

The various sources of household income of paddy farmers in East Kalimantan, Indonesia

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Abstract. Karmini, Karyati. 2018. *The various sources of household income of paddy farmers in East Kalimantan, Indonesia. Biodiversitas 19: 357-363.* Some reports showed that agricultural and non-agricultural activities contribute to farmer household income. The objectives of this study were to identify the various sources of household income of paddy farmers, the average amount of every source of income, and the contribution of paddy farm income and non-paddy farm income to household income. This study was conducted in East Kalimantan Province, Indonesia. The two-stage cluster sampling was applied to select the study areas. The number of respondents was 380 paddy households. Descriptive statistics were used to explore, summarize, and describe the data. The sources of household income of paddy farmers in the study areas are from paddy farm income and non-paddy farm income. Paddy farm income is income from paddy farming. Non-paddy income is income from non-paddy farming jobs such as annual crops farmer, perennial crop farmer, employee, seller, fisherman, breeder of livestock, carpenter, and laborer. The average paddy farm income, non-paddy farm income, and total household income of paddy farmers in East Kalimantan in 2013 was Rp. 13,487,069.21 year⁻¹, Rp. 20,920,464.31 year⁻¹, and Rp. 27,360,640.28 year⁻¹, respectively. The contribution of paddy farm income and non-paddy farm income to household income of paddy farmers was 49.29% and 50.71%, respectively.

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

INTRODUCTION

Paddy farming is still the main occupation in rural areas of Indonesia, especially in East Kalimantan Province (the province was divided into East Kalimantan and North Kalimantan based on Law No. 20 of October 25, 2012; in this research East Kalimantan Province refers to formerly East Kalimantan Province before separation). The number of households in Indonesia in 2016 was 66,385.4 thousands (Statistics of Indonesia 2017). In East Kalimantan in 2013, the total number of households was 820,888, of which 180,614 (22.00%) were farmers and 83,564 (10.18%) were food producing farmers (Statistics of East Kalimantan 2014).

The household of paddy farmers consists of an individual and all family members, or a group of individuals, who live together and have responsibility to the household head. They are engaged in paddy farming as their main job as well as other jobs to support household income. The members of paddy household are involved in some economic activities, both in rural and urban areas. There were 1,624,272 citizens aged more than 15 years who worked in East Kalimantan in 2013, 26.61% of whom worked in agricultural sector, which was the biggest percentage among economic sectors (Statistics of East Kalimantan 2014). According to Mariyah and Priyantini (2008), the members of farmer households in Pasir District, East Kalimantan, spent longer time in the non-agricultural

sectors (70.96% work-days year⁻¹) than in the agricultural sector (29.04% work-days year⁻¹).

Previous studies identified and classified the various sources of household income in different ways (Kuniyasu 2002; Swastika et al. 2004; Kendawang et al. 2005; Ilham et al. 2007; Irawan et al. 2007; Lokollo et al. 2007; Kustiari et al. 2008; Kamanga et al. 2009; Otsuka 2009; Ding et al. 2011). Irawan et al. (2007) found that the majority of farmer households in West Java, Central Java, East Java, North Sumatera, and South Sulawesi, Indonesia have 2 or 3 sources of income. Only a small number of farmer households have more than four sources of income. Ilham et al. (2007) reported that paddy farming and non-paddy farming contribute to the income of farmer households in West Java, Central Java, and South Sumatra, Indonesia. However, the result of Lokollo et al. (2007) study showed that the contribution of non-agricultural sector to farmer household income was only 16.3% in Indonesia in 2008. This implies that the household members have opportunity to work in various jobs and those jobs contribute to household income.

This study was constructed differently from the previous studies, using only 2 categories of sources of household income of paddy farmers to focus into paddy farm job and non-paddy farm jobs. The sources of household income of paddy farmers in East Kalimantan, Indonesia, were classified to be paddy farm income and non-paddy farm income. Paddy farm income is income obtained from paddy farming. Non-paddy farm income is

income resulted from non-paddy farming jobs both agricultural activities and non-agricultural activities. The objectives of this study were to identify the various sources of household income of paddy farmers, to calculate the average amount of every source of income, and to calculate the contribution of paddy farm income and non-paddy farm income to household income of paddy farmers in East Kalimantan, Indonesia. It is hoped that findings of this study will provide additional literature for related studies in future.

MATERIALS AND METHODS

Study area

This study was conducted from July 2012 to October 2013, the collection of primary data was done from July 2012 to September 2012. The population of this study was the formerly Province of East Kalimantan, the Republic of Indonesia (the province was divided into two, East Kalimantan and North Kalimantan based on Indonesian Law No. 20 of October 25, 2012), while the sampling location was three districts/city (each represented by three sub-districts) (Figure 1). There were three reasons for the selection of this study location. First, the household of agricultural labors in Indonesia in 2008 had the lowest income after taxes both in rural and urban areas (Statistics of Indonesia 2009). Second, East Kalimantan has a tropical climate with two seasons, the dry and rainy seasons. There are two planting seasons for wetland paddy during a year. Paddy farming is the main job of household members who have job as paddy farmers and they obtain paddy farm income from that job. Third, the household members of paddy farmers have opportunity to work in other jobs and they obtain non-paddy farm income from non-paddy farm jobs.

Procedures

The primary data were obtained from household heads or household members of paddy farmers who were currently engaged in paddy farming and he or she knew income of other household members. The secondary data, mostly collected from Statistics of East Kalimantan and Statistics of Indonesia, were also needed, particularly to support the primary data.

The two-stage cluster sampling was used to choose the study areas. The first stage selection was done as follows. East Kalimantan Province has 13 primary units (4 cities and 9 districts) which were called clusters. Then, every city/district was classified into 3 different categories such as the high (2 cities and 3 districts), medium (4 districts), and low (2 cities and 2 districts) Gross Domestic Product (GDP) of food crops. The GDP diversity was very high; there was a district having very high GDP, while other districts had small GDP. Because of that, the classification did not use the same interval of GDP but it was based on the total number of cities/districts in a category. Cities/districts were classified as the high, medium, and low GDP of food crops, in the ranges of Rp. 159,776.00 millions-Rp. 1,332,384.00 millions; Rp. 147,807.00

millions-Rp. 156,868.00 millions; and Rp. 18,778.00 millions-Rp. 126,252.00 millions, respectively. The study purposively selected three areas to represent the high, medium, and low GDP of food crops. Those areas were Kutai Kartanegara District, Penajam Paser Utara District, and Bontang City.

Then, the second stage selection was done as follows. Kutai Kartanegara District, Penajam Paser Utara District, and Bontang City have 18, 4, and 3 sub-cities/sub-districts, respectively. Based on the harvested area of paddy, all sub-districts in Kutai Kartanegara were classified into large, medium, and small harvested areas of paddy, each of which consisted of 6 sub-districts. The classification did not use a wide interval of harvested area of paddy because this study wanted the study areas representing every category. Penajam Paser Utara had only 4 sub-districts; therefore, this study classified each sub-district as large and medium harvested areas of paddy. Bontang had 3 sub-cities which were classified as large, medium, and small of harvested area of paddy.

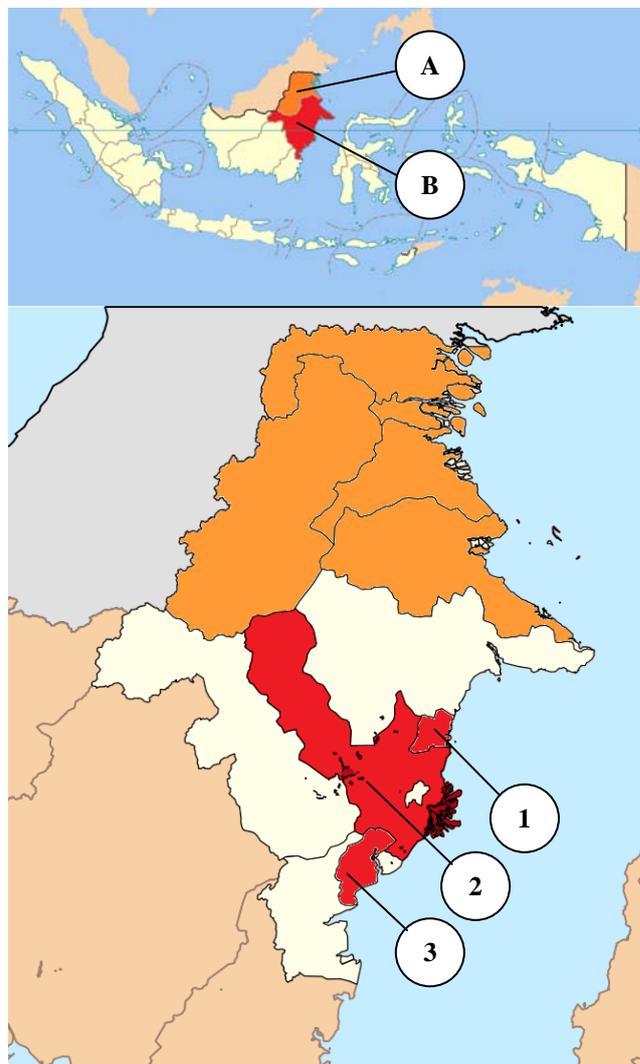


Figure 1. Study areas in Bontang City (1), Kutai Kartanegara District (2), and Penajam Paser Utara District (3), East Kalimantan Province, Indonesia. A. North Kalimantan Province (Formerly part of East Kalimantan Province). B. Recent East Kalimantan Province

The study areas were purposively selected. Tenggarong Seberang was chosen as the study area because it had the widest harvested area of paddy in Kutai Kartanegara. Loa Janan and Muara Muntai were selected to represent the medium and low harvested areas of paddy in Kutai Kartanegara. Loa Janan represented paddy households next to urban area. Muara Muntai represented paddy households in upstream. Babulu and Penajam were selected to represent the large and medium of harvested areas of paddy in Penajam Paser Utara. Waru was selected as study area from small harvested area of paddy in Penajam Paser Utara because the job diversity in that area was better than Sepaku. All sub-cities in Bontang were selected as study areas because South Bontang, North Bontang, and West Bontang represented the large, medium, and small of harvested areas of paddy, respectively.

In 2009, there were 36,970 households of paddy farmers residing in Kutai Kartanegara District, Penajam Paser Utara District, and Bontang City (Statistics of East Kalimantan 2010). The population in this study was 36,970 households of paddy farmers. According to Rea and Parker (1997), the minimum sample sizes for populations of 20,000 and 50,000 are 377 persons and 382 persons, respectively. The sample size (380 households of paddy farmers) in each study area was calculated proportionally based on harvested area of paddy. Respondents resided in Tenggarong Seberang (128 households), Loa Janan (17 households), Muara Muntai (4 households), Babulu (128 households), Penajam (84 households), Waru (16 households), South Bontang (2 households), North Bontang (1 household) and West Bontang (0 household). The purposive sampling was applied to select the households of paddy farmers that could become respondents.

Data analysis

This study analyzed the various sources of household income of paddy farmers using descriptive statistics such as total, mean, maximum, minimum, standard deviation, percentage, range, and frequency distribution. Descriptive statistics, according to Coakes and Steed (2007) is used to explore, summarize, and describe data. Irianto (2004) mentioned that descriptive statistics provides limited information; they are only based on the collected data. However, descriptive statistics helps the researcher to display the data in good and simple ways, so the researcher can explain the meaning of data more easily. Numerous studies in the past also used descriptive statistics as tool to analyze income, such as Kuniyasu (2002), Kendawang et al. (2005), Ilham et al. (2007), Irawan et al. (2007), Lokollo et al. (2007), Kustiari et al. (2008), and Otsuka (2009).

RESULTS AND DISCUSSION

Paddy farm income

The average income of paddy farm in East Kalimantan in 2013 was Rp. 13,487,069.21 year⁻¹ or Rp. 1,123,922.43 month⁻¹. The minimum paddy farm income of respondents was Rp. 349,000.00 year⁻¹. However, there was one paddy household that gained Rp. 98,058,333.33 year⁻¹, the maximum income in this study. The standard deviation of

Rp. 13,350,917.44 year⁻¹ showed variable expressed as a deviation from its sample mean value. A total of 312 households (82.11% respondents) generated income the same as or less than Rp. 20,000,000.00 year⁻¹ from paddy farming. A small number of respondents (17.89%) in Babulu and Penajam had income of more than Rp. 40,000,000.00 year⁻¹. This means that the wealth rates of paddy households were similar because the majority of respondents (96.32%) had paddy farm income the same as or lower than Rp. 40,000,000.00 year⁻¹ (Table 1).

The result of prior study (Karmini, 2017) showed that age of household head, depreciation of tools, experience of household head in paddy farming, labor cost, land cultivation cost, paddy farm size, raw materials cost, and rice requirement of the household, collectively, very significantly affect paddy farm income in East Kalimantan Province, Indonesia. Meanwhile, land cultivation cost, paddy farm size, and raw materials cost, individually, very significantly affect paddy farm income in East Kalimantan Province, Indonesia. Labor cost, individually, significantly affect paddy farm income. However, age of household head, depreciation of tools, experience of household head in paddy farming, and rice requirement of the household, individually, are not significantly affect paddy farm income.

Non-Paddy Farm Income

The average income of non-paddy farm in the study areas in 2013 was Rp. 20,920,464.31 year⁻¹ or Rp. 1,743,372.03 month⁻¹ with a standard deviation of Rp. 15,174,179.81 year⁻¹. The minimum non-paddy farm income among respondents was Rp. 1,500,000.00 year⁻¹. However, there was one paddy household that reached the maximum value of Rp. 86,700,000.00 year⁻¹. The majority of respondents (89 households or 23.42% respondents) had income of more than Rp. 21,000,000.00 year⁻¹ generated from non-paddy farming. A total of 34 households (8.95% respondents) had non-paddy farm income between Rp. 1,000,000.00 year⁻¹ and Rp. 7,000,000.00 year⁻¹. The number of respondents who did not have non-paddy farm income was 128 households. As demonstrated in Table 2, paddy households in Tenggarong Seberang mainly had a higher income than those in Babulu. On the contrary, the contribution of non-paddy farm income to household income in Loa Janan, Muara Muntai, Waru, and South Bontang was relatively small. According to Case et al. (2009), the differences in the amount of wage and salary or income among households are caused by labor characteristics (for instance skills, training, education, experience, etc) and the degree of job difficulty (for instance dangerous, exciting, glamorous, difficulty, etc).

The informal sector offers more job opportunities as sources of non-paddy farm income in the study areas such as annual crop farmer, perennial crop farmer, employee, seller, fisherman, livestock breeder, carpenter, and laborer as listed in Table 3. Annual crop farmer is someone who cultivates annual crops. Perennial crop farmer is someone who cultivates perennial crops. According to Ulyseas (2010), informal sectors contribute to the Gross National Product. Agriculture absorbs most of the total labor force in

paddy households. Agricultural laborers are people working in the agricultural sector including estates, fisheries, forestry, and hunting, whether working as an individual or in collaboration with other parties, leading, supervising, and conducting related activities (Statistics of Indonesia 2011). The result of this study was in line with those of the previous studies such as Swastika et al. (2004), Ilham et al. (2007), Irawan et al. (2007), Lokollo et al. (2007), Kustiari et al. (2008), and Kamanga et al. (2009). They show that 3 sources of household income in Indonesia are on-farm, off-farm, and non-farm.

On-farm income is income from all activities that have direct relation with agricultural cultivation or income from job at farm, for instance paddy farm income. Off-farm income is defined as income from activities out side farm land but still related with agricultural products or marketing of agricultural products, for example rice milling income. Non-farm income is income from non agricultural activities such as income from agricultural machine factory.

Small-scale farmers follow some existing farming practices such as intercropping, spatial diversification, and sequential planting that aim to produce a greater yield, reduce farming risk, increase food security, raise efficiency, and warrant continuous income. Intercropping is a multiple cropping practice to cultivate two or more crops at a farm land in proximity arrangement. Total cost, total revenue, and profit of the application of *G. max* as intercropping plant in the agroforestry system of *A. cadamba* and *G. max*, in the first year in the first cropping season, were Rp. 11,019,000.00 ha⁻¹ cs⁻¹; Rp. 3,500,000.00 ha⁻¹ cs⁻¹; and Rp. -7,519,000.00 ha⁻¹ cs⁻¹, respectively (Karmini et al. 2017). Spatial diversification is defined as a cropping practice involving some different plants with consideration of how plants fit together in a farm land. Sequential planting is a cropping practice which plant different crop species in sequence.

Table 1. Number of respondents based on city/district and paddy farm income

City/District	Sub-district	Paddy farm income (Rp million year ⁻¹)					Total respondent (paddy household)
		0.00-20.00	20.10-40.00	40.10-60.00	60.10-80.00	80.00-100.00	
Kutai Kartanegara	Tenggarong Seberang	115	13				128
Kutai Kartanegara	Loa Janan	17					17
Kutai Kartanegara	Muara Muntai	3	1				4
Penajam Paser Utara	Babulu	80	32	10	4	2	128
Penajam Paser Utara	Penajam	81	2	1			84
Penajam Paser Utara	Waru	13	3				16
Bontang	South Bontang	2					2
Bontang	North Bontang	1					1
Bontang	West Bontang						
Total		312	51	11	4	2	380

Table 2. Number of respondents based on city/district and non-paddy farm income

City/District	Sub-district	Non-paddy farm income (Rp million year ⁻¹)					Total respondent (paddy household)
		1.00-7.00	7.10-14.00	14.10-21.00	>21.00	Others	
Kutai Kartanegara	Tenggarong Seberang	13	17	29	45	24	128
Kutai Kartanegara	Loa Janan	1	7		1	8	17
Kutai Kartanegara	Muara Muntai		2	1	1		4
Penajam Paser Utara	Babulu	12	16	20	18	62	128
Penajam Paser Utara	Penajam	4	20	10	19	31	84
Penajam Paser Utara	Waru	3	6		5	2	16
Bontang	South Bontang	1	1				2
Bontang	North Bontang					1	1
Bontang	West Bontang						
Total		34	69	60	89	128	380

Table 3. The various sources of non-paddy farm income

Occupation	Number (person)	The average income (Rp month ⁻¹)	Range of income (Rp month ⁻¹)	Percentage of total household income (%)
Annual crop farmer	46	1,860,000.00	500,000.00-2,000,000.00	14.37-71.86
Perennial crop farmer	7	2,950,000.00	750,000.00-6,000,000.00	22.90-39.64
Employer	47	2,366,489.36	500,000.00-3,000,000.00	21.06-70.13
Seller	52	1,315,384.62	500,000.00-2,000,000.00	19.05-79.55
Fisherman and livestock breeder	12	1,092,857.14	500,000.00-2,000,000.00	19.05-69.10
Carpenter	39	1,196,153.85	450,000.00-2,000,000.00	20.30-62.54
Labour	88	1,446,590.91	700,000.00-3,500,000.00	18.00-79.05
Others	45	1,320,000.00	350,000.00-3,000,000.00	22.06-76.29
Total	336			

Farmers who cannot produce enough rice have to seek fast-growing crops (such as cabbage, potato, chili, and passion fruit) immediately to earn income quickly for their livelihoods (Otsuka 2009). A total of 46 households utilized their dryland for annual crops planting in the study areas in 2013 such as French bean (*Phaseolus vulgaris* L.), cowpea (*Vigna sinensis* L.), cassava (*Manihot esculenta* Crantz), corn (*Zea mays* L.), cucumber (*Cucumis sativus* L.), and pumpkin (*Cucurbita maxima* L.). The annual crops planting could generate income in the average of Rp. 1,860,000.00 month⁻¹. Hutabarat et al. (2008) found that the contribution of secondary crops (such as maize, cocoa, and banana) to family income is less than 50.00%. However, the result of this study showed that annual crops planting gave contribution to household income between Rp. 500,000.00 month⁻¹ and Rp. 2,000,000.00 month⁻¹ or 14.37% to 71.86% of the total household income. According to Otsuka (2009), profits from non-paddy crops can be substituted by the paddy production.

In addition to annual crops, perennial crops such as oil palm (*Elaeis guineensis* Jacq.), banana (*Musa* sp), and cassava (*Manihot esculenta* Crantz.) are sources of non-paddy farm income and contribute to household income. The average amount of perennial crops income obtained by paddy farmer households was Rp. 2,950,000.00 month⁻¹ (31.27% of the total household income) in East Kalimantan in 2013. However, there were only seven households that practiced perennial crops planting. The number was small, mainly because the price of land was high, capital was needed intensively, and the distance was far from the village. This result is similar to that of other studies by Barham and Chitemi (2009), Fu et al. (2009), and Mestre-Sanchis and Feijoo-Bello (2009), who mentioned that commodities contribute to generate household income and influence farmer's net margin. Otsuka (2009) stated that perennial crops are supplementary to paddy in generating income. The result of this study showed that perennial crops planting contributed to the total household income of paddy farmers in the range of Rp. 750,000.00 month⁻¹ to Rp. 6,000,000.00 month⁻¹ or 22.90% to 39.64%. Fu et al. (2009) mentioned that on-farm works, for instance rubber, tea, fruit (passion fruit, grapefruit), maize, chily, and off-farm works, for instance collecting mushrooms and bamboo shoots, had significant differences in gross annual income per household between Baka and Daka villages in Xishuangbanna, Southwestern China, while rice had no significant influence on household income. It could be caused by the fact that the contribution of paddy farm income to the household income was smaller than on-farm income and off-farm income.

There are some economic advantages of crop diversification. Crops diversification contributes to the increase of the total household income. In this study, annual crops contributed 14.37%-71.86% of income and perennial crops 22.90%-39.64%. Practicing crop diversification as a farming system gives farmers income throughout the year, because various crops can be harvested at different times. Another economic benefit associated with crop diversification is its effect in reducing the impact of price fluctuation (Kasem and Thapa 2011).

The last advantage of crop diversification is that a farmer can change crops combination more easily on the same land based on the market demand and the commodity price, which is quite impossible to do with paddy farming. It also becomes easier for a farmer to adopt new technology. The different kinds of crop lead to the different kinds of planting methods and farm technologies. The adoption of new technology can be done through the usage of high variety seeds, organic and inorganic fertilizers, pesticide, high technology machines, new methods of land preparation, planting, crop maintenance, harvesting, post harvesting, and other technologies.

Households can diversify income by having several sources of income such as off-farm employment and livestock production (Illukpitiya and Yanagida 2010). A total of 47 persons in this study areas worked as employees in government institutions or companies as teachers, administrators, drivers, security officers, etc. They worked approximately 8 hours day⁻¹. Their wage was between Rp. 500,000.00 month⁻¹ and Rp. 3,000,000.00 month⁻¹ or 21.06% to 70.13% of total household income in East Kalimantan in 2013. They received monthly wages in the average of Rp. 2,366,489.36 month⁻¹. A total of 52 persons worked as sellers and generated income in the range of Rp. 500,000.00 month⁻¹ to Rp. 2,000,000.00 month⁻¹ or 19.05% to 79.55% of total household income. They got income from the daily business profit of vegetables, foods, and goods selling and their average income was Rp. 1,315,384.62 month⁻¹ from. Both employees and sellers worked approximately 8 hours day⁻¹; they were mainly employed as hired laborers or contract laborers in paddy farming.

Livestock production is another source of household income in the study areas. Twelve persons worked as fishermen and breeders of fish and livestock, chickens, and cows. They had income in the range of Rp. 500,000.00 month⁻¹ and Rp. 2,000,000.00 month⁻¹ or 19.05% to 69.10% of the total household income in East Kalimantan in 2013. Fishing and fish breeding were done in lakes and rivers located near their house. A total of 39 persons worked as carpenters and they had an income ranging from 20.10% to 62.54% of the total household income or between Rp. 450,000.00 month⁻¹ and Rp. 2,000,000.00 month⁻¹. People frequently need carpenters to build houses through contracts or the daily wage system and the average carpenter income was Rp. 1,196,153.85 month⁻¹.

Some members of paddy households (88 persons) had employment as laborers with average income of Rp. 1,446,590.92 month⁻¹ in East Kalimantan in 2013. They commonly worked as agricultural laborers in their village to do planting, weeding, controlling pest and disease, harvesting, and post harvesting. These jobs do not give stable income every month because they depend on demand; however, their contribution to the total household income was in the range of 18.00% and 79.05% or Rp. 700,000.00 month⁻¹ to Rp. 3,500,000.00 month⁻¹. Other jobs contributed to total household income in the range of Rp. 350,000.00 month⁻¹ and Rp. 3,000,000.00 month⁻¹ or 22.06% to 76.29%. In 2013, 45 persons got income from other jobs in the average of Rp. 1,320,000.00 month⁻¹.

Table 4. Number of respondents based on city/district and total household income of paddy farmers

City/District	Sub-district	Total household income of paddy farmers (Rp million year ⁻¹)					Total respondent (paddy household)
		< 25	25-50	51-75	76-100	>100	
Kutai Kartanegara	Tenggarong Seberang	63	45	13	6	1	128
Kutai Kartanegara	Loa Janan	12	5				17
Kutai Kartanegara	Muara Muntai	2	2				4
Penajam Paser Utara	Babulu	62	41	16	8	1	128
Penajam Paser Utara	Penajam	56	24	3	1		84
Penajam Paser Utara	Waru	9	6	1			16
Bontang	South Bontang	2					2
Bontang	North Bontang	1					1
Bontang	West Bontang						
Total		206	123	33	15	2	380

Total household income of paddy farmers

The average total household income of paddy farmers in East Kalimantan in 2013 was Rp. 2,280,053.36 month⁻¹ or Rp. 27,360,640.28 year⁻¹. The standard deviation value was Rp. 19,974,647.11 year⁻¹. There was a paddy household in the study areas that had minimum household income as much as Rp. 997,333.33 year⁻¹. However, another paddy household had a maximum household income as much as Rp. 103,302,000.00 year⁻¹. The majority of paddy households in Tenggarong Seberang, Loa Janan, Babulu Penajam, and Waru gained total household income of less than Rp. 25,000,000.00 year⁻¹. A total of 123 respondents had a total household income in the range of Rp. 25,000,000.00 month⁻¹ to Rp. 50,000,000.00 year⁻¹. A small number of respondents in Tenggarong Seberang, Babulu, Penajam, and Waru had a total household income of more than Rp. 50,000,000.00 year⁻¹. Table 4 shows the distribution of respondents in the study areas based on the total household income. Generally, the paddy households in East Kalimantan have various sources of income, which are categorized into paddy farm income and non-paddy farm income.

The increase of paddy farm income causes the increase of total household income of paddy farmers. Data showed that the contribution of paddy farm income to household income was 49.29%. The average paddy farm income in East Kalimantan in 2013 was Rp. 13,487,069.21 year⁻¹. Another income source of paddy households is non-paddy farm income. A large portion of the total household income of paddy farmers (50.71%) was derived from non-paddy farm income rather than from paddy farm income. The average non-paddy farm income was Rp. 13,873,571.07 year⁻¹. Some non-paddy farm activities need more skill and capital than paddy farm activities. However, those activities can produce income throughout the year while paddy farming gives only seasonal income. The increasing non-paddy farm income relates to the increasing total household income of paddy farmers. The previous study (Karmini and Isa 2013) identified four programmes that have the potential ability to increase total household income of paddy farmers in East Kalimantan, Indonesia. They are (i) increasing tractor numbers, (ii) creating on farm and off farm jobs, (iii) increasing the number of family laborers, and (iv) intensification, extensification,

and diversification.

The role of agricultural sector in the rural economy of Indonesia decreased in recent years. Lokollo et al. (2007) found that the contribution of the agricultural sector, non-agricultural sector, and other sectors to household income in West Sumatra, West Nusa Tenggara, West Kalimantan, and South Sulawesi in 2007 were 60.49%, 16.30%, and 23.21%, respectively. Kustiari et al. (2008) research showed that the contribution of agricultural sector to household income in Indonesia in 2008 was between 58.00% and 94.00%. The results of this study showed that the contribution of paddy farm income to the household income of paddy farmers in East Kalimantan in 2013 was in the range of 39.20% to 49.29% and the range of 50.71% and 60.80% for non-paddy farm income. If the role of agricultural sector decreases in the future, it is predicted that its role will be replaced by non-agricultural sectors. Therefore, there is an urgent need to increase its role in the rural economy as Suryahadi et al. (2009) mentioned that agriculture growth in rural areas still plays a major role in reducing poverty in Indonesia. The role of agriculture should be considered not only in terms of production, but also in the aspect of generating employment opportunities and rural development as a whole (Janssen 1993). This means that there is still a possibility to enhance the role of agricultural sector in the development of rural economies in the future.

This study has identified the various sources of household income of paddy farmers. Households of paddy farmers in East Kalimantan, Indonesia, have the sources of income from paddy farm income and non-paddy farm income. Paddy farming is the main source of paddy household income. Besides, paddy households have the sources of income from various jobs as annual crops farmer, perennial crops farmer, employee, seller, fisherman, breeder livestock, carpenter, laborer, and others. The average paddy farm income, non-paddy farm income, and the total household income of paddy farmers in East Kalimantan in 2013 was Rp. 13,487,069.21 year⁻¹ or Rp. 1,123,922.43 month⁻¹, Rp. 20,920,464.31 year⁻¹ or Rp. 1,743,372.03 month⁻¹, and Rp. 27,360,640.28 year⁻¹ or Rp. 2,280,053.36 month⁻¹, respectively. Paddy farm income and non-paddy farm income contributed 49.29% and 50.71% to household income, respectively.

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