies in Musi Banyuasin regency, South Sumatra, Indonesia. The results of the analysis show that the income of plasma farmers from the private company is higher than that of the state company plasma farmers. The type of nucleus company has a significant effect on the plasma farm households' income due to the differences in the organizational performance of the private- and state-sponsored cooperatives and the differences in the nucleus-plasma farmer relations. The cooperative that operates in a private company performs well, whereas the cooperative in a state company has ceased its operations. This research also found out that the number of household working members, income share from oil palm production, and land area have significant effects on the income of plasma farm households.

Keywords: labor allocation, income, oil palm smallholders, South Sumatra Province

JEL Classification: O15, Q12

Introduction

Oil palm (*Elaeis guineensis*) is one of the strategic commodities of Indonesia's economy. In 1982, the area planted to oil palm was 294,560 ha, and this has since expanded to 11.26 million ha as of 2015 (Directorate General of Estate Crops 2016). Accordingly, this rapid development has placed Indonesia as the world's largest oil palm-producing country since 2006.

The three main actors that manage oil palm plantations in Indonesia are the state companies, private companies, and smallholders. Oil palm smallholders are further divided into plasma farmers and independent farmers. The former are those who are associated with large companies through plasma-nucleus schemes, while independent farmers are those who manage plantations independently.

Before 1980, large companies managed most of the oil palm plantations in Indonesia because small farmers did not have the financial capacity to cover the substantial land clearance costs. Moreover, the market demand for oil palm was still low at that time. Since the 1980s, small farmers have begun to establish oil palm plantations with the support of the Indonesian government's Nucleus Estate Smallholders (NES) project, which is also known as *Inti Rakyat* (PIR). The enormous profits that can be gained from producing oil palm had encouraged Indonesian farmers to begin to develop oil palm plantations independently. Since the mid-1990s, independent oil palm farmers have grown in number (Euler et al. 2016). This growth has led smallholders' oil palm production to expand rapidly, with production areas increasing from 5.7 ha in 1981 to 4.56 million ha in 2015 (Directorate General of Estate Crops 2016). Accordingly, the percentage of oil palm smallholders increased from 1.8 percent in 1981 to 40.3 percent by 2015.

Establishing oil palm plantations through the NES project is through partnerships between smallholders and large companies under the plasma-nucleus scheme. A cooperative village unit (*Koperasi Unit Desa* [KUD]) exists at the plasma-farmer level. At this level, the plasma

farmers coordinate the maintenance, harvesting, transportation, and sale of oil palm. Meanwhile, the nucleus company is responsible for developing the oil palm plantations in accordance with the physical standards established by the Directorate General of Plantation.

Various studies have shown that the strength of the organization and the partnership between the smallholders and large companies are critical to successfully develop the oil palm industry under the plasma-nucleus scheme (Syahyuti 2007; Jelsma et al. 2017). Under this scheme, the plasma farmers would take over the oil palm plantation within 48 months via a cooperation agreement between companies, farmers, and banks. After turning over the land to the smallholder farmers, they will then get the produce from the plantations. In return, farmers are obligated to pay credit to the bank as owners of the plantations. Meanwhile, the nucleus company is responsible for developing and maintaining the cooperatives and farmer groups, and for deducting revenues gained from farmers' oil palm production to meet its financial obligations to the bank plantation development executive.

In reality, KUDs perform at varying levels of efficiency, which affects the productivity of the plantation and the farmers' welfare. Some KUDs are highly effective in managing the plantation, enabling the farmers to profit from producing oil palm, increasing their income. Meanwhile, other KUDs are not as effective; this hampers plantation management and eventually leads the cooperative to close down (Vermeulen and Goad 2006; Jelsma, Giller, and Fairhurst 2009). The relationship between the nucleus company and the plasma farmers also varies, depending on the capability of the company, KUD, and plasma farmers. While some partnerships can work harmoniously and profitably, other partnerships are discordant in which the nucleus company and the plasma farmers are prone to conflicts.

These differences in the ability of KUDs to manage the plantations well and the relationship between the nucleus and plasma farmers have been occurring since the oil palm industry started to develop in the early 1980s. Budidarsono et al.

(2012) found that the kind of oil palm plantations established under the NES schemes have an impact on the socioeconomic status of the oil palm farm households, in particular, and the villagers, in general.

Oil palm is part of a plasma farm household's economic resources. Accordingly, the productivity of the plantation affects the household's ability to meet their expenditures (e.g., education, health) and social relations. Once a plantation enters the unproductive age, it would have long-term effects on the socioeconomic status of the farm households who work on the plantation.

This paper explores the income inequality between the plasma farmers under a private company in Tungkal Jaya subregency and those under a state company in Lais subregency. The farmers' organizational structure and nucleus-plasma relationship are two essential factors in the management of oil palm plantation.

Methodology

Location

The research was conducted in Musi Banyuasin regency, South Sumatra province. In particular, the plantation operated by the oil palm plasma farmers of state company PT Perkebunan Nusantara 7 (PTPN7) and private company (PT Hindoli) are the subjects of the study. PTPN7 plasma farmers reside in Gajah Mati village, Babat Supat subregency, and in Teluk Kijing III village, Lais subregency. The two subregencies are less than 46 km from the capital of Musi Banyuasin regency. On the other hand, the plasma farmers of PT Hindoli are located in Srimulyo village, Tungkal Jaya subregency. This village is 110 km from the capital of Musi Banyuasin regency.

Data Collection

Data collection was done through surveys, key informant interviews (KIIs), and field observations. The information gathered from the survey included the socioeconomic profile of the sample households, such as sex, age, education level, occupation, individual/household income, land tenure, and crop productivity. A total of 10

enumerators conducted the survey interview—six enumerators in PT Hindoli plasma farmers and four enumerators in PTPN7 plasma farmers. The enumerators were local residents who had been trained prior to data collection. The KIIs were conducted with several informants at the village level: village heads, KUD managers, and oil palm farmers.

Sample

A total sample of 138 households in PT Hindoli in Srimulyo village and 80 households in PTPN7 were interviewed for the survey. The sample households in PT Hindoli came from five subdistricts (*dusun*). The sample households from PTPN7 are the Gajah Mati village and Teluk Kijing III village.

Data Analysis

Data were analyzed through descriptive and regression analyses. Regression analysis was also performed to determine the functional relationship between household income and the socioeconomic profile of the household, as follows: (1) profile of the household head (e.g., sex, age, years of schooling); (2) number of household members who work in the plantation; (3) share of the household income that come from oil palm; (4) plantation land area; and (5) type of nucleus company that the farm household is engaged in.

Results and Discussion

Organizational Arrangement of Plasma Farmers

The oil palm plasma farmer group of PTPN7 in Musi Banyuasin regency is one of the first groups (since 1980) that developed oil palm plantation in Indonesia through the NES project. The project covered about 8,000 ha for the plasma farmers and 5,630 ha for the nucleus company. The plantations were developed through PTPX, which eventually became PTPN7. The plasma farmers in this area are divided into five *afdeling*.¹

¹ *Afdeling* refers to a department, branch section, or part of a larger unit.

The oil palm plants were planted between 1981/1982 and 1990/1991. Currently, the plasma farmers are located in Lais and Babat Supat subregencies.

On the other hand, 18 cooperatives manage the plasma farmers of PT Hindoli in Musi Banyuasin. Oil palm plasma farmers started to participate in the project between 1991/1992 and 2000/2001 under the NES transmigration scheme, covering 17,594 ha of oil palm land. In this project, the land where the oil palm plantation was developed is a transmigrated area. Most of the plasma farmers in this area are migrants from Java who moved to South Sumatra through the transmigration program. Plantation development was accompanied by the construction of two crude palm oil processing industries, with production capacity of 100 t/hour and 60 t/hour. The plantation area of PT Hindoli encompasses three subregencies, namely, Tungkal Jaya, Sungai Lilin, and Keluang. A total of 20 villages, covering 8,500 households and 371 community groups, are participating in the project. However, an additional 594 ha of land were also cleared for the oil palm plantation; thus, the total plasma area is 17,594 ha.

Plasma farmers organize themselves into farmer cooperatives so that they can manage the oil palm plantation. Accordingly, the plasma farmers of PT Hindoli have established cooperatives in almost every village, totaling 18 cooperatives to date. On the other hand, PTPN7 plasma farmers formed only one cooperative to manage 4,000 plasma farmers. However, the cooperative has stopped operating since the 2000s. From then on, plasma farmers managed their own lands individually.

Cooperatives play a vital role in managing and developing oil palm plasma plantations, and their performance determines oil palm productivity. Gatto et al. (2017) found that the efficiency of cooperatives and the relationship between the nucleus and the smallholders are the main factors affecting oil palm productivity. Furthermore, Jelsma et al. (2017) found that cooperatives with strong organizational management enable farmers to participate in the supply chain, thereby increasing productivity that would improve rural development and land efficiency.

In this study, the two farmer cooperatives performed differently—the PT Hindoli plasma farmer cooperative performs relatively well, while the PTPN7 cooperative performed poorly, which eventually led to its closure. One indicator of PT Hindoli cooperative's good performance is the continuous increase of its assets, which reached 18.32 billion Indonesian Rupiah (IDR) in 2015. The main task of this cooperative is to manage the plasma plantation and maintain high productivity, thereby increasing smallholders' income and improving their welfare.

Managing the plantation includes ensuring the efficient operations of plantation activities, such as maintenance, harvesting, and marketing of oil palm fresh fruit bunches (FFB). The PT Hindoli cooperative also coordinates with an insurance company for the savings fund allocated for replanting activities. The cooperative has been recognized for its efficient operations and received various awards, such as: (1) best of various jurisdiction cooperatives in Musi Banyuasin Regency in 2007; (2) winner of South Sumatra production cooperative in 2007; (3) first winner of producer cooperative in South Sumatra Province in 2007; (4) best national cooperative in 2008; and (5) roundtable of Sustainable Palm Oil certificate in 2010.

On the other hand, the PTPN7 plantation was formerly managed by KUD Trijaya. The cooperative performed rather poorly and eventually closed. This led to low land productivity, worsening the farmers' welfare. Prior to its closure, all plantation management activities had been conducted solely by plasma farmers, without any regulation from the nucleus companies. Plasma farmers sold low-quality oil palm products to the village trader fetching low price. They established a centralized cooperative with a total of 4,000 members from smaller cooperative units. This organizational structure consequently led to a set of disjointed and fragile smaller cooperatives. In some villages, some plasma farmers attempted to form a joint business group in order to establish an independent cooperative; however, this effort failed. The inefficient structure of the cooperatives also caused operational problems such as the

inability of farmers to replant despite the 30-year operations of the plantation.

A cooperative's performance also affects farmers' access to land. The PT Hindoli plasma farmers have good access to land, as all plasma farmer members have oil palm land certificates. Moreover, most of the PT Hindoli farmers have expanded their landholdings by purchasing land within and outside of the village. The lands were used for independent oil palm production or rubber planting. By 2016, each plasma farm household of the PT Hindoli had more than 2 ha agricultural land and approximately 38.4 percent of the farm households have more than 4 ha of farmland. The PT Hindoli farmers have been able to acquire substantial parcels of land mainly because the plasma farmers, particularly in Srimulyo village, are transmigrants who have been given 2 ha of oil palm plantation land right from the start.

Meanwhile, the PTPN7 plasma farmers have far less capacity to acquire land, as indicated by the number of farmer members who had land certificates. Based on the data from the plantation office of Musi Banyuasin regency, a total of 1,483 land parcels had issues: 293 land parcels had unpublished certificates, 58 had certificates with the government land authority, 385 had unconverted land certificates, and 747 certificates were with the bank due to unpaid loans (UPP Sekayu 2012). The PTPN7 plasma farmers' land issues had hindered the cooperative's replanting activities, since banks and funding agencies required farmers to submit land certificates to obtain financing.

Household Labor Allocation

The productivity of each oil palm plantation was different, and this had implications on a farm household's decision to send its members to the labor market. Agyeman, Asuming Brempong, and Onumah (2014) stated that the variations in the work of agricultural household members are influenced by various factors, such as household income, gender, education, and the number of household members.

Figure 1 shows that most plasma farm households in the study areas send one or two of

Figure 1. Number of working household members, PT Hindoli and PTPN7

their household members to participate in labor market activities. One of the working household members is generally the head of the household while the other is usually the spouse. The number of households that has two working household members indicates the high participation of women (wives) in the labor market. This is a general scenario in Indonesia, which places women as part of the household economic unit. Some farm households in PT Hindoli (9.4%) and PTPN7 (13%) have three working household members.

The jobs of the working household members are categorized into primary job and side job. A primary job refers to work that generates the main household income, performed by the main income earners in the household. On the other hand, a side job is work undertaken in addition to one's main occupation, and is a supplementary source of income. Table 1 shows the primary jobs of the household members of the PT Hindoli and the PTPN7 plasma farmers. More than half of the working members of the farm households work as oil palm plasma farmers. Specifically, 54.0 percent and 66.4 percent of the household members of the PT Hindoli and the PTPN7 plasma farmers, respectively, work as oil palm farmers.

Aside from on-farm activities in the oil palm plantation, most of the PT Hindoli farm household members have jobs that are related to oil palm

Table 1. Main jobs of the family members of PT Hindoli and PTPN7 plasma farm households

No	Main Job	PT Hindoli		PTPN 7	
		Amount	Percentage	Amount	Percentage
1	Oil palm plasma farmer	167	54.0	95	66.4
2	Casual workers of the oil palm	24	7.8	2	1.4
2	Rubber farmers	21	8.6	1	0.7
3	Casual workers of rubber	9	3.7	8	5.6
4	Farmers of food crops	0	0.0	3	2.1
5	Employee of KUD	2	0.8	0	0.0
6	Services	3	1.2	2	1.4
7	Merchants	24	9.8	2	1.4
8	Workshop	2	0.8	0	0.0
9	Teacher-employees	13	5.3	28	19.6
10	Home industry/entrepreneur	0	0.0	2	2.1

Note: KUD = *Koperasi Unit Desa*

production (off-farm). As oil palm production is a lucrative business, the industry is able to create new jobs for the labor force. Farm household members work as casual workers, cooperative employees, and transport workers. About 8.6 percent of the PT Hindoli farm household members work as casual workers and cooperative employees. It is noteworthy that these types of work have attracted the interest of the youth, encouraging them to stay in the village rather than move to other villages or to the city. Most of the casual workers in oil palm plantations are men because plantation work is physically strenuous in nature, compared to tasks required from cooperative employees, which are done by both men and women.

Some of the members of the PTPN7 farm households have nonfarm jobs, primarily as teachers and employees (19.6%). This is mainly because of the low productivity of the PTPN7 plantation, which brought in low income from cultivating oil palm. In addition, since the PTPN7 plantation is close to the capital city of Musi Banyuasin and Betung subregencies, farm households engage in nonfarm employment. The residents have better access to nonagricultural work (e.g., teachers, subregency officials, health workers, and private employees).

Table 1 shows that none of the members of the PTPN7 farm households work in either the cooperative or the workshop since the cooperative

has already ceased its operations. Only a few people (5.6%) work as casual workers in the PTPN7 plantation.

Meanwhile, opportunities for nonfarm employment have also been developing in PT Hindoli in Srimulyo village. Table 1 shows that the number of shop traders and food product traders are the highest among the nonfarm workers in PT Hindoli. Trade grows in line with local consumption needs. However, this village is far from the urban area; thus, the residents' access to similar nonfarm employment is lower than those of the PTPN7 plasma farmers. This situation is in line with Foster's (2011) opinion that agriculture is not the only source of income in most low-income countries. Nonfarm revenues are almost half the total income in rural areas of developing countries. Vargas-Lundius and Lanly (2007) also cited that agricultural labor in most developing countries has been declining—many rural areas are undergoing “de-agrarianization”, in which young workers start looking for jobs outside of the agriculture sector. This then decreases the role of the agriculture sector in employment. Allen (2016) pointed out that the employment structure in Indonesia has changed over time. In 1986, 54.4 percent of the workforce worked in the agriculture sector, 22.8 percent in the industry sector, and 15.6 percent in the services sector.

Some of the plasma farm household members in both areas have side jobs. The lower the income a farm household earns from farming activities, the more that the household members would get additional work. This occurs in the villages of the PTPN7 plantation, where some of the residents have additional jobs to increase their income. The most common type of side job in both areas is working in the rubber plantation (Table 2). On the other hand, oil palm farmers usually grow rubber because it can be complementary to oil palm production. If oil palm prices are falling or if the production is low, they may still earn from working in rubber plantations. Conversely, if the price of rubber is falling, then they can still earn from working in oil palm plantations. In addition, having rubber plantations adjacent to oil palm plantation balances out the ecosystem because monoculture farming is avoided. The land in both areas is also suitable for rubber production. Since the ancient times, Musi Banyuasin regency has been the center of rubber production because rubber can thrive in this region.

The second most popular side jobs in Srimulyo village are as traders and service workers, while in PTPN7, these are as teachers or employees. The different types of side jobs available in the study areas are consistent with

the availability of employment opportunities and the potential of the village. The economy in Srimulyo village has flourished mainly because the oil palm plantations in the area are highly productive. The high revenues that can be gained in this village have an impact on the needs of other communities, thereby creating trade jobs. In addition, the thriving oil palm industry in this area has created employment opportunities for the residents. For example, people have been employed to transport FFB from the village to the factories. Srimulyo village is far from the center of regency government; thus, only a low proportion of the workforce in the area works in public service.

Meanwhile, the most popular nonfarm side job in PTPN7 is as teacher or employee, since PTPN7 is adjacent to the regency center. Also, many of the children of the plasma farmers acquired higher education, and they work as teachers or employees. These jobs generally offer higher salaries than those offered in the agriculture sector.

Income Inequality of Oil Palm Plasma Farmers

The productivity of the oil palm plantations and the rate of participation of the household members in the labor market have a direct effect

Table 2. Side jobs of plasma farm household members of PT Hindoli and PTPN7

No	Main Job	PT Hindoli		PTPN 7	
		Amount	Percentage	Amount	Percentage
1	Oil palm farmers	0	0.0	5	7.5
2	Rubber farmers	43	44.8	25	37.3
2	Employee of KUD	8	8.3	0	0.0
3	Services	16	16.7	4	6.0
4	Trade	13	13.5	3	4.5
5	Workshop	1	1.0	0	0.0
6	A Casual worker of oil palm	5	5.2	0	0.0
7	A Casual worker of rubber	5	5.2	9	13.4
8	Teacher, employees	2	2.1	7	10.4
9	Farmers of food crops	0	0.00	11	16.4
10	Others	3	3.1	3	4.5
Total		96	100.0	67	100.0

on a farm household's income. Rist et al. (2010) found that oil palm is a profitable crop, such that the income of oil palm farm households is generally higher than that of other farm households. Meanwhile, Khrisna et al. (2016) cited that the benefit of oil palm production depends on some conditions. They asserted that the economic benefits of oil palm production could only be obtained through good cooperative management and through a mutual benefit of the nucleus-plasma relationship.

Table 3 shows that the average household monthly income of PT Hindoli plasma farmers is IDR 4.17 million (USD 302.00),² whereas the per capita income is IDR 1.31 million (USD 95.00). Meanwhile, the household income and per capita income of PTPN7 plasma farm households amount to IDR 3.04 million (USD 220) and IDR 698,000 (USD 51), respectively. The household monthly income of smallholders in both locations is higher than the agricultural minimum wage of Musi Banyuasin regency in 2015, and the poverty line of the regency in 2014, which amounts to IDR 357,567 (BPS 2015). This shows that plasma farm

households in both regions have high income.

There are variations in the household incomes of the sample farm households based on household characteristics. Male-headed households generally have higher income than female-headed households (Table 3). Male heads generally have complete household members who are still productive—they can still work in jobs outside the oil palm plantations or own more substantial lands. Meanwhile, female-headed households generally consist of older household members who are no longer productive. Their household incomes come from only one source, working in oil palm plantation.

Militaru and Stanila (2015) found that household income is influenced by the education level of the household head. This view is consistent with the results of this study, which show that the educational level of the plasma farm household heads in the study areas positively impacts household income. Household heads with higher education generally have side jobs, such as teachers, field supervisors, and traders. The additional income from the side jobs is the primary factor

Table 3. Average household monthly income and per capita income (IDR) of plasma farmers

Information	PTPN7			PT Hindoli		
	Household	Per Capita	N	Household	Per Capita	N
<i>Sex of Household head</i>						
Men	3,661,583	1,216,583	73	4,200,400	1,224,916	125
Women	2,987,095	655,388	6	3,917,692	2,146,923	13
<i>Education of Household head</i>						
Elementary or below	2,595,153	623,217	39	3,994,533	1,328,072	103
Junior high school	1,859,230	448,864	13	4,140,550	1,133,179	20
Senior high school	4,082,130	802,493	23	4,872,200	1,448,700	10
Diploma and above	5,189,375	1,636,196	4	6,602,000	1,416,500	5
<i>Age of Household head</i>						
≤ 39	4,522,846	839,862	13	4,902,850	1,201,720	20
40–49	2,695,975	567,282	20	4,142,604	1,120,061	48
50–59	3,251,310	744,646	21	4,616,857	1,509,376	35
60 +	2,361,340	689,658	25	3,356,800	1,439,971	35
<i>Average</i>	3,038,322	698,010	79	4,173,768	1,311,771	138

Note: One household was excluded from this table because the income was too high at IDR 40 million per month.

² USD 1 = IDR 13,800 (2016)

that increases household income. Furthermore, some households with highly educated household heads have more than 4 ha of land.

The trend in the household incomes of PTPN7 and PT Hindoli farm households based on the age group of the household head shows that the older the age group is, the higher the income per capita would be. In the age group $39 \leq$ years old, the average per capita income of PT Hindoli farm households is IDR 1.2 million, while in the 60 and above age group, the per capita income is IDR 1.44 million. Households with older heads have lesser number of household members, as some of them have already left the household to form their own families. Nevertheless, the age of the household head does not affect land productivity because land management is left entirely to the cooperative.

The PT Hindoli farm households have higher income because the plantation managed by the cooperatives is very productive. About 75.6 percent of the PT Hindoli farm household income is derived from the income gained from producing oil palm. Plasma farmers also invest in other commodities (e.g., rubber) to have additional income. On the other hand, household income in the young age group is relatively low because most of these households work only as casual workers in oil palm and rubber plantations with low wages. They also have not been able to invest in plantations independently because they are still financially constrained.

Unlike the PT Hindoli plantation, PTPN7 has low productivity, thereby pushing most of the farmers to look for additional income from nonfarm activities. Some of the plasma farm households in this village have left oil palm farming because the operational costs have become higher than the income gained. Oil palm is a commodity that is no longer profitable to PTPN7 farmers. The research data show that the average income earned by PTPN7 plasma farmers from oil palm farming is IDR 1.01 million per month. The low income of oil palm in this area is due to the unproductive age of the plants (27–34 years).

On the other hand, PTPN7 oil palm farmers have not received assistance from their nucleus

companies for proper crop maintenance and management. The farmers also usually encounter issues during replanting as they do not have savings for replanting. This has directly led to the high production costs of managing the plantation and low land productivity. Consequently, PTPN7 plasma farm households have to find additional income from work unrelated to oil palm production.

The results of this study show that the household income share from oil palm production is relatively low at 33.4 percent. This figure is lower than the share of farmers' income from the agriculture sector in South Sumatra in 2013 (79.3%) and from the national rate (53.6%). The low income earned by plasma farmers from oil palm production is mainly because the plantation has been managed poorly by both the smallholders and the independent farmers.

The results presented in Table 4 explain the functional relationship between the income of the plasma farm households and the variables that indicate the socioeconomic characteristics of the sample households. Overall, the type of nucleus company³ has a negative and significant effect on the plasma farm households' income. This can be seen in the household income of PT Hindoli plasma farmers, which is much higher than that of the PTPN7 plasma farm households. This is mainly because the cooperative that the former belongs to is well managed, unlike in the latter. Moreover, the nucleus company and plasma farmers in PT Hindoli have a mutually beneficial relationship. Consequently, the oil palm plantation is well managed and highly productive. On the other hand, the cooperative in PTPN7 has stopped operations since the 2000s. Oil palm plantations in this area are no longer productive because the oil palm in these plantations are beyond the productive age and do not receive optimal treatment.

The results also show that the higher income share from oil palm production decreases the income of plasma farm households. Therefore, diversifying household livelihood sources should

³ The types of nucleus company in this research are private company (PT Hindoli) and state company (PTPN7).

Table 4. Determinants of oil palm farm household income

Explanatory Variable	All Plasma	Plasma of Hindoli	Plasma of PTPN7
(Constant)	8.125***	7.513***	9.110
Sex of head (Male=1)	-.171	-.240	-.584
Age of head	-.103	-.045	-.248
Age	.001	.000	.002
LYS	.567	.093**	-.028
Number_working	.029***	.272	.992**
Share_OP	-.035***	-.046***	-.026**
Land area	.170***	.122**	1.054***
Nucleus (state=1)	-1.529***	-	-
R ²	.323	.395	.323
N	217	138	79

Note:

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, respectively

Dependent variable: household income (in Million IDR)

LYS = long years of schooling

be an alternative strategy to increase the income of the farm households in the study areas. This result is consistent with the findings of Davis et al. (2010), which reports that rural economic nonfarms must be a component of growth strategies. Growth from rural economic nonfarms will be followed by general economic growth and by the development of the agriculture sector itself. Carletto et al. (2007) state a positive trend between household welfare status and household participation in nonagricultural activities. Low-income farm households will try to meet their needs through nonfarm activities or work (Carletto et al. 2007).

Table 4 shows that the long years of schooling of household head (LYS) has a significant and positive impact on the household income of PT Hindoli plasma farmers. However, it has an insignificant effect on the income of PTPN7 farm households. This difference in the effect is due to the differences between the employment opportunities available to the household heads with high educational level from those with low educational level. The PT Hindoli oil palm plantation is highly productive, creating job opportunities for workers. Accordingly, the higher the educational level that a household member possesses, the more nonagricultural job opportunities that he/she will have, and the more likely that household income will increase.

Meanwhile, the number of working household members (number_working) has a significant effect on the income of PTPN7 farm households. However, the same variable has an insignificant effect on the income of PT Hindoli farm households. This difference in the effect is due to the differences in the share of household income from oil palm production between the two farm household groups and the differences in the plantation management models applied by the PTPN7 and the PT Hindoli plantations. The PT Hindoli is managed entirely by cooperatives, while the cooperatives in PTPN7 have already ceased their operations. Moreover, the income share from oil palm production is higher in the PT Hindoli farm households.

Conclusion

The plasma farmers of a state company (PTPN7) and a private company (PT Hindoli) have differences in household incomes, as a result of the differences in the organizational performance of the cooperatives under each company, and on the relationship between the nucleus company and the smallholder farmers. The PT Hindoli plasma farmers earn substantial income from oil palm production due to the healthy performance of the cooperative supporting PT Hindoli. Meanwhile,

the farm households of PTPN7 earn minimal income because the cooperatives that are supposed to assist the farmers did not perform well.

Most farmer groups in Indonesia suffer from organizational underperformance, which has become an obstacle to sustainable production. The underperformance and poor management of many organizations bring about poor practices in oil palm production, which consequently lead to low productivity and farmers' poverty. Therefore, strengthening farmer organizations (cooperatives) should be the first step to increase the income of oil palm farmers. However, even well-managed cooperatives can also have limited development if they are involved only in crop production. Hence, farmer organizations should be given a more significant role in the development of activities, such as in the processing of FFB and engaging in the downstream products of oil palm. Accordingly, farmers could earn higher income from off-farm activities, to the extent that they no longer have to expand their production area. Excessive expansion will impact the ecological balance of the environment.

The disparities in the household incomes of oil palm smallholders will have an impact on job sustainability because an oil palm plantation has a life cycle of up to 26 years only. Thereafter, the oil palm crop needs to be replanted because overmature oil palm plants will no longer be productive and profitable. The low income earned from overmature oil palm plants will have an impact on farmers' ability to replant, impacting on job sustainability. The preparation for oil palm replanting is usually programmed, and the farmer organization is normally responsible for collecting the dues and fees that would finance the replanting activities. However, many farmers do not follow the program. Hence, when the time for replanting is already at hand, the plasma farmers cannot provide the needed funds for this activity. In this study, the PTPN7 plasma farmers in Musi Banyuasin regency belong to this kind of farmers who are not able to save and finance the needed replanting activity. Consequently, oil palm replanting is usually delayed, with some plantations reaching more than 30 years. This inevitably causes

low productivity and poor income. On the other hand, PT Hindoli has been able to effectively plan and prepare for replanting. Thus, most of the farmers in this plantation have the funds to finance replanting.

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