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Penulis	Imron Zahri, Elisa Wildayana, Agus Thony Ak, **Dessy Adriani**, and M. Umar Harun
Institusi	Faculty of Agriculture, Universitas Sriwijaya, Palembang, South Sumatra, Indonesia

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Converting Impact of Rice Farming to Oil Palm Plantation on the Socio-Economic Aspects of Ex-Migrants in the South Sumatra Tidal Swamp, Indonesia

Imron Zahri[1], Elisa Wildayana[1], Agus Thony Ak[2], Dessy Adriani[1,*], And M. Umar Harun[1]

[1]*Faculty of Agriculture, Universitas Sriwijaya, Palembang, South Sumatra, Indonesia*
[2]*Faculty of Agriculture, Universitas* Sjakhyakirti*, Palembang, South Sumatra, Indonesia*

*Corresponding author: dessyadriani@fp.unsri.ac.id

Abstract: This paper aims to investigate converting impact of rice farming to oil palm plantation on the socio-economic aspects of ex-migrants in the South Sumatra tidal swamp, Indonesia. Land conversion belongs to an adaptation form of ex-migrant farmers occurring from rice farming to oil palm plantations and it will increase food deficits in Indonesia. Ex-migrant farmers initially cultivated food crops with conventional technology and has been changing which led to form two large groups of farmers, namely rice-based farming that implementing mechanization and oil palm-based plantation. These changes have resulted in increased arable land, reduced labor allocation and increased farmer income. Income of rice farming farmers was slightly higher compared to oil palm-based farmers. Beside carrying out the main activities of rice farming and oil palm palantation, around 42% of farmers participate in other farming activities (on-farm) and 47% participate in out-farm activities. The main determinant factors of farmers to participate in out farm activities are ownership of arable land, age of farmers, number of members and family labor. While the factors influencing the household income of farmers are ownership of arable land, age of farmers,

number of members and family labor, and farmer participation in onfarm activities.

Key words: rice farming, oil palm, farm, income, tidal swamp

Introduction

Rural development in Indonesia was carried out including the transmigration program, which has moved Javanese to outside of Java sponsored by the government. Java covering only 6% of Indonesia is inhabited by 57.5% of Indonesia's population. The first transmigration program to tidal swampin Indonesia occurred in 1969, namely to Delta Upang in South Sumatra Province. After that there was a massive population movement to the tidal swamp that lasted until the 1990s. The transmigration program was carried out by developing rice-based agriculture as a new livelihood in the destination area. Through the tidal swamp transmigration program, it is purposed to this region as a center for rice production.

Not all migrant farmers have successed to manage rice farming in new areas and their lives are partly performend by poverty (Adriani et al. 2017). Therefore in their development some rice farming converted into oil-palm plantation. This land conversion has caused that farmers cultivated agricultural plants not on their land suitability (Armanto et al. 2013) and have changed their household income (Wildayana 2017). Besides that, it has caused environmental issues, and changes in the socio-economic aspects of the farming community (Zahri et al. 2018 and Wildayana and Armanto 2018).

Oil palm plantations in tidal swamp has contributed to the development of oil palm in Indonesia, and this has raised a number of issues. Developing oil palm plantations in Indonesia has caused deforestation which has an impact on increasing carbon dioxide emissions (Abood at al. 2014; Vijay at al. 2016) and affects biodiversity (Konopik at al. 2015, and Ganser at al. 2016).

Increasing such issues because of the land clearing of forest and peatland for oil palm plantations. For land conversion from rice farming to oil palm palatation, environmental issues are highly dependent on the initial land

condition to change the function. Another problem is that arable land for rice will be reduced which decreasing in rice production as a staple food for the Indonesian population.

Oil palm plantations have become economically very profitable crops and have improved the lives of poor rural communities in Southeast Asia (Wilcove and Koh. 2010), requiring less labor than rubber plantations (Krishnaa at al. 2016). Therefore it needs to be investigated how the socio-economic impact of farmers if oil palm plantations is cultivated on the previous rice farming by comparing the socio-economic conditions of rice farmers who still consistently grow rice with the socio-economic conditions of oil palm farmers.

Based on the above description, this study was carried out with the aim of (1) to describe the productive economic business structure of ex-migrant farmers in tidal swamp that consistently carry out rice farming and who convert land into oil palm plantations, and (2) to analyze determinant factors and the impact of change cropping patterns on the income structure of migrants in tidal areas.

Process of Population Migration

The Indonesia population which had been moved in the period 1905-1942 was 235,802 people, originating from Java with the destinations of Sumatra and Sulawesi. In the period of 1969 until around 2000, the population of no less than 1 million families or around 4 million people from Java left the island of Java. The transmigration program to tidal swamp in Indonesia first occurred in 1969, namely to Delta Upang in South Sumatra Province. The area of the transmigration program was conditioned like the atmosphere on Java, so that transmigrants to South Sumatra Province in 1937 built irrigation networks, namely to Belitang and Tugu Mulyo which are now centers of rice production. Until 1990, the South Sumatra Province was the largest recipient of transmigration program.

In the destination area of the transmigration program, the government built drainage networks from the surrounding rivers and these rivers are considered as the primary channel for an irrigation network. This drainage network in addition to regulating the entry and exit of water is as a result of rising and falling or the ebb and flow of sea water, and also used as a river transportation route. The topographic

conditions of most tidal swamps are 0.5-2.25 m above sea level. Initially the tidal area that became the transmigration destination was categorized as a marginal area or sub-optimal land area, meaning that this area carries a large risk and requires a large amount of effort if converted into agricultural land. But in reality most former migrant farmers continue to carry out agricultural activities despite changes in their agricultural business.

At the beginning of the arrival the farmers were given a land area of 0.25 ha for business land and 2 ha for food crops. The livelihoods of the ex-migrant population were mostly as food crop farmers (rice and corn). During the initial five years of their arrival, these migrants received guidance from the Indonesian government (the Ministry of Manpower and Transmigration), and for the first three years migrant households received food aid from the government because migrants have not been able to cultivate agricultural land. After five years, guidance is given to the local government. The process of adaptation of migrants is very slow and they generally have difficulty farming rice due to lack of capital, lack of labor, lack of appropriate technology, pest and plant diseases. Because it was around 15 years since his arrival, some migrants tried to divert agricultural business from rice monocultures to multicultural activities including the development of plantation businesses. After that, some farmers developed plantation monocultures, especially oil palm plantations in partnership and independent patterns.

Occurring Changes

Most changing took place around the year of 2000, namely: (1) Changing in rice cultivation techniques from conventional to mechanization in terms of processing land by tractors, planting rice with direct seed stocking systems (tabela) without nursery, and harvesting using combine harvester. Mechanization of rice farming causes crop rotation systems between the rainy and dry seasons, namely the rice-rice and rice-maize cropping patterns. (2) Changing from rice farming to oil palm plantation. The business of smallholder oil palm plantations is partially cultivated with a core-plasma system (contract system with plantation companies) and partly with independent business plantations. So with these changes, in the tidal swamp there are two large groups of ex-migrants, namely groups of farmers who maintaining a pattern of agriculture based on food crops (rice and corn), and groups of farmers who converting food land into oil palm plantation land, coconut and rubber. In the

Delta Upang which is the first time migrants have come to tidal areas of South Sumatra, now around 75% have become coconut plantations. In the Air Salek, transmigrants came around in 1982, some of them had carried out rubber plantation business. Whereas in almost all locations oil palm plantations are cultivated in areas that are narrow to very wide by ex migrants. Changes in plantations carried out by farmers as stated by Euler at al. (2016) are driven by geographical location and related contextual factors, such as access to markets and processing plants. The oil palm plantation in the research area was carried out first in 2005, which was partnered with a nucleus plantation company, so that oil palm plants are currently around 12 years old. It is estimated that the area of agricultural food crops remaining is less than 50%.

Research Methods

This research was conducted in South Sumatra Province with the consideration that in this province there are rice production centers which are cultivated in ex-migrant rice fields. The tidal swamps are located in along Eastern part of South Sumatra. The tidal swamps in Indonesia are estimated at 20.11 million ha, tidal swamps which have the potential for an agricultural business of 9.53 million ha and which have been reclaimed covering an area of 4.17 million ha. The reclaimed tidal swamps for the most extensive transmigration program in Indonesia are in South Sumatra Province covering 0.38 million ha.

The research location was determined by purposive sampling, namely Banyuasin District by taking five sample villages (i.e. Banyu Urip, Tungkal Ilir, and Sumber Hidup) whose farmers still carried out a monoculture pattern of rice, whereas villages of Sukadamai, Tungkal Ilir, and Pulau Rimau whose farmers have changed their cropping patterns to oil palm plantations.

This research was done using a survey method with primary data collection in five villages. Around 50 respondents taken by random sampling were interviewed in each village because the average population of each village in South Sumatra was a maximum of 500 households, meaning that each village on average was taken as much as 10% of the population. Thus the total number of respondents chosen was 300 respondents, and the sampling technique used

was Disproportionate Random Sampling. The research sample framework is presented in Table 1.

Table 1. Research locations and number of samples

Cropping	Villages	Respondents (farmers)
	Banyu Urip	50
Rice	Tungkal Ilir	50
	Sumber Hidup	50
	Sukadamai	50
Oil palm	Tungkal Ilir	50
	Pulau Rimau	50
Total		300

Empirical Model Specification

The agricultural production process is defined as the conversion of inputs to produce output that referring to the paradigm, namely there is a connection between production (Y) and the environment (E) and input management (M) which can be formulated as follows:

Y = (E, M) ……(1)

Whereas:

Y = production

E = environment

M = input management

Production is influenced by input management on environmental conditions described by certain ecosystems, while ecosystems can also influence input management. The input of agricultural production is sourced from inside and outside the farmer's household. Inputs owned by farmer households are agricultural land, labors and capital. In addition, the demographic aspects of the family such as age, farming experience and education will affect the management of farming, so that it is included as a variable that affects change and at the same time towards production and income. If the farmer's household has a lot of free time, it has the potential to influence income diversification or determine the structure of farmer's household income.

In general, the equation model to analyze the relationship between the dependent variable (Yi) and the independent variable (Xi) according to Gujarati (1978) is described as follow:

$Y_i = \beta_0 X_i^{\beta 1} e^{ui}$ ……(2)

Whereas:

Yi = dependent variable

Xi = independent variable

β_0 = Intercept

β_1 = Coeficient Regresion

Where u_i is a disturbance factor or commonly referred to as the standard error or error of an equation function. u_i states the combined effect (of non-independent variables) of a large number of independent variables that are not explicitly raised in the regression model. The u_i value can be defined as follows:

$Y_i = \beta_0 + \beta_i X_i + (u_i - \bar{u})$ ……(3)

Whereas:

Yi = dependent variable

Xi = independent variable

β_0 = Intercept

β_1 = Coeficient Regresion

u_i = The combined effect (of non-independent variables) of a large number of independent variables that are not explicitly raised in the regression model.

One of the important assumptions in using the parameter estimator of the regression model with the least square method is the homokedastic residual error, meaning that the variable non-free (Yi) is constant. Classic normal linear regression which assumes each u_i is normally distributed:

Average: $E(u_i) = 0$ …… (4)

Variance: $E(u_i) = \sigma^2$ ……(5)

Cov (u_i, u_j) : $E(u_i) = 0$ $i \neq j$ …… (6)

Assumption briefly can be stated:

$u_i \sim N(0, \sigma^2)$ …… (7)

Distribution of u_i values is assumed indenpendtly and identic, thus value follows:

$\sigma^2 = \sigma_{u_i}{}^2 - \sigma_{\bar{u}}{}^2$…… (8)

The first equation in this study is to use the logistic (logit) regression model equation, a regression model used to measure the effect of probability on an event, in general the logit regression equation is:

$\text{Ln}\left[\frac{P}{1-P}\right] = \alpha_3 + , \beta_i \text{ Ln } X_i + u_i$ ……..(9)

The second stochastic empirical model used is the Cobb-Douglas type non-linear regression model. As for general statements written in the form of natural logarithms (ln) the equation becomes:

$\text{Ln}Y_i = \text{Ln } f (X_i, \beta) + u_i$…… (10)

In this regression analysis the variables are broad ownership of arable land (LPL), age of husband (USU), number of family members (JAK), male active labors (TKP), male female labors (TKW), education (EDU), main work (D1), other on-farm activities (D2), and out-farm activities (D3), as well as farm household income (INC), and the model is compiled as follows:

$K= \text{Ln}\left[\frac{P}{1-P}\right] = \text{Ln}\alpha_i + \beta_{1\ln}\text{LnLLG}_i + \beta_2\text{LnUSUi} + \beta_3\text{LnJAKi} + \beta_4\text{LnTKP}_i + \beta_5\text{LnTKW}_i + \beta_6\text{LnEDU}_i + \beta_7\text{LnD}_{1i} + \beta_8\text{LnD}_3 + \varepsilon_{ij}$ …… (11)

$\text{Ln INC}_{ij} = \alpha_3 + \beta_{31}\text{LnLLG}_i + \beta_{32}\text{LnUSU}_i + \beta_{33}\text{LnJAK}_i + \beta_{34}\text{LnTKP}_i + \beta_{35}\text{LnTKW}_i + \beta_{36}\text{LnEDU}_i + \beta_{37}\text{LnD}_{1i} + \beta_{38}\text{LnD}_{2i} + \beta_{38}\text{LnD}_{3i} + \varepsilon_{ij}$ ……(12)

Whereas:

i = 1, 2, 3, ……n

LPL = broad ownership of arable land USU = age of husband

JAK = number of family members

TKP = male active labors

TKW = male female labors

EDU = education

D1 = main work

D2 = other on-farm activities

D3 = out-farm activities

Results and Discussion

Characteristics of Farmer's Households

The demographic sampling characteristics of farmer's households can be seen in Table 2. Table 2 shows that there are not many differences in variable characteristics of demographic aspects, such as age, number of family members, active male workers and active female workers in each households with different cropping patterns, except the average year of education.

The average husband's age as the household head is 46.44 years and the average wife's age is 41.09 years. On average the total number of family's members of rice farmers is four people compared to the number of family members of oil palm farmers with an average number of family members of three people.

Table 2. Characteristics of demographic aspects of farmer's households

Variables	All Sample (N=300)		Rice (n=150)		Oil palm (n=150)		t-siq
	Mean	Sd	Mean	Sd	Mean	Sd	
Husband's age (years)	46.44	11.85	45.69	12.39	47.19	11.29	0.165
Wife's age (years)	41.09	12.58	39.90	13.92	42.27	10.99	0.041
Family members (people)	3.46	1.19	3.76	1.13	3.15	1.17	0.214
Active male workers	1.56	0.70	1.59	0.70	1.53	0.70	0.872
Active female workers	1.49	0.69	1.52	0.70	1.45	0.67	0.398
Average education (years)	7.51	3.50	6.50	2.51	8.53	4.02	0.000

Active male workers in rice farming and oil palm households have an average of 1.5 people. Female workers who are active in rice farming households are slightly higher compared to oil palm farmer households. The potency of farmer household labors also varies, the leisure time amount of each farmer is not comparable to the farmer's labor requirements for rice farming and oil palm plantations which needed relatively small labors. It allows the allocation of labor to other productive economic activities which will have an impact on the amount of farmer household income. The average education of each member of the oil

palm farmer household is 8.53 years greater than the rice farmer of 6.5 years. Oil palm farmers have an educational level approaching junior high schools (SMP), while rice farmers are slightly higher than elementary schools (SD).

Description of Agricultural Business

The description of the agricultural business is described in the form of business scale, labor use and land productivity as can be presented in Table 3. The farm size is seen from the number of fields (plots) of arable land and the area of arable land. In general, farmers have more than one parcel of land, which is an average of 1.43 units of arable land. The area of arable land owned by each farmer is on average 1.96 ha, where the area of arable land based on different cropping patterns is not significantly different, namely oil palm farmers have 1.96 ha wider than the average coconut farmer 1.95 ha . Most farmers have more than one parcel and more than 1 ha of arable land which was caused by displacement of land ownership, causing land fragmentation, especially through buying and selling of arable land.

Table 3. Characteristics of farmer agriculture

Variables	All Sample (N=300)		Rice (n=150)		Oil palm (n=150)		t-siq
	Mean	Sd	Mean	Sd	Mean	Sd	
Land unit total	1.43	0.57	1.40	0.61	1.45	0. 30	0.34
Land size (ha)	1.96	1.23	1.96	1.40	1.95	1.03	0.02
smallholders (%)	5.33		10.00		0.67		
Labors (working days, HOK)			19.09	9.11	18.00		
Rice productivity (ton)			4.37	1.78			
Oil palm productivity (ton)					9.12	6.18	

Explanation: Smallholders or gurem farmers is defined as small farmer having land of less 0.50 ha or not having

Most small farmers, who have adopted oil palm, are expanding their cultivated land. In tidal swamps farmers adopt oil palm by replacing their rice farming on the same land and there is a tendency to not be able to expand their planting area except by buying other lands. Thus it is natural that the cultivated area of rice farmers is not much different from the area of oil palm.

Rice farmers have cultivated areas that vary with the number of smallholders (cultivation < 0.50 ha) by 10%, while oil palm farmers are hardly

varied (only 0.67%). Before the change in rice technology and the change to oil palm plantations, there were farmers who were less successful in rice farming, some had moved to other areas to look for a better life, so their land was bought by local villagers. Another cause has been the inheritance of cultivated land from parents to their children, although this inheritance is still a little done by farmers.

The use of family labor for rice farming averages 19 HOK per planting season. The use of family labor on an average of 19 HOK on their cultivated land of 1.96 ha for a single growing season is very little. This is due to the development of mechanization in rice farming activities. Especially for rice harvesting, if all this time using human labor, each 1 ha takes about 25 HOK, while using a harvesting machine for each 1 ha takes only about 4 hours. The development of mechanization has increased the ability of farmers to work on a wider area, which is now an average of 1.96 ha per family. But if using human labor, the ability of farmers to work on land is only around 0.7 ha. According to Otsuka at al (2016) that agriculture in Asia is dominated by small-scale agriculture, and small-scale agriculture generally uses labor-intensive production methods. However, in tidal swamps with the discovery of new ways and the development of agricultural mechanization it turns out that rice farming is changing from labor intensive to capital intensive and farmers are no longer short of labor for some rice farming activities. Starting from the cultivation of land that has used a hand tractor and the use of a small family labor. Seedlings are no longer done because they have been replaced with tabela (direct seeding). Harvesting which initially used family labor and hired labors were replaced by using a combining harvester (harvesting machine).

The use of oil palm farmers is not much different in number compared to rice farming. Oil palm farmers who have partnered with nucleus estates (located in Sukadamai Village) do not use labor for their plantation because all activities are carried out by officers from cooperatives (KUD). All farmers are members of cooperatives that partner with core companies, and this is done because there is very little labor demand for oil palm plantations. Whereas oil palm farmers in two other villages (Tungkal Ilir and Pulau Rimau), are farmers who adopt oil palm plantations independently working on their management by using family

labor or by using hired labor. The average labor requirement for each 2 ha of oil palm plantations for each 6 months is only around 18 HOK, namely for 12 HOK harvests, 2 HOK weeding, 2 HOK fertilization, and 2 HOK other activities. Because of this the time of the family workforce is very large, allowing farmers to develop other productive economic businesses. So the use of labor is very little, and this is in line with the research of Krishna at al. (2016) which says that oil palm farmer households need less labor than rubber as the main alternative crop.

Rice productivity is around 4.8 tons/ha per planting season, so if farmers do a double rice planting in a year, then rice productivity can reach 9.6 tons/year. But most farmers grow corn for the second season, which is between April and July with a productivity of around 7 tons per planting season. Most farmers do farming with two planting seasons, and this condition causes rice farmers to have a higher income than farmers in oil palm plantations. This is the cause, as said earlier, that farmers in these tidal areas have found efficient farming methods, with good results and very little use of labor.

Palm oil plantation productivity averages 11.04 tons of fresh fruit bunches (FFB)/ha per year. If it is compared with the results of other plantations producing at least 24 tons/ha per year, such productivity is very low at less than 1 ton/ha per month and varies in a year. The low productivity is influenced by several things, namely the lack of optimal plantation maintenance by farmers such as low fertilization and pest and disease control is still limited.

Before mechanization technology in rice farming in tidal swamps was developed, there were problems with labor shortages and there was even a tendency for farmers to change cropping patterns like shifting cultivation and return using old technology. If this is applied, it will reduce land productivity. This is in line with the situation in Ethiopia as stated by Brhanu. (2018) that agriculture-based livelihood strategies are not in line with sustainable land use practices and result in decreased land productivity. But after the development of mechanical technology adopted by rice farmers, turned out that it could increase productivity. Adoption of oil palm plantations can actually increase land productivity compared to rice farming before using mechanical technology.

Income of Farmer's Households

The income of farmer's households can be analysed in terms of source and amount of income and it is summarized in Table 4. The average farm household income is Rp. 54.19 million per year, and the income of rice farmers averages Rp. 56.27 million per year is greater than the average oil palm farmer's income of Rp. 52.12 million per year. Revenue of Rp. 54.19 million is equivalent to US $ 3,612 per year, equivalent to US $ 1.68 per person per day. Such figures show according to the size in Indonesia that farmers in tidal areas who seek rice and oil palm are on average above the poverty line.

Viewed from the source of income, the income of rice farmers comes from agricultural businesses 81.60% and outside agriculture 13.06% (off-farm). While oil palm farmers who have an income of Rp. 52.12 million per year comes from agriculture 87.76% and outside agriculture 12.24%. In addition to rice and/or oil palm plantation as a main business, farmer households also have other farming jobs and work outside of farming. Oil palm farmers who work on other farms account for 40.67% and work outside agriculture by 50%, while rice farmers accounted for 43.33% working outside farming and 43.33% working outside agriculture. This condition shows that farmers do not only do a single business, but they have developed multiple businesses or diversified household businesses. In line with that, as stated by Pastusiak at al. (2017) that agriculture is one of the most risky businesses, farmer households therefore try to diversify their sources of income and carry out other strategies that aim to stabilize their income by off farm activities. Krishna at al. (2016) says that oil palm farmer households need less labor and this allows more labor to be allocated to off-farm activities or to expand their agricultural land.

Table 4. Income of farmer households

Variable	Unit	All Sample (N=300)		Rice (n=150)		Oil palm (n=150)		t-siq
		Mean	Sd	Mean	Sd	Mean	Sd	
Total income	Mill Rp/year	54.19	33.74	56.27	41.90	52.12	22,80	0.287
	%	100,00		100,00		100.00		
Rice/oil palm Income	Mill Rp/year	39.49	27.15	38.42	29.34	40.56	24.83	0.496
	%	72.94		68.05		77.82		
Other on farm Income	Mill Rp/year	7.82	15.11	10.47	20.00	5.18	6.63	0.002
	%	14.24		18.55		9.94		

Non-agriculture Income	Mill Rp/year %	6.88 12.65	19.74	7.37 13.06	21.53	6.38 12.24	10.00	0.607
Working on other farm income	%	42.00		43.33		40.67		
Working on off-farm	%	46.67		43.33		50.00		

Based on the description of the income above, it appears that the welfare of rice farmers is slightly better than that of oil palm farmers. This means that by only looking at the reality in terms of income, the change in cropping patterns from rice to oil palm plantation will actually reduce farmers' income. With the conversion of land from rice farming to oil palm, it will harm the farmers individually and also reduce food production (rice and corn), so that the supply of food will be disrupted. Indonesia experienced a rice deficit as experienced by several countries such as Ghana (Coffie at al. 2016) and Kenya (Atera at al. 2018). If the land conversion from food crops (rice and corn) into plantation crops or other uses continues to occur, it will disrupt food security in Indonesia. The problem of transferring this land must be stopped because it will disrupt Indonesian rice production. According to Euler at al. (2016) that concessions that have been allocated by the government to oil palm companies in the past have led to the adoption of oil palm in the small agricultural sector, and the dynamics of subsequent land use are largely out of government control. So the government should have implemented a policy so that the conversion of rice land into oil palm plantations was immediately controlled. Especially after it was discovered that land conversion from food crops to plantation crops did not increase the area of arable land, it did not significantly reduce labor use and did not increase farmers' income.

Analysis of Factors Affecting Farmers' Income

Farmer income comes from the main business income (rice or oil palm), other agricultural business income and farmer participation in activities outside of agricultural business. Farmer's household free time is very large, and the choice of farmers to participate in out farm activities is certainly influenced by land ownership factors as the main source of income for farmers and family

demographic aspects. The equation for estimating logit functions is used to determine the determinants of farmer participation working in out-farm business activities as can be seen in Table 5. The determinant factors of farmers to participate in out-farm activities. It can be seen that there are five variables that influence the choice of out-farm activities, namely the area of land owned, the number of active male and female workers has a negative effect, and the age and number of family members have a positive influence on the choice of participating in off-farm activities.

Table 5. Factors influencing the choice of farmer participation in out-farm activities

Dependent variable : Choices work on off-farm activities (Y_2)

Independent variable	Regression coef.	Std error	Sign
LPL	-.482*	.223	.033
USU	1.892**	.564	.001
JAK	.906**	.441	.004
TKP	-.760*	.0.387	.050
TKW	-.743*	.389	.056
EDU	-.046	.282	.871
D_1	.024	.387	.951
D_2	-.336	.384	.382
Constant	-7.904	2.425	.001

Farmer participation in out-farm activities is a form of developing business diversification carried out by farmer households. Eshetu and Mekonnen (2016) who investigate the determinants of agricultural income diversification in Ethiopia show that age, education, access to infrastructure, livestock ownership, use of credit, and agricultural income are the main determinants of household participation in agricultural activities. In addition, Wuepper at al. (2018) conducting research in Ethiopia said that the choice between specialization and income diversification was driven by various interacting factors, such as scale and economic coverage, risk considerations, context and household characteristics. Zhao (2014) who conducted income diversification research in China showed that a larger family size stimulated households to carry out various patterns of income diversification.

Furthermore, the factors influencing the variation of farmer household income can be seen in Table 6. There are four proven variables affecting the

amount of farmer's income, namely land area owned, age of farmer, number of male workers, choosing of on-farm activities besides the main business. Judging from the sign and magnitude of the regression coefficient, the age variable of the farmer has a very significant negative effect on income, while the variable area of land ownership and the number of male active labor have a real positive effect on income. This means that the older the farmer causes the smaller the income will be. The function change of land by changing cropping patterns from rice to oil palm cannot be proven to have an effect on increasing farmers' income, and even tends to be smaller incomes of oil palm farmers.

Table 6. Factors influencing farmers' income

Dependent variable : Y_3 = income of households

Independent variable	b	Std error	t	Sign
Constant	4.599	.572	8.039	.000
LnLPL	.225	.052	4.296**	.000
LnUSU	-.311	.130	-2.393*	.017
LnJAK	-.063	.108	-.581	.562
LnTKP	.306	.092	3.316**	.001
LnTKW	.084	.089	.942	.347
LnEDU	.123	.089	1.385	.167
LnD_1	.017	.093	.178	.859
LnD_2	.180	.091	1.984*	.048
LnD_3	-.171	.091	-1.873	.062

The situation found in this study differs from the results of the study of Eshetu and Mekonnen (2016) which investigated the determinants of diversification of agricultural income and its effect on rural poverty in Ethiopia. In Ethiopia the level of participation outside agriculture was 76% while income from the agricultural sector accounted for 51% of total household income. Estimated results from the logit model also show that farmer participation significantly reduces the likelihood of being poor from rural agricultural households. About 29.8% of the population was found below the poverty line. The situation in Indonesia shows that agricultural business in tidal swmps causes the average farmer to be above the poverty line and leaves considerable free time. Therefore food crops need to be pursued to become sustainable agriculture with increased productivity. It should also be noted that pre-harvest and harvest technology

improvements are accompanied by improvements in the rice marketing system produced by farmers.

Conclusions

Changes in ex-migrant farming efforts that have taken place are mechanization of rice farming and land use change that has caused the cultivated land area and the use of labor and farm household income that are not much different between two large groups of migrant farmers in tidal swamp areas. There has been a shift in arable land due to buying and selling and inheritance, and smallholders are still relatively small.

The income structure of the two household groups of farmers was not much different. Changes from rice farming to oil palm cause the income of oil palm farmers to be lower, although not much different. The number of farmers participating in outside rice farming activities and outside the oil palm business was less than 50%. While the participation of farmers working outside the field of off-farm oil palm farmers was more than rice farmers.

Factors having a positive effect on farmer's income are the area of arable land and the number of active workers, while the factors that negatively affect income are farmer's age and changes in cropping patterns from rice to oil palm.

Policy Implications

Changes in cropping patterns from rice to oil palm need to be inhibited or completely eliminated. It is necessary to increase the development of agricultural mechanization for agricultural cultivation techniques, so that farmers have the ability to cultivate wider land in swamp and tidal swamps. Efforts to develop business diversification are needed to exploit the potential of excessive labor, especially for farmers who have small arable land.

REFERENCES

Abood, S. A., J. S. H. Lee., Z. Burivalova., J. G. Ulloa1., and L. P. Koh. (2014): Relative contributions of the logging, fiber, oil palm, and mining industries to forest loss in Indonesia. Conservation Letters, xxx 2014, 0(0), 1–10. Wiley Periodicals, Inc.

Adriani D. E. Wildayana, Yulius, I. Alamsyah and M.M. Hakim. 2017. Technological Innovation and Business Diversification: Sustainability Livelihoods Improvement Scenario of Rice Farmer Household in Sub-Optimal Land. Russian Journal of Agricultural and Socio-Economic Sciences, Vol 9 (69); 77-88. September 2017. Available at https://doi.org/10.18551/rjoas.2017-09.10 (accessed October 12, 2018).

Armanto, M.E., M.A. Adzemi., E. Wildayana and M.S. Imanudin. (2013): Land Evaluation for Rice Cultivation in the Reclaimed Tidal Lowland in Delta Saleh, South Sumatra, Indonesia. Journal of Sustainability Science and Management. Vol 8(1): 32-42. ISSN 1823-8556 Available at http://jssm.umt.edu.my/files/2013/07/4w.pdf (accessed October 18, 2018).

Atera, E. A., F. N. Onyancha., and E. B. O. Majiwa. (2018): Production and marketing of rice in Kenya: Challenges and opportunities. Journal of Development and Agricultural Economic, Vol. 10(3): 64-70.

Brhanu, G. A. (2018): Access to land and agricultural based livelihoods in Northwestern Ethiopia: Implications for land use. Article Number - B6BC85E58277. Vol. 10(9): 292-297.

Coffie, R. O., M. P. Burton., F. L. Gibson., and A. Hailu. (2016): Choice of Rice Production Practices in Ghana: A Comparison of Willingness to Pay and Preference Space Estimates. Journal of Agricultural Economics, Vol. 67 (3):799–819.

Eshetu, F., and E. Mekonnen. (2016): Determinants Of Off Farm Income Diversification and Its Effect On Rural Household Poverty In Gamo Gofa Zone, Southern Ethiopia. Journal of Development and Agricultural Economics. Vol. 8(10): 215-227.

Euler, M., S. Schwarze., H. Siregar., and M. Qaim. (2016): Oil Palm Expansion among Smallholder Farmers in Sumatra, Indonesia. Journal of Agricultural Economics doi: 10.1111/1477-9552.12163.

Ganser, D., L.H. Denmead., Y. Clough., D. Buchori., and T. Tscharntke. (2016): Local and landscape drivers of arthropod diversity and decomposition processes in oil palm leaf axils. Agricultural and Forest Entomology (2016), DOI: 10.1111/afe.12181.

Gujarati, D. N. (1995): Basic Ecometrics. Thrid Edition. McGraw-Hill Book. Co. Singapore.

Konopik, O. I. D., and T. U. Grafe. (2015): Effects of Logging and Oil Palm Expansion on Stream Frog Communities on Borneo, Southeast Asia. BIOTROPICA 47(5): 636–643

Krishnaa, V., M. Eulerb., H. Siregar., and M. Qaima. (2016): Differential livelihood impacts of oil palm expansion in Indonesia. Agricultural Economics Journal. 00: 1–15.

Otsuka, K., Y. Liu., and F. Yamauchi. (2016): The Future Of Small Farms In Asia. Development Policy Review. Wiley Online Library.

Pastusiak1, R., M. Jasiniak., M. Soliwoda., and J. Stawska. (2017): What may determine the off-farm income? A review. Agric. Econ. – Czech 63 (8): 380–391.

Vijay, V., S. L. Pimm., C. N. Jenkins., and S. J. Smith. (2016): The Impacts of Oil Palm on Recent Deforestation and Biodiversity Loss. Plosone/ Doi:10.1371/ journal.

Wilcove, D. S., and L. P. Koh. (2010): Addressing the threats to biodiversity from oil-palm agriculture. Biodivers Conserv 19: 999–1007 DOI 10.1007/s10531-009-9760-*x*.

Wildayana, E. (2017): Challenging Constraints of Livelihoods for Farmers on the South Sumatra Peatlands, Indonesia. Bulgarian Journal of Agricultural Science. Vol 23(6): 894-905. Available at http://www.agrojournal.org/23/06-02.pdf (accessed at October 20, 2018)

Wildayana, E., and M. Edi Armanto. (2018): Dynamics of Landuse Changes and General Perception of Farmers on South Sumatra Wetlands. Bulgarian Journal of Agricultural Science. Vol 24(2): 180-188 . Available at (http://www.agrojournal.org/24/02-02.html. (accessed at October 20, 2018)

Wueper, D., H. Y. Ayenew., and J. Sauer. (2018): Social Capital, Income Diversification and Climate Change Adaptation: Panel Data Evidence from Rural Ethiopia. JAE Vol 69 (12): 23-35.

Zahri, I., D. Adriani., E. Wildayana., Sabaruddin; and M. U. Harun. (2018): Comparing Rice Farming Apperance of Different Agroecosystem in South Sumatra, Indonesia. Bulgarian Journal of Agricultural Science, 24 (2): 189-198

Zhao, J. (2014): Rural income diversification Patterns and their determinants in China. Agric. Econ. – Czech, 60 (5): 219–231.

Table

Table 1. Research locations and number of samples

Cropping	Villages	Respondents (farmers)
Rice	Banyu Urip	50
	Tungkal Ilir	50
	Sumber Hidup	50
	Sukadamai	50
Oil palm	Tungkal Ilir	50
	Pulau Rimau	50
Total		300

Table 2. Characteristics of demographic aspects of farmer's households

Variables	All Sample (N=300)		Rice (n=150)		Oil palm (n=150)		t-siq
	Mean	Sd	Mean	Sd	Mean	Sd	
Husband's age (years)	46.44	11.85	45.69	12.39	47.19	11.29	0.165
Wife's age (years)	41.09	12.58	39.90	13.92	42.27	10.99	0.041
Family members (people)	3.46	1.19	3.76	1.13	3.15	1.17	0.214
Active male workers	1.56	0.70	1.59	0.70	1.53	0.70	0.872
Active female workers	1.49	0.69	1.52	0.70	1.45	0.67	0.398
Average education (years)	7.51	3.50	6.50	2.51	8.53	4.02	0.000

Table 3. Characteristics of farmer agriculture

Variables	All Sample (N=300)		Rice (n=150)		Oil palm (n=150)		t-siq
	Mean	Sd	Mean	Sd	Mean	Sd	
Land unit total	1.43	0.57	1.40	0.61	1.45	0. 30	0.34
Land size (ha)	1.96	1.23	1.96	1.40	1.95	1.03	0.02
smallholders (%)	5.33		10.00		0.67		
Labors (working days, HOK)			19.09	9.11	18.00		
Rice productivity (ton)			4.37	1.78			
Oil palm productivity (ton)					9.12	6.18	

Explanation: Smallholders or gurem farmers is defined as small farmer having land of less 0.50 ha or not having

Table 4. Income of farmer households

Variable	Unit	All Sample (N=300)		Rice (n=150)		Oil palm (n=150)		t-siq
		Mean	Sd	Mean	Sd	Mean	Sd	
Total income	Mill Rp/year	54.19	33.74	56.27	41.90	52.12	22,80	0.287
	%	100,00		100,00		100.00		
Rice/oil palm Income	Mill Rp/year	39.49	27.15	38.42	29.34	40.56	24.83	0.496
	%	72.94		68.05		77.82		
Other on farm Income	Mill Rp/year	7.82	15.11	10.47	20.00	5.18	6.63	0.002
	%	14.24		18.55		9.94		
Non-agriculture Income	Mill Rp/year	6.88	19.74	7.37	21.53	6.38	10.00	0.607
	%	12.65		13.06		12.24		
Working on other farm income	%	42.00		43.33		40.67		
Working on off-farm	%	46.67		43.33		50.00		

Table 5. Factors influencing the choice of farmer participation in out-farm activities

Dependent variable : Choices work on off-farm activities (Y_2)

Independent variable	Regression coef.	Std error	Sign
LPL	-.482*	.223	.033
USU	1.892**	.564	.001
JAK	.906**	.441	.004
TKP	-.760*	.0.387	.050
TKW	-.743*	.389	.056
EDU	-.046	.282	.871
D_1	.024	.387	.951
D_2	-.336	.384	.382
Constant	-7.904	2.425	.001

Table 6. Factors influencing farmers' income

Dependent variable : Y_3 = income of households

Independent variable	b	Std error	t	Sign
Constant	4.599	.572	8.039	.000
LnLPL	.225	.052	4.296**	.000
LnUSU	-.311	.130	-2.393*	.017
LnJAK	-.063	.108	-.581	.562
LnTKP	.306	.092	3.316**	.001
LnTKW	.084	.089	.942	.347

LnEDU	.123	.089	1.385	.167
LnD_1	.017	.093	.178	.859
LnD_2	.180	.091	1.984*	.048
LnD_3	-.171	.091	-1.873	.062

2. Bukti Konfirmasi Revisi ke 2

1. Bukti Dokumen Revisi yang harus dilakukan

Dari: <agricecon@cazv.cz>
Date: Wed, 8 Mei 2019 17.20
Subject: [CAAS Agricultural Journals] 349/2018-AGRICECON Article for correction
To: <dessyadriani@gmail.com>, <dessyadriani@fp.unsri.c.id>

Dear Dessy Adriani Dessy,
We would like to inform you that your manuscript **Converting Impact of Rice Farming to Oil Palm Plantation on the Socio-Economic Aspects of Ex-Migrants in the South Sumatra Tidal Swamp, Indonesia** (submitted as 349/2018-AGRICECON) should be corrected according to reviewers' comments.

For correction use the **MS Word Track Changes function**. Please attach an **Accompanying letter** where you will respond to all suggestions of reviewers and where you will inform us whether you accepted the suggestions or not and what revisions you made in the original text of the paper according to these suggestions.

Please submit the corrected manuscript and also the Accompanying letter in anonymized form. See the Instructions to Authors. We kindly ask you to resubmit corrected manuscript under the same identification number. To do so, login into the system, click on this manuscript and fill in "Corrected Text File and Attachments" input field.

Please see the file attached for the reviewers' comments. (The version of the article with the row counting is attached to enable you to react to the reviewers' comments.)

Please revise the paper within 30 days from the date of sending off. After this time limit the paper will be crossed out from our records.

Yours sincerely,
Ing. Vendula Pospíšilová, Ph.D.
Agricultural Economics
Executive Editor
Czech Academy of Agricultural Sciences
Slezská 7, 120 00 Prague 2, Czech Republic
tel.: + 420 227 010 358
e-mail: agricecon@cazv.cz
https://www.agriculturejournals.cz/

2. Bukti Koreksi Reviewer

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Praha 2

ID 349/2018–AGRICECON: Converting Impact of Paddy to Oil Palm Farmers on Socio-Economic Aspects of Ex-migrant, Indonesia

Imron Zahri, Elisa Wildayana, Agus Thony Ak, Dessy Adriani, M. Umar Harun

PEER REVIEW A – Publish as Original Paper after major revisions and a second review

Comment for author:

Abstract:

- Main findings are not well organized. This makes readers to be confused about what are the selling points from the study.

Introduction:

- On page 1 at second paragraph (line 28-29), “Not all migrant farmers have successed to manage rice farming in new areas and their lives are partly performend by poverty (Adriani et al. 2017)”. The author should provide solid reason(s) to support such a statement in the context of South Sumatra Province. - The author should state any possible reasons for why migrant farmers who could not successfully manage their rice farming would choose to convert their farming into oil-palm plantation instead of other types of crop plantation.

Research Method:

- How does the author select 5 villages in Banyuasin District, South Sumatra Province? Does the author apply a cluster sampling method to choose these villages? The selection criteria of 5 villages should be stated. - Based on the selected villages, the author uses a purposive sampling method to choose households to be respondents. Based on this non-probability sampling method, the author is required to provide

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expert knowledge of the population in judging whether selected households can be respondents or not. - The author interviews around 300 respondents in each village. Some information is missing. For example, response rate and sample size. - The author is also suggested to provide the background of respondents in terms of their demographic with a proper manner.

Model Specification:

- On page 2-3, the author should not explain the well-known multiple linear and logit regression models in the detail manner. The author should focus on how both regression models can be used to achieve two specific objectives. - The author needs to enhance the explanation of selected variables in the model specification based on theoretical frameworks. - The author should use proper notations to describe variables in the model. - On page 4 (line 95-98), the author specifies a logit model without stating the conditional probability of occurrence of an event. In order to apply such a qualitative model specification, the author needs to identify the type of event in estimating its conditional probability.

Results and Discussion:

- On page 5 and 8, what is "t-siq" as shown in Table 1 and 2? - On page 10 and 11, the author should perform diagnostic checking in order to ensure the adequacy of models before interpretation of results in Table 3 and 4. - On page 10, the authors should report the result for ANOVA, R-squared and adjusted R-squared. This allows readers could know the adequacy of model in estimating the ln odds ratio based on coefficient values. - On page 11, what is the functional form for "income of households"? In the level form or natural logarithmic form? - On page 10 and 11, the author should explain clearly the use of asterisk (*) in Table 3 and 4. - I find that the author discusses the empirical results with a manor way by comparing some findings with

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other studies. I suggest that the results would be interesting if the author could provide own justifications and arguments on the findings. What is a rational reason in behind for the findings? - The author is suggested to categorize all sub-sections into 2 sub-sections, namely (1) Ex-migrant farmers' productive economic business structure and (2) Determinant factors and impact of change cropping patterns on ex-migrant farmers' income structure. Each sub-section is related to each objective.

Conclusion:

- The author should summarize the finding based on the respective objective. - On page 12 at the last paragraph (line 334-338), the author recommends 2 policies. However, I could not seem any linkage between suggested policies and findings.

Overall:

- I think that the paper is interesting, but further improvements should be undertaken, especially in enhancing the discussion of methodology, empirical results, findings and implications.

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PEER REVIEW B – Publish as Original Paper after minor revisions

Completeness: fair

Scientific merit: good

Citations: fair

International relevance: good

Importance to field: fair

Language quality: good

Conciseness: good

Technical quality: good

Clarity of presentation: good

Originality: good

Comment for author:

Overall, the key content of the study is interesting, particularly for those involved in the field of applied economics and econometrics. The manuscript presents a proper balance between the model specification, the results and discussion proposed. On the other side, to the advantage of those who are not expert in econometrics, existing litetature on the logit model and non linear regression model should be extended; with regard to the logit, the meaning of β coefficients shoud be clarified.

Email: agricecon@cazv.cz
Tel: + 420 777 835 566
Web: www.agriculturejournals.cz

3. Bukti Revisi Artikel yang Dilakukan

CZECH ACADEMY OF AGRICULTURAL SCIENCES

MANUSCRIPT

Converting Impact of Rice to Oil Palm Farmers on Socio-Economic Aspects of Ex-migrant, Indonesia

Imron Zahri[1], Elisa Wildayana[1], Agus Thony Ak[2], Dessy Adriani[1,*], and M. Umar Harun[1]

[1]*Faculty of Agriculture, Universitas Sriwijaya, Palembang, South Sumatra, Indonesia*
[2]*Faculty of Agriculture, Universitas* Sjakhyakirti*, Palembang, South Sumatra, Indonesia*

*Corresponding author: dessyadriani@fp.unsri.ac.id

Abstract: This paper aims to investigate land converting impact of rice farming to oil palm plantation on the socio-economic aspects of ex-migrants in the South Sumatra tidal swamp, Indonesia. Land conversion belongs to an adaptation form of ex-migrant farmers occurring from rice farming to oil palm plantations and it will increase food deficits in Indonesia. Ex-migrant farmers initially cultivated food crops with conventional technology and has been changing which led to form two large groups of farmers, namely rice-based farming that implementing mechanization and oil palm-based plantation. The results showed that changes in rice farming to oil palm did not make the economy of farm households better. Between the two groups of farmers, there is no difference in cultivated land area, the allocation of labor for agriculture and the income of farmers. In addition, there is not much difference between farmers' participation in on-farm and out-farm activities. Ownership of cultivated land area, age of farmers, and family size variables are determinants of farmers' choice to participate in on-farm and out farm activities and influence farmers' income. So changes in cropping from rice to oil palm have no impact on cultivation area, labor allocation, income and on-farm and out-farm activities.

Key words: rice farming, oil palm, ex-migrant, socio-economic, converting, tidal swamp

Introduction

Rural development in Indonesia was carried out including the transmigration program, which has moved Javanese to outside of Java sponsored by the government. The first transmigration program to tidal swamp in Indonesia occurred in 1969, namely to Delta Upang in South Sumatra Province. After that there was a massive population movement to the tidal swamp that lasted until the 1990s. The transmigration program was carried out by developing rice-based agriculture as a new livelihood in the destination area.

Not all migrant farmers have successed to manage rice farming in new areas and their lives are partly performend by poverty (Adriani et al. 2017). Based on Zahri et al. (2018) and Wildayana and Armanto (2018), therefore some rice farming converted into oil-palm plantation. This land conversion has caused that farmers cultivated agricultural plants not on their land suitability and have changed their household income. Besides that, it has caused environmental issues, and changes in the socio-economic aspects of the farming community.

Oil palm plantations in tidal swamp, itself, has contributed to the development of oil palm in Indonesia, and this has raised a number of issues. Developing oil palm plantations in Indonesia has caused deforestation which has an impact on increasing carbon dioxide emissions (Vijay at al. 2016) and affects biodiversity (Konopik at al. 2015, and Ganser at al. 2016, Wilcove and Koh. 2010, Krishnaa at al. 2016).

Based on the above description, this study was carried out with the aim of (1) to describe the productive economic business structure of ex-migrant farmers in tidal swamp that consistently carry out rice farming and who convert land into oil palm plantations, and (2) to analyze determinant factors and the impact of change cropping patterns on the income structure of ex-migrants in tidal swamp areas.

Research Methods

This research method was a survey method with primary data. Sampling method used Multi Stage Random Sampling with Tidal swamp areas from 3 districts, namely Banyuasin Regency, Musi Banyuasin Regency and Ogan Komering Ilir Regency. From regency, we choosed in five villages. Around 50 respondents taken by random sampling were interviewed in each village because the average population of each village in South Sumatra was about 500 households, meaning that each village on average was taken as much as 10% of the

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population as respondent rate. All respondents were ex-migrants from Java who moved to this location between 1982-1985.

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Empirical Model Specification

In general, the equation model to analyze the relationship between the dependent variable (Yi) and the independent variable (Xi) according to Gujarati (1978) is described as follow:

$$Y_i = \beta_0 + \beta_i X_i + u_i \quad (1)$$

Whereas:

Yi = dependent variable

Xi = independent variable

β_0 = Intercept

β_1 = Coeficient Regresion

Where u_i is a disturbance factor or commonly referred to as the standard error or error of an equation function. u_i states the combined effect (of non-independent variables) of a large number of independent variables that are not explicitly raised in the regression model. The u_i value can be defined as:

One of the important assumptions in using the parameter estimator of the regression model with the least square method is the homokedastic residual error, meaning that the variable non-free (Yi) is constant. Classic normal linear regression which assumes each u_i is normally distributed:

Average: $E(u_i) = 0$

Variance: $E(u_i) = \sigma^2$

Cov (u_i, u_j) : $E(u_i) = 0$ $i \neq j$

Assumption briefly can be stated:

$u_i \sim N(0, \sigma^2)$

Distribution of u_i values is assumed indenpendtly and identic, thus value follows:

$$\sigma^2 = \sigma_{u_i}{}^2 - \sigma_{\bar{u}}{}^2$$

Based on the equation (1), we then developed equations (2) and (3) to analyze the second purpose more deeply about the determinants of farmers participating in on-farm and off-farm activities and determinants income of farmers for the two group we've been analyzed.

The second equation is the logistic regression model, to measure the effect of probability on an event, in general the logit regression equation, that is measuring household probability for having off-farm activities. The third equation is a non linier multiple regression model, to measure the determinant income of farmers

The model is compiled as follows:

$$K = \text{Ln}\left[\frac{P}{1-P}\right] = \text{Ln}\alpha_i + \beta_{1\text{ln}}\text{LnLPL}_i + \beta_2\text{LnUSUi} + \beta_3\text{LnJAKi} + \beta_4\text{LnTKP}_i + \beta_5\text{LnTKW}_i + \beta_6\text{LnEDU}_i + \beta_7\text{LnD}_{1i} + \beta_8\text{LnD}_2 + \varepsilon_{ij} \quad (2)$$

$$\text{Ln INC}_{ij} = \alpha_3 + \beta_{31}\text{LnLPL}_i + \beta_{32}\text{LnUSU}_i + \beta_{33}\text{LnJAK}_i + \beta_{34}\text{LnTKP}_i + \beta_{35}\text{LnTKW}_i + \beta_{36}\text{LnEDU}_i + \beta_{37}\text{LnD}_{1i} + \beta_{38}\text{LnD}_{2i} + \beta_{38}\text{LnD}_{3i} + \varepsilon_{ij} \quad (3)$$

Whereas:

i = 1, 2, 3, …n

P = Probability for having off-farm activities

(1-P) = Probability for not having off-farm activities)

INC = Income (Rp/Year)

LPL = cultivated land area (Ha)

USU = age of husband (Years)

JAK = number of family members (Person)

TKP = male active labors (Person)

TKW = female active labors (Person)

EDU = education (Years)

D1 = main work (1 for rice farmers and 0 for oil palm farmers)

D2 = other on-farm activities (1 for other having on-farm activities and 0 for not having on-farm activities)

D3 = off-farm activities (1 for other having off-farm activities and 0 for not having off-farm activities)

Results and Discussion

Characteristics of Farmer Households

In Table 1, it can be seen that there are not many differences in the characteristics of demographic aspects such as age variables, family size, active male and female workers in each households with different cropping patterns, except the average year of education.

Table 1. Characteristics of demographic aspects of farmer households

Variable	All Sample (N=300)		Rice (n=150)		Oil palm (n=150)		sign
	Mean	Sd	Mean	Sd	Mean	Sd	
Husband Age (Year)	46.44	11.85	45.69	12.39	47.19	11.29	0.165
Wife Age (Year)	41.09	12.58	39.90	13.92	42.27	10.99	0.041
Family Size (Person)	3.46	1.19	3.76	1.13	3.15	1,17	0.214
Active Man Worker (Person)	1.56	0.70	1.59	0.70	1.53	0.70	0.872
Active Man Worker (Person)	1.49	0.69	1.52	0.70	1.45	0.67	0.398
Education (Year)	7.51	3.50	6.50	2.51	8.53	4.02	0.000

Source: own processing

Productive Economic Business Structure for Ex-Migrant Farmers

The farm size. The cultivated land area owned by each farmer is on average 1.96 ha, where the area of cultivated land area based on different cropping patterns is not significantly different, namely oil palm farmers have 1.96 ha wider than the average rice farmer 1.95 ha. Most farmers have more than one parcel and more than 1 ha of cultivated land area which was caused by displacement of land ownership, causing land fragmentation, especially through buying and selling of cultivated land area. With such cultivated area, the agricultural business of exmigrant farmers is classified as small businesses.

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Table 2. Characteristics of farmer agriculture

Variables	All Sample (N=300)		Rice (n=150)		Oil Palm (n=150)		Sign (α)
	Mean	Sd	Mean	Sd	Mean	Sd	
Land Unit Persil	1.43	0.57	1.40	0.61	1.45	0.30	0.34
Cultivated Land Area (ha)	1.96	1.23	1.96	1.40	1.95	1.03	0.02
Labors (working days)			19.09	9.11	18.00	5,67	
Farm Cost (USD $)	228	84	237	101	266	66	
Rice productivity (ton)			4.37	1.78			
Oil palm productivity (ton)					9.12	6.18	

Explanation: Smallholders or gurem farmers is defined as small farmer having land of less 0.50 ha or not having

Source: own processing

Most small farmers, who have adopted oil palm, are expanding their cultivated land. In tidal swamps farmers adopt oil palm by replacing their rice farming on the same land and there is a tendency to not be able to expand their planting area except by buying other lands. Thus it is natural that the cultivated area of rice farmers is not much different from the area of oil palm. So that, the conversion of land from rice to oil palm does not cause an increase in the scale of farmers' business.

The Use of Family Labor for rice farming averages 19 workingday per planting season on their cultivated land of 1.96 ha for a single growing season is very little. This is due to the development of mechanization in rice farming activities. The development of mechanization has increased the ability of farmers to work on a wider area, which is now an average of 1.96 ha per family. But if using human family labor, the ability of farmers to work on land is only around 0.7 ha. In tidal swamps with the discovery of new ways and the development of agricultural mechanization it turns out that rice farming is changing from labor intensive to capital intensive. Land preparation is managed by using tractor. Rice farming used *tabela* (direct seeding) systém and rice harvesting is managed by using a combining harvester.

The workingday of family labor of oil palm farmers is not much different in number compared to rice farming. The average labor requirement for each 2 ha of oil palm plantations for each 6 months is only around 18 workingday, namely for 12 workingday harvests, 2 workingday weeding, 2 workingday fertilization, and 2 workingday other activities. The leisure time of family labor is still very large, allowing farmers to develop other productive economic businesses. This finding is in line with the research of Krishna at al. (2016) which says that oil palm farmer households need less labor than rubber as the main alternative crop so that they still have much leisure time.

Agricultural production costs. Rice farming after the development of rice cultivation program is more capital intensive mechanically. The total production cost per ha for rice farming per planting season was USD $ 237/year , which consists of 27% fertilizer costs, land processing costs and 73% harvest costs. While the costs incurred for oil palm are costs for purchasing fertilizer and harvest costs, which is USD $ 266/year, which consists of 32% fertilizer costs and 68% harvest costs. The cost of processing land and harvest costs for rice farming is 73%, which is the cost of using agricultural machinery and previously done using human labor, this shows that rice farming has turned into a capital intensive business.

Rice productivity is around 4.8 tons/ha per planting season, so if farmers do a double rice planting in a year, then rice productivity can reach 9.6 tons/year. But most farmers grow corn for the second season, which is between April and July with a productivity of around 7 tons per planting season. Most farmers do farming with two planting seasons, and this condition causes rice farmers to have a higher income than farmers in oil palm plantations. This is the fact, as mention earlier, that farmers in these tidal swamp areas have found efficient farming methods, with good results and little use of labor.

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Palm oil plantation productivity averages 11.04 tons of fresh fruit bunches (FFB)/ha per year. If it is compared with the results of other plantations producing at least 24 tons/ha per year, such productivity is very low at less than 1 ton/ha per month and varies in a year. The low productivity is influenced by several things, namely the lack of optimal plantation maintenance by farmers such as low fertilization.

Before mechanization of technology in tidal swamps rice farming, there were problems with labor shortages and there was even a tendency for farmers to change cropping patterns like shifting cultivation and return using old technology. If this is applied, it will reduce land productivity. This is in line with Brhanu (2018). But after mechanization of technology adopted by rice farmers, turned out that it could increase productivity. Adoption of oil palm plantations can actually increase land productivity compared to rice farming before using mechanical technology.

Income of Farmer's Households

Farmer's Livelihoods. At the beginning of arrival until around the first 5 years since arrival in the new area, all migrants (100%) have jobs as farmers, namely working on rice farming and other seasonal crops such as vegetables and pulses. After that, changes in the business of farmers began to occur by adding other types of work, which eventually could be grouped into (1) basic agricultural jobs, namely rice farming and/or oil palm plantations, (2) on-farm jobs, such as vegetable farming, crops, livestock and fisheries, and (3) outfarm jobs, such as farm laborers, employees, carpentry, and others. In Table 2 it can be seen that 43.33% of rice farmers work by carrying out agricultural activities outside of their main business and 43.33% work on off-farm businesses. While oil palm farmers account for 40.67% working in agriculture outside their main business, and 50% working outside agriculture. This condition shows that farmers do not only do a single business, but have developed multiple businesses or diversified household businesses. In line with that, as stated by Pastusiak at al (2017) that agriculture is one of the most risky businesses, farmer households therefore try to diversify their sources of income and carry out other strategies that aim to stabilize their income by offarm activities. Krishnaa al (2016) said that oil palm farmer households need less labor and this allows more labor to be allocated to off-farm activities or to expand their agricultural land.

Impact and Determinant Factor Changes in Cropping Patterns on the Structure of Ex-Migrant Income

The income of farmer households comes from the income of the main rice and oil palm business, other agricultural business income and non-agricultural income. In Table 3 it can be seen that the average household income of a farmer is US $ 3,607 /year, which is the income of paddy farmers averaging US $ 2,627 /year which is greater than the income of oil palm farmer. The contribution of farmer household income from agricultural businesses averaged 87.18%, namely paddy farming at 86.60% and oil palm plantation farmers at 87.76%. This figure shows that agricultural business provides the largest contribution to the income of farmer households. Such figures show according to the size in Indonesia that farmers in tidal areas who seek rice and oil palm are on average above the poverty line. The income of rice farmers is greater than the average oil palm farmer's income. Such figures show according to the size in Indonesia that farmers in tidal areas who seek rice and oil palm are on average above the poverty line.

Table 3. Income of farmer households

Income type	Unit	All Sample (N=300)		Rice (n=150)		Oil palm (n=150)	
		Mean	Sd	Mean	Sd	Mean	Sd
Total income	USD $/year	3,607	2,249	3,745	2,793	3,475	1,520
	%	100,00		100,00		100.00	
Rice/oil palm Income	USD $/year	2,627	1,810	2,556	1,956	2,704	1,655
	%	72.94		68.05		77.82	
Other on farm Income	USD $/year	521	1,007	698	1,333	345	442
	%	14.24		18.55		9.94	
Off-farm Income	USD $/year	459	1,183	491	1,435	425	667
	%	12.65		13.06		12.24	
Working on other farm income	%	42.00		43.33		40.67	
Working on off-farm	%	46.67		43.33		50.00	

Source: own processing

Viewed from the source of income, the income of rice farmers comes from on-farm 81.60% and off-farm 13.06%. While oil palm farmers who have an income of US $ 3,475 /year comes from on-farm 87.76% and off-farm 12.24%. In addition to rice and/or oil palm plantation as a main business, farmer households also have other farming jobs and work outside of farming. Oil palm farmers who work on other on-farm account for 40.67% and work outside agriculture by 50%, while rice farmers accounted for 43.33% working on other on-farm and 43.33% off-farm working. This condition shows that farmers do not only do a single business, but they have developed multiple businesses or diversified household

businesses. In line with that, as stated by Pastusiak at al. (2017) and Krishna at al. (2016) that agriculture is one of the most risky businesses, farmer households therefore try to diversify their sources of income and carry out other strategies that aim to stabilize their income by off farm activities or to expand their agricultural land.

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Based on the description of the income above, it appears that the welfare of rice farmers is slightly not better than that of oil palm farmers. This means that by only looking at the reality in terms of income, the change in cropping patterns from rice farming to oil palm plantation will have no significant effect on farmers' income. But, we have noticed that with the conversion of land from rice farming to oil palm, it will harm the farmers individually and also reduce food production (rice and corn), so that the supply of food will be disrupted. Indonesia experienced a rice deficit as experienced by several countries such as Ghana (Coffie at al. 2016) and Kenya (Atera at al. 2018). If the land conversion from food crops (rice and corn) into plantation crops or other uses continues to occur, it will disrupt food security in Indonesia. The problem of transferring this land must be stopped because it will disrupt Indonesian rice production. According to Euler at al. (2016) that concessions that have been allocated by the government to oil palm companies in the past have led to the adoption of oil palm in the small agricultural sector, and the dynamics of subsequent land use are largely out of government control. So the government should have implemented a policy so that the conversion of rice land into oil palm plantations was immediately controlled. Especially after it was discovered that land conversion from food crops to plantation crops did not increase the area of cultivated land, it did not significantly reduce labor use and did not increase farmers' income.

As mention above, we develop equations (2) and (3) to analyze the second purpose more deeply about the determinants of farmers participating in on-farm and off-farm activities and determinants income of farmer. The model estimation results show that the model is representative enough to analyze the determinants of farmers participating in on-farm and off-farm activities and determinants income of farmer. Determination coefficient value (R2) are 0.51 and 0.64. This shows that all explanatory variables in the model can explain the model behavior well. The explanatory variables in the equation together clearly explain the diversity of endogenous variables indicated by the λ^2 value of 14.906 and F statistic value of 4276,236. The results of the t test showed several variables that have a significant effect on the dependent variable. The results of the econometric criteria test show that the model does not experience violations of classical assumptions with multicollinearity, autocorrelation and heteroskedasticity. One of the most important things and the main orientation of this study is

that all presumptive parameter result in the model are in accordance with expectations based on economic theory and logic.

Farmer income comes from the main business income (rice or oil palm), other on-farmincome and off-farm. Farmer's household free time is very large, and the choice of farmers to participate in out farm activities is certainly influenced by land ownership factors as the main source of income for farmers and family demographic aspects.

The estimating logit functions, which is used to determine farmer participation in off-farm as can be seen in Table 4. It can be seen that there are five variables that influence the choice of off-farm activities, namely the area of land owned, the number of active male and female workers has a negative effect, and the age and number of family members have a positive influence on the choice of participating in off-farm activities.

Table 4. Factors influencing the farmer participation in off-farm

Dependent variable : Choices work on off-farm activities (Y_2)				
Independent variable	Regression coef.	Std error	Sign	*Odds Ratio* (Ψ)
LPL	-.482*	.223	.033	1.617
USU	1.892**	.564	.001	6.594
JAK	.906**	.441	.004	2.468
TKP	-.760*	.0.387	.050	2.133
TKW	-.743*	.389	.056	2.097
EDU	-.046	.282	.871	1.047
D_1	.024	.387	.951	1.024
D_2	-.336	.384	.382	1.398
Constant	-7.904	2.425	.001	
Nagelkerke R^2= 0.51		λ^2 = 14.906 is significant at α =0.061		

Source: own processing

Farmer participation in out-farm activities is a form of developing business diversification carried out by farmer households. Eshetu and Mekonnen (2016) who investigate the determinants of agricultural income diversification in Ethiopia show that age, education, access to infrastructure, livestock ownership, use of credit, and agricultural income are the main determinants of household participation in agricultural activities. In addition, Wuepper at al. (2018) and Zhao (2014) conducting research in Ethiopia said that the choice between specialization and income diversification was driven by various interacting factors, such as scale and economic coverage, risk considerations, household characteristics, family size, stimulated households to carry out various patterns of income diversification.

Furthermore, the factors influencing the variation of farmer household income can be seen in Table 5. There are four variables affecting the farmer's income, namely land owned, farmers' age of, number of male workers, choosing on-farm activities besides the main business. Judging from the sign and magnitude of the regression coefficient, the age variable has a very significant negative effect on income, while the land ownership and the number of male active labor variable have a real positive effect on income. This means that the older the farmer causes the smaller income. The function change of land by changing cropping patterns from rice to oil palm cannot be proven to have an effect on increasing farmers' income, and even tends to be smaller incomes of oil palm farmers.

Table 5. Factors influencing farmers' income

Dependent variable : Y_3 = income of households				
Independent variable	b	Std error	t	Sign
Constant	4.599	.572	8.039	.000
LnLPL	.225	.052	4.29	.000
LnUSU	-.311	.130	-2.393	.017
LnJAK	-.063	.108	-.581	.562
LnTKP	.306	.092	3.316	.001
LnTKW	.084	.089	.942	.347
LnEDU	.123	.089	1.385	.167
D_1	.017	.093	.178	.859
D_2	.180	.091	1.984	.048
D_3	-.171	.091	-1.873	.062
$R^2 = 0.618$	Adj-$R^2 = 0.588$		F-value = 0.987 significant at α =0.000	

Source: own processing

The situation found in this study differs from the results of the study of Eshetu and Mekonnen (2016) which investigated the determinants of diversification of agricultural income and its effect on rural poverty in Ethiopia. In Ethiopia the level of participation outside agriculture was 76% while income from the agricultural sector accounted for 51% of total household income. Estimated results from the logit model also show that farmer participation significantly reduces the livelihood of being poor from rural agricultural households. The situation shows that agricultural business for ex-migrant causes the average farmer to be above the poverty line and leaves considerable free time. Therefore food crops need to be pursued to become sustainable agriculture with increased productivity. It should also be noted that pre-harvest and harvest technology improvements are accompanied by improvements in the rice marketing system produced by farmers.

Conclusions

Changes in rice farming to oil palm did not make the economy of farm households better. Between the two groups of farmers, there is no difference in cultivated land area, the allocation of labor for agriculture and the income of farmers. In addition, there is not much difference between farmers' participation in on-farm and out-farm activities. Ownership of cultivated land area, age of farmers, and family size variables are determinants of farmers' choice to participate in on-farm and out farm activities and influence farmers' income. So changes in cropping from rice farming to oil palm have no impact on cultivation area, labor allocation, income and on-farm and out-farm activities.

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Changes in cropping patterns from rice to oil palm need to be inhibited or completely eliminated. It is necessary to increase the development not only for rice farmers but also for oli palm farmers through agricultural cultivation innovation, so that farmers have the ability going out from proverty. It is also need to develop business diversification to give farmers alternatif income from off farm , especially for farmers who have small cultivated land area. The last one, rice and oil palm need to be pursued to become sustainable agriculture with increased productivity.

REFERENCES

Adriani D. E. Wildayana, Yulius, I. Alamsyah and M.M. Hakim. 2017. Technological Innovation and Business Diversification: Sustainability Livelihoods Improvement Scenario of Rice Farmer Household in Sub-Optimal Land. Russian Journal of Agricultural and Socio-Economic Sciences, Vol 9 (69); 77-88.

Atera, E. A., F. N. Onyancha., and E. B. O. Majiwa. (2018): Production and marketing of rice in Kenya: Challenges and opportunities. Journal of Development and Agricultural Economic, Vol. 10(3): 64-70.

Brhanu, G. A. (2018): Access to land and agricultural based livelihoods in Northwestern Ethiopia: Implications for land use. Article Number - B6BC85E58277. Vol. 10(9): 292-297.

Coffie, R. O., M. P. Burton., F. L. Gibson., and A. Hailu. (2016): Choice of Rice Production Practices in Ghana: A Comparison of Willingness to Pay and Preference Space Estimates. Journal of Agricultural Economics, Vol. 67 (3):799–819.

Eshetu, F., and E. Mekonnen. (2016): Determinants Of Off Farm Income Diversification and Its Effect On Rural Household Poverty In Gamo Gofa Zone, Southern Ethiopia. Journal of Development and Agricultural Economics. Vol. 8(10): 215-227.

Euler, M., S. Schwarze., H. Siregar., and M. Qaim. (2016): Oil Palm Expansion among Smallholder Farmers in Sumatra, Indonesia. Journal of Agricultural Economics doi: 10.1111/1477-9552.12163.

Ganser, D., L.H. Denmead., Y. Clough., D. Buchori., and T. Tscharntke. (2016): Local and landscape drivers of arthropod diversity and decomposition processes in oil palm leaf axils. Agricultural and Forest Entomology (2016).

Gujarati, D. N. (1995): Basic Ecometrics. Thrid Edition. McGraw-Hill Book. Co. Singapore.

Konopik, O. I. D., and T. U. Grafe. (2015): Effects of Logging and Oil Palm Expansion on Stream Frog Communities on Borneo, Southeast Asia. BIOTROPICA 47(5): 636–643

Krishnaa, V., M. Eulerb., H. Siregar., and M. Qaima. (2016): Differential livelihood impacts of oil palm expansion in Indonesia. Agricultural Economics Journal. 00: 1–15.

Pastusiak1, R., M. Jasiniak., M. Soliwoda., and J. Stawska. (2017): What may determine the off-farm income? A review. Agric. Econ. – Czech 63 (8): 380–391.

Vijay, V., S. L. Pimm., C. N. Jenkins., and S. J. Smith. (2016): The Impacts of Oil Palm on Recent Deforestation and Biodiversity Loss. Plosone/ Doi:10.1371/ journal.

Wilcove, D. S., and L. P. Koh. (2010): Addressing the threats to biodiversity from oil-palm agriculture. Biodivers Conserv 19: 999–1007

Wildayana, E., and M.E. Armanto. (2018): Dynamics of Landuse Changes and General Perception of Farmers on South Sumatra Wetlands. Bulgarian Journal of Agricultural Science. Vol 24(2): 180-188 .

Wueper, D., H.Y. Ayenew and J. Sauer. (2018): Social Capital, Income Diversification and Climate Change Adaptation: Panel Data Evidence from Rural Ethiopia. JAE Vol 69 (12): 23-35.

Zahri, I; D. Adriani; E. Wildayana; Sabaruddin; M. U. Harun. 2018. Comparing Rice Farming Apperance Of Different Agroecosystem In South Sumatra, Indonesia. Bulgarian Journal of Agricultural Science, 24 (No 2) 2018, 189–198 Agricultural Academy.

Zhao, J. (2014): Rural income diversification Patterns and their determinants in China. Agric. Econ. – Czech, 60 (5): 219–231.

4. Bukti Konfirmasi Revisi 3 pada Tanggal 12 Juni 2019

1. Bukti Konfirmasi Email

Dari: <agricecon@cazv.cz>
Date: Fri, 12 June 2019 08.34
Subject: [CAAS Agricultural Journals] 349/2018-AGRICECON Article for correction
To: <dessyadriani@gmail.com>, <dessyadriani@fp.unsri.c.id>

Dear Dessy Adriani Dessy,
This is to inform you that your manuscript **Converting Impact of Rice Farming to Oil Palm Plantation on the Socio-Economic Aspects of Ex-Migrants in the South Sumatra Tidal Swamp, Indonesia** (submitted as 349/2018-AGRICECON) needs a deep revision before passing it to reviewers.

- We found out that Tables 1 and 2 are the same with the exception of 1 row (Wife Age (Year)). This is not possible.
- I suppose that you misunderstood the requirement of the reviewer connected to the change of "et al." versus "at al." - the proper version of the citation is "et al.", not "at al.".
- The tracking of changes in your document is confusing, the document should show, which are the last changes done in your manuscript (the changes connected to the correction based on Peer Review part 2).

I am attaching a comparison of a previous version of your article (349-018 Agricecon reviewer1 corr) and the current version of your article (349-018 Agricecon reviewer2corr), done by MS Word Comparison function. The document displayes only the changes connected to part 2 of the review - 349-018 Agricecon reviewer1 corr comparison). For further corrections, track all changes in the article, please.

For correction use the **MS Word Track Changes function**. Please attach an **Accompanying letter** where you will respond to all suggestions of reviewers and where you will inform us whether you accepted the suggestions or not and what revisions you made in the text of the paper according to these suggestions.

> We kindly ask you to resubmit corrected manuscript under the same identification number. To do so, please login into the editorial system, click on this manuscript and fill in "Corrected Text File and Attachments" input field.
>
> Make sure that the corrected versions of your manuscript is anonymized. See the Instructions to Authors.
>
> Please revise your paper preferably within 14 days.

Yours sincerely,
Ing. Vendula Pospíšilová, Ph.D.
Agricultural Economics
Executive Editor
Czech Academy of Agricultural Sciences
Slezská 7, 120 00 Prague 2, Czech Republic
tel.: + 420 227 010 358
e-mail: agricecon@cazv.cz
https://www.agriculturejournals.cz/

2. Bukti Koreksi Reviewer

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ID 349/2018–AGRICECON: Converting Impact of Paddy to Oil Palm Farmers on Socio-Economic Aspects of Ex-migrant, Indonesia

PART 2

PEER REVIEW A – Publish as Original Paper after major revisions and a second review

Comments to the Author:

I find that the author does not appropriately incorporate most of my comments in the revised version of the paper, especially in the discussion on the problem statement and empirical results. These problems are not fully solved. This paper has some noteworthy output but needs to address the issues given below:

1. On page 1-2, the author still does not provide any solid reason(s) to support the fact of migrant farmers who unsuccessfully manage their rice farming would convert to the oil-palm plantation. Why they choose oil-palm plantation instead of other crops (example nature rubber)? It is not clear whether such a changing plantation from rice farming to oil-palm plantation would be of great interest to the scientific community in Indonesia. Please explain.
2. On page 2 at the section of "Research Method", it is important for the authors to provide the information about respondents in terms of their demography. For example, age group, gender, etc.
3. On page 2-3 at the section of "Empirical Model Specification", the author is required no need to explain Equation (1) in the detailed manner. The author should focus on the explanation about Equation (2) and (3). Why are the interested variables selected to form model specifications (Equation (2) and (3))? The author is required to provide the theoretical framework in order to support these selected variables.

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4. On page 9, in the second paragraph, the author claims that the results estimation in Table 4 and 5 do not encounter any econometric problems. However, the author does not show the results of diagnostic checking to demonstrate the adequacy of model estimations.
5. On page 10 in Table 4, 0.061 is the alpha value or p-value? Please check and clarify it again.
6. On page 10 in Table 4, I do not understand why the author provides odds ratios for each independent variable. If odds ratios, the relationship between independent variable and conditional probability would be a non-linear relationship. If ln odds ratios, the relationship between independent variable and conditional probability would be a linear relationship. From the discussion, I do not find any further explanation and discussion about these ratios. Please justify.
7. On page 9-11, the author still compares the empirical findings (from Table 4 and 5) with the existing findings in the discussion. The author does not interpret and justify the coefficient values for significant variables in the case of Indonesian oil-palm plantation. The author should critically discuss the findings. On the other word, the results should be discussed with a systematic and scientific way.

8. I find that there are some spelling errors, typo errors, hanging sentences and inappropriate sentence structures in the content. For example “at al”, “identic”, linier”, etc. I suggest that the author needs to check and proof read the content.

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PART 1

PEER REVIEW A – Publish as Original Paper after major revisions and a second review

Comment for author:

Abstract:

- Main findings are not well organized. This makes readers to be confused about what are the selling points from the study.

Introduction:

- On page 1 at second paragraph (line 28-29), "Not all migrant farmers have successed to manage rice farming in new areas and their lives are partly performend by poverty (Adriani et al. 2017)". The author should provide solid reason(s) to support such a statement in the context of South Sumatra Province. - The author should state any possible reasons for why migrant farmers who could not successfully manage their rice farming would choose to convert their farming into oil-palm plantation instead of other types of crop plantation.

Research Method:

- How does the author select 5 villages in Banyuasin District, South Sumatra Province? Does the author apply a cluster sampling method to choose these villages? The selection criteria of 5 villages should be stated. - Based on the selected villages, the author uses a purposive sampling method to choose households to be respondents. Based on this non-probability sampling method, the author is required to provide expert knowledge of the population in judging whether selected households can be respondents or not. - The author interviews around 300 respondents in each village. Some information is missing. For example, response rate and sample size. - The

Agricultural Economics (Czech)
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author is also suggested to provide the background of respondents in terms of their demographic with a proper manner.

Model Specification:

- On page 2-3, the author should not explain the well-known multiple linear and logit regression models in the detail manner. The author should focus on how both regression models can be used to achieve two specific objectives. - The author needs to enhance the explanation of selected variables in the model specification based on theoretical frameworks. - The author should use proper notations to describe variables in the model. - On page 4 (line 95-98), the author specifies a logit model without stating the conditional probability of occurrence of an event. In order to apply such a qualitative model specification, the author needs to identify the type of event in estimating its conditional probability.

Results and Discussion:

- On page 5 and 8, what is "t-siq" as shown in Table 1 and 2? - On page 10 and 11, the author should perform diagnostic checking in order to ensure the adequacy of models before interpretation of results in Table 3 and 4. - On page 10, the authors should report the result for ANOVA, R-squared and adjusted R-squared. This allows readers could know the adequacy of model in estimating the ln odds ratio based on coefficient values. - On page 11, what is the functional form for "income of households"? In the level form or natural logarithmic form? - On page 10 and 11, the author should explain clearly the use of asterisk (*) in Table 3 and 4. - I find that the author discusses the empirical results with a manor way by comparing some findings with other studies. I suggest that the results would be interesting if the author could provide own justifications and arguments on the findings. What is a rational reason in behind for the findings? - The author is suggested to categorize all sub-sections into 2 sub-

Agricultural Economics (Czech)
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sections, namely (1) Ex-migrant farmers' productive economic business structure and (2) Determinant factors and impact of change cropping patterns on ex-migrant farmers' income structure. Each sub-section is related to each objective.

Conclusion:

- The author should summarize the finding based on the respective objective. - On page 12 at the last paragraph (line 334-338), the author recommends 2 policies. However, I could not seem any linkage between suggested policies and findings.

Overall:

- I think that the paper is interesting, but further improvements should be undertaken, especially in enhancing the discussion of methodology, empirical results, findings and implications.

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Praha 2

PEER REVIEW B – Publish as Original Paper after minor revisions

Completeness: fair

Scientific merit: good

Citations: fair

International relevance: good

Importance to field: fair

Language quality: good

Conciseness: good

Technical quality: good

Clarity of presentation: good

Originality: good

Comment for author:

Overall, the key content of the study is interesting, particularly for those involved in the field of applied economics and econometrics. The manuscript presents a proper balance between the model specification, the results and discussion proposed. On the other side, to the advantage of those who are not expert in econometrics, existing litetature on the logit model and non linear regression model should be extended; with regard to the logit, the meaning of β coefficients should be clarified.

3. Tabel Perbaikan untuk Penjelasan

Accompanying letter

Please explain all the corrections proceeded in the manuscript.

The revised writing was done in several author team meetings:

1. Imron Zahri as the main author, first revised the journal substance.
2. After the revision was made by Imron Zahri, the next review paper was corrected by Agus Thonyand Umar Harun, to sharpen the revisions made by Imron Zahri, especially related to the journal substance.
3. Furthermore, the revisions were made by Elisa Wildayana and Dessy Adriani. This revision is the final revision, aiming to ensure that all corrections requested by editors have been fulfilled.

General Information: We-have been fulfilled to correct all the reviewer comments

Review	Revision
On page 1-2, the author still does not provide any solid reason(s) to support the fact of migrant farmers who unsuccessfully manage their rice farming would convert to the oil-palm plantation. Why they choose oil-palm plantation instead of other crops (example nature rubber)? It is not clear whether such a changing plantation from rice farming to oil-palm plantation would be of great interest to the scientific community in Indonesia. Please explain.	We've corrected to make it clear about the main finding of paper with the statement ont page 2 : Farmers are attracted to oil palm because they want to improve their standard of living, they expect income to increase, the use of labor will decrease and the risk of failure is low. At that time, farmers consider that the conversion to be the most profitable choice, compare to other crops. Smallholder oil palm plantations in Indonesia grow rapidly. In 1980, the total area is only 6,175 ha, while in 2010 the area has reached 3,077,629 ha.
On page 2 at the section of "Research Method", it is important for the authors to provide the information about respondents in terms of their demography. For example,	We've added Table 1. Characteristics of Demographic Aspects of Farmer Households on page 3

age group, gender, etc.	
On page 2-3 at the section of "Empirical Model Specification", the author is required no need to explain Equation (1) in the detailed manner. The author should focus on the explanation about Equation (2) and (3). Why are the interested variables selected to form model specifications (Equation (2) and (3))? The author is required to provide the theoretical framework in order to support these selected variables.	On page 3-4, we provide the theoretical framework in order to support these selected variables.
In page 9, in the second paragraph, the author claims that the results estimation in Table 4 and 5 do not encounter any econometric problems. However, the author does not show the results of diagnostic checking to demonstrate the adequacy of model estimations.	We've explained in page 9: As mention above, we develop equations (1) and (2) to analyze the second purpose more deeply about the determinants of farmers participating in on-farm and off-farm activities and determinants income of farmer. The model estimation results show that the model is representative enough to analyze the determinants of farmers participating in other jobs (on-farm and out-farm activities) and determinants income of farmer. Determination coefficient value (R^2) are 0.51 for equation (1) and 0.64 for equation (2). This shows that all explanatory variables in the model can explain the model behavior well. The explanatory variables in the equation together clearly explain the diversity of variables indicated by the λ^2 value of 14.906 for equation (1) and F statistic value of 0.987 for equation (2). The results of the t test show several variables that have a significant effect on the dependent variable. The results of the econometric criteria test show that the model does not experience violations of classical assumptions with multicollinearity, autocorrelation and heteroskedasticity. One of the most important things and the main orientation of this study is that all presumptive parameter result in the model are in accordance with expectations based on economic theory and logic.
On page 10 in Table 4, 0.061 is the alpha	On page 10 in Table 4, 0.061 is the p-value

value or p-value? Please check and clarify it again.	
On page 10 in Table 4, I do not understand why the author provides odds ratios for each independent variable. If odds ratios, the relationship between independent variable and conditional probability would be a non-linear relationship. If ln odds ratios, the relationship between independent variable and conditional probability would be a linear relationship. From the discussion, I do not find any further explanation and discussion about these ratios. Please justify.	At the end of page 9-10, we've explain that: The estimating logit functions, which is used to determine farmer participation in other jobs can be seen in Table 4. From odds ratio, we concluded that *the probability choice of participating in other jobs activities will increase if the percentage of* (1) arable land, active man-woman worker, and education are decreasing, and (2) husband age and family size are increasing. This in line with Eshetu and Mekonnen (2016); Wuepper at al. (2018) and Zhao (2014) finds that the choice between specialization and income diversification was driven by various interacting factors, such as scale and economic coverage, risk considerations, household characteristics, family size, stimulated households to carry out various patterns of income diversification. Farmer participation in other jobs is a form of developing business diversification carried out by farmer households.
On page 9-11, the author still compares the empirical findings (from Table 4 and 5) with the existing findings in the discussion. The author does not interpret and justify the coefficient values for significant variables in the case of Indonesian oil- palm plantation. The author should critically discuss the findings. On the other word, the results should be discussed with a systematic and scientific way.	We've been revised it in page 10-11: Furthermore, the factors influencing the variation of farmer household income can be seen in Table 5. There are four variables affecting the farmer's income, namely land owned, farmers' age of, number of male workers, choosing on-farm activities besides the main business. Judging from the sign and magnitude of the regression coefficient, the age variable has a very significant negative effect on income, while the land ownership and the number of male active labor variable have a real positive effect on income. This means that the older the farmer causes the smaller income. The function change of land by changing cropping patterns from rice to oil palm cannot be proven to have an effect on increasing farmers' income, and even tends to be smaller incomes of oil palm farmers. The situation found in this study

	differs from the results of the study of Eshetu and Mekonnen (2016) which investigated the determinants of diversification of agricultural income and its effect on rural poverty in Ethiopia. Estimated results from the logit model also show that farmer participation significantly reduces the livelihood of being poor from rural agricultural households. The situation shows that agricultural business for ex-migrant causes the average farmer to be above the poverty line and leaves considerable free time. Therefore, food crops need to be pursued to become sustainable agriculture with increased productivity. It should also be noted that pre-harvest and harvest technology improvements are accompanied by improvements in the rice marketing system produced by farmers.
I find that there are some spelling errors, typo errors, hanging sentences and inappropriate sentence structures in the content. For example “at al”, “identic”, linier”, etc. I suggest that the author needs to check and proof read the content.	We’ve fixed it.

3. Bukti Konfirmasi Revisi 4-9 pada tanggal 14 Juni 2019 sampai 13 Desember 2019

1. Contoh Email Permintaan Revisi 4-9

Dari: <agricecon@cazv.cz>
Date: Mon, 12 Agt 2019 19.51
Subject: [CAAS Agricultural Journals] 349/2018-AGRICECON Article for correction
To: <dessyadriani@gmail.com>, <dessyadriani@fp.unsri.c.id>

Dear Dessy Adriani Dessy,
We would like to inform you that your manuscript **Converting Impact of Rice Farming to Oil Palm Plantation on the Socio-Economic Aspects of Ex-Migrants in the South Sumatra Tidal Swamp, Indonesia** (submitted as 349/2018-AGRICECON) should be corrected according to reviewers' comments.

1. The article contains Equations (2) and (3), however the text describes Equations (1,2). We suppose that this is a mistake. Change the numbering of the equations accordingly, please.

2. The required explanation of "beta coefficient" was not added. According to the Instructions to Authors of our journal, each variable/symbol used in the Equation should be explained, while firstly mentioned. Add the general explanation of "beta coefficient" behind the Equations, please (whereas: i = ...).

For correction use the **MS Word Track Changes function**. Before you start with the new corrections, **accept all the previous changes** (all the text should be in black colour too). Please attach an **Accompanying letter** where you will respond to both the suggestions of reviewers and where you will inform us whether you accepted the suggestions or not and what revisions you made in the original text of the paper according to these suggestions.

Please submit the corrected manuscript and also the Accompanying letter in anonymized form. See the Instructions to Authors.

We kindly ask you to resubmit corrected manuscript under the same identification number. To do so, login into the system, click on this manuscript and fill in "Corrected Text File and Attachments" input field.
Please revise the paper within 14 days from the date of sending off. After this time limit the paper will be crossed out from our records.

Yours sincerely,
Ing. Vendula Pospíšilová, Ph.D.
Agricultural Economics
Executive Editor
Czech Academy of Agricultural Sciences
Slezská 7, 120 00 Prague 2, Czech Republic
tel.: + 420 227 010 358
e-mail: agricecon@cazv.cz
https://www.agriculturejournals.cz/

2. Bukti Accompanying letter

Accompanying letter

Please explain all the corrections proceeded in the manuscript.

The revised writing was done in several author team meetings:

1. Imron Zahri as the main author, first revised the journal substance.
2. After the revision was made by Imron Zahri, the next review paper was corrected by Agus Thony and Umar Harun, to sharpen the revisions made by Imron Zahri, especially related to the journal substance.
3. Furthermore, the revisions were made by Elisa Wildayana and Dessy Adriani. This revision is the final revision, aiming to ensure that all corrections requested by editors have been fulfilled.

General Information: We-have been fulfilled to correct all the reviewer comments

9th Revision

Yellow Page	Comment	Correction
Page 1	Impact of conversion from rice farms to oil palm plantations on socio-economic aspects of ex-migrants in Indonesia	No Correction
Page 1	Universitas Sriwijaya dan Universitas Sjakhyakirti	No Correction. At the two universities there is a university policy that the naming of the University name in international publications, remains in Indonesian languange
Page 3	Impact of conversion from rice farms to oil palm plantations on socio-economic aspects of ex-migrants in Indonesia.	No Correction
Page 3	Ln	No Correction
Page 4	farmer agriculture	Need Correction: Farmers‘ Household

Page 4	4.8 t/ha/planting season 5.51 t/ha. 11.04 t	Need Correction: 4.8 tons/ha/planting season It seems something happen in our file→ the word "tons" changed to "t"
Page 5	In Table 3	No Correction
Page 5	is 3 607 USD/year, which is the income of rice farmers averaging 2 627 USD/year which is greater than the income of oil palm farmer.	No Correction
Page 5	Farmers Household	Need Correction: Farmers' Household
Page 5	42.00%	No Correction
Page 6	–0.743*	No Correction
Page 6	land ownership	No Correction
Page 9	1. Vijay V., Pimm S.L., Jenkins C.N., Smith S.J. (2016): The im- pacts of oil palm on recent deforestation and biodiversity loss. Plosone/ Doi: 10.1371/ journal. 2. Krishna V., Euler M., Siregar H., Qaima M. (2016): Diferential livelihood impacts of oil palm expansion in In- donesia. Agricultural Economics Journal, 00: 1–15.	**Need Correction:** 1. Vijay V, Pimm SL, Jenkins CN, Smith SJ (2016) The Impacts of Oil Palm on Recent Deforestation and Biodiversity Loss. PLoS ONE 11(7): e0159668. https://doi.org/10.1371/journal.pone.0159668. 2. Krishna V., Euler M., Siregar H., Qaim M. (2017): Differential livelihood impacts of oil palm expansion in Indonesia. Agricultural Economics, 48(5): 639–653.

8 th Revision (ERR1 Revision)

Rev No.	EER	Revision
1	References – All references mentioned in the reference list have to be cited in the text, and vice versa. a. Reference list b. Text of the article	We've all the references requested on a. Reference list, page 3, 10 b. Text of the article, page 11,13
2	Keywords – keywords should differ from the nouns used in the title, consider to change some of the keywords, used in the article, please.	We've all the references requested Page 1
3	Thousand separator	We've all the references requested on Page 1
4	Equations →K	We've all the references requested on Page 4

Page 4	4.8 t/ha/planting season 5.51 t/ha. 11.04 t	Need Correction: 4.8 tons/ha/planting season It seems something happen in our file→ the word "tons" changed to "t"
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Page 5	is 3 607 USD/year, which is the income of rice farmers averaging 2 627 USD/year which is greater than the income of oil palm farmer.	No Correction
Page 5	Farmers Household	Need Correction: Farmers' Household
Page 5	42.00%	No Correction
Page 6	–0.743*	No Correction
Page 6	land ownership	No Correction
Page 9	1. Vijay V., Pimm S.L., Jenkins C.N., Smith S.J. (2016): The im- pacts of oil palm on recent deforestation and biodiversity loss. Plosone/ Doi: 10.1371/ journal. 2. Krishna V., Euler M., Siregar H., Qaima M. (2016): Diferential livelihood impacts of oil palm expansion in In- donesia. Agricultural Economics Journal, 00: 1–15.	**Need Correction:** 1. Vijay V, Pimm SL, Jenkins CN, Smith SJ (2016) The Impacts of Oil Palm on Recent Deforestation and Biodiversity Loss. PLoS ONE 11(7): e0159668. https://doi.org/10.1371/journal.pone.0159668. 2. Krishna V., Euler M., Siregar H., Qaim M. (2017): Differential livelihood impacts of oil palm expansion in Indonesia. Agricultural Economics, 48(5): 639–653.

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2	Keywords – keywords should differ from the nouns used in the title, consider to change some of the keywords, used in the article, please.	We've all the references requested Page 1
3	Thousand separator	We've all the references requested on Page 1
4	Equations →K	We've all the references requested on Page 4

5	Table 3 – Change the thousand's separators to "space", please.	We've all the references requested Page 16
6	Table 4,5 – Use "0" in the beggining of the values, please (f.e. "0.223", not ".223", please.	We've all the references requested Page 17 dan 18
7	Table 4 – Consider to add the explanation of "λ^2", please.	We've all the references requested Page 8-9
8	Table 5 – Consider to add the explanation of "b", "t", please (as a short note).	We've all the references requested Page 18

7 th Revision

Rev No.	Review	Revision
1	Number of Equation	We've changed the number of equation from (2,3) be (1,2) → Page 5
2	Beta Coefficient	We've added the general informatio about beta coefficient. → Page 4 Whereas: i = Number of Sample 1, 2, 3, …n α_i = Constanta $\beta_{1..}\beta_{19}$ = Beta regression coefficient which explain the effect of independent variables on the dependent variable e_{ij} = Error terms

6 th Revision

Rev No.	Review	Revision
1	Beta Coefisient	For the 1st equation, we didn't explaining about beta coef, but we explained about the odds ratio in this section, related to the probability choice develop in that equation (Page 9) From odds ratio, we concluded that the

		probability choice of participating in other jobs activi ties will increase if the percentage of (1) arable land, active man-woman worker, and education are decreasing, and (2) husband age and family size are increasing.
		For the 2nd equation, we have been clarifing the beta coef on this section (Page 10) There are four variables affecting the farmer's income, namely arable land, farmers' age, male workers, on-farm activities besides the main business. The second equation is a non-linear equation, then the β coefficient has a value in percentage, for example the variable of arable land has a β coefficient by 0.225. This means that if arable land increased by 1 percent, then the income of farmers increased by 0.225 percent. So that judging from the sign and magnitude of the regression coefficient, the age and arable land variable has a significant negative effect on income, while the land ownership and the number of male active labor variable have a significant positive effect on income. The function change of land by changing cropping patterns from rice to oil palm cannot be proven to have an effect on increasing farmers' income, and even tends to be smaller incomes of oil palm farmers.

5th Revision

Rev No.	Review	Revision
1	Please consider including the following article in your article to strengthen some point(s) in the section of the introduction: Go Y.H., Lau W.Y. (2019): Palm Oil Spot-Futures Relation: Evidence from Unrefined and Refined Products, Agricultural Economics-Zemědělská	We've added information on Introducton, Page 2 as below: Oil palm farmers are also faced with issues regarding their large dependence on oil palm companies in terms of processing and marketing of products, and farmers get a small marketing margin. So far, farmers are selling products to companies in the form of fresh fruit bunches. Companies process the

	Ekonomika, 65(3), 133-142. explain.	products and sell the processed products of the spot and futures markets. Go and Lau analysis (2019) showed that the sale of processed palm oil in the futures market is better than sales in the spot market.

4th Revision

Rev No.	Review	Revision
1	On page 1-2, the author still does not provide any solid reason(s) to support the fact of migrant farmers who unsuccessfully manage their rice farming would convert to the oil-palm plantation. Why they choose oil-palm plantation instead of other crops (example nature rubber)? It is not clear whether such a changing plantation from rice farming to oil-palm plantation would be of great interest to the scientific community in Indonesia. Please explain.	We've corrected to make it clear about the main finding of paper with the statement ont page 2 : Farmers are attracted to oil palm because they want to improve their standard of living, they expect income to increase, the use of labor will decrease and the risk of failure is low. At that time, farmers consider that the conversion to be the most profitable choice, compare to other crops. Smallholder oil palm plantations in Indonesia grow rapidly. In 1980, the total area is only 6,175 ha, while in 2010 the area has reached 3,077,629 ha.
2.	On page 2 at the section of "Research Method", it is important for the authors to provide the information about respondents in terms of their demography. For example, age group, gender, etc.	We've added Table 1. Characteristics of Demographic Aspects of Farmer Households on page 3
3.	On page 2-3 at the section of "Empirical Model Specification", the author is required no need to explain Equation (1) in the detailed manner. The author should focus on the explanation about Equation (2) and (3). Why are the interested variables selected to form model specifications (Equation (2) and (3))? The author is required to provide the theoretical framework in order to support these selected	On page 3-4, we provide the theoretical framework in order to support these selected variables.

	variables.	
4	In page 9, in the second paragraph, the author claims that the results estimation in Table 4 and 5 do not encounter any econometric problems. However, the author does not show the results of diagnostic checking to demonstrate the adequacy of model estimations.	We've explained in page 9: As mention above, we develop equations (1) and (2) to analyze the second purpose more deeply about the determinants of farmers participating in on-farm and off-farm activities and determinants income of farmer. The model estimation results show that the model is representative enough to analyze the determinants of farmers participating in other jobs (on-farm and out-farm activities) and determinants income of farmer. Determination coefficient value (R^2) are 0.51 for equation (1) and 0.64 for equation (2). This shows that all explanatory variables in the model can explain the model behavior well. The explanatory variables in the equation together clearly explain the diversity of variables indicated by the λ^2 value of 14.906 for equation (1) and F statistic value of 0.987 for equation (2). The results of the t test show several variables that have a significant effect on the dependent variable. The results of the econometric criteria test show that the model does not experience violations of classical assumptions with multicollinearity, autocorrelation and heteroskedasticity. One of the most important things and the main orientation of this study is that all presumptive parameter result in the model are in accordance with expectations based on economic theory and logic.
5	On page 10 in Table 4, 0.061 is the alpha value or p-value? Please check and clarify it again.	On page 9 in Table 4, 0.061 is the p-value
6	On page 10 in Table 4, I do not understand why the author provides odds ratios for each independent variable. If odds ratios, the relationship between independent variable and conditional probability would be a non-linear relationship. If ln odds ratios, the relationship between independent variable and conditional probability would be a	At the end of page 9, we've explain that: The estimating logit functions, which is used to determine farmer participation in other jobs can be seen in Table 4. From odds ratio, we concluded that *the probability choice of participating in other jobs activities will increase if the percentage of* (1) arable land, active man-woman worker, and education are decreasing, and (2) husband age and family size are increasing. This in line with Eshetu

	linear relationship. From the discussion, I do not find any further explanation and discussion about these ratios. Please justify.	and Mekonnen (2016); Wuepper at al. (2018) and Zhao (2014) finds that the choice between specialization and income diversification was driven by various interacting factors, such as scale and economic coverage, risk considerations, household characteristics, family size, stimulated households to carry out various patterns of income diversification. Farmer participation in other jobs is a form of developing business diversification carried out by farmer households.
7	On page 9-11, the author still compares the empirical findings (from Table 4 and 5) with the existing findings in the discussion. The author does not interpret and justify the coefficient values for significant variables in the case of Indonesian oil- palm plantation. The author should critically discuss the findings. On the other word, the results should be discussed with a systematic and scientific way.	We've been revised it in page 10: Furthermore, the factors influencing the variation of farmer household income can be seen in Table 5. There are four variables affecting the farmer's income, namely land owned, farmers' age of, number of male workers, choosing on-farm activities besides the main business. Judging from the sign and magnitude of the regression coefficient, the age variable has a very significant negative effect on income, while the land ownership and the number of male active labor variable have a real positive effect on income. This means that the older the farmer causes the smaller income. The function change of land by changing cropping patterns from rice to oil palm cannot be proven to have an effect on increasing farmers' income, and even tends to be smaller incomes of oil palm farmers. The situation found in this study differs from the results of the study of Eshetu and Mekonnen (2016) which investigated the determinants of diversification of agricultural income and its effect on rural poverty in Ethiopia. Estimated results from the logit model also show that farmer participation significantly reduces the livelihood of being poor from rural agricultural households. The situation shows that agricultural business for ex-migrant causes the average farmer to be above the poverty line and leaves considerable free time. Therefore, food crops need to be pursued to become sustainable agriculture with increased productivity. It should also be noted that pre-harvest and

		harvest technology improvements are accompanied by improvements in the rice marketing system produced by farmers.
8	I find that there are some spelling errors, typo errors, hanging sentences and inappropriate sentence structures in the content. For example “at al”, “identic”, linier”, etc. I suggest that the author needs to check and proof read the content.	We’ve fixed it.

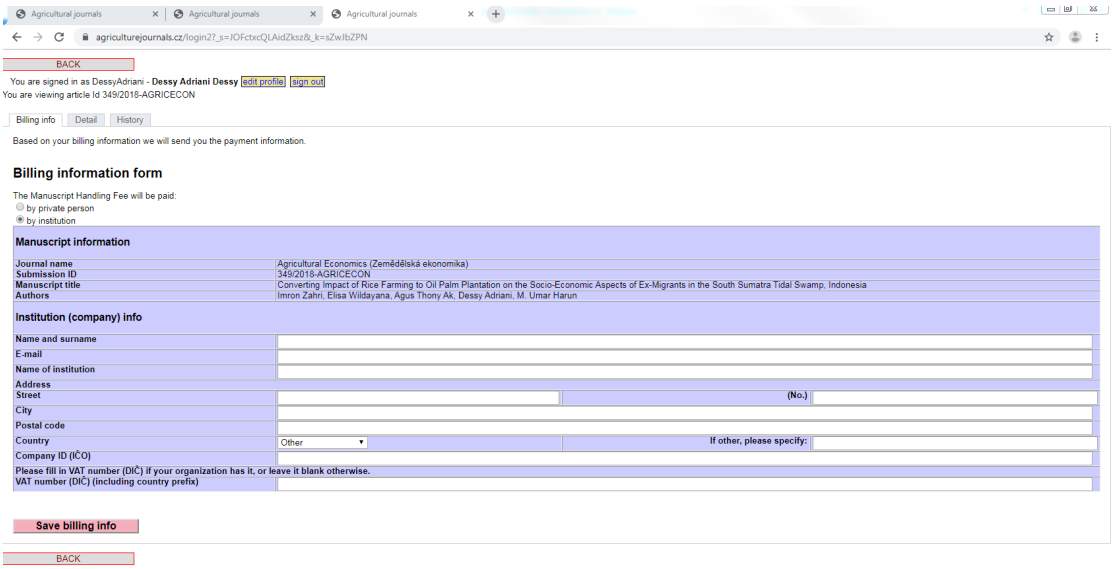
3.Contoh Email Balasan

On Thursday, July 25, 2019, 08:49:04 AM GMT+7, <agricecon@cazv.cz> wrote:

Dear Dessy Adriani Dessy,
Many thanks for the corrected manuscript submission.

Yours sincerely,
Ing. Vendula Pospíšilová, Ph.D.
Agricultural Economics
Executive Editor
Czech Academy of Agricultural Sciences
Slezská 7, 120 00 Prague 2, Czech Republic
tel.: + 420 227 010 358
e-mail: agricecon@cazv.cz
https://www.agriculturejournals.cz/

5.Pembayaran Paper setelah Paper diterima tanggal 28 Nopember 2019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Converting Impact of Rice Farming to Oil Palm Plantation on the Socio-Economic Aspects of Ex-Migrants in the South Sumatra Tidal Swamp, Indonesia
Authors
Imron Zahri, Elisa Wildayana, Agus Thony Ak, Dessy Adriani, M. Umar Harun
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6. Proofsheet Paper sebelum publikasi pada tanggal 17 Desember 2019

https://doi.org/10.17221/349/2018-AGRICECON

Impact of conversion from rice farms to oil palm plantations on socio-economic aspects of ex-migrants in Indonesia

Imron Zahri[1], *Elisa Wildayana*[1], *Agus Thony Ak*[2], *Dessy Adriani*[1]*, *M. Umar Harun*[1]

[1]*Faculty of Agriculture, Universitas Sriwijaya, Palembang, South Sumatra, Indonesia*
[2]*Faculty of Agriculture, Universitas Sjakhyakirti, Palembang, South Sumatra, Indonesia*
**Corresponding author: dessyadriani@fp.unsri.ac.id*

Citation: Zahri I., Wildayana E., Ak A.T., Adriani D., Harun M.U. (2019): Impact of conversion from rice farms to oil palm plantations on socio-economic aspects of ex-migrants in Indonesia. Agricultural Economics – Czech, 65: 00–00.

Abstract: This paper aims to investigate the impact of land conversion from rice farming to oil palm plantations on the socio-economic aspects of ex-migrants in the South Sumatra tidal swamp, Indonesia. Land conversion from rice farming to oil palm plantations is a form of adaptation for ex-migrant farmers and will increase food deficits in Indonesia. Ex-migrant farmers initially cultivated food crops with conventional technology. This pattern has been changing, which have led to the formation of two large groups of farms, namely rice-based farms implementing mechanisation, and oil palm-based plantations. The results showed that changes from rice farming to oil palm plantations did not make the economy of farm households better. Between the two groups of farmers, there is no difference in arable land, the labour allocation for agriculture and the farmers' income. In addition, there is not much difference between farmers' participation in on-farm and out-farm activities. The area of arable land owned, the husbands'age, and family size variables are determinants of farmers' choice to participate in other jobs activities and influence farmers' income. Thus, changes in crops from rice to oil palm have no impact on cultivation area, labour allocation, income, on-farm and out-farm activities.

Keywords: household; migrant; socio-economic; tidal swamp

Rural development in Indonesia has been carried out including the government-sponsored transmigration program, which has moved Javanese populations to areas outside Java. The first program of transmigration to the tidal swamp in Indonesia was implemented in 1969, namely to Delta Upang in South Sumatra Province. After that time, there was a massive population movement to the tidal swamp that lasted until the 1990s. The transmigration program was fuelled by developing rice-based agriculture as a new livelihood in the destination area. Not all migrant farmers have succeeded to manage rice farming in new areas and their lives are partly marked by poverty (Adriani et al. 2017). According to Zahri et al. (2018) and Wildayana and Armanto (2018), some rice farms, therefore, converted into oil-palm plantations. Farmers are attracted to oil palms because they want to improve their standard of living, they expect their income to increase and their use of labour to decrease and the risk of failure is low. At that time, farmers consider the conversion to oil palm plantation to be the most profitable choice, as compared to other crops. Smallholder oil palm plantations in Indonesia grow rapidly. In 1980, their

Supported by Universitas Sriwijaya, Indonesia, Profession Grant Project No. 0006/UN9/SK.LP2M.PT/2018.

https://doi.org/10.17221/349/2018-AGRICECON

total area was only 6 175 ha, while in 2010 the area has reached 3 077 629 ha.

Oil palm plantations in the tidal swamp have contributed to the development of oil palms in Indonesia, and this has raised a number of issues. Developing oil palm plantations in Indonesia has caused deforestation, which has an impact on increasing carbon dioxide emissions (Vijay et al. 2016) and affects biodiversity (Wilcove and Koh 2010, Krishna et al. 2016). Oil palm farmers are also faced with issues regarding their large dependence on oil palm companies in terms of processing and marketing of products, and farmers get a small marketing margin. So far, farmers have been selling products to companies in the form of fresh fruit bunches. Companies process the products and sell the processed products on the spot and futures markets. Go and Lau analysis (Go and Lau 2019) showed that the sale of processed palm oil in the futures market is better than its sales in the spot market.

Based on the above description, this study was carried out with the aims: (1) to describe the productive economic business structure of those ex-migrant farmers in tidal swamp that consistently carry out rice farming and those who convert land into oil palm plantations, and (2) to analyse determinant factors and the impact of change in cropping patterns on the income structure of ex-migrants in tidal swamp areas.

RESEARCH METHODS

The research method used was a survey method with primary data. The sampling method used was Multi Stage Random Sampling with tidal swamp areas from 3 districts, namely Banyuasin Regency, Musi Banyuasin Regency and Ogan Komering Ilir Regency. From each regency, we chose five villages. Around 50 respondents chosen by random sampling were interviewed in each village because the average population of each village in South Sumatra was about 500 households, meaning that in each village as much as 10% of the population on average were chosen as respondents. All respondents were ex-migrants from Java who moved to this location in the period from 1982 to 1985. Demographic characteristics of the farmer household sample can be seen in Table 1. The age of the husband was on average 46.44 years, the number of family members was around 3 persons. There are on average 1.5 active male workers both on rice farms and oil palm plantations.

EMPIRICAL MODEL SPECIFICATION

Becker (1965) stated that every household will maximise production and consumption behaviour, and Nakajima (1986) developed this idea further by a subjective balance model for households that produce many products. Vemminem et al. (2002) state that if the main farm provides (on-farm) income that is too small for each person in it, then in order to meet their needs other sources of income are needed outside of their farming (off-farm and out-farm income). As stated by Pastusiak et al. (2017), agriculture is one of the riskiest businesses. Farmer households, therefore, try to diversify their sources of income and carry out other strategies that aim to stabilise their income by off-farm and out-farm income. Krishna et al. (2016) said that oil palm farmer households need less labour and this allows more labour to be allocated to off-farm activities or to expanding their agricultural land. The concept of on-farm, off-farm, and out-farm income is further referred to as business diversification, as revealed by Ellis (1998) finding that farm diversification is due to quantitative variables, namely land area,

Table 1. Characteristics of demographic aspects of farmer's households

Variable	All sample (N = 300)		Rice (n = 150)		Oil palm (n = 150)		*p*-value
	mean	SD	mean	SD	mean	SD	
Husband's age (year)	46.44	11.85	45.69	12.39	47.19	11.29	0.165
Wife's age (year)	41.09	12.58	39.90	13.92	42.27	10.99	0.041
Family size (persons)	3.46	1.19	3.76	1.13	3.15	1.17	0.214
Active man worker (persons)	1.56	0.70	1.59	0.70	1.53	0.70	0.872
Active woman worker (persons)	1.49	0.69	1.52	0.70	1.45	0.67	0.398
Education (year)	7.51	3.50	6.50	2.51	8.53	4.02	0.000

Source: own processing

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experience (age), and health. Poor households have fewer opportunities to carry out off-farm activities. It is likewise with education: educated family heads have higher participation than others. Opportunities for off-farm and out-farm activities have an influence on income. In general, researchers have analysed variables including respondent status, family size, gender, land area, education, access to capital, number of productive workforce, and experience, as determinants of household income (Schwarze and Zeller 2005; Bhattacharyya 2008; Amurtiya et al. 2016).

Based on theoretical framework, we develop Equations (1–2) to analyse in more depth the second purpose about the determinants of participation of farmers in other jobs (other on-farm and out-farm activities, except main jobs as rice and/or oil palm farmers) and determinants of income factors of farmers. Equation (1) is the logistic regression model, to measure the effect of probability on an event. Equation (2) is a non-linear multiple regression model.

The model is compiled as follows in Equations (1–2). In Equations (1–2):

K – ratio of the probability of having and not having other jobs;
i – sample number 1, 2, 3, ..., n;
α_i – constant;
β_{1-19} – beta regression coefficients which explain the effect of independent variables on the dependent variable;
e_{ij} – error terms;
P_i – probability of having other jobs;
$(1-P_i)$ – probability of not having other jobs;
INC – income (USD/year);
LPL – arable land (ha);
USU – husbands' age (years);
JAK – family size (persons);
TKP – male active labourers (persons);
TKW – female active labourers (persons);
EDU – education (years);
D_1 – dummy variable for main work (1 for rice farmers and 0 for oil palm farmers);
D_2 – dummy variable for other on-farm activities (1 for having other on-farm activities and 0 for not having other on-farm activities);
D_3 – dummy variable for out-farm activities (1 for having other out-farm activities and 0 for not having other out-farm activities).

RESULTS AND DISCUSSION

Productive economic business structure for ex-migrant farmers

Farm size. The arable land owned by each farmer is on average 1.96 ha, and the area of arable land owned is not significantly different with regards to different cropping patterns. On average, rice farmers have 1.96 ha of arable land while oil farm farmers have 1.95 ha of arable land. With such a cultivated area, the agricultural business of ex-migrant farmers is classified as small farmers (Table 2).

In the tidal swamp, farmers adopt oil palm cultivation by replacing their rice farming on the same land and there is a tendency not to allow expanding their planting area except by buying another land. Thus, it is natural that the cultivated area of rice farmers is not much different from the area of oil palm plantations. The conversion of land from rice farming to oil palm cultivation, therefore, does not cause an increase in the scale of farmers' businesses.

Before the change in rice technology, there were farmers who were less successful in rice farming. Some moved to other areas to look for a better life, so their land was bought by local villagers. Another cause has been the inheritance of cultivated land by children from their parents.

Use of family labour. The use of family labour for rice farming averages 19 workdays/planting season on the average cultivated land of 1.96 ha, which is very little. This is due to the development of mechanisation in rice farming activities. This is especially true for rice harvesting: when performed using human labour only, each hectare takes about 25 workdays, while when using a harvesting machine, each hectare takes only about 4 hours. The development of mechanisation has increased the ability of farmers to work on a wider area, which is now on average 1.96 ha per family. In tidal swamps, with the development of agri-

$$\mathrm{Ln}\,K = \mathrm{Ln}\left[\frac{Pi}{1-Pi}\right] = \mathrm{Ln}\,\alpha_i + \beta_1 \mathrm{Ln}\,LPL_i + \beta_2 \mathrm{Ln}\,USU_i + \beta_3 \mathrm{Ln}\,JAK_i + \beta_4 \mathrm{Ln}\,TKP_i + \beta_5 \mathrm{Ln}\,TKW_i + \beta_6 \mathrm{Ln}\,EDU_i + \\ + \beta_7 \mathrm{Ln}\,D_{1i} + \beta_8 \mathrm{Ln}\,D_{2i} + \varepsilon_i \quad (1)$$

$$\mathrm{Ln}\,INC_i = \mathrm{Ln}\,\alpha_9 + \beta_{10} \mathrm{Ln}\,LPL_i + \beta_{11} \mathrm{Ln}\,USU_i + \beta_{12} \mathrm{Ln}\,JAK_i + \beta_{13} \mathrm{Ln}\,TKP_i + \beta_{14} \mathrm{Ln}\,TKW_i + \beta_{15} \mathrm{Ln}\,EDU_i + \beta_{16} \mathrm{Ln}\,D_i + \\ + \beta_{17} \mathrm{Ln}\,D_{1i} + \beta_{18} \mathrm{Ln}\,D_{2i} + \beta_{19} \mathrm{Ln}\,D_{3i} + \varepsilon_i \quad (2)$$

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Table 2. Characteristics of farmer's household

Variables	All sample (N = 300)		Rice (n = 150)		Oil palm (n = 150)		*p*-value
	mean	SD	mean	SD	mean	SD	
Land size (ha)	1.96	1.23	1.96	1.40	1.95	1.03	0.02
Labours (workdays)	–	–	19.09	9.11	18.00	5.67	–
Farm cost (USD)	228	84	237	101	266	66	–
Rice productivity (t)	–	–	4.80	1.78	–	–	–
Oil palm productivity (t)	–	–	–	–	11.04	6.18	–

Source: own processing

cultural mechanisation, it turns out that rice farming is changing from labour intensive to capital intensive. Hand tractor has been used in land cultivation. Seedlings are no longer being used because they have been replaced by tabela (direct seed planting without seedlings). Combined harvesters are used for harvesting. This is in line with Brhanu (2018) who claims that adoption of mechanical technology by rice farmers could increase productivity.

The use of the labour of oil palm cultivation is not much different in numbers compared to rice farming. Oil palm farmers partnering with core estates do not use labour for their plantations because all activities are carried out by officers from core estates. The average labour requirement for each 2 ha of oil palm plantations for every 6 months is only around 18 workdays, namely 12 workdays for harvesting, 2 workdays for seedling planting, 2 workdays for fertilising, and 2 workdays for other activities. Because of this, the farmers' leisure time is very large, allowing farmers to develop other productive economic businesses. This finding is in line with Krishna et al. (2016) stating that oil palm farmer households need less labour than households cultivating rubber which is the main alternative crops.

Agricultural production costs. In conventional rice farming activities, many costs incurred are connected to labour wages: from land preparation through planting to harvesting. On the other hand, following the development of rice cultivation using machinery, rice farming has been becoming more capital intensive. The total production costs per hectare for rice farming per planting season was 237 USD/year, consisting of fertiliser costs (27%), and land processing and harvesting costs (73%). On the other hand, the costs incurred for oil palm cultivation amount to 266 USD/year, which consists of fertiliser costs (32%) and harvesting costs (68%). The costs of processing land and harvesting in case of rice farming amount to 73% of total production costs. It is the cost of using agricultural machinery and it had been previously covered by using human labour. This shows that rice farming has turned into a capital-intensive business.

Rice productivity. The rice productivity is around 4.8 t/ha/planting season, so if farmers perform a double planting in a year, then rice productivity can reach 9.6 t/year. But most farmers grow corn for the second season, which is between April and July with a productivity of around 7 t/planting season. Most farmers operate with two planting seasons. This condition causes rice farmers to have a higher income than farmers in oil palm plantations. This is caused, as stated earlier, by the fact that farmers in these tidal areas have found efficient farming methods, with good results and little use of labour. Data from the Indonesian Central Bureau of Statistics (2015) shows that the productivity of lowland rice in Indonesia is 5.51 t/ha. This means that the productivity of paddies carried out by ex-migrants is higher than rice productivity in Indonesia.

Palm oil plantation productivity averages 11.04 t of fresh fruit bunches (FFB)/ha/year. If it is compared with the results of other plantations producing at least 24 t/ha/year, such productivity is very low at less than 1 t/ha/month and varies in a year. The low productivity is influenced by several things, namely the lack of optimal plantation maintenance by farmers such as low fertilisation and pest and disease control is still limited.

Income of farmer's households

Farmer's livelihoods. At the beginning of arrival until around the first 5 years since arrival in the new area, all migrants (100%) had jobs as farmers on-farm rice and other seasonal crops such as vegetables and pulses. After that, changes in the business of farm-

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ers began to occur by adding other types of work, which could be grouped into: (1) main agricultural jobs, namely rice farming and/or oil palm plantations; (2) other agricultural jobs (on-farm jobs, such as vegetable farming, crops, livestock and fisheries; off-farm, such as farm labourers; and out-farm jobs such as employees and carpenters). In Table 3, it can be seen that 43.33% of rice farmers carry out agricultural activities also outside of their main business and 43.33% work on off-farm businesses. In the case of oil palm farmers, 40.67% of those in the sample work in agriculture outside their main business, and 50% work outside agriculture. This condition shows that farmers do not only do a single business but have developed multiple businesses or diversified household businesses.

Impact and determinant factor changes in cropping patterns on structure of ex-migrant income

The income of farmer households is composed of the income from the main rice and oil palm business, income from other agricultural businesses, and non-agricultural income. In Table 3, it can be seen that the average farm household income is 3 607 USD/year, which is the income of rice farmers averaging 3 745 USD/year which is greater than the income of oil palm farmer. The contribution from the main agricultural business to farmer household income is on average 72.94%, in the case of rice farming it is 68.05% and for oil palm plantation farmers it is 77.82%. This figure shows that agricultural business provides the largest contribution to the income of farmer households.

In terms of the source of income, rice farmers derive 18.55% of it from other on-farm sources and 13.06% from out-farm sources, while for oil palm farmers these shares are 9.94% (on-farm sources) and 12.24% (out-farm sources). Oil palm farmers who have another on-farm income account for 40.67% of the sample and those who work outside agriculture account for 50% of the sample, while rice farmers who have other on-farm income accounted for 42.00% of the sample and those with out-farm income accounted also for 43.33% of the sample. This proved that farmers do not only have a single business, but they have developed multiple businesses or diversified household businesses. That is in line with Krishna et al. (2016) and Pastusiak et al. (2017).

Conversion of land use from rice farming to oil palm plantations will harm the farmers individually and also reduce food production (rice and corn), thus disrupting the supply of food. Indonesia experienced a rice deficit, similar to that experienced by several countries such as Ghana (Coffie et al. 2016) and Kenya (Atera et al. 2018). If the land conversion from food crops (rice and corn) into plantation crops or other uses continues to occur, it will disrupt food security in Indonesia. The problem of transferring this land must be stopped because it will disrupt Indonesian rice production. According to Euler et al. (2016), concessions that had been allocated by the government to oil palm companies in the past have led to the adoption of oil palm in the small agricultural sector, and the dynamics of subsequent land use are

Table 3. Income of farmer' household

Income type	Unit	All sample (N = 300)		Rice (n = 150)		Oil palm (n = 150)	
		mean	SD	mean	SD	mean	SD
Total income	USD/year	3 607	2 249	3 745	2 793	3 475	1 520
	%	100.00	–	100.00	–	100.00	–
Rice/oil palm income	USD/year	2 627	1 810	2 556	1 956	2 704	1 655
	%	72.94	–	68.05	–	77.82	–
Other on-farm income	USD/year	521	1 007	698	1 333	345	442
	%	14.24	–	18.55	–	9.94	–
Out-farm income	USD/year	459	1 183	491	1 435	425	667
	%	12.65	–	13.06	–	12.24	–
Working on other farm income	%	42.00		42.00		40.67	
Working on out-farm income	%	46.67		43.33		50.00	

Source: own processing

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largely out of government control. The government should have implemented a policy so that the conversion of rice land into oil palm plantations was immediately controlled. Especially after it was discovered that land conversion from food crops to plantation crops did not increase the area of arable land, did not significantly reduce labour use and did not increase farmers' income.

We develop Equations (1–2) to analyse the second purpose more deeply in terms of the determinants of farmer participation in on-farm and off-farm activities and of the determinants of farmer income. The model estimation results show that the model is representative enough to analyse the determinants of farmers participating in other jobs (on-farm and outfarm activities) and the determinants of farmer income. Determination coefficient values (R^2) are 0.510 for Equation (1) and 0.618 for Equation (2). This shows that all explanatory variables in the model can explain the model behaviour well. Together, the explanatory variables in the equation clearly explain the diversity of variables indicated by the λ^2 value of 14.906 for Equation (1) and *F*-statistic value of 0.987 for Equation (2). The overall model test using Chi square (λ^2) 14.906 on the Omnibus Test shows the significant value of the model of 0.061, which means that the overall model can be used as a prediction tool for Equation (1). The overall model test using *F*-value 0.987 on the *F*-test shows the significant value of the model of 0.00, which means that the overall model can be used as a prediction tool for Equation (2). The results of the *t*-test show several variables that have a significant effect on the dependent variable. The results of the econometric criteria test show that the model does not experience violations of classical assumptions with multicollinearity, autocorrelation and heteroskedasticity. One of the most important things and the main orientation of this study is that all presumptive parameter results in the model are in accordance with expectations based on economic theory and logic.

The estimating logit function, which is used to determine farmer participation in other jobs, can be seen in Table 4. From odds ratio, we concluded that the probability choice of participating in other jobs activities will increase if the percentage of (1) arable land, active man-woman workers, and education are decreasing, and (2) husband age and family size are increasing. This, in line with Zhao (2014); Wuepper et al. (2018) and Eshetu and Mekonnen (2016), shows that the choice between specialisation and income diversification was driven by various interacting factors, such as scale and economic coverage, risk considerations, household characteristics, and stimulated households to carry out various patterns of income diversification.

Table 4. Factors influencing farmer participation in other jobs (dependent variable: Y_2 = work on other jobs activities)

Independent variables	β	Std. error	*p*-value	Odds ratio (Ψ)
LPL	–0.482	0.223	0.033	1.617
USU	1.892	0.564	0.001	6.594
JAK	0.906	0.441	0.004	2.468
TKP	–0.760	0.387	0.050	2.133
TKW	–0.743	0.389	0.056	2.097
EDU	–0.046	0.282	0.871	1.047
D_1	0.024	0.387	0.951	1.024
D_2	–0.336	0.384	0.382	1.398
Constant	–7.904	2.425	0.001	–
Nagelkerke R^2 = 0.510		λ^2 = 14.906 (significant at *p*-value = 0.061)		

β – beta regression coefficient which explains the effect of independent variable on the dependent variable; *LPL* – arable land; *USU* – husbands' age; *JAK* – family size; *TKP* – male active labourers; *TKW* – female active labourers; *EDU* – education; D_{1-2} – dummy variables

Source: own processing

Farmer participation in out-farm activities is a form of business diversification carried out by farmer households. Eshetu and Mekonnen (2016) and Zhao (2014) who investigated the determinants of agricultural income diversification in Ethiopia show that age, education, access to infrastructure, livestock ownership, use of credit, and agricultural income are the main determinants of household participation in agricultural activities. The choice between specialisation and income diversification is driven by various interacting factors, such as scale and economic coverage, risk considerations, household characteristics, and stimulated households to carry out various patterns of income diversification.

Furthermore, the factors influencing the variation of farmer household income can be seen in Table 5. There are four variables affecting the farmer's income, namely the area of arable land, farmer's age, number of male workers, and on-farm activities besides the main business. The second equation is a nonlinear equation where the β coefficient has a value in percentage, for example, the variable of arable land

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Table 5. Factors influencing farmers' income (dependent variable: Y_3 = income of households)

Independent variables	β	Std. error	*t*-value	*p*-value
Constant	4.599	0.572	8.039	0.000
Ln*LPL*	0.225	0.052	4.290	0.000
Ln*USU*	–0.311	0.130	–2.393	0.017
Ln*JAK*	–0.063	0.108	–0.581	0.562
Ln*TKP*	0.306	0.092	3.316	0.001
Ln*TKW*	0.084	0.089	0.942	0.347
Ln*EDU*	0.123	0.089	1.385	0.167
D_1	0.017	0.093	0.178	0.859
D_2	0.180	0.091	1.984	0.048
D_3	–0.171	0.091	–1.873	0.062
R^2 = 0.618	Adj-R^2 = 0.588		*F*-value = 0.987 (significant at α = 0.000)	

β – beta regression coefficient; *t*-value – result of *t*-test to analyse the significant effect of each independent variable on the dependent variable; *LPL* – arable land; *USU* – husbands' age; *JAK* – family size; *TKP* – male active labourers; *TKW* – female active labourers; *EDU* – education; D_{1-3} – dummy variables

Source: own processing

has a β coefficient of 0.225. This means that if the area of arable land increased by 1%, then the income of farmers increased by 0.225%. Judging from the sign and magnitude of the regression coefficient, the age and the area of arable land variables have a significant negative effect on income, while the land ownership and the number of male active labourers variables have a significant positive effect on income. The function of the change of land by changing cropping patterns from rice to oil palm cannot be proven to have an effect on increasing farmers' income, and incomes of oil palm farmers even tend to be smaller.

The situation found in this study differs from the studies of Kanyua et al. (2013) and Eshetu and Mekonnen (2016) who investigated the diversification determinants of agricultural income and their effect on rural poverty in Ethiopia. Estimated results from the logit model show that farmer participation significantly reduces the likelihood of rural agricultural households being poor. The situation shows that agricultural business for ex-migrant causes the average farmer to be above the poverty line and leaves considerable free time. Therefore, food crops need to be pursued in order to have sustainable agriculture with increased productivity. It should also be noted that pre-harvest and harvest technology improvements are accompanied by improvements in the rice marketing system produced by farmers.

CONCLUSION

Changes from rice farming to oil palm plantations did not make the economy of farm households better. Between the two groups of farmers, there is no difference in cultivated land area, the allocation of labour for agriculture and the income of farmers. In addition, there is no large difference between farmer participation in on-farm and out-farm activities. Area of cultivated land, age of farmers, and family size variables are determinants of farmers' choice to participate in on-farm and out farm activities and influence farmers' income. Therefore, changes in crops from rice to oil palm have no impact on cultivation area, labour allocation, income and on-farm and out-farm activities.

Changes in cropping patterns from rice to oil palm need to be inhibited or completely eliminated. It is necessary to increase the development of not only rice farmers, but also oil palm farmers, through agricultural cultivation innovation, so that farmers have the ability to get out of poverty. It is also needed to develop business diversification to give farmers alternative income from off-farm sources, especially for farmers who have a small cultivated land area. Lastly, rice and oil palm need to be pursued to achieve sustainable agriculture with increased productivity.

REFERENCES

Adriani D.E., Wildayana Y., Alamsyah I., Hakim M.M. (2017): Technological innovation and business diversification: Sustainability livelihoods improvement scenario of rice farmer household in sub-optimal land. Russian Journal of Agricultural and Socio-Economic Sciences, 9: 77–88.

Amurtiya M., Lumbonyi C.A., Abdullahi A., Olaywola S.A., Yaduma Z.B., Abdullah A. (2016): Livelihood diversification and income: A case study of communities resident along the Kiri Dam, Adamaya State, Nigeria. Journal of Agribusiness and Rural Development, 4: 483–492.

Atera E.A., Onyancha F.N., Majiwa E.B.O. (2018): Production and marketing of rice in Kenya: Challenges and opportunities. Journal of Development and Agricultural Economic, 10: 64–70.

Becker G.S. (1965): A theory of the allocation of time. The Economic Journal, 75: 493–517.

Bhattacharyya R. (2008): Crop diversification: A search for an alternative income of the farmers in the state

https://doi.org/10.17221/349/2018-AGRICECON

of West Bengal in India. In: Proceedings International Conference on Applied Economics (ICOAE), Kastoria, Greece, May 15–17, 2008: 83–94.

Brhanu G.A. (2018): Access to land and agricultural based livelihoods in Northwestern Ethiopia: Implications for land use. Journal of Development and Agricultural Economics, 10: 292–297.

Coffie R.O., Burton M.P., Gibson F.L., Hailu A. (2016): Choice of rice production practices in Ghana: A comparison of willingness to pay and preference space estimates. Journal of Agricultural Economics, 67: 799–819.

Ellis F. (1998): Survey article: Household strategies and rural livelihood diversification. The Journal of Development Studies, 35: 1–38.

Eshetu F., Mekonnen E. (2016): Determinants of off farm income diversification and its effect on rural household poverty in Gamo Gofa Zone, Southern Ethiopia. Journal of Development and Agricultural Economics, 8: 215–227.

Euler M., Schwarze S., Siregar H., Qaim M. (2016): Oil palm expansion among smallholder farmers in Sumatra, Indonesia. Journal of Agricultural Economics, 67: 658–676.

Go Y.-H., Lau W.-Y. (2019): Palm oil spot-futures relation: Evidence from unrefined and refined products. Agricultural Economics – Czech, 65: 133–142.

Indonesian Central Bureau of Statistics (2015): Data on Low Land Rice Productivity. Indonesian Central Bureau of Statistics.

Kanyua M.J, Itinjii G.K., Muluvi A.S., Gido O.E., Waluse S.K. (2013): Factor influencing diversification and intensification of horticultural production by smallholder tea farmer in Gataga District Kenya. Current Research Journal of Social Science, 5: 103–111.

Krishna V., Eulerb M., Siregar H., Qaima M. (2016): Differential livelihood impacts of oil palm expansion in Indonesia. Agricultural Economics, 48: 639–653.

Nakajima C. (1986): Subjective equilibrium theory of the farm household. Development in Agriculture 3. Elsevier, Amsterdam, Oxford, New York, Tokyo.

Pastusiak R., Jasiniak M., Soliwoda M., Stawska J. (2017): What may determine the off-farm income? A review. Agricultural Economics – Czech, 63: 380–391.

Schwarze S., Zeller M. (2005): Income diversification of rural household in Central Sulawesi, Indonesia. Quarterly Journal of International Agriculture, 44: 61–73.

Vemminem T., Bourgeois M., Huylenbroeck G.V., Meert H., Hecke E.V. (2002): Diversification as a survival strategy for marginal farms. An exploratory research. In: EAAE Congress – Exploring Diversity in the European Agri-Food System, Zaragoza, Spain, August 28– 31, 2002: 1–14.

Vijay V., Pimm S.L., Jenkins C.N., Smith S.J. (2016): The impacts of oil palm on recent deforestation and biodiversity loss. PLoS ONE, 11: e0159668.

Wilcove D.S., Koh L.P. (2010): Addressing the threats to biodiversity from oil-palm agriculture. Biodiversity and Conservation, 19: 999–1007.

Wildayana E., Armanto M.E. (2018): Dynamics of land use changes and general perception of farmers on South Sumatra Wetlands. Bulgarian Journal of Agricultural Science, 24: 180–188.

Wuepper D., Ayenew H.Y., Sauer J. (2018): Social capital, income diversification and climate change adaptation: Panel data evidence from rural Ethiopia. Journal of Agricultural Economics, 69: 23–35.

Zahri I., Adriani D., Wildayana E., Sabaruddin, Harun M.U. (2018): Comparing rice farming appearance of different agroecosystem in South Sumatra, Indonesia. Bulgarian Journal of Agricultural Science, 24: 189–198.

Zhao J. (2014): Rural income diversification patterns and their determinants in China. Agricultural Economics – Czech, 60: 219–231.

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