



Elements Influencing Total Household Income of Paddy Farmers in East Kalimantan Province, Indonesia

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Abstract. The average income of agricultural workers in East Kalimantan is lower than that of manufacturing workers. Income from paddy farming also contributed less to the total household income of paddy farmers compared to income from non-paddy farming. The welfare of paddy farmers can be improved by increasing their income. This study identified the factors influencing the total household income of paddy farmers. The research was conducted in East Kalimantan Province, Indonesia, with collected primary and secondary data. The study area, sample size, and respondent number were determined by purposive, proportional, and purposive samplings, respectively. Seven socioeconomic factors collectively influence the total household income of paddy farmers in East Kalimantan, Indonesia. Individually, paddy land size, non-paddy farm jobs, and non-paddy farm laborers have very significant and positive influences. Tillage and material costs have partially significant and negative influences. Labor cost and the mean number of workdays in non-paddy farm jobs individually have no significant influence. This study found that a set of socioeconomic elements influencing the total household income of paddy farmers consists of paddy land size, tillage cost, material cost, labor cost, non-paddy farm jobs, non-paddy farm laborers, and the mean number of work days in non-paddy farm jobs. The total household income of paddy farmers can be increased through extensification, agricultural machinery supply, intensification, job opportunities creation, employment of household members, and so on.

Keywords: East Kalimantan, farmer, household, income, paddy.

1 Introduction

Agriculture plays an important role in Indonesia's economy by supplying food for the community, providing materials for the industry, creating job opportunities, becoming a source of income, contributing to national income, and yielding export earnings. Paddy has become one of the most important commodities in the agricultural sector because it can be used as a staple food for most Indonesians. Agriculture has developed

in East Kalimantan Province. This province has 180,614 agricultural households whereas 83,564 of them have activity in the food sector in 2013. Kutai Kartanegara Regency has the highest number of agriculture households in East Kalimantan (29.85%), meanwhile Bontang City has the lowest number of that (1.43%), then Penajam Paser Utara Regency has approximately 15,728 agriculture households (7.68%) [1].

Agricultural development has met some challenges to be addressed in relation to production and income. Rice production in East Kalimantan in 2022 (139,266 tons) is lower than the average rice production in Indonesia (927,662.41 tons) [2]. Households of paddy farmers have sources of income from paddy farming and non-paddy farming. The contribution of paddy farm income to the total household income of paddy farmers in East Kalimantan (49.29%) was lower than that of non-paddy farm income (50.71%) [3]. The average net income per month for casual workers in February 2023 in East Kalimantan (IDR2,220,900.00) was higher than that in 30 other provinces in Indonesia and higher than the national average (IDR1,541,700.00) but lower than that in three other provinces in Indonesia (DKI Jakarta, West Papua, and Papua). The average net income per month of agricultural casual workers in February 2023 in East Kalimantan (IDR2,191,800.00) was lower than that of manufacturing casual workers (IDR2,293,700.00) [4].

These facts show that efforts are needed to improve household income and the welfare of paddy farmers' households. Several studies have identified several sets of factors influencing rice production [5, 6, 7], paddy farm income [8, 9], non-paddy income [10], wages [11], and household income [12, 13, 14, 15]. Some previous studies have investigated several different factors influencing household income, including 11 variables [12], 17 variables [13], six variables [14], and seven variables [15] in different locations. However, few studies have investigated the influence of paddy land size, tillage costs, material costs, labor costs, non-paddy farm jobs, non-paddy farm laborers, and mean work days in non-paddy farm jobs on the total household income of paddy farmers in East Kalimantan, Indonesia. Elements of total household income of paddy farmers need to be known as the foundation to formulate integrated acts and policies to increase the total household income of paddy farmers more effectively and efficiently.

The objective of this study was to identify the factors influencing the total household income of paddy farmers in East Kalimantan, Indonesia. This study was designed to make a significant contribution, particularly in terms of theoretical development and farming practices, to overcome the main issues related to the household income of paddy farmers. This study observed, examined, and discovered a different set of variables that became elements of the total household income of paddy farmers. It is hoped that the findings of this study will provide additional support to the existing income literature and can be considered a reference for related studies in the future. This study contributes to the practical level by providing information to paddy farmers and other stakeholders on methods of increasing the total household income of paddy farmers. This study expects an improvement in farmers' welfare.

Households of paddy farmers have sources of income and can be classified into many categories, for example, income from paddy farming and non-paddy farming [3]. Farmer household income comes from farms and non-farms [14]. Furthermore, total household income can be derived from farmland income, animal husbandry income,

and off-farm income (labor wage, self-owned business, transfers, subsidies/support from government/private, pension, or support from relatives) [16]. The contribution of paddy farm income to the total household income of paddy farmers in East Kalimantan (49.29%) was lower than that of non-paddy farm income (50.71%) [3].

A previous study [8] constructed a set of variables consisting of eight socioeconomic factors affecting paddy farm income in East Kalimantan. However, only four variables—labor cost, land cultivation cost, paddy farm size, and raw material cost—individually affect paddy farm income significantly. Thus, there is a significant effect of age, farmers' experience, number of family members, land area owned, capital, and number of workers on the income of paddy field farm management [9].

A previous study [10] found a set of factors affecting non-paddy farm income in East Kalimantan, which consists of eight socioeconomic variables. Nevertheless, only the variables of working days in non-paddy farm jobs, number of non-paddy farm jobs, and number of non-paddy farm laborers significantly affect non-paddy farm income. The factors affecting the household income of farmers are rice production, the number of working family members, age of farmers, farmer education, and other jobs [14]. The influence of age, two dummy sectors, three dummy working status, dummy gender, years of education, and dummy location on wages found that income inequality decreased before the economic crisis but increased afterward [11].

Hence, it was hypothesized that paddy land size, tillage cost, material cost, labor cost, non-paddy farm jobs, non-paddy farm laborers, and mean work days in non-paddy farm jobs, collectively and individually, significantly influence the total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.

2 Methods

2.1 Time and Place of Study

This study was conducted between July and December 2022 in the Province of East Kalimantan, Republic of Indonesia. The study areas were determined purposively in Bontang City, Kutai Kartanegara Regency, and Penajam Paser Utara Regency, which have the lowest, highest, and medium agricultural households, respectively. North Bontang and South Bontang Districts deputize the wide and medium of paddy harvested areas in Bontang City. Muara Muntai, Loa Janan and Tenggarong Seberang own the narrow, medium and wide of paddy harvested areas in Kutai Kartanegara, respectively, similar to Waru, Penajam and Babulu Districts in Penajam Paser Utara.

2.2 Sampling

The minimum sample sizes for a population of approximately 20,000 people and 50,000 people were 377 people and 382 people, respectively, at a 95% confidence level with a $\pm 5\%$ confidence interval [17]. The total sample for the population of 36,970 agricultural households was 380. Number of paddy farmers households and the sample size (by proportional sampling) were North Bontang (24; 1), South Bontang (120; 2), Muara Muntai (206; 4), Loa Janan (1,002; 17), Tenggarong Seberang (7,388; 128), Waru (908;

16), Penajam (4,829; 84), and Babulu (7,343; 128). Purposive sampling was used for respondent selection.

2.3 Procedure for Data Collection

This study collected primary data from household heads or members of paddy farmers who are currently engaged in wetland paddy farming. Secondary data were gathered from the Central Bureau of Statistics of Indonesia. An open-ended questionnaire was prepared as a useful tool for the survey. The questions were designed to encourage respondents to provide detailed answers and free responses. Enumerators were employed to assist with the interview process.

In the beginning, the researcher provided adequate training to the enumerator to ensure uniformity of some understanding, then went to paddy fields and met paddy farmers as potential respondents. The next step was to explain the study purpose and the right of potential respondents to answer the questions at any time. The enumerator guaranteed that the data would be kept confidential and only aggregated data were used. After the respondent agreed to consent to be interviewed, the interview was held directly, whereas the enumerator and respondent were held at the same place. The enumerator asked respondents questions in accordance with the questions in the questionnaire that had been previously prepared. The enumerator then recorded the respondents' answers on the questionnaire form.

2.4 Statistical Analysis

Classical assumptions were examined, including normality, multicollinearity, and heteroscedasticity. The data normality test was performed using the Kolmogorov-Smirnov test. Multiple log-linear regression equation (1) was formulated to identify socioeconomic elements influencing paddy farmer income in East Kalimantan, Indonesia, as follows:

$$\ln y_i = \beta_0 + \beta_1 \ln x_{1i} + \beta_2 \ln x_{2i} + \beta_3 \ln x_{3i} + \beta_4 \ln x_{4i} + \beta_5 \ln x_{5i} + \beta_6 \ln x_{6i} + \beta_7 \ln x_{7i} + \varepsilon_i \quad (1)$$

where:

y_i = total household income of paddy farmers (IDR year⁻¹)

x_{1i} = paddy land size (ha year⁻¹)

x_{2i} = tillage cost (IDR year⁻¹)

x_{3i} = materials cost (IDR year⁻¹)

x_{4i} = labor cost (IDR year⁻¹)

x_{5i} = non paddy farm jobs (number year⁻¹)

x_{6i} = non paddy farm labors (person year⁻¹)

x_{7i} = mean of workdays in non-paddy farm jobs (day year⁻¹)

$\ln$ = natural log

ε_i = error term

This study collected data on one dependent variable and seven independent variables from 380 respondents through interviews, using an open-ended questionnaire. The total household income of paddy farmers is the amount of income earned by all members of paddy farmer households per year. The paddy land size is the area used for paddy farming in hectares per year. Tillage cost is the annual cost of land cultivation for paddy farming in the IDR. Material cost is the cost of purchasing materials for paddy farming

in IDR per year. Labor cost is the cost incurred per year for labor wages in paddy farming in IDR. Non-paddy farm jobs are the number of non-paddy farm jobs engaged in by all members of the paddy farming households per year. Non-paddy farm laborers are the number of members of paddy farming households who work outside of paddy farming per person per year. The mean number of workdays in non-paddy farm jobs is the average number of workdays on which members of paddy farming households work outside of paddy farming on a daily basis.

The hypothesis of the simultaneous influence of seven socioeconomic elements on the total household income of paddy farmers was tested using ANOVA with $\alpha = 0.01$. Furthermore, the partial influence of each factor on the total household income of paddy farmers was determined from the t-test results with $\alpha = 0.01$ and $\alpha = 0.05$. This study also calculated R , R^2 , and adjusted R^2 values. Symptoms of multicollinearity were observed in the R^2 , F , and t values. Heteroscedasticity was detected by graphical methods.

3 Results and Discussion

3.1 Paddy Farmer Household in East Kalimantan, Indonesia

A survey was conducted to interview 380 respondents from paddy farm households in East Kalimantan. Most of the respondents were male (95.53%), married (93.42%) and had 4-6 members in their households (53.63%). Wetland paddy farmers in this study came from communities of Javanese (119 respondents), Sundanese (seven respondents), Kutainese (six respondents), Bugisnese (six respondents), and Banjarnese (two respondents). Household members of the respondents were mainly male (51.92 %) and the rest were female. Paddy farmer households consist of heads, spouses, children, children in law, grandchildren, family, or non-family. The members of paddy farming households were married (57.79%), unmarried (40.25%), divorced (1.12%), or widowed (0.84%).

Households of paddy farmers in East Kalimantan have different quantities and qualities of human and capital resources. Household members use resources for paddy farming and other economic activities. Paddy farming requires land, materials, and labor. Table 1 presents the socioeconomic data for the variables examined in this study. The median data of paddy land size was 2.00 ha.year⁻¹, there was respondent who has the minimum paddy land size as many as 0,50 ha.year⁻¹ while other respondents had the maximum paddy land size until 10,00 ha.year⁻¹. Paddy farmers spend money on tillage, materials, and labor costs. The median tillage cost was IDR2,000,000.00 per year. Meanwhile, the mode of material cost was IDR1,899,500.00 per year. The survey results showed that the data range for non-paddy farm jobs was three jobs per year. As many as 620 household members per year were involved in non-paddy farm jobs. The variance in the mean number of workdays for non-paddy farm jobs is 515.84 days per year. Percentile data of 25, 50, and 75 of paddy farmer incomes were IDR13,842,250.00 per year, IDR22,950,750.00 per year and IDR35,365,875.00 per year, respectively.

Table 1. Socioeconomic data of respondents in the study area

Measurement	Paddy land size (ha year ⁻¹)	Tillage cost (IDR year ⁻¹)	Materials cost (IDR year ⁻¹)	Labor cost (IDR year ⁻¹)
Median	2.00	2,000,000.00	2,101,500.00	8,000,000.00
Mode	2.00	2,000,000.00	1,899,500.00	5,700,000.00
Variance	2.73	2,813,087,574,642.41	3,969,229,912,725.73	13,936,264,240,649.63
Skewness	1.75	1.93	1.88	0.96
Std. error of skewness	0.13	0.13	0.13	0.13
Kurtosis	4.18	4.80	4.37	0.50
Std. error of kurtosis	0.25	0.25	0.25	0.25
Range	9.50	9,650,000.00	12,415,000.00	19,060,000.00
Minimum	0.50	350,000.00	485,000.00	3,100,000.00
Maximum	10.00	10,000,000.00	12,900,000.00	22,160,000.00
Sum	968.60	877,950,000.00	1,045,934,200.00	3,404,402,200.00
Percentiles 25	1.50	1,050,000.00	1,396,950.00	5,900,000.00
50	2.00	2,000,000.00	2,101,500.00	8,000,000.00
75	3.38	2,950,000.00	3,498,500.00	11,300,000.00
Measurement	Non paddy farm jobs (number year ⁻¹)	Non-paddy farm la- bors(person year ⁻¹)	Mean of workdays in non-paddy farm jobs (day year ⁻¹)	Total household income of paddy farmers (IDR year ⁻¹)
Median	2.00	2.00	184.00	22,950,750.00
Mode	2.00	2.00	195.00	997,333.33
Variance	0.27	0.78	515.84	398,986,527,130,096.60
Skewness	0.65	1.29	-0.95	1.40
Std. error of skew- ness	0.15	0.15	0.15	0.13
Kurtosis	2.09	1.43	1.28	2.20
Std. error of kurtosis	0.31	0.31	0.31	0.25
Range	3.00	5.00	126.00	102,304,666.67
Minimum	1.00	1.00	101.00	997,333.33
Maximum	4.00	6.00	227.00	103,302,000.00
Sum	531.00	620.00	44,722.00	10,397,043,306.76
Percentiles 25	2.00	2.00	163.00	13,842,250.00
50	2.00	2.00	184.00	22,950,750.00
75	2.00	3.00	193.00	35,365,875.00

Figure 1 describes the distribution of respondents from the view of paddy land size, tillage cost, materials cost, labor cost, non-paddy farm jobs, non-paddy farm laborers, mean number of workdays in non-paddy farm jobs, and paddy farmer income. Table 1 shows the values of skewness, standard error of skewness, kurtosis, and standard error of kurtosis for each variable. The kurtosis value shows a low high curve or a flat spiky shape of the normal distribution curve. Skewness is a measure of the asymmetry of a distribution; a distribution can have right (or positive), left (or negative), or zero skewness. The coefficients of asymmetry (skewness) and kurtosis [18] can be used in exploratory analysis to recognize the shape of the distribution, or even to recognize mixtures of distributions.

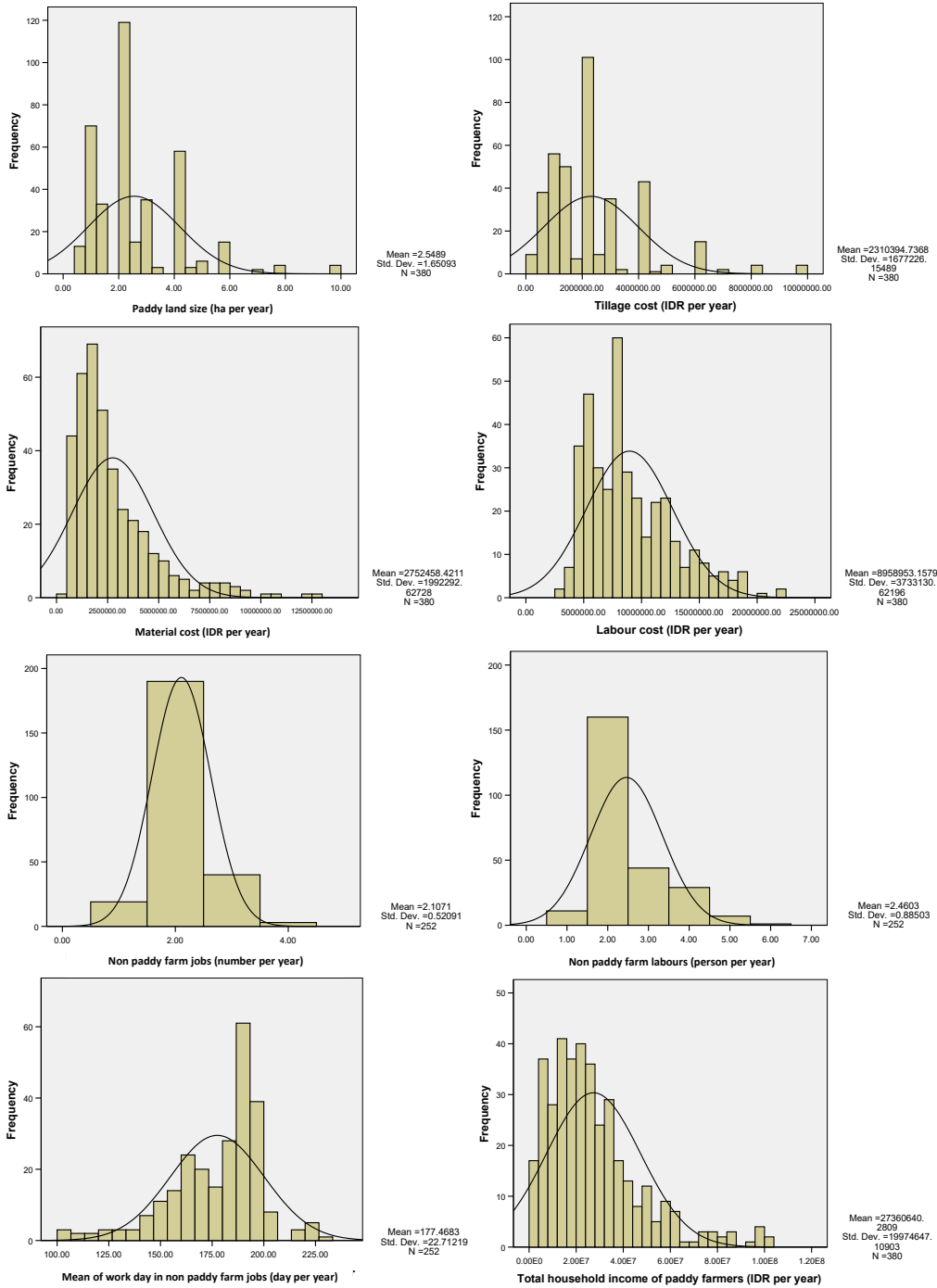


Fig. 1. Respondents' distribution based on socioeconomic elements.

3.2 Total Household Income of Paddy Farmers in East Kalimantan, Indonesia

This study hypothesized that the seven independent variables, namely paddy land size, tillage cost, material cost, labor cost, non-paddy farm jobs, non-paddy farm laborers, and mean number of work days in non-paddy farm jobs, influence the total household income of paddy farmers in East Kalimantan as the dependent variable. The Kolmogorov-Smirnov test showed that the value of the Kolmogorov-Smirnov Z of the unstandardized residual was 0.776 and the exact p -value or asymp. sig. of 0.584, which is > 0.05 , indicating data distributed normality and is worthy of further testing.

The interpretation was that 48.2% of the variation or fluctuation in the total household income of paddy farmers was caused by fluctuations in the seven dependent variables and 51.8% by other variables. This study accepted the hypothesis based on the results of the data analysis, which showed a computed F value of 20.172 while sig. values of 0 or less than 0.01. This means that, collectively or simultaneously, paddy land size, tillage cost, materials cost, labor cost, non-paddy farm jobs, non-paddy farm laborers, and mean of workdays in non-paddy farm jobs have a significant influence on the total household income of paddy farmers in East Kalimantan, *ceteris paribus*.

Measurement of the beta coefficient is important for presenting the elasticity of the dependent variable (total household income of paddy farmers) with respect to the independent variables. In this study, the multiple log-linear regression equation was $\ln y_i = 18.698 + 1.039 \ln x_{1i} - 0.483 \ln x_{2i} - 0.185 \ln x_{3i} + 0.318 \ln x_{4i} + 0.598 \ln x_{5i} + 0.481 \ln x_{6i} + 0.277 \ln x_{7i} + \varepsilon_i$. Five variables have positive signs in the beta coefficient: paddy land size, labor cost, non-paddy farm jobs, non-paddy farm laborers, and mean number of workdays in non-paddy farm jobs. These positive signs show that, *ceteris paribus*, if the use of an independent variable increases by one percent, on average, the dependent variable increases by approximately one percent. The other two variables have negative signs, namely, tillage cost and material cost. These negative signs mean that, *ceteris paribus*, if the use of an independent variable increases by one percent, on average, the dependent variable decreases by about one percent.

The t -values of the three variables were statistically significant at the 1% level of significance. Individually, paddy land size, non-paddy farm jobs, and non-paddy farm laborers influence the total household income of paddy farmers in East Kalimantan, Indonesia *ceteris paribus*. The t values of the two variables were statistically significant at the 5% level of significance. Tillage and material costs partially influence the total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*. The t -values of the two variables were not statistically significant at the 1% and 5% levels of significance. Individually, labor costs and mean workdays in non-paddy farm jobs do not significantly influence the total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.

No symptoms of multicollinearity were found in the data for the dependent and independent variables. Based on the R^2 value of 0.482 (< 0.8), an F value of 20.172, and sig. value of 0 (< 0.01), this study accepted the hypothesis, and five of the seven variables had t -values that were significant at the 1% and 5% levels. A high R^2 but a few significant t ratios [16] are classic symptoms of multicollinearity.

Figure 2.a illustrates that the data were distributed normally based on the value of the regression standardized residual, with a standard deviation of 0.978. Meanwhile Figure 2.b is a normal p-p plot curve. Figure 2.c shows most of the data do not exhibit

a systematic pattern in the curve of the relationship between the $\widehat{u}^2$ and $\hat{Y}$. If no systematic graphic pattern exists between $\widehat{u}^2$ and $\hat{Y}$, [19] that perhaps no heteroscedasticity is present in the data.

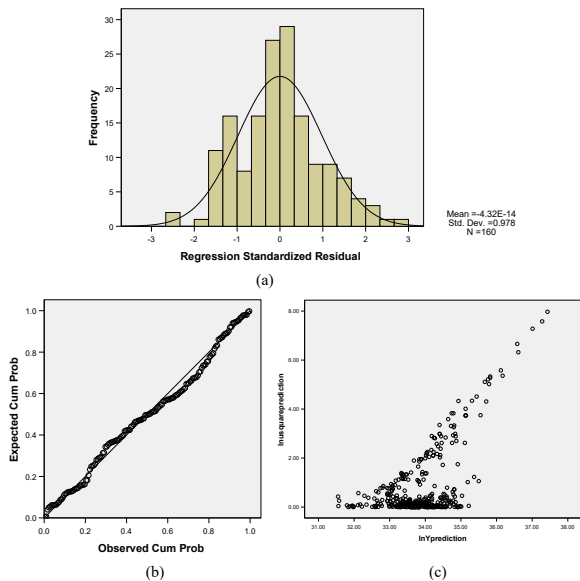


Fig. 2. Frequency of regression standardized residual (a), normal p-p plot of regression standardized residual (b), and relationship between $\widehat{u}^2$ and $\hat{Y}$ (c).

Table 2 shows the results of the multiple log-linear regression, which attempted to identify factors influencing the total household income of paddy farmers in East Kalimantan. The results of this study showed that the computed R , R^2 , and adjusted R^2 values were 0.694, 0.482, and 0.458, respectively (standard error = 0.361).

Table 2. The results of multiple log-linear regression on socioeconomic factors influencing total household income of paddy farmers in East Kalimantan, Indonesia

Description	Unstandardized coefficient	Standard error	T	Sig.
R	0.694			
R^2	0.482			
Adjusted R^2	0.458	0.361		
F	20.172			0.000
(Constant)	18.698	5.124	3.649	0.000
Ln paddy land size (ha year ⁻¹)	1.039	0.301	3.451**	0.001
Ln tillage cost (IDR year ⁻¹)	-0.483	0.232	-2.084*	0.039
Ln materials cost (IDR year ⁻¹)	-0.185	0.074	-2.487**	0.014
Ln labor cost (IDR year ⁻¹)	0.318	0.165	1.924 ^{ns}	0.056
Ln non paddy farm jobs (number year ⁻¹)	0.598	0.166	3.604**	0.000
Ln non paddy farm labors (person year ⁻¹)	0.481	0.102	4.714**	0.000
Ln mean of work days in non-paddy farm jobs (day.year ⁻¹)	0.277	0.340	0.815 ^{ns}	0.417

Notes: *) significant at the 5% level; **) significant at the 1% level; ^{ns}) non-significant.

3.3 Socioeconomic Elements Influencing Total Household Income of Paddy Farmers in East Kalimantan, Indonesia

Paddy Land Size. Paddy land size becomes a factor that may influence paddy farmers' income. Paddy farmers households in East Kalimantan cultivate paddy on wetland field with size in the range of 0.5 to 10 hectares year⁻¹. Paddy farming households in East Kalimantan have an average paddy farm size on average 2.55 hectares year⁻¹. The results of the data analysis showed that the coefficient of paddy farm size was 1.039, indicating that if paddy farm size increased by 1%, average paddy farmer income increased by 1.039%. The standard error was 0.301 for the coefficient of paddy farm size. The computed *t-value* was 3.451, whereas the sig. value of 0.001 was very close to significance at the 1% level. The interpretation is that paddy land size significantly and positively influenced the total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.

The paddy land size reflects the amount of output that can be reached every cropping season. The larger the paddy land size, the higher the output and paddy farm income. This statement is in line with a prior study result [6] that found farm size significantly and positively related to production in organic farming of white and black paddies in Karanganyar, Central Java. In addition, increasing paddy farm income leads to an increase in paddy farmers' income. The high elasticity value shows that increasing farm size impacts high turnover, and mean paddy farming has a high development potential in the study areas.

Tillage Cost. Paddy farmer households spend a certain amount of their income on tillage. This includes expenditures for wages of hired and family laborers to cultivate land and/or the cost of tractor usage. The minimum expenditure for tillage cost was IDR 350,000.00 year⁻¹; however, the expenditure for larger land and tractor usage until IDR10,000,000.00 year⁻¹. The average expenditure of tillage cost in the study areas was calculated as IDR2,310,394.74 year⁻¹.

The results of this study showed that the coefficient of tillage cost was -0.483, indicating that if tillage cost increases by 1%, the average total household income of paddy farmers decreases by 0.483%. The standard error of the tillage cost coefficient was 0.232. The computed *t* value was -2.084 while the sig. value of 0.039 is very close to being significant at the 5% level. The interpretation was that tillage costs negatively and significantly influenced the total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.

Larger paddy farms require less labor to cultivate land because tractor usage is more intensive. This can reduce the number of working days in land cultivation, but it does not reduce tillage cost because it is determined based on land size. The results of this study indicate that paddy farmer income can be increased through tillage cost minimization because tillage cost impacts paddy farm income and total household income. An increase in hand tractor ownership in rural areas is suggested because the number of hand tractor renters (87.37%) in East Kalimantan in 2014 was larger than that of hand tractor owners (12.63%). There are also significant differences in the number of hand tractor owners, number of hand tractor renters, and tillage costs among the regions in East Kalimantan [20].

Materials Cost. Paddy farming requires materials to be used as inputs in paddy farming. The coefficient of material cost was -0.185, meaning that if the material cost increased by 1%, on average, paddy farmer income decreased by 0.185%. The standard error of the material cost coefficient was 0.074. The result of this study showed a computed *t-value* of -2.487, while the sig. or an exact *p-value* of 0.014 was significant at the 1% level. Material costs influence the total household income of paddy farmers in East Kalimantan, Indonesia *ceteris paribus*. This finding is in line with the findings of a previous study [21], where production costs had a negative and significant effect on the income of rice farmers in North Toto Village, Tilongkabila District, and Bone Bolango Regency.

Even the proportion of materials cost in paddy farming in East Kalimantan was relatively small, at only 10.06% of the total household income of paddy farmers; however, it had an impact on the total household income of paddy farmers. Paddy farmers households spent on average IDR2,752,458.42 year⁻¹ for buying raw materials (the standard error of IDR191,505.56 year⁻¹). The minimum expenditure among respondents was IDR485,000.00 year⁻¹ for buying raw materials. However, another paddy farmer household spent as many as IDR12,900,000.00 year⁻¹. The expenditure for buying raw materials depends on factors such as quantity, quality, buying price, buying price of other inputs, selling price of output, and financial ability. The increasing raw material cost leads to greater farmer expenditure, which subsequently leads to a decrease in paddy farm income and total household income. Because of this situation, farmers try to optimize input usage to achieve optimal output, minimum cost, and maximum profit; in other words, the production process needs to be performed efficiently and effectively [8].

Labor Cost. Paddy farmers households spend money for labor cost in paddy farming on average as much as IDR8,958,952.16 year⁻¹. The coefficient of labor cost was 0.318, which meant that if the labor cost increased by 1%, the total household income of paddy farmers on average increased by 0.318%. The standard error was 0.165 for the labor-cost coefficient. The computed *t-value* was 1.924, whereas that of the sig. The value of 0.056 is not significant at the 1% and 5% levels. Labor costs have a positive influence; however, they do not significantly influence the total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.

The total labor cost of paddy farming in East Kalimantan, Indonesia accounted for a large proportion of the production cost (84.50%), which was greater than the raw material cost (12.98%) as well as the depreciation of tools (2.52%) [8]. The mean labor cost was 32.74% of the mean total household income in East Kalimantan. Nevertheless, many paddy farming households use family laborers without salaries or wages during paddy cultivation. Some activities are performed collectively through mutual assistance, such as planting and harvesting. This expenditure is relatively small for hired laborers. This condition causes labor cost increases in paddy farming and can increase the total household income, but the effect is very small or insignificant.

Non-Paddy Farm Jobs. On average, members of paddy farming households have two non-paddy farm jobs. The minimum number of non-paddy farm jobs was one per household, with a maximum of four jobs per household. Paddy farming households with larger paddy areas tend to have fewer non-paddy farm jobs because they need

more family laborers to cultivate paddy. The coefficient of the number of non-paddy farm jobs was 0.598, which meant that if the number of non-paddy farm jobs increased by 1%, the total household income of paddy farmers, on average, increased by 0.598%. The standard error was 0.166 for the coefficient of the number of non-paddy farm jobs. The computed *t-value* was 3.604, whereas the value of sig. The value of 0 was very close to significance at the 1% level. Non-paddy farm jobs have a significantly positive influence on the total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*.

Paddy farming households that own large varieties of non-paddy farm jobs have various sources of household income and have the potential to obtain more income than those that own small ones. Members of paddy farming households can create new jobs that are related or unrelated to paddy farming. The increasing number of non-paddy farm jobs has led to increases in non-paddy farm income and total household income. Job opportunity creation can increase non-paddy farm income and the total household income of paddy farmers, such as encouraging crop diversification, building home industries, utilizing local resources, creating agribusiness, and establishing public-private partnerships. Other researchers [22] offer strategies for farm and off-farm diversification, such as inter-varietal diversity, agrotourism, product processing, direct marketing, financial reserves, forestry work, off-farm work or off-farm investment, off-farm income, and relationship with insurance uptake.

Non-Paddy Farm Laborers. Non-paddy farm laborers in the study areas varied in the range of one to six people, with an average of two persons (standard deviation of one person). Household heads and spouses commonly become non-paddy farm laborers. The large number of non-paddy farm laborers in a paddy farming household indicates a large household size. The coefficient of 0.481 meant that if non-paddy farm labor increased by 1%, the total household income of paddy farmers, on average, increased by 0.481% (the standard error of 0.102). The computed *t-value* was 4.714, whereas that of sig. The value of 0 was very close to being significant at the 1% level. Non-paddy laborers influence the total household income of paddy farmers in East Kalimantan, Indonesia *ceteris paribus*.

Non paddy farm laborers gain non paddy farm income. They contribute to household income through wages, salaries, or profits from their business [10]. A large number of non-paddy laborers indicated more sources of household income. The number of occupied adults per household increases [23] because the number of working-age adults increases, which shows poverty reduction due to employment growth, whereas the increase in earnings per occupied adult makes the largest contribution to poverty reduction. The increase in the number of family laborers in this study area and other farm areas can be realized through the provision of educational facilities for both formal and informal education in rural and urban areas, employment creation, and expanding family business.

Mean of Workdays in Non-Paddy Farm Jobs. The involvement of household members in non-paddy farm jobs can be seen from the number of workdays per year. Members of paddy farming households were working in non-paddy farm jobs in the range of 101 days year⁻¹ to 227 days year⁻¹. The mean number of working days in non-paddy

farm jobs was 177.47 days year⁻¹. Meanwhile, paddy farmers of Toraja ethnic in transmigration had 112.55 days ha⁻¹ per cropping season [24], it consisted of 54.45 days ha⁻¹ (48.37%) for farming, 32.36 days ha⁻¹ (28.75%) for off farm, and 18.79 days ha⁻¹ (21.67%) for social-religious activities.

The coefficient of 0.277 shows that if the mean number of working days in non-paddy farm jobs increases by 1%, the total household income of paddy farmers increases by 0.277% (standard error of 0.340). The computed *t-value* was 0.815, whereas that of the sig. The value of 0.417 is not significant at the 1% and 5% levels. The mean number of working days in non-paddy farm jobs does not significantly influence the total household income of paddy farmers in East Kalimantan, Indonesia, *ceteris paribus*, but has a positive influence. Non-paddy farm jobs use different standards in the wage system such as jobs, skills, education, and gender. It is possible for laborers in a non-paddy farm job to receive a higher income compared to other laborers with fewer working days. Since the increase in working days has only a small effect on the increase in total household income, efforts to increase non-paddy farm income and total household income can be made by working more efficiently [10].

It was quite difficult to ensure that respondents truly represented the highly heterogeneous types of paddy farming households, although this study selected the study areas from regions and respondents from the population. This study has *R*² values less than 1, implying that most of the variation or fluctuation in the total household income of paddy farmers is caused by other variables that have not been studied.

4 Conclusion

This study found a set of socioeconomic factors influencing the total household income of paddy farmers in East Kalimantan, Indonesia, namely paddy land size, tillage cost, material cost, labor cost, non-paddy farm jobs, non-paddy farm laborers, and mean work days in non-paddy farm jobs. Its equation is $\ln y_i = 18.698 + 1.039 \ln x_{1i} - 0.483 \ln x_{2i} - 0.185 \ln x_{3i} + 0.318 \ln x_{4i} + 0.598 \ln x_{5i} + 0.481 \ln x_{6i} + 0.277 \ln x_{7i} + \varepsilon_i$ (3). The total household income of paddy farmers can be increased through extensification, agricultural machinery supply, intensification, job opportunity creation, employment of household members, and so on.

Disclosure of interest. The authors have no competing interests to declare relevant to the content of this article.

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