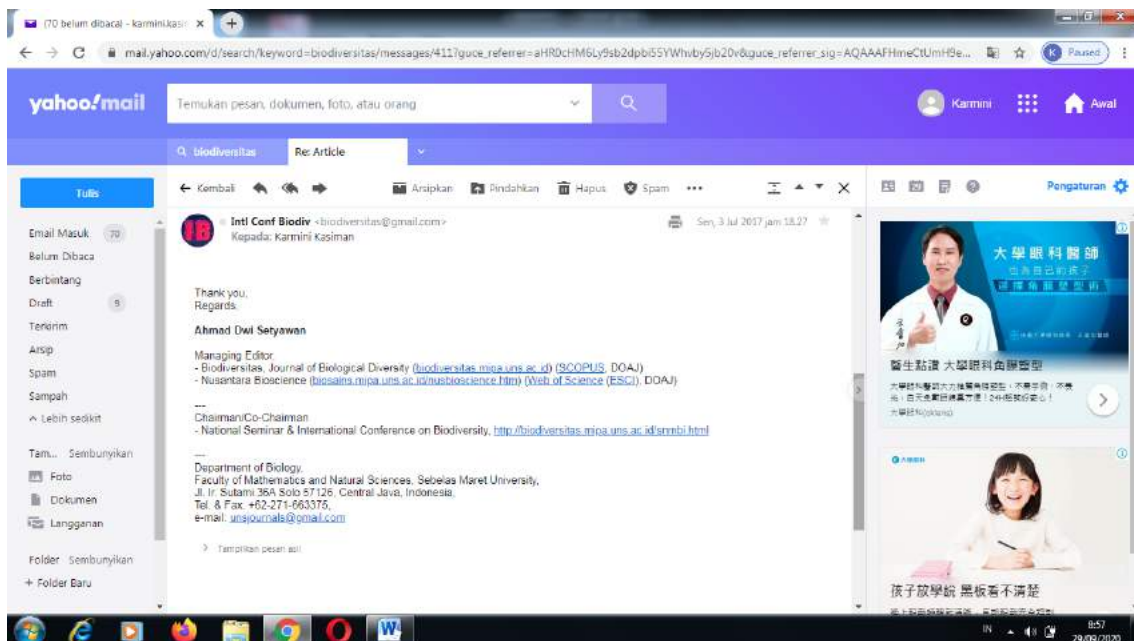
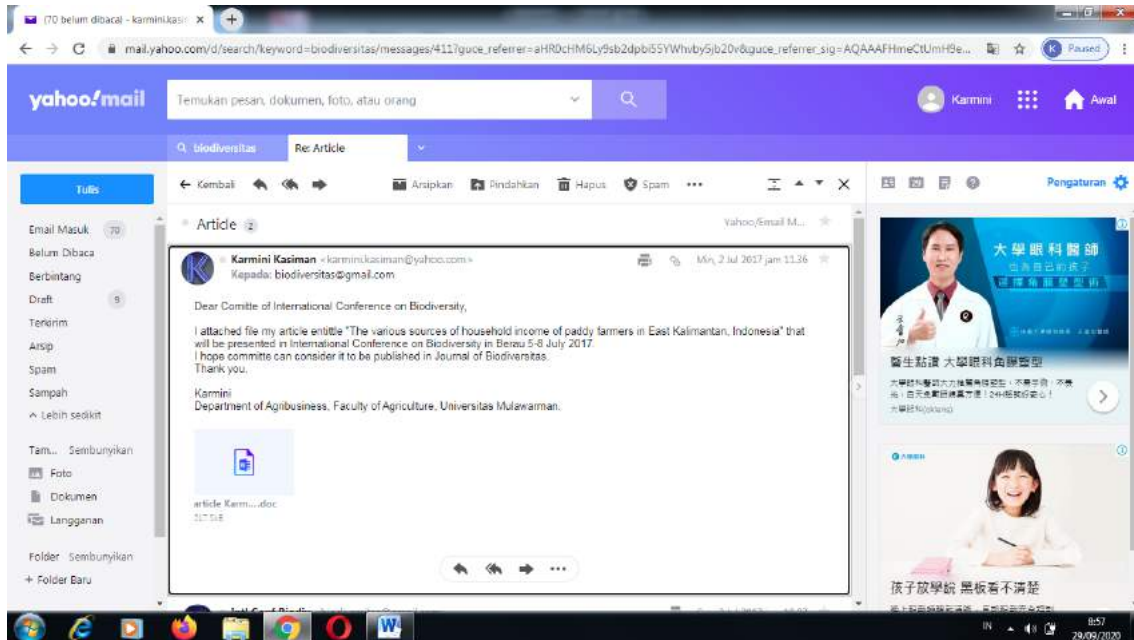


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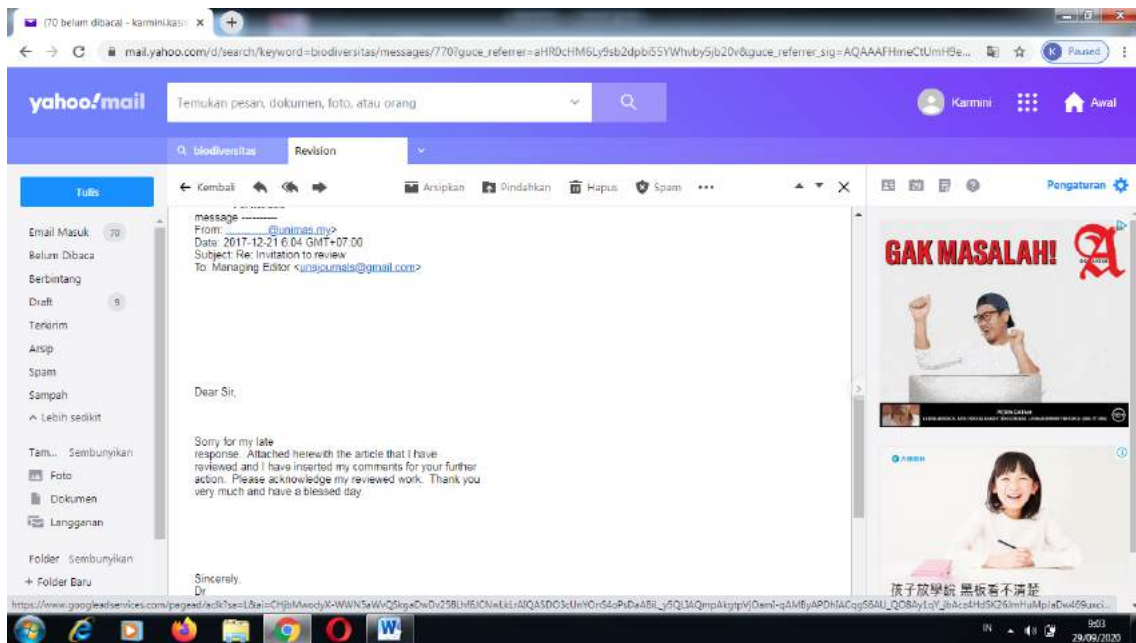
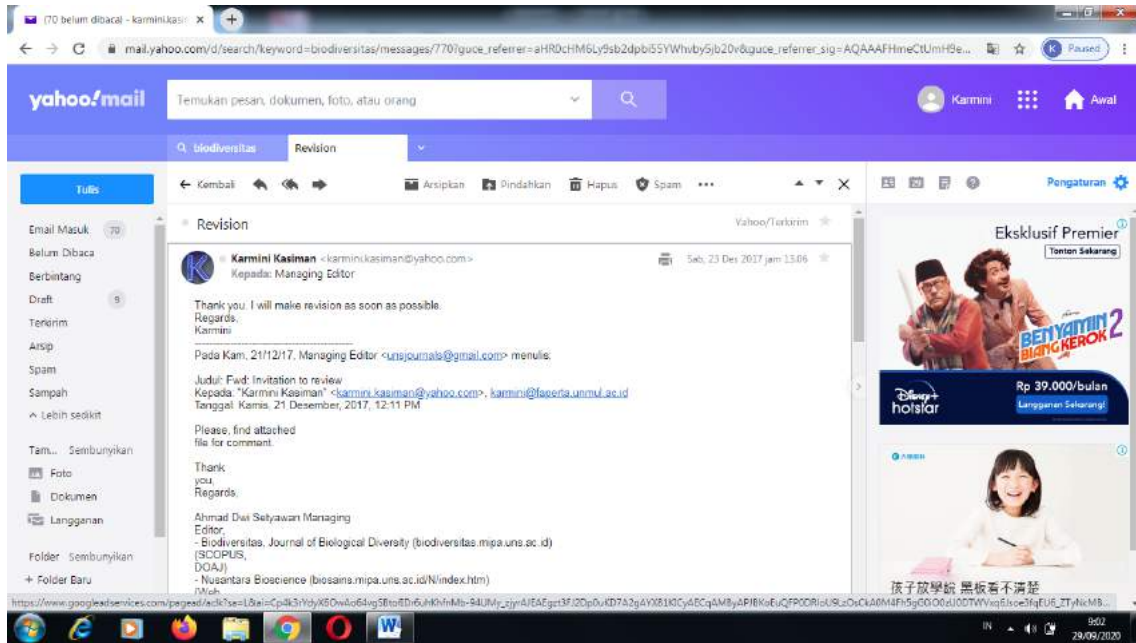
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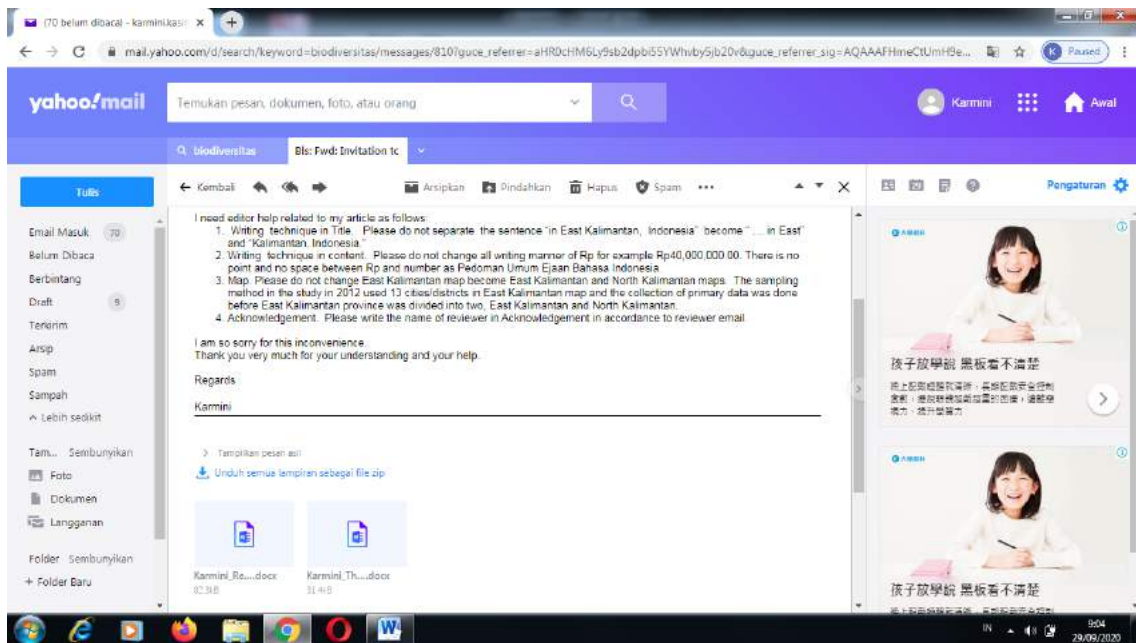
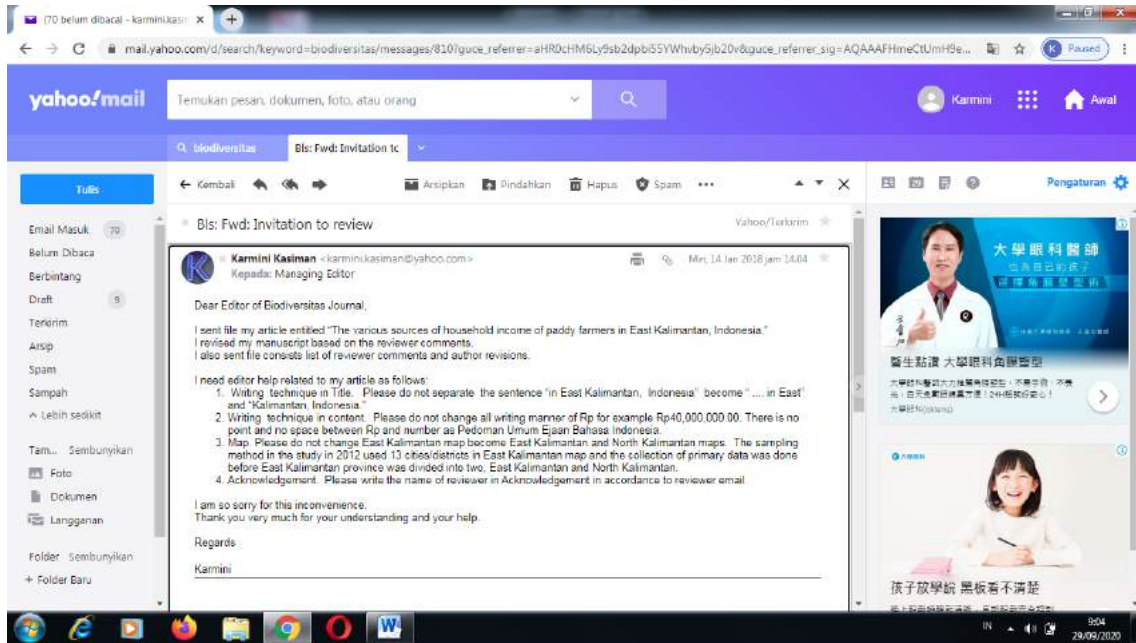
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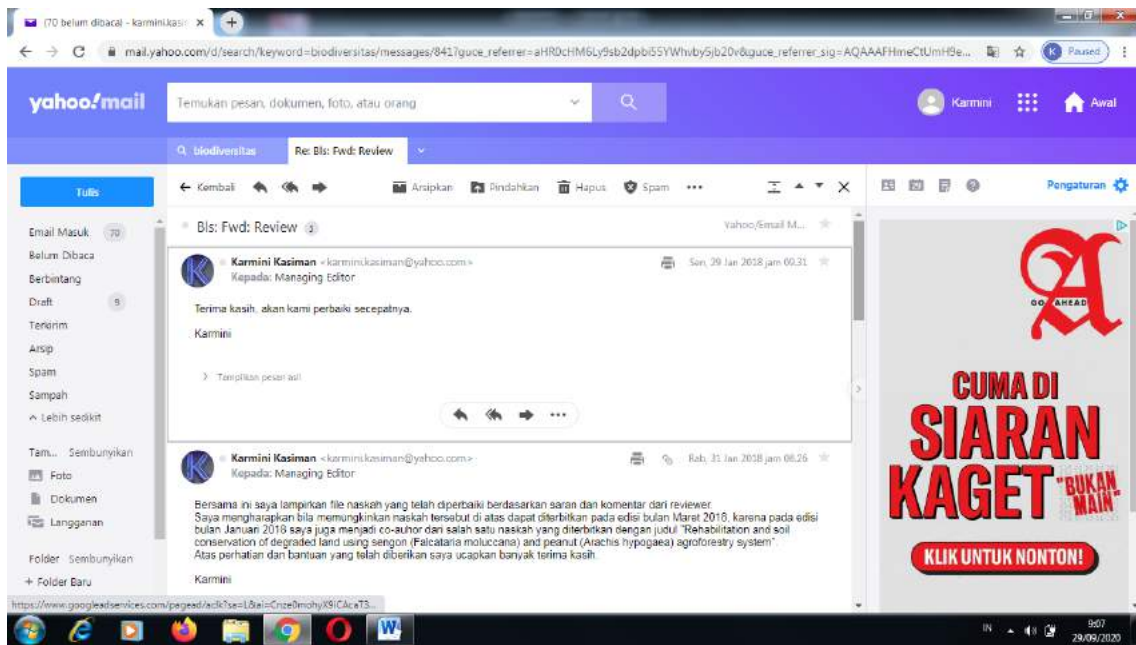
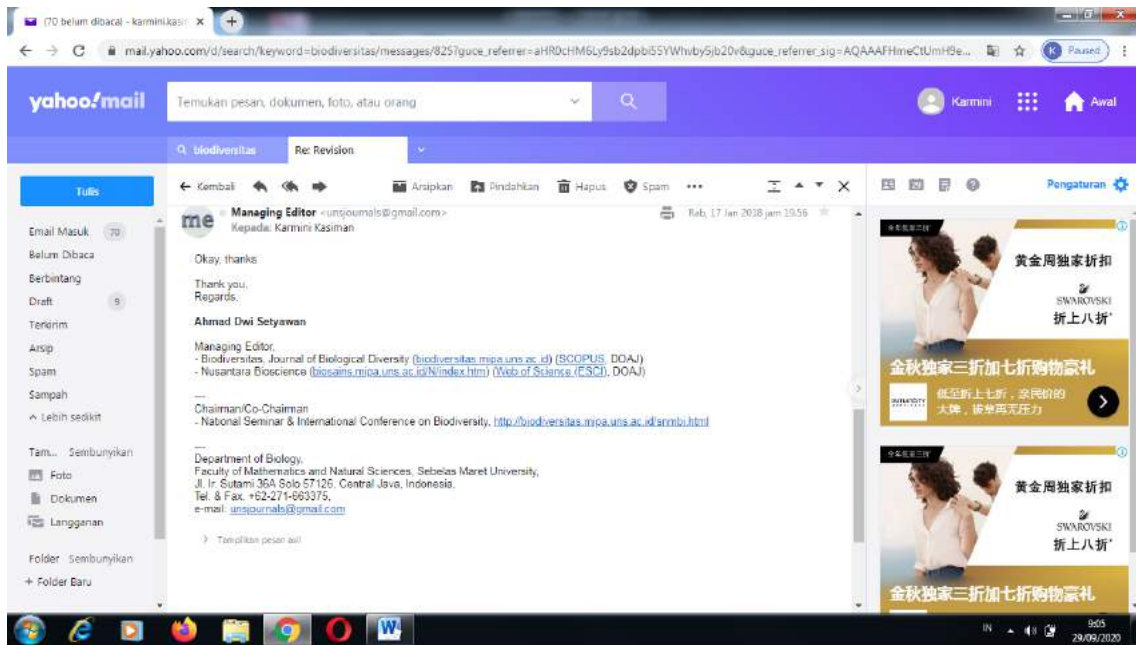
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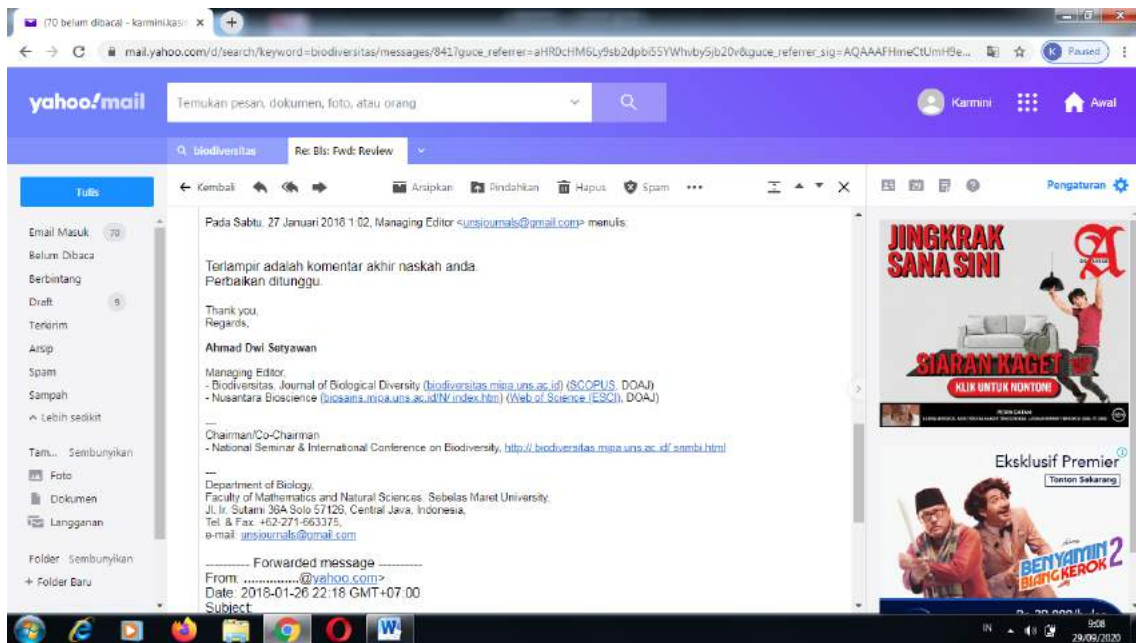
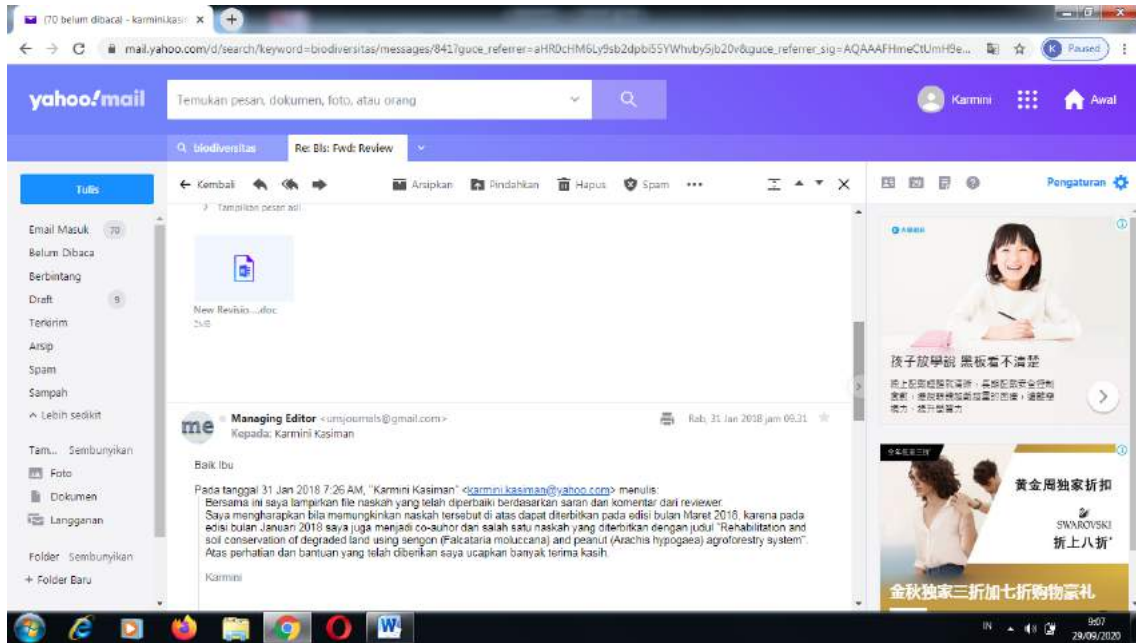
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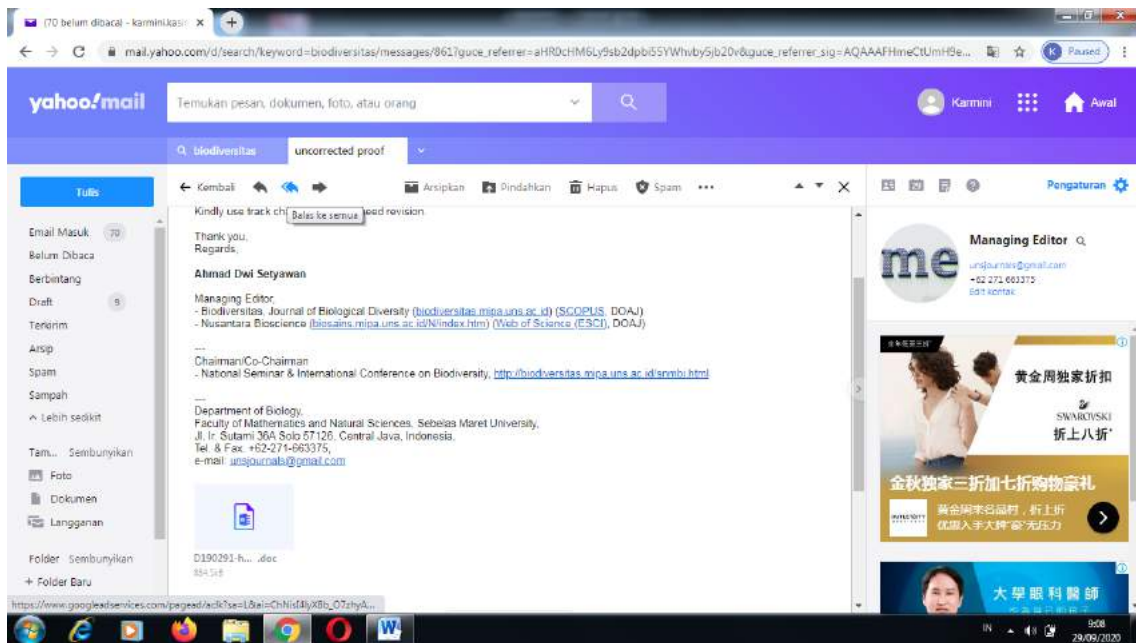
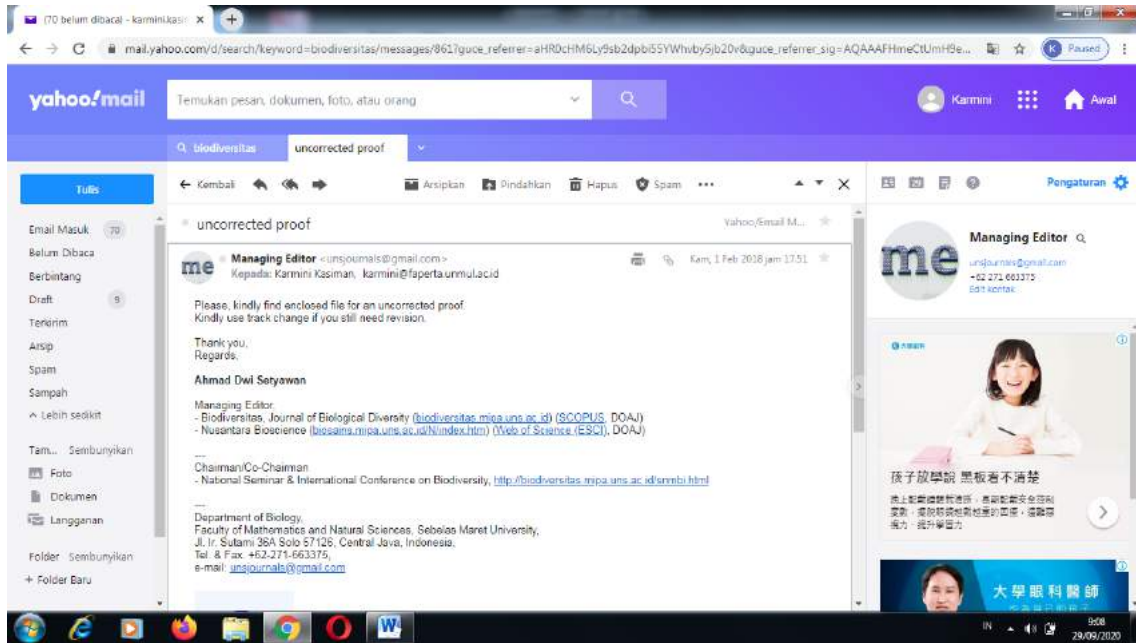
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# The various sources of household income of paddy farmers in East Kalimantan, Indonesia

**Abstract.** 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 were from paddy farm income and non-paddy farm income. Paddy farm income is income from paddy farming. Non-paddy income is income from various 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 Rp13,487,069.21 year<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup>, 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.

**Running title:** The various sources of household income of paddy farmers in East Kalimantan, Indonesia.

## INTRODUCTION

Paddy farming is still the main occupation in rural areas of Indonesia, especially in East Kalimantan Province. 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 consist 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<sup>-1</sup>) than in the agricultural sector (29.04% work-days year<sup>-1</sup>).

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 income is income resulted from various occupations, from both agricultural activities other than paddy farming 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.

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## 82 Study area

83 (SEBAIKNYA ALINEA INI DIBUANG, ATAU DIMASUKKAN KE INTRODUCTION: There were numerous  
84 studies, particularly on income, which were conducted in Indonesia. Some of income studies were conducted in Sumatra  
85 island for instance Province of North Sumatera (Irawan et al. 2007), West Sumatera (Lokollo et al. 2007; Otsuka 2009),  
86 Riau (Kuniyasu 2002), South Sumatera (Ilham et al. 2007), and Lampung (Kustiari et al. 2008). Meanwhile, some studies  
87 was held in Java island for example Province of West Java (Ilham et al. 2007; Irawan et al. 2007; Kustiari et al. 2008),  
88 Central Java (Swastika et al. 2004; Ilham et al. 2007; Irawan et al. 2007; Kustiari et al. 2008), and East Java (Irawan et al.  
89 2007; Kustiari et al. 2008). A few studies selected Nusa Tenggara Timur (Swastika et al. 2004; Lokollo et al. 2007) and  
90 Nusa Tenggara Barat (Swastika et al. 2004). Other studies were located in Central Sulawesi (Swastika et al. 2004) and  
91 South Sulawesi (Rusmadi 2005; Ilham et al. 2007; Irawan et al. 2007; Lokollo et al. 2007; Kustiari et al. 2008). West  
92 Kalimantan is one of four provinces in Kalimantan island that was the location of the studies by Kendawang et al. (2005)  
93 and Lokollo et al. (2007). However, the publication of researches about paddy household income in East Kalimantan  
94 Province is still limited. The publication of research findings will provide additional support for existing literature. This  
95 study has been able to give useful relevant information in relation to household income of paddy farmers in East  
96 Kalimantan, Indonesia. Other researchers could consider the findings of this study as reference for related studies in  
97 future).

98 This study was conducted from July 2012 to October 2013, but the collection of primary data was done from July  
99 2012 to September 2012. The location of this study was the Province of East Kalimantan, the Republic of Indonesia (the  
100 province was divided into two, East Kalimantan and North Kalimantan based on Law No. 20 of October 25, 2012), as  
101 illustrated in Figure 1. There were three reasons for the selection of this study location. First, the household of agricultural  
102 labors in Indonesia in 2008 had the lowest income after taxes both in rural and urban areas (Statistics of Indonesia 2009).  
103 Second, East Kalimantan has a tropical climate with two seasons, the dry and rainy seasons commonly happen from May  
104 to October and from November to April, respectively. There are two planting seasons for wetland paddy during a year  
105 (Statistics of East Kalimantan 2010). Paddy farming is the main job of household members who have job as paddy  
106 farmers and they obtain paddy farm income from that job. Third, the household members of paddy farmers have  
107 opportunity to work in other jobs in addition to being paddy farmers and they obtain non-paddy farm income from non-  
108 paddy farm jobs.

## 109 Procedures

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

113 The two-stage cluster sampling was used to choose the study areas. The first stage selection was done as follows. East  
114 Kalimantan Province has 13 primary units (4 cities and 9 districts) which were called clusters. Then, every city/district was  
115 classified into 3 different categories such as the high (2 cities and 3 districts), medium (4 districts), and low (2 cities and 2  
116 districts) Gross Domestic Product (GDP) of food crops. The GDP diversity was very high, there was a district having very  
117 high GDP, while other districts had small GDP. Because of that, the classification did not use the same interval of GDP  
118 but it was based on the total number of cities/districts in a category. Cities/districts were classified as the high, medium,  
119 and low GDP of food crops, in the ranges of Rp159,776.00 millions - Rp1,332,384.00 millions; Rp147,807.00 millions -  
120 Rp156,868.00 millions; and Rp18,778.00 millions - Rp126,252.00 millions, respectively. The study purposively selected  
121 three areas to represent the high, medium, and low GDP of food crops. Those areas were Kutai Kartanegara District,  
122 Penajam Paser Utara District, and Bontang City.

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

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

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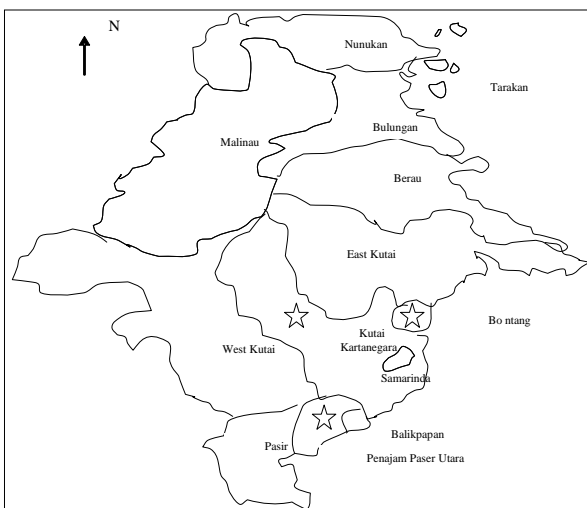
172 In 2009, there were 36,970 households of paddy farmers residing in Kutai Kartanegara District, Penajam Paser Utara  
 173 District, and Bontang City (Statistics of East Kalimantan 2010). The population in this study was 36,970 households of  
 174 paddy farmers. According to Rea and Parker (1997), the minimum sample sizes for populations of 20,000 and 50,000 are  
 175 377 persons and 382 persons, respectively. The sample size (380 households of paddy farmers) in each study area was  
 176 calculated proportionally based on harvested area of paddy. Respondents resided in Tenggarong Seberang (128  
 177 households), Loa Janan (17 households), Muara Muntai (4 households), Babulu (128 households), Penajam (84  
 178 households), Waru (16 households), South Bontang (2 households), North Bontang (1 household) and West Bontang (0  
 179 household). The purposive sampling was applied to select the households of paddy farmers that could become respondents.

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180 **Data analysis**

181 This study analyzed the various sources of household income of paddy farmers using descriptive statistics such as total,  
 182 mean, maximum, minimum, standard deviation, percentage, range, and frequency distribution. Descriptive statistics,  
 183 according to Coakes and Steed (2007), is used to explore, summarize, and describe data. Irianto (2004) mentioned that  
 184 descriptive statistics provides limited information; they are only based on the collected data. However, descriptive  
 185 statistics helps the researcher to display the data in good and simple ways, so the researcher can explain the meaning of  
 186 data more easily. Numerous studies in the past also used descriptive statistics as tool to analyze income, such as Kuniyashi  
 187 (2002), Kendawang et al. (2005), Ilham et al. (2007), Irawan et al. (2007), Lokollo et al. (2007), Kustiari et al. (2008), and  
 188 Otsuka (2009).

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189 Figure 1. Study areas (☆) in East Kalimantan, Indonesia.  
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191 **RESULTS AND DISCUSSION**

192 **Paddy Farm Income**

193 The average income of paddy farm in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43 month<sup>-1</sup>.  
 194 The minimum paddy farm income of respondents was Rp349,000.00 year<sup>-1</sup>. However, there was one paddy household  
 195 that gained Rp98,058,333.33 year<sup>-1</sup>, the maximum income in this study. The standard deviation of Rp13,350,917.44 year<sup>-1</sup>  
 196 showed variable expressed as a deviation from its sample mean value. A total of 312 households (82.11% respondents)  
 197 generated income the same as or less than Rp20,000,000.00 year<sup>-1</sup> from paddy farming. A small number of respondents  
 198 (17.89%) in Babulu and Penajam had income of more than Rp40,000,000.00 year<sup>-1</sup>. This mean that the wealth rates of  
 199 paddy households were similar because the majority of respondents (96.32%) had paddy farm income the same as or lower  
 200 than Rp40,000,000.00 year<sup>-1</sup> (Table 1).  
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203 Table 1. Number of respondents based on city/regency and paddy farm income  
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No.	City/Regency	Paddy farm income (Rp million year <sup>-1</sup> )					Total respondent (paddy household)
		0.00-20.00	20.10-40.00	40.10-60.00	60.10-80.00	80.00-100.00	
1.	Tenggarong Seberang	115	13				128
2.	Loa Janan	17					17
3.	Muara Muntai	3	1				4
4.	Babulu	80	32	10	4	2	128
5.	Penajam	81	2	1			84
6.	Waru	13	3				16
7.	South Bontang	2					2
8.	North Bontang	1					1
9.	West Bontang						
	Total	312	51	11	4	2	380

### Non-Paddy Farm Income

The average income of non-paddy farm in the study areas in 2013 was Rp20,920,464.31 year<sup>-1</sup> or Rp1,743,372.03 month<sup>-1</sup> with a standard deviation of Rp15,174,179.81 year<sup>-1</sup>. The minimum non-paddy farm income among respondents was Rp1,500,000.00 year<sup>-1</sup>. However, there was one paddy household that reached the maximum value of Rp86,700,000.00 year<sup>-1</sup>. The majority of respondents (89 households or 23.42% respondents) had income of more than Rp21,000,000.00 year<sup>-1</sup> generated from non-paddy farming. A total of 34 households (8.95% respondents) had non-paddy farm income between Rp1,000,000.00 year<sup>-1</sup> and Rp7,000,000.00 year<sup>-1</sup>. 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).

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

No.	City/Regency	Non-paddy farm income (Rp million year <sup>-1</sup> )					Total respondent (paddy household)
		1.00-7.00	7.10-14.00	14.10-21.00	>21.00	Others	
1.	Tenggarong Seberang	13	17	29	45	24	128
2.	Loa Janan	1	7		1	8	17
3.	Muara Muntai		2	1	1		4
4.	Babulu	12	16	20	18	62	128
5.	Penajam	4	20	10	19	31	84
6.	Waru	3	6		5	2	16
7.	South Bontang	1	1				2
8.	North Bontang					1	1
9.	West Bontang						
	Total	34	69	60	89	128	380

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 Ulyysea (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 put 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.

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

No.	Occupation	Number (person)	The average income (Rp month <sup>-1</sup> )	Range of income (Rp month <sup>-1</sup> )	Percentage of total household income
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					(%)
1.	Annual crop farmer	46	1,860,000.00	500,000.00 - 2,000,000.00	14.37 – 71.86
2.	Perennial crop farmer	7	2,950,000.00	750,000.00 - 6,000,000.00	22.90 – 39.64
3.	Employer	47	2,366,489.36	500,000.00 - 3,000,000.00	21.06 - 70.13
4.	Seller	52	1,315,384.62	500,000.00 - 2,000,000.00	19.05 – 79.55
5.	Fisherman and livestock breeder	12	1,092,857.14	500,000.00 - 2,000,000.00	19.05 – 69.10
6.	Carpenter	39	1,196,153.85	450,000.00 - 2,000,000.00	20.30 – 62.54
7.	Labour	88	1,446,590.91	700,000.00 - 3,500,000.00	18.00 – 79.05
8.	Others	45	1,320,000.00	350,000.00 - 3,000,000.00	22.06 - 76.29
Total		336			

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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. 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.

Farmers who can not produce enough rice have to seek fast-growing crops (such as cabbage, potato, chili, passion fruit) immediately to earn income quickly for their livelihoods (Otsuka 2009). A total of 46 households utilized their dry land 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 Rp1,860,000.00 month<sup>-1</sup>. 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 Rp500,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup> 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 Rp2,950,000.00 month<sup>-1</sup> (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, a lot of money was needed, 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), 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 Rp750,000.00 month<sup>-1</sup> to Rp6,000,000.00 month<sup>-1</sup> or 22.90% to 39.64%. Fu et al. (2009) mentioned that on-farm works, for instance rubber, tea, fruit (passion fruit, grapefruit), maize, chili, and off-farm work, 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 and 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 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<sup>-1</sup>. Their wage was between Rp500,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 21.06% to 70.13% of total household income in East Kalimantan in 2013. They received monthly wages in the average of Rp2,366,489.36 month<sup>-1</sup>. A total of 52 persons worked as sellers and generated income in the range of Rp500,000.00 month<sup>-1</sup> to Rp2,000,000.00 month<sup>-1</sup> or 19.05% to 79.55% of total household income. They got income from the daily business profit of vegetables,

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389 foods, and goods selling and their average income was Rp1,315,384.62 month<sup>-1</sup> from. Both employees and sellers worked  
 390 approximately 8 hours day<sup>-1</sup>; they were mainly employed as hired laborers or contract laborers in paddy farming.

391 Livestock production is another source of household income in the study areas. Twelve persons worked as fishermen  
 392 and breeders of fish and livestock, chickens, and cows. They had income in the range of Rp500,000.00 month<sup>-1</sup> and  
 393 Rp2,000,000.00 month<sup>-1</sup> or 19.05% to 69.10% of the total household income in East Kalimantan in 2013. Fishing and fish  
 394 breeding were done in lakes and rivers located near their house. A total of 39 persons worked as carpenters and they had  
 395 an income ranging from 20.10% to 62.54% of the total household income or between Rp450,000.00 month<sup>-1</sup> and  
 396 Rp2,000,000.00 month<sup>-1</sup>. People frequently need carpenters to build houses through contracts or the daily wage system  
 397 and the average carpenter income was Rp1,196,153.85 month<sup>-1</sup>.

398 Some members of paddy households (88 persons) had employment as laborers with average income of Rp1,446,590.92  
 399 month<sup>-1</sup> in East Kalimantan in 2013. They commonly worked as agricultural laborers in their village to do planting,  
 400 weeding, controlling pest and disease, harvesting, and post harvesting. These jobs do not give stable income every month  
 401 because they depend on demand; however, their contribution to the total household income was in the range of 18.00%  
 402 and 79.05% or Rp700,000.00 month<sup>-1</sup> to Rp3,500,000.00 month<sup>-1</sup>. Other jobs contributed to total household income in the  
 403 range of Rp350,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 22.06% to 76.29%. In 2013, 45 persons got income from  
 404 other jobs in the average of Rp1,320,000.00 month<sup>-1</sup>.

#### 405 Total Household Income of Paddy Farmers

406 The average total household income of paddy farmers in East Kalimantan in 2013 was Rp2,280,053.36 month<sup>-1</sup> or  
 407 Rp27,360,640.28 year<sup>-1</sup>. The standard deviation value was Rp19,974,647.11 year<sup>-1</sup>. There was a paddy household in the  
 408 study areas that had minimum household income as much as Rp997,333.33 year<sup>-1</sup>. However, another paddy household  
 409 had a maximum household income as much as Rp103,302,000.00 year<sup>-1</sup>. The majority of paddy households in  
 410 Tenggarong Seberang, Loa Janan, Babulu Penajam, and Waru gained total household income of less than  
 411 Rp25,000,000.00 year<sup>-1</sup>. A total of 123 respondents had a total household income in the range of Rp25,000,000.00 month<sup>-1</sup>  
 412 to Rp50,000,000.00 year<sup>-1</sup>. A small number of respondents in Tenggarong Seberang, Babulu, Penajam, and Waru had a  
 413 total household income of more than Rp50,000,000.00 year<sup>-1</sup>. Table 4 shows the distribution of respondents in the study  
 414 areas based on the total household income. Generally, the paddy households in East Kalimantan have various sources of  
 415 income, which are categorized into paddy farm income and non-paddy farm income.

416 The increase of paddy farm income causes the increase of total household income of paddy farmers. Data showed that  
 417 the contribution of paddy farm income to household income was 49.29%. The average paddy farm income in East  
 418 Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup>. Another income source of paddy households is non-paddy farm income.  
 419 A large portion of the total household income of paddy farmers (50.71%) was derived from non-paddy farm income rather  
 420 than from paddy farm income. The average non-paddy farm income was Rp13,873,571.07 year<sup>-1</sup>. Some non-paddy farm  
 421 activities need more skill and capital than paddy farm activities. However, those activities can produce income  
 422 throughout the year while paddy farming gives only seasonal income. The increasing non-paddy farm income relates to the  
 423 increasing total household income of paddy farmers.

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

No.	City/Regency	Total household income of paddy farmers (Rp million year <sup>-1</sup> )					Total respondent (paddy household)
		< 25	25-50	51-75	76-100	>100	
1.	Tenggarong Seberang	63	45	13	6	1	128
2.	Loa Janan	12	5				17
3.	Muara Muntai	2	2				4
4.	Babulu	62	41	16	8	1	128
5.	Penajam	56	24	3	1		84
6.	Waru	9	6	1			16
7.	South Bontang	2					2
8.	North Bontang	1					1
9.	West Bontang						
	Total	206	123	33	15	2	380

426 The role of agricultural sector in the rural economy of Indonesia decreased in recent years. Lokollo et al. (2007) found  
 427 that the contribution of the agricultural sector, non-agricultural sector, and other sectors to household income in West  
 428 Sumatra, West Nusa Tenggara, West Kalimantan, and South Sulawesi in 2007 were 60.49%, 16.30%, and 23.21%,  
 429 respectively. Kustiari et al. (2008) research showed that the contribution of agricultural sector to household income in  
 430 Indonesia in 2008 was between 58.00% and 94.00%. The results of this study showed that the contribution of paddy farm  
 431 income to the household income of paddy farmers in East Kalimantan in 2013 was in the range of 39.20% to 49.29% and  
 432 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  
 433 predicted that its role will be replaced by non-agricultural sectors. Therefore, there is an urgent need to increase its role in  
 434 the rural economy as Suryahadi et al. (2009) mentioned that agriculture growth in rural areas still plays a major role in  
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475 reducing poverty in Indonesia. The role of agriculture should be considered not only in terms of production, but also in the  
 476 aspect of generating employment opportunities and rural development as a whole (Janssen 1993). This means that there is  
 477 still a possibility to enhance the role of agricultural sector in the development of rural economies in the future.  
 478 This study has identified the various sources of household income of paddy farmers. Households of paddy farmers in  
 479 East Kalimantan, Indonesia, have the sources of income from paddy farm income and non-paddy farm income. Paddy  
 480 farming is the main source of paddy household income. Besides, paddy households have the sources of income from  
 481 various jobs as annual crops farmer, perennial crops farmer, employee, seller, fisherman, breeder livestock, carpenter,  
 482 laborer, and others. The average paddy farm income, non-paddy farm income, and the total household income of paddy  
 483 farmers in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43 month<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup> or  
 484 Rp1,743,372.03 month<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup> or Rp2,280,053.36 month<sup>-1</sup>, respectively. Paddy farm income  
 485 contributed 49.29% to household income while non-paddy farm income 50.71%.

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

**Abstract.** Some reports showed the 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 held out 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 was 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 obtained from paddy farming. Non-paddy income is income obtained from various occupations such as annual crops farmer, perennial crop farmer, employee, seller, fisher, breeder of livestock, carpenter, labourer, and others. The average amount of paddy farm income, non-paddy farm income, and total household income of paddy farmers in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup>, 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.

**Running title:** The various sources of household income of paddy farmers in East Kalimantan, Indonesia.

## INTRODUCTION

Paddy farming is still the main occupation in rural areas of Indonesia, especially in East Kalimantan Province. The number of households in Indonesia in 2009 was 58,421,900 of which 17,488,276 (29.93%) were engaged in paddy, corn, soybean, and sugar-cane farming (Statistics Indonesia 2011a). In East Kalimantan in 2013, the total of households was 820,888, as part of that, the farm households were 180,614 (22.00%) and the food farm households were 83,564 (10.18%) (Statistics East Kalimantan 2014).

The household of paddy farmer comprises an individual and all family members, or a group of individuals, who live together and have responsibility to one household head, they engage in paddy farming as their main job as well as other occupations 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 more than 15 years old who worked in East Kalimantan in 2013, the 26.61% of them worked in agricultural sector, it was the biggest number compared than others sector (Statistics East Kalimantan 2014). According to Mariyah and Priyantini (2008), the members of farmer households in Pasir District, East Kalimantan, work longer in the non-agricultural sector (70.96% work-days year<sup>-1</sup>) than the agricultural sector (29.04% work-days year<sup>-1</sup>).

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 has 2 or 3 sources of income. It is only a small number of farmer households that 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 Sumatera, 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 many opportunities to work in some types of job and it contributes to household income.

This study was constructed differently from the previous studies, with only 2 categories of sources of household income of paddy farmers. The sources of household income of paddy farmers in East Kalimantan, Indonesia, are classified to be paddy farm income and non-paddy farm income. Paddy farm income is income obtained from paddy farming. Non-paddy income is income obtained from various occupations both from agricultural activities besides paddy farming and also non-agricultural activities. 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

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50 farm income to household income of paddy farmers in East Kalimantan, Indonesia. It is hoped that findings of this study  
51 will provide additional support for the income literature and as a reference for related studies in future.

## 52 MATERIALS AND METHODS

### 53 Study area

54 There were numerous studies, particularly on income, which were conducted in Indonesia. Some of income studies  
55 were conducted in Sumatra for instance North Sumatra (Irawan et al. 2007), West Sumatra (Lokollo et al. 2007; Otsuka  
56 2009), Riau (Kuniyasu 2002), South Sumatra (Ilham et al. 2007), and Lampung (Kustiari et al. 2008). Many studies had  
57 location in three provinces in Java for instance West Java (Ilham et al. 2007; Irawan et al. 2007; Kustiari et al. 2008),  
58 Central Java (Ilham et al. 2007; Irawan et al. 2007; Kustiari et al. 2008; Swastika et al. 2004), and East Java (Irawan et al.  
59 2007; Kustiari et al. 2008). A few studies selected Nusa Tenggara Timur (Lokollo et al. 2007; Swastika et al. 2004) and  
60 Nusa Tenggara Barat (Swastika et al. 2004). Other studies were located in Central Sulawesi (Swastika et al. 2004) and  
61 South Sulawesi (Rusmadi 2005; Ilham et al. 2007; Irawan et al. 2007; Lokollo et al. 2007; Kustiari et al. 2008). West  
62 Kalimantan is one of four provinces in Kalimantan island that was the location of the studies by Kendawang et al. (2005)  
63 and Lokollo et al. (2007). However, the publication of researches about paddy household income in East Kalimantan  
64 Province is still limited.

65 This study was conducted from October 2012 to October 2013. The location of this study was Province of East  
66 Kalimantan, the Republic of Indonesia (Now, the province was divided into two, East Kalimantan and North Kalimantan),  
67 as illustrated in Figure 1. There were three reasons for the selection of this study location. First, agricultural labor  
68 household in Indonesia owned the average of per capita income after taxes was lowest in 2008 among the other household  
69 groups both in rural and urban levels (Statistics Indonesia 2009). Second, East Kalimantan has a tropical climate with two  
70 seasons, a dry season that commonly happens from May to October and a rainy season that usually comes from November  
71 to April. There are two planting seasons for wetland paddy during a year (Statistics East Kalimantan 2010). This meant  
72 paddy farming could be main source of household income. Third, the household members of paddy farmers have  
73 opportunity to work in other jobs besides as paddy farmers.

### 74 Procedures

75 The primary data were obtained from household heads or household members of paddy farmers who are currently  
76 engaged in paddy farming and he or she should have known income of other household members. The secondary data  
77 which mostly collected from journals were also needed, particularly to support the primary data.

78 The two-stage cluster sampling was used to choose the study areas. The first stage selection was done as follows. East  
79 Kalimantan Province has 13 primary sampling units (4 cities and 9 districts) which were called clusters. Then, every  
80 city/district was classified into 3 different categories such as the high (2 cities and 3 districts), medium (4 districts), and  
81 low (2 cities and 2 districts) of Gross Domestic Product (GDP) of food crops. Then, study selected a random sample of  
82 these units such as Kutai Kartanegara District, Penajam Paser Utara District, and Bontang City. Then, the second stage  
83 selection as follows. This study classified all sub-cities/sub-districts had been chosen into 3 groups such as the high,  
84 medium, and low harvested areas of paddy. Kutai Kartanegara District, Penajam Paser Utara District, and Bontang City  
85 have 18, 4, and 3 secondary sampling unit, respectively. This study chose a subset of smaller units within the primary units  
86 that randomly selected, they were 3 sub-cities and 6 sub-districts as the study areas.

87 There were 36,970 households of paddy farmers in East Kalimantan in 2009 reside in Kutai Kartanegara District,  
88 Penajam Paser Utara District, and Bontang City (Statistics East Kalimantan 2010). According to Rea and Parker (1997),  
89 the minimum sample size for 20,000 persons and 50,000 persons population is 377 and 382 persons, respectively. The  
90 sample size (380 households of paddy farmers) in each study area was calculated proportionally based on harvested area of  
91 paddy. Respondents reside in Tenggarong Seberang (128 households), Loa Janan (17 households), Muara Muntai (4  
92 households), Babulu (128 households), Penajam (84 households), Waru (16 households), South Bontang (2 households),  
93 North Bontang (1 household) and West Bontang (0 household). The simple random sampling was applied to select the  
94 households of paddy farmers that could be respondents.

### 95 Data analysis

96 This study analyzed the various sources of household income of paddy farmers by using descriptive statistics such as  
97 total, mean, maximum, minimum, standard deviation, percentage, range, and frequency distribution. Descriptive statistics,  
98 according to Coakes and Steed (2007), are used to explore, summarize, and describe data. Irianto (2004) mentioned that  
99 descriptive statistics provide limited information; they are only based on the collected data. However, descriptive statistics  
100 help the researcher to display the data in good and simple ways, therefore, the researcher can give special meaning to the  
101 data. Numerous studies in the past also used descriptive statistics as tool to analyze income, such as Kuniyasu (2002),  
102 Kendawang et al. (2005), Ilham et al. (2007), Irawan et al. (2007), Lokollo et al. (2007), Kustiari et al. (2008), and Otsuka  
103 (2009).

Commented [u12]: Please improve your sentence structure.

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Commented [u19]: How if in the case the respondent does not know other members' income?

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Commented [u21]: How much is the high, medium and low?

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Figure 1. Study areas in East Kalimantan, Indonesia.

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## RESULTS AND DISCUSSION

### Paddy Farm Income

The result of this research shows that the average amount of paddy farm income in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43 month<sup>-1</sup>. The minimum value of paddy farm income of respondents was Rp349,000.00 year<sup>-1</sup>. However, there was one paddy household that gained Rp98,058,333.33 year<sup>-1</sup>, the maximum income in this study. The standard deviation of Rp13,350,917.44 year<sup>-1</sup> showed that variable expressed as a deviation from its sample mean value. Table 1 shows that the majority of respondents obtained income under Rp. 40,000,000.00 year<sup>-1</sup>. The 312 households (82.11% respondents) generated income less than Rp. 20,000,000.00 year<sup>-1</sup> from paddy farming. A small number of respondents (17.89%) in Babulu and Penajam obtained income more than Rp. 40,000,000.00 year<sup>-1</sup>. This meant that, in general, the wealth rates of paddy households are similar.

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Commented [u31]: Why similar?

Table 1. Number of respondents based on paddy farm income

No.	City/Regency	0.00-20.00	20.10-40.00	40.10-60.00	60.10-80.00	80.00-100.00	Total
1.	Tenggarong Seberang	115	13				128
2.	Loa Janan	17					17
3.	Muara Muntai	3	1				4
4.	Babulu	80	32	10	4	2	128
5.	Penajam	81	2	1			84
6.	Waru	13	3				16
7.	South Bontang	2					2
8.	North Bontang	1					1
9.	West Bontang						
	Total	312	51	11	4	2	380

Note: Paddy farm income = Rp million year<sup>-1</sup>

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### Non-Paddy Farm Income

The results of this study show the average amount of non-paddy farm income in the study areas in 2013 was Rp. 20,920,464.31 year<sup>-1</sup> or Rp. 1,743,372.03 month<sup>-1</sup> with a standard deviation of Rp15,174,179.81 year<sup>-1</sup>. The minimum value of non-paddy farm income among respondents was Rp. 1,500,000.00 year<sup>-1</sup>. However, there was one paddy household that reached the maximum value of Rp. 86,700,000.00 year<sup>-1</sup>. The majority of respondents (89 households or 23.42% respondents) obtained income more than Rp. 21,000,000.00 year<sup>-1</sup> generated from non-paddy farming. The 34 households (8.95% respondents) had non-paddy farm income between Rp. 1,000,000.00 year<sup>-1</sup> and Rp. 7,000,000.00 year<sup>-1</sup>.

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129 The number of respondents who did not have non-paddy farm income was calculated to be as many as 128 households. As  
 130 demonstrated in Table 2, paddy households in Tenggarong Seberang mainly had a higher income compared to Babulu. On  
 131 the contrary, the contribution of non-paddy farm income to household income in Loa Janan, Muara Muntai, Waru, and  
 132 South Bontang was relatively small. According to Case et al. (2009), the differences in the amount of wage and salary or  
 133 income among households are caused by labour characteristics (for instance skills, training, education, experience, etc) and  
 134 the degree of job difficulty (for instance dangerous, exciting, glamorous, difficulty, etc).  
 135

136 Table 2. Number of respondents based on non-paddy farm income

No.	City/Regency	1.00-7.00	7.10-14.00	14.10-21.00	>21.00	Others	Total
1.	Tenggarong Seberang	13	17	29	45	24	128
2.	Loa Janan	1	7		1	8	17
3.	Muara Muntai		2	1	1		4
4.	Babulu	12	16	20	18	62	128
5.	Penajam	4	20	10	19	31	84
6.	Waru	3	6		5	2	16
7.	South Bontang	1	1				2
8.	North Bontang					1	1
9.	West Bontang						
	Total	34	69	60	89	128	380

138 Note: Non-paddy farm income = Rp million year<sup>-1</sup>

139 The informal sector offers more job opportunities as sources of non-paddy farm income in the study areas such as  
 140 annual crop farmer, perennial crop farmer, employee, seller, fisherman, livestock breeder, carpenter, laborer, and others as  
 141 listed in Table 3. Ulysea (2010) defined the informal sector as all economic activities which contribute to the Gross  
 142 National Product. Agriculture absorbs most of the total labor force in paddy households. Agricultural laborers are people  
 143 working in the agricultural sector including estates, fisheries, forestry, and hunting, whether working as an individual or in  
 144 collaboration with other parties, leading, supervising, and conducting related activities (Statistics Indonesia 2011b). The  
 145 result of this study was in line with other previous studies such as Swastika et al. (2004), Ilham et al. (2007), Irawan et al.  
 146 (2007), Lokollo et al. (2007), Kustiari et al. (2008), and Kamanga et al. (2009). They show that 3 sources of household  
 147 income in Indonesia are on-farm, non-farm, and off-farm.  
 148

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

No.	Occupation	Number (person)	The average income (Rp month <sup>-1</sup> )	Range of income (Rp month <sup>-1</sup> )	Percentage to total household income (%)
1.	Annual crop farmer	46	1,860,000.00	500,000.00 - 2,000,000.00	14.37 – 71.86
2.	Perennial crop farmer	7	2,950,000.00	750,000.00 - 6,000,000.00	22.90 – 39.64
3.	Employer	47	2,366,489.36	500,000.00 - 3,000,000.00	21.06 - 70.13
4.	Seller	52	1,315,384.62	500,000.00 - 2,000,000.00	19.05 – 79.55
5.	Fisherman and livestock breeder	12	1,092,857.14	500,000.00 - 2,000,000.00	19.05 – 69.10
6.	Carpenter	39	1,196,153.85	450,000.00 - 2,000,000.00	20.30 – 62.54
7.	Labour	88	1,446,590.91	700,000.00 - 3,500,000.00	18.00 – 79.05
8.	Others	45	1,320,000.00	350,000.00 - 3,000,000.00	22.06 - 76.29
	Total	336			

152 Traditionally small-scale farmers follow some culturally existing practices such as inter cropping, spatial  
 153 diversification, and sequential planting dates to reduce income risks, increase food security, and raise efficiency (Adesina  
 154 and Zinnah 1993; Hutabarat et al. 2008; Larson and Plessmann 2009). Farmers who could not produce enough paddy have  
 155 to seek annual crops immediately to earn income quickly for their livelihoods (Otsuka 2009). The 46 households utilized  
 156 their dryland for annual crops planting in the study areas in 2013 such as French bean (*Phaseolus vulgaris* L.), cowpea  
 157 (*Vigna sinensis* L.), cassava (*Manihot esculenta* Crantz), corn (*Zea mays* L.), cucumber (*Cucumis sativus* L.), and pumpkin  
 158 (*Cucurbita maxima* L.). The annual crops planting could generate income in the average amount of Rp1,860,000.00  
 159 month<sup>-1</sup>. Hutabarat et al. (2008) found that the contribution of secondary crops to family income is less than 50.00%.  
 160 However, the result of this study shows that annual crops planting gave contribution to household income between Rp.  
 161 500,000.00 month<sup>-1</sup> and Rp. 2,000,000.00 month<sup>-1</sup> or 14.37% to 71.86% of total household income. According to Otsuka  
 162 (2009), profit from non-paddy crops could be substituted by the paddy production.  
 163

164 Besides annual crops planting, perennial crops planting such as oil palm (*Elaeis guineensis* Jacq.), banana (*Musa* sp),  
 165 and cassava (*Manihot esculenta* Crantz.) are sources of non-paddy farm income and contribute to household income. The  
 166 average amount of perennial crops income obtained by paddy farmer households was Rp2,950,000.00 month<sup>-1</sup> in East  
 167 Kalimantan in 2013. However, there were only seven households that practiced perennial crops planting. The number was

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Commented [u36]: How do you define them?

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Commented [u40]: Examples of these?

Commented [u41]: What are those crops?

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168 small, mainly because of the high price of land, capital intensiveness, and the far distance from the village. This is similar  
169 to studies by Barham and Chitemi (2009), Fu et al. (2009), Mestre-Sanchis and Feijoo-Bello (2009), who mentioned that  
170 commodities contribute to generate household income and influence farmer's net margin. Otsuka (2009) stated that  
171 perennial crops are supplementary to paddy in generating income. The result of this study shows that perennial crops  
172 planting contributed to total household income of paddy farmers in the range of Rp750,000.00 month<sup>-1</sup> to Rp6,000,000.00  
173 month<sup>-1</sup> or 22.90% to 39.64%. Fu et al. (2009) mentioned that on-farm work for instance rubber, tea, fruit (passion fruit,  
174 grapefruit), maize, vegetable capsicum, and off-farm work for instance collecting mushrooms and bamboo shoots, have  
175 significant differences in gross annual income per household between Baka and Daka villages in Xishuangbanna,  
176 Southwestern China, while rice has no significant influence on household income.

177 There are some economic advantages of crop diversification. Crop diversification contributes to the increase of farmer  
178 income through the cultivation of high-value crops such as vegetables and cropping intensification. Practicing crop  
179 diversification as a farming system gives farmers income throughout the year, because various crops have their life cycles,  
180 which means they can be harvested at different times. Another economic benefit associated with crop diversification is its  
181 ability to smoothen out the impact of price fluctuation (Kasem and Thapa 2011). The last advantage of crop diversification  
182 is that a farmer can more easily change crops combination on the same land based on the market demand and the  
183 commodities price, which is quite impossible to do with paddy farming. It also becomes easier for a farmer to adopt new  
184 technology.

185 Households can diversify income by having several sources of income such as off-farm employment and livestock  
186 production (Illukpitiya and Yanagida 2010). The 47 persons in this study areas work as employees in government  
187 institutions or companies as teachers, administrators, drivers, security officers, etc. Their wage was between Rp500,000.00  
188 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 21.06% to 70.13% of total household income in East Kalimantan in 2013. They  
189 received monthly wages in the average of Rp2,366,489.36 month<sup>-1</sup>. The 52 persons worked as sellers and generated  
190 income in the range of Rp500,000.00 month<sup>-1</sup> to Rp2,000,000.00 month<sup>-1</sup> or 19.05% to 79.55% of total household income.  
191 They obtain income from the daily business profit of vegetables, foods, and goods selling and their income were on the  
192 average of Rp1,315,384.62 month<sup>-1</sup>. Both employees and sellers work approximately 8 hours day<sup>-1</sup>, they mainly employ  
193 as hired laborers or contract laborers to be engaged in paddy farming.

194 Livestock production is another source of household income in the study areas. The 12 persons work as fisherman and  
195 breeders of fish and livestock, chickens, and cows. They obtained income in the range of Rp500,000.00 month<sup>-1</sup> and  
196 Rp2,000,000.00 month<sup>-1</sup> or 19.05% to 69.10% of total household income in East Kalimantan in 2013. Fishing and fish  
197 breeding is done in lakes and rivers located near their house. The 39 persons work as carpenters and they had an income  
198 ranging from 20.10% to 62.54% of total household income or between Rp450,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup>.  
199 People frequently need carpenters to build houses through contracts or the daily wage system and the average amount of  
200 carpenter income was Rp1,196,153.85 month<sup>-1</sup>.

201 Some members of paddy households (88 persons) have employment as laborers with income on average at  
202 Rp1,446,590.92 month<sup>-1</sup> in East Kalimantan in 2013. They are commonly working as agricultural laborers in their village  
203 to do planting, weeding, controlling pest and disease, harvesting, and post harvesting. These jobs do not give stable  
204 income every month because they depend on demand, however, their contribution to total household income was in the  
205 range of 18.00% and 79.05% or Rp700,000.00 month<sup>-1</sup> to Rp3,500,000.00 month<sup>-1</sup>. Other jobs contributed to total  
206 household income in the range of Rp350,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 22.06% to 76.29%. In 2013, the  
207 45 persons obtained income from other jobs in the average amount of Rp1,320,000.00 month<sup>-1</sup>.

## 208 Total Household Income of Paddy Farmers

209 The average amount of total household income of paddy farmers in East Kalimantan in 2013 was Rp. 2,280,053.36  
210 month<sup>-1</sup> or Rp27,360,640.28 year<sup>-1</sup>. The standard deviation value was Rp19,974,647.11 year<sup>-1</sup>. There was paddy  
211 household in the study areas that had minimum household income of Rp. 997,333.33 year<sup>-1</sup>. However other paddy  
212 household had a maximum household income among respondents of Rp. 103,302,000.00 year<sup>-1</sup>. The majority of paddy  
213 households in Tenggarong Seberang, Loa Janan, Babulu Penajam, and Waru gained total household income less than Rp.  
214 25,000,000.00 year<sup>-1</sup>. The 123 respondents had total household incomes in the range of Rp. 25,000,000.00 month<sup>-1</sup> to Rp.  
215 50,000,000.00 year<sup>-1</sup>. A small number of respondents in Tenggarong Seberang, Babulu, Penajam, and Waru had total  
216 household income more than Rp. 50,000,000.00 year<sup>-1</sup>. Table 4 shows the distribution of respondents in the study areas  
217 based on total household income. Generally, the paddy households in East Kalimantan have various sources of income,  
218 which are categorized into paddy farm income and non-paddy farm income.

219 The increase of paddy farm income forces the increase of total household income of paddy farmers. Data show that the  
220 contribution of paddy farm income to household income was 49.29%. The average income which received by paddy  
221 farms was Rp13,487,069.21 year<sup>-1</sup> in East Kalimantan in 2013. Another source of income in paddy households are from  
222 non-paddy farm income. A large portion of total household income of paddy farmers (50.71%) was derived from non-  
223 paddy farm income rather than from paddy farm income. The average income which received from non-paddy farming  
224 was Rp. 13,873,571.07 year<sup>-1</sup>. Non-paddy farm income has a larger contribution compared to paddy farm income with the  
225 consideration of some aspects such as labor intensiveness, skills, and capital intensiveness. More than that, non-paddy

Commented [u44]: Why?

Commented [u45]: How much increase?

Commented [u46]: Why? How?

Commented [u47]: Are they employing or being employed?

Commented [u48]: Grammar?

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Commented [u50]: Grammar?

Commented [u51]: Grammar?

Commented [u52]: What do you mean here?

226 farm jobs allow stable income during the year which is different from paddy farming which gives seasonal income. The  
 227 increasing non-paddy farm income relates to the increasing total household income of paddy farmers.

Commented [u53]: Is this always true?

228  
 229 Table 4. Number of respondents based on total household income of paddy farmers

No.	City/Regency	< 25	25-50	51-75	76-100	>100	Total
1.	Tenggarong Seberang	63	45	13	6	1	128
2.	Loa Janan	12	5				17
3.	Muara Muntai	2	2				4
4.	Babulu	62	41	16	8	1	128
5.	Penajam	56	24	3	1		84
6.	Waru	9	6	1			16
7.	South Bontang	2					2
8.	North Bontang	1					1
9.	West Bontang						
Total		206	123	33	15	2	380

Commented [u54]: What number is this? What unit?

Commented [u55]: What number? What unit?

231 Note: Total household income of paddy farmers = Rp million year<sup>-1</sup>

232  
 233 The role of agricultural sector in the rural economy of Indonesia decreased in recent years. Lokollo et al. (2007) found  
 234 that the contribution of the agricultural sector, non-agricultural sector, and other sectors to household income in West  
 235 Sumatra, West Nusa Tenggara, West Kalimantan, and South Sulawesi in 2007 were 60.49%, 16.30%, and 23.21%,  
 236 respectively. Kustiari et al. (2008) research showed that the contribution of agricultural sector to household income in  
 237 Indonesia in 2008 was between 58.00% and 94.00%. The results of this study show that the contribution of paddy farm  
 238 income to the household income of paddy farmers in East Kalimantan in 2013 was identified in the range of 39.20% to  
 239 49.29% and the range of 50.71% and 60.80% for non-paddy farm income. If the role of agricultural sector decreases in  
 240 the future, it is predicted that its role will be replaced by non-agricultural sectors. Therefore, there is an urgent need to  
 241 increase its role in the rural economy as Suryahadi et al. (2009) mentioned that agriculture growth in rural areas still plays  
 242 a major role in reducing poverty in Indonesia. The potency of agriculture should be considered not only in terms of  
 243 production, but also in the aspect of generating employment opportunities and rural development as a whole (Janssen  
 244 1993). This meant that there is still a possibility to enhance the role of agricultural sector in the development of rural  
 245 economies in the future.

Commented [u56]: ??

246 This study has identified the various sources of household income of paddy farmers. Households of paddy farmers in  
 247 East Kalimantan, Indonesia, have the sources of income from paddy farm income and non-paddy farm income. Paddy  
 248 farming is the main source of paddy household income. Beside, becomes paddy farmer, members of paddy household have  
 249 the sources of income from various occupations as annual crops farmer, perennial crops farmer, employee, seller, fisher,  
 250 breeder livestock, carpenter, laborer, and others. The average amount of paddy farm income, non-paddy farm income, and  
 251 total household income of paddy farmers in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43  
 252 month<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup> or Rp1,743,372.03 month<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup> or Rp2,280,053.36 month<sup>-1</sup>,  
 253 respectively. Paddy farm income contributed 49.29% to household income while non-paddy farm income contributed  
 254 50.71% to that.

Commented [u57]: What is this?

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**The Author Revision on Review of Article**  
**“The various sources of household income of paddy farmers in East Kalimantan, Indonesia”**

No.	Reviewer Comment	Author Revision	Line
u1	The various sources of household income of paddy farmers in East Kalimantan, Indonesia Overall, it is a rather poor written piece of article that does not have any theoretical contribution. The empirical data is also not clearly discussed or justified of its importance. The grammar is indeed very poor that need drastic editing process. At the moment, this piece of work is not suitable to be published if quality is a crucial factor for consideration for the journal.	Revised.	1-2
u2	Abstract Grammar needs to be corrected and improved further for the whole abstract here.	Revised.	8
u3	.... annual crops farmer, perennial crop farmer, employee, seller, fisher, breeder of livestock, carpenter, labourer, and others. What is this?	Revised. .... various jobs ....	14-15
u4	.... in 2009 .... This year is 2017 and the publication is expected in 2018. It is about 9 years out of date. Is there any more latest statistics provided?	Revised. .... in 2016 ....	23
u5	.... total of .... Total number?	Revised. .... total number of ....	24
u6	.... and have responsibility to one household head .... What do you mean here?	Revised. .... and have responsibility to the household head ....	28 → 27
u7	.... compared than others .... What is this?	Revised. .... among economics ....	31
u8	.... to Mariyah and Priyantini.... Is this source from 2 authors? The list of reference does not seem to be two authors.	Yes. It has written as guidance for authors.	32 → 31
u9	.... work longer in .... What do you mean here? Longer time spent?	Revised. .... spent longer time ....	33 → 32
u10	.... many opportunities to work in some types of job and it contributes to household income. What do you mean by many opportunities here? How many is considered many here? What do you refer to “some types of job”? What are those jobs? How many involved in what jobs and how they contribute to the household income? How many percentage is the contribution?	Revised. .... opportunity to work in various jobs and those jobs contribute to household income.	43 → 42
u11	This study was constructed differently from the previous studies .... What is the significance by just looking at the two categories?	Revised. .... to focus into paddy farm job and non-paddy farm jobs.	44
u12	.... studies had location in three provinces in Java for instance .... Please improve your sentence structure.	Revised. Meanwhile, some studies was held in Java island for instance Province of ....	56-57 → 57
u13	.... the publication of researches about paddy household income in East Kalimantan Province is still limited. Why is this important? What is the significance in scholarly debate?	Revised.	63-64 → 64-67
u14	Now.... Since when?	Revised. .... based on Law No. 20 of October 25, 2012.	66 → 69-70

No.	Reviewer Comment	Author Revision	Line
u15	First, agricultural labor household in Indonesia owned the average of per capita income after taxes was lowest in 2008 among the other household .... Please improve your sentence structure to make it clearer.	Revised. First, the household of agricultural labors in Indonesia in 2008, obtained the lowest of income after taxes both in rural and urban levels (Statistics Indonesia 2009).	67-68 → 71-72
u16	.... comes .... Is this the right term used?	Revised.	70 → 73
u17	This meant .... How can you get this?	Revised.	71 → 75
u18	.... the household members of paddy farmers have opportunity to work in other jobs besides as paddy farmers. So, what?	Revised. .... and they obtain non-paddy farm income from non-paddy farm jobs.	72-73 → 76-77
u19	.... and he or she should have known .... How if in the case the respondent does not know other members' income?	Find and try to ask directly to household members or ask to other household members and if none knew his/her income, the researcher will ask to respondent to make income prediction. Revised. .... he or she knew ....	76 → 80
u20	.... sampling units .... It is not called sampling unit until you have used it to do the sampling.	Revised. .... units ....	79 → 84
u21	.... the high (2 cities and 3 districts), medium (4 districts), and low (2 cities and 2 districts) of Gross Domestic Product (GDP) of food crops. How much is the high, medium and low?	Revised.	80-81 → 86-92
u22	.... selection as follows. Where is the verb of this sentence?	Revised. .... selection was done as follows.	83 → 93
u23	This study classified all sub-cities/sub-districts had been chosen into 3 groups such as the high, medium, and low harvested areas .... How? Please correct the sentence grammar and structure.	Revised.	83-84 → 93-99
u24	.... randomly selected, they were 3 sub-cities and 6 sub-districts as the study areas. Not clear here. Grammar is also problematic here.	Revised.	86 → 100-107
u25	.... 2009 reside .... Grammatical error	Revised. .... 2009 resided ....	87 → 108
u26	.... persons .... Are you referring to total population in that area or total population of paddy farmers? What is your population of study?	Revised. .... population .... The number of population in this study was 36,970 households of paddy farmers.	89 → 110
u27	.... simple random sampling .... Are you using random table here?	I did not use random table in this study. Revised. The purposive sampling ....	93 → 115
u28	.... can give special meaning .... What do you mean here?	Revised. .... the researcher can more easier explain the meaning of data.	100 → 121-122
u29	.... Study areas in East Kalimantan, Indonesia. Which one? All labeled are your study area?	Revised. .... Study areas (☆) in East Kalimantan, Indonesia.	105 → 126

No.	Reviewer Comment	Author Revision	Line
u30	.... there was one paddy household that gained Rp98,058,333.33 year <sup>-1</sup> , the maximum income in this study. The standard deviation of Rp13,350,917.44 year <sup>-1</sup> showed that variable expressed as a deviation from its sample mean value. Table 1 shows that the majority of respondents obtained income under Rp40,000,000.00 year <sup>-1</sup> . The 312 households (82.11% respondents) generated income less than Rp20,000,000.00 year <sup>-1</sup> from paddy farming. A small number of respondents (17.89%) in Babulu and Penajam obtained income more than Rp40,000,000.00 year. Are all figures here for 2013 data? Is there any latest data?	Yes, 2013 data. I did not found the latest data yet.	110-114 → 131-135
u31	.... wealth rates of paddy households are similar. Why similar?	Revised. .... because 96.32% respondents had paddy farm income the same with or lower than Rp40,000,000.00 year <sup>-1</sup> .	115 → 135-137
u32	0.00-20.00 20.10-40.00 40.10-60.00 60.10-80.00 80.00-100.00 What number is this? What is the unit involved?	Revised. Paddy farm income (Rp million year <sup>-1</sup> ). Total respondent (paddy household).	118 → 139
u33	.... year <sup>-1</sup> . Which	Revised.	127 → 148
u34	.... year <sup>-1</sup> . This number should not be seperated.	Revised.	127 → 148
	.... year <sup>-1</sup> . Deleted <sup>1</sup>	Revised.	127 → 148
u35	Table 2 What are the number in the first row and the number in the table?	Revised. Non-paddy farm income (Rp million year <sup>-1</sup> ). Total respondent (paddy household).	135 → 156
u36	.... annual crop farmer, perennial crop farmer, .... How do you define them?	Revised.	140 → 161-163
u37	.... the informal sector as all economic activities which contribute to the Gross National Product. Is this the right definition?	Revised.	141-142 → 164
u38	.... are on-farm, off-farm, and non-farm. How do you define them?	Revised.	147 → 170-175
u39	.... cropping, spatial diversification, and sequential planting dates .... Any definition for these terms?	Revised.	152-153 → 180-185
u40	.... annual crops.... Examples of these?	Revised. .... fast-growing crops (such as cabbage, potato, chili, passion fruit) ....	155 → 186-187
u41	.... secondary crops .... What are those crops?	Revised. .... secondary crops (such as maize, cocos, and banana) ....	159 → 191
u42	.... profit .... Are you referring to profit or total revenue here?	Revised. .... profits .... (Otsuka, 2009)	162 → 194
u43	.... Rp2,950,000.00 month <sup>-1</sup> .... How many percent of total household income?	Revised. .... Rp2,950,000.00 month <sup>-1</sup> (31.27% of total household income) ....	165 → 197-198
u44	.... while rice has no significant influence .... Why?	Revised. It could be caused by the contribution of paddy farm income to the household income was smaller than on-farm income and off-farm income.	175 → 207-209

No.	Reviewer Comment	Author Revision	Line
u45	.... the increase .... How much increase?	Revised. Crops diversification contributes to increase the total household income whereas the results of this study show as much as 14.37%-71.86% of annual crops and 22.90%-39.64% of perennial crops.	176 → 210-212
u46	.... farmer to adopt new technology .... Why? How?	Revised.	182-183 → 217-220
u47	.... employ .... Are they employing or being employed?	Revised. .... they are mainly being employed ....	191 → 229
u48	They obtain income from the daily business profit of vegetables, foods, and goods selling and their income were on the average of Rp1,315,384.62 month <sup>-1</sup> . Both employees and sellers work approximately 8 hours day <sup>-1</sup> , they mainly employ as hired laborers or contract laborers to be engaged in paddy farming. Grammar	Revised.	190-192 → 227-230
u49	.... fisherman .... Grammar	Revised. .... fishermen ....	193 → 231
u50	.... average income which received by paddy farms was Rp13,487,069.21 year <sup>-1</sup> in East Kalimantan in 2013. Another source of income in paddy households .... Grammar	Revised. The average amount of paddy farm income in East Kalimantan in 2013 was Rp13,487,069.21 year <sup>-1</sup> . Other income source of paddy households is from non-paddy farm income.	219-220 → 257-259
u51	.... which received .... Grammar	Revised. The average amount of non-paddy farm income ....	222 → 260
u52	.... income has a larger contribution compared to paddy farm income with the consideration of some aspects such as labor intensiveness, skills, and capital intensiveness. What do you mean here?	Revised. Some non-paddy farm activities need more skill and capital than paddy farm activities.	223-224 → 260-261
u53	.... farm jobs allow stable income .... Is this always true?	That is not always true. Revised. .... that activities could produce income throughout the year ....	225 → 261-262
u54	<25 25-50 51-75 76-100 >100 What number is this? What unit?	Revised. Total household income of paddy farmers (Rp million year <sup>-1</sup> ). Total respondent (paddy household).	229 → 265
u55	1 1 What number? What unit?	Total respondent (paddy household).	229 → 265
u56	.... potency of .... ??	Revised. .... role ....	241 → 277
u57	Beside, becomes .... What is this?	Revised. Besides that ....	247 → 283
	ACKNOWLEDGMENT Please acknowledge my reviewed work.	The author thanks to Dr. .... for helpful comments in improve this article.	289-290
u58	REFERENCES Most of the articles are too old. Get some latest publication as your source of reference.	Revised.	254 → 291-351

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

**Abstract.** 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 various 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 Rp13,487,069.21 year<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup>, 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.

**Running title:** The various sources of household income of paddy farmers in East Kalimantan, Indonesia.

## INTRODUCTION

Paddy farming is still the main occupation in rural areas of Indonesia, especially in East Kalimantan Province. 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 consist 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<sup>-1</sup>) than in the agricultural sector (29.04% work-days year<sup>-1</sup>).

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 various occupations 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 location of this study was the Province of East Kalimantan, the Republic of Indonesia (the province was divided into two, East Kalimantan and North Kalimantan based on Law No. 20 of October 25, 2012), as illustrated in 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 commonly happen from May to October and from November to April, respectively. There are two planting seasons for wetland paddy during a year (Statistics of East Kalimantan 2010). 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 Rp159,776.00 millions - Rp1,332,384.00 millions; Rp147,807.00 millions - Rp156,868.00 millions; and Rp18,778.00 millions - Rp126,252.00 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.

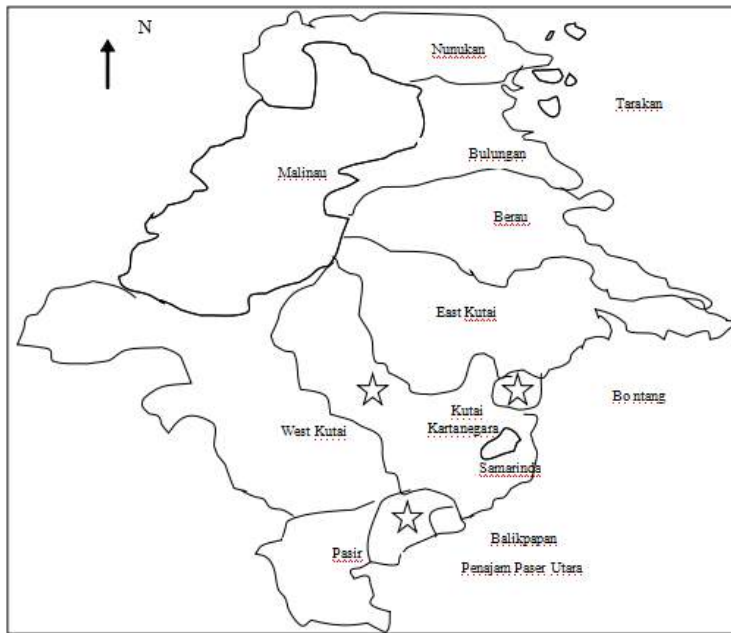
The study areas were purposively selected. Tenggarong Seberang was chosen as the study area because it had the widest harvested area of paddy in Kutai Kartanegara. Loa Janan and Muara Muntai were selected to represent the medium and low harvested area of paddy in Kutai Kartanegara. Loa Janan represented 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 area 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

104 data [more easily](#). Numerous studies in the past also used descriptive statistics as tool to analyze income, such as Kuniyash  
105 (2002), Kendawang et al. (2005), Ilham et al. (2007), Irawan et al. (2007), Lokollo et al. (2007), Kustiari et al. (2008), and  
106 Otsuka (2009).  
107



108  
109 **Figure 1.** Study areas (☆) in East Kalimantan, Indonesia.

## 110 RESULTS AND DISCUSSION

### 111 Paddy Farm Income

112 The average [income](#) of paddy farm in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.46  
113 month<sup>-1</sup>. The minimum paddy farm income of respondents was Rp349,000.00 year<sup>-1</sup>. However, there was one paddy  
114 household that gained Rp98,058,333.33 year<sup>-1</sup>, the maximum income in this study. The standard deviation of  
115 Rp13,350,917.44 year<sup>-1</sup> showed variable expressed as a deviation from its sample mean value. A total of 312 households  
116 (82.11% respondents) generated income the same as or less than Rp20,000,000.00 year<sup>-1</sup> from paddy farming. A small  
117 number of respondents (17.89%) in Babulu and Penajam had income of more than Rp40,000,000.00 year<sup>-1</sup>. This mean that  
118 the wealth rates of paddy households were similar because the majority of respondents (96.32%) had paddy farm income  
119 the same as or lower than Rp40,000,000.00 year<sup>-1</sup> (Table 1).

### 120 Non-Paddy Farm Income

121 The average income of non-paddy farm in the study areas in 2013 was Rp20,920,464.31 year<sup>-1</sup> or Rp1,743,372.05  
122 month<sup>-1</sup> with a standard deviation of Rp15,174,179.81 year<sup>-1</sup>. The minimum non-paddy farm income among respondents  
123 was Rp1,500,000.00 year<sup>-1</sup>. However, there was one paddy household that reached the maximum value of  
124 Rp86,700,000.00 year<sup>-1</sup>. The majority of respondents (89 households or 23.42% respondents) had income of more than  
125 Rp21,000,000.00 year<sup>-1</sup> generated from non-paddy farming. A total of 34 households (8.95% respondents) had non-paddy  
126 farm income between Rp1,000,000.00 year<sup>-1</sup> and Rp7,000,000.00 year<sup>-1</sup>. The number of respondents who did not have  
127 non-paddy farm income was 128 households. As demonstrated in Table 2, paddy households in Tenggara Seberang

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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).

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

No.	City/Regency	Paddy farm income (Rp million year <sup>-1</sup> )					Total respondent (paddy household)
		0.00-20.00	20.10-40.00	40.10-60.00	60.10-80.00	80.00-100.00	
1.	Tenggarong Seberang	115	13				128
2.	Loa Janan	17					17
3.	Muara Muntai	3	1				4
4.	Babulu	80	32	10	4	2	128
5.	Penajam	81	2	1			84
6.	Waru	13	3				16
7.	South Bontang	2					2
8.	North Bontang	1					1
9.	West Bontang						
	Total	312	51	11	4	2	380

Source: Primary data (analyzed) (2012).

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

No.	City/Regency	Non-paddy farm income (Rp million year <sup>-1</sup> )					Total respondent (paddy household)
		1.00-7.00	7.10-14.00	14.10-21.00	>21.00	Others	
1.	Tenggarong Seberang	13	17	29	45	24	128
2.	Loa Janan	1	7		1	8	17
3.	Muara Muntai		2	1	1		4
4.	Babulu	12	16	20	18	62	128
5.	Penajam	4	20	10	19	31	84
6.	Waru	3	6		5	2	16
7.	South Bontang	1	1				2
8.	North Bontang					1	1
9.	West Bontang						
	Total	34	69	60	89	128	380

Source: Primary data (analyzed) (2012).

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 Ulyssea (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.

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

No.	Occupation	Number (person)	The average income (Rp month <sup>-1</sup> )	Range of income (Rp month <sup>-1</sup> )	Percentage of total household income (%)
1.	Annual crop farmer	46	1,860,000.00	500,000.00 - 2,000,000.00	14.37 - 71.86
2.	Perennial crop farmer	7	2,950,000.00	750,000.00 - 6,000,000.00	22.90 - 39.64
3.	Employer	47	2,366,489.36	500,000.00 - 3,000,000.00	21.06 - 70.13
4.	Seller	52	1,315,384.62	500,000.00 - 2,000,000.00	19.05 - 79.55
5.	Fisherman and livestock breeder	12	1,092,857.14	500,000.00 - 2,000,000.00	19.05 - 69.10
6.	Carpenter	39	1,196,153.85	450,000.00 - 2,000,000.00	20.30 - 62.54
7.	Labour	88	1,446,590.91	700,000.00 - 3,500,000.00	18.00 - 79.05
8.	Others	45	1,320,000.00	350,000.00 - 3,000,000.00	22.06 - 76.29
	Total	336			

Source: Primary data (analyzed) (2012).

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The average income of non-paddy farm in the study areas in 2013 was Rp20,920,464.31 year<sup>-1</sup> or Rp1,743,372.03 month<sup>-1</sup> with a standard deviation of Rp15,174,179.81 year<sup>-1</sup>. The minimum non-paddy farm income among respondents was Rp1,500,000.00 year<sup>-1</sup>. However, there was one paddy household that reached the maximum value of Rp86,700,000.00 year<sup>-1</sup>. The majority of respondents (89 households or 23.42% respondents) had income of more than Rp21,000,000.00 year<sup>-1</sup> generated from non-paddy farming. A total of 34 households (8.95% respondents) had non-paddy farm income between Rp1,000,000.00 year<sup>-1</sup> and Rp7,000,000.00 year<sup>-1</sup>. 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). ¶

Deleted: 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 outside 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. ¶

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

186 Small-scale farmers follow some existing farming practices such as intercropping, spatial diversification, and  
 187 sequential planting that aim to produce a greater yield, reduce farming risk, increase food security, raise efficiency, and  
 188 warrant continuous income. Intercropping is a multiple cropping practice to cultivate two or more crops at a farm land in  
 189 proximity arrangement. Spatial diversification is defined as a cropping practice involving some different plants with  
 190 consideration of how plants fit together in a farm land. Sequential planting is a cropping practice which plant different crop  
 191 species in sequence.

192 Farmers who cannot produce enough rice have to seek fast-growing crops (such as cabbage, potato, chili, and passion  
 193 fruit) immediately to earn income quickly for their livelihoods (Otsuka 2009). A total of 46 households utilized their  
 194 dryland for annual crops planting in the study areas in 2013 such as French bean (*Phaseolus vulgaris* L.), cowpea (*Vigna*  
 195 *sinensis* L.), cassava (*Manihot esculenta* Crantz), corn (*Zea mays* L.), cucumber (*Cucumis sativus* L.), and pumpkin  
 196 (*Cucurbita maxima* L.). The annual crops planting could generate income in the average of Rp1,860,000.00 month<sup>-1</sup>.  
 197 Hutabarat et al. (2008) found that the contribution of secondary crops (such as maize, cocoa, and banana) to family income  
 198 is less than 50.00%. However, the result of this study showed that annual crops planting gave contribution to household  
 199 income between Rp500,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup> or 14.37% to 71.86% of the total household income.  
 200 According to Otsuka (2009), profits from non-paddy crops can be substituted by the paddy production.

201 In addition to annual crops, perennial crops such as oil palm (*Elaeis guineensis* Jacq.), banana (*Musa* sp), and cassava  
 202 (*Manihot esculenta* Crantz.) are sources of non-paddy farm income and contribute to household income. The average  
 203 amount of perennial crops income obtained by paddy farmer households was Rp2,950,000.00 month<sup>-1</sup> (31.27% of the total  
 204 household income) in East Kalimantan in 2013. However, there were only seven households that practiced perennial crops  
 205 planting. The number was small, mainly because the price of land was high, capital was needed intensiveness, and the  
 206 distance was far from the village. This result is similar to that of other studies by Barham and Chitemi (2009), Fu et al.  
 207 (2009), and Mestre-Sanchis and Feijoo-Bello (2009), who mentioned that commodities contribute to generate household  
 208 income and influence farmer's net margin. Otsuka (2009) stated that perennial crops are supplementary to paddy in  
 209 generating income. The result of this study showed that perennial crops planting contributed to the total household income  
 210 of paddy farmers in the range of Rp750,000.00 month<sup>-1</sup> to Rp6,000,000.00 month<sup>-1</sup> or 22.90% to 39.64%. Fu et al. (2009)  
 211 mentioned that on-farm works, for instance rubber, tea, fruit (passion fruit, grapefruit), maize, chily, and off-farm work,  
 212 for instance collecting mushrooms and bamboo shoots, had significant differences in gross annual income per household  
 213 between Baka and Daka villages in Xishuangbanna, Southwestern China, while rice had no significant influence on  
 214 household income. It could be caused by the fact that the contribution of paddy farm income to the household income was  
 215 smaller than on-farm income and off-farm income.

216 There are some economic advantages of crop diversification. Crops diversification contributes to the increase of the  
 217 total household income. In this study, annual crops contributed 14.37%-71.86% of income and perennial crops 22.90%-  
 218 39.64%. Practicing crop diversification as a farming system gives farmers income throughout the year, because various  
 219 crops can be harvested at different times. Another economic benefit associated with crop diversification is its effect  
 220 inreducing the impact of price fluctuation (Kasem and Thapa 2011). The last advantage of crop diversification is that a  
 221 farmer can change crops combination more easily on the same land based on the market demand and the commodity price,  
 222 which is quite impossible to do with paddy farming. It also becomes easier for a farmer to adopt new technology. The  
 223 different kinds of crop lead to the different kinds of planting methods and farm technologies. The adoption of new  
 224 technology can be done through the usage of high variety seeds, organic and inorganic fertilizers, pesticide, high  
 225 technology machines, new methods of land preparation, planting, crop maintenance, harvesting, post harvesting, and other  
 226 technologies.

227 Households can diversify income by having several sources of income such as off-farm employment and livestock  
 228 production (Illukpitiya and Yanagida 2010). A total of 47 persons in this study areas worked as employees in government  
 229 institutions or companies as teachers, administrators, drivers, security officers, etc. They worked approximately 8 hours  
 230 day<sup>-1</sup>. Their wage was between Rp500,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 21.06% to 70.13% of total  
 231 household income in East Kalimantan in 2013. They received monthly wages in the average of Rp2,366,489.36 month<sup>-1</sup>.  
 232 A total of 52 persons worked as sellers and generated income in the range of Rp500,000.00 month<sup>-1</sup> to Rp2,000,000.00  
 233 month<sup>-1</sup> or 19.05% to 79.55% of total household income. They got income from the daily business profit of vegetables,  
 234 foods, and goods selling and their average income was Rp1,315,384.62 month<sup>-1</sup> from. Both employees and sellers worke  
 235 d approximately 8 hours day<sup>-1</sup>; they were mainly employed as hired laborers or contract laborers in paddy farming.

236 Livestock production is another source of household income in the study areas. Twelve persons worked as fishermen  
 237 and breeders of fish and livestock, chickens, and cows. They had income in the range of Rp500,000.00 month<sup>-1</sup> and  
 238 Rp2,000,000.00 month<sup>-1</sup> or 19.05% to 69.10% of the total household income in East Kalimantan in 2013. Fishing and fish  
 239 breeding were done in lakes and rivers located near their house. A total of 39 persons worked as carpenters and they had  
 240 an income ranging from 20.10% to 62.54% of the total household income or between Rp450,000.00 month<sup>-1</sup> and

Rp2,000,000.00 month<sup>-1</sup>. People frequently need carpenters to build houses through contracts or the daily wage system and the average carpenter income was Rp1,196,153.85 month<sup>-1</sup>.

Some members of paddy households (88 persons) had employment as laborers with average income of Rp1,446,590.92 month<sup>-1</sup> 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 Rp700,000.00 month<sup>-1</sup> to Rp3,500,000.00 month<sup>-1</sup>. Other jobs contributed to total household income in the range of Rp350,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 22.06% to 76.29%. In 2013, 45 persons got income from other jobs in the average of Rp1,320,000.00 month<sup>-1</sup>.

#### 250 Total Household Income of Paddy Farmers

The average total household income of paddy farmers in East Kalimantan in 2013 was Rp2,280,053.36 month<sup>-1</sup> or Rp27,360,640.28 year<sup>-1</sup>. The standard deviation value was Rp19,974,647.11 year<sup>-1</sup>. There was a paddy household in the study areas that had minimum household income as much as Rp997,333.33 year<sup>-1</sup>. However, another paddy household had a maximum household income as much as Rp103,302,000.00 year<sup>-1</sup>. The majority of paddy households in Tenggarong Seberang, Loa Janan, Babulu Penajam, and Waru gained total household income of less than Rp25,000,000.00 year<sup>-1</sup>. A total of 123 respondents had a total household income in the range of Rp25,000,000.00 month<sup>-1</sup> to Rp50,000,000.00 year<sup>-1</sup>. A small number of respondents in Tenggarong Seberang, Babulu, Penajam, and Waru had a total household income of more than Rp50,000,000.00 year<sup>-1</sup>. 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 Rp13,487,069.21 year<sup>-1</sup>. 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 Rp13,873,571.07 year<sup>-1</sup>. 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.

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

No.	City/Regency	Total household income of paddy farmers (Rp million year <sup>-1</sup> )					Total respondent (paddy household)
		<25	25-50	51-75	76-100	>100	
1.	Tenggarong Seberang	63	45	13	6	1	128
2.	Loa Janan	12	5				17
3.	Muara Muntai	2	2				4
4.	Babulu	62	41	16	8	1	128
5.	Penajam	56	24	3	1		84
6.	Waru	9	6	1			16
7.	South Bontang	2					2
8.	North Bontang	1					1
9.	West Bontang						
	Total	206	123	33	15	2	380

271 Source: Primary data (analyzed) (2012).

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.

284 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

286 farming is the main source of paddy household income. Besides, paddy households have the sources of income from  
287 various jobs as annual crops farmer, perennial crops farmer, employee, seller, fisherman, breeder livestock, carpenter,  
288 laborer, and others. The average paddy farm income, non-paddy farm income, and the total household income of paddy  
289 farmers in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43 month<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup> or  
290 Rp1,743,372.03 month<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup> or Rp2,280,053.36 month<sup>-1</sup>, respectively. Paddy farm income and  
291 non-paddy farm income contributed 49.29% and 50.71% to household income, respectively.

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

**Abstract.** Some reports showed the 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 held out 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 obtained from paddy farming. Non-paddy income is income achieved from various jobs such as annual crops farmer, perennial crop farmer, employee, seller, fisher, breeder of livestock, carpenter, labourer, and others. The average amount of paddy farm income, non-paddy farm income, and total household income of paddy farmers in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup>, 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.

**Running title:** The various sources of household income of paddy farmers in East Kalimantan, Indonesia.

## INTRODUCTION

Paddy farming is still the main occupation in rural areas of Indonesia, especially in East Kalimantan Province. The number of households in Indonesia in 2016 was 66,385.4 thousand (Statistics Indonesia 2017). In East Kalimantan in 2013, the total number of households was 820,888, as part of that, the farm households were 180,614 (22.00%) and the food farm households were 83,564 (10.18%) (Statistics East Kalimantan 2014).

The household of paddy farmers comprises an individual and all family members, or a group of individuals, who live together and have responsibility to the household head, they engage 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 more than 15 years old who worked in East Kalimantan in 2013, the 26.61% of them worked in agricultural sector, it was the biggest percentage number among economics sectors (Statistics 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 sector (70.96% work-days year<sup>-1</sup>) than the agricultural sector (29.04% work-days year<sup>-1</sup>).

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 has 2 or 3 sources of income. It is only a small number of farmer households that 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, with 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, are classified to be paddy farm income and non-paddy farm income. Paddy farm income is income obtained from paddy farming. Non-paddy income is income achieved from various occupations both from agricultural activities besides paddy farming and also non-agricultural activities. 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 of paddy farmers in East

50 Kalimantan, Indonesia. It is hoped that findings of this study will provide additional support for the income literature and  
51 as a reference for related studies in future.

## 52 MATERIALS AND METHODS

### 53 Study area

54 There were numerous studies, particularly on income, which were conducted in Indonesia. Some of income studies  
55 were conducted in Sumatra island for instance Province of North Sumatera (Irawan et al. 2007), West Sumatera (Lokollo  
56 et al. 2007; Otsuka 2009), Riau (Kuniyasu 2002), South Sumatera (Ilham et al. 2007), and Lampung (Kustiari et al. 2008).  
57 Meanwhile, some studies was held in Java island for example Province of West Java (Ilham et al. 2007; Irawan et al.  
58 2007; Kustiari et al. 2008), Central Java (Swastika et al. 2004; Ilham et al. 2007; Irawan et al. 2007; Kustiari et al. 2008),  
59 and East Java (Irawan et al. 2007; Kustiari et al. 2008). A few studies selected Nusa Tenggara Timur (Swastika et al.  
60 2004; Lokollo et al. 2007) and Nusa Tenggara Barat (Swastika et al. 2004). Other studies were located in Central  
61 Sulawesi (Swastika et al. 2004) and South Sulawesi (Rusmadi 2005; Ilham et al. 2007; Irawan et al. 2007; Lokollo et al.  
62 2007; Kustiari et al. 2008). West Kalimantan is one of four provinces in Kalimantan island that was the location of the  
63 studies by Kendawang et al. (2005) and Lokollo et al. (2007). However, the publication of researches about paddy  
64 household income in East Kalimantan Province is still limited. The publication of research findings will provide additional  
65 support for existing literature. This study has been able to give useful relevan information in relation to household income  
66 of paddy farmers in East Kalimantan, Indonesia. Other researchers could consider the findings of this study as reference  
67 for related studies in future.

68 This study was conducted from July 2012 to October 2013, the collection of primary data was held from July 2012 to  
69 September 2012. The location of this study was Province of East Kalimantan, the Republic of Indonesia (the province was  
70 divided into two, East Kalimantan and North Kalimantan based on Law No. 20 of October 25, 2012), as illustrated in  
71 Figure 1. There were three reasons for the selection of this study location. First, the household of agricultural labours in  
72 Indonesia in 2008 obtained the lowest of income after taxes both in rural and urban levels (Statistics Indonesia 2009).  
73 Second, East Kalimantan has a tropical climate with two seasons, the dry and rainy seasons commonly happen from May  
74 to October and from November to April, respectively. There are two planting seasons for wetland paddy during a year  
75 (Statistics East Kalimantan 2010). Paddy farming is the main job of household members who have job as paddy farmers  
76 and they obtain paddy farm income from that job. Third, the household members of paddy farmers have opportunity to  
77 work in other jobs besides as paddy farmers and they obtain non-paddy farm income from non-paddy farm jobs.

### 78 Procedures

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

83 The two-stage cluster sampling was used to choose the study areas. The first stage selection was done as follows. East  
84 Kalimantan Province has 13 primary units (4 cities and 9 districts) which were called clusters. Then, every city/district was  
85 classified into 3 different categories such as the high (2 cities and 3 districts), medium (4 districts), and low (2 cities and 2  
86 districts) of Gross Domestic Product (GDP) of food crops. The GDP diversity was very high, there was a district owned  
87 very high GDP, on other hand, other district had small GDP. Because of that, the classification did not use the same  
88 interval of GDP but it based on the total number of city/district in a category. City/district was classified as the high,  
89 medium, and low GDP of food crops owned GDP in the range of Rp159,776.00 millions - Rp1,332,384.00 millions;  
90 Rp147,807.00 millions - Rp156,868.00 millions; and Rp18,778.00 millions - Rp126,252.00 millions, respectively. The  
91 study purposively selected three areas to represent the high, medium, and low GDP of food crops. Those areas were Kutai  
92 Kartanegara District, Penajam Paser Utara District, and Bontang City.

93 Then, the second stage selection was done as follows. Kutai Kartanegara District, Penajam Paser Utara District, and  
94 Bontang City have 18, 4, and 3 sub-cities/sub-districts, respectively. Based on the wide harvested area of paddy, all sub-  
95 districts in Kutai Kartanegara were classified into high harvested area of paddy (6 sub-districts), medium harvested area of  
96 paddy (6 sub-districts), and low harvested area of paddy (6 sub-districts). The classification did not use the wide interval of  
97 harvested area of paddy because this study wanted the study areas that represented every category. Penajam Paser Utara  
98 had only 4 sub-districts, therefore this study classified each 1 sub-district as high and medium harvested areas of paddy.  
99 Bontang had 3 sub-cities those were classified as each high, medium, and low of harvested area of paddy.

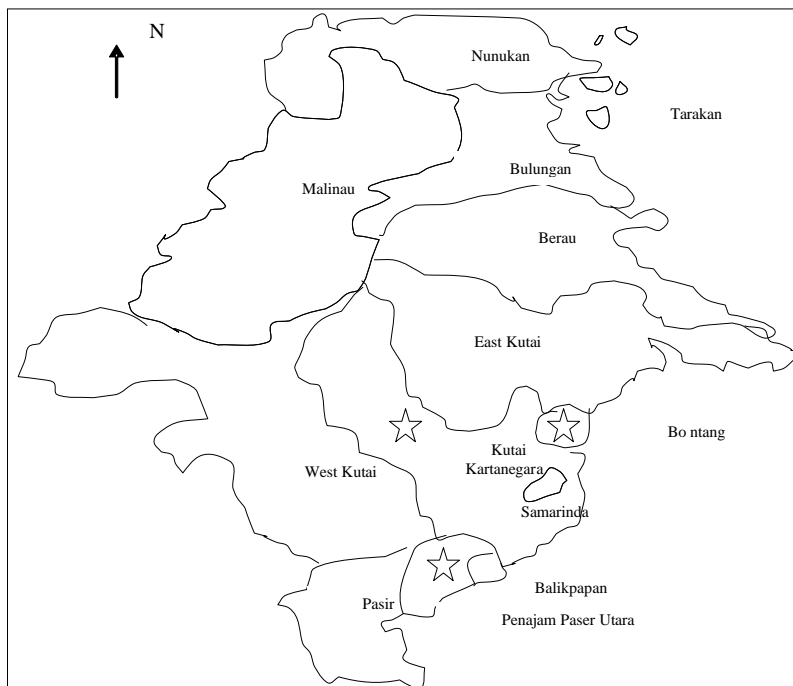
100 The study areas purposively selected. Tenggarong Seberang was chosen as the study area because it had the widest  
101 harvested area of paddy in Kutai Kartanegara. Loa Janan and Muara Muntai were selected to represent the medium and  
102 low harvested area of paddy in Kutai Kartanegara. Loa Janan represented paddy households next to urban area. Muara  
103 Muntai represented paddy households in upstream. Babulu and Penajam were selected to represent the high and medium of  
104 harvested area of paddy in Penajam Paser Utara. Waru was selected as study area from low harvested area of paddy in  
105 Penajam Paser Utara because the job diversity in that area was better than Sepaku. All sub-cities in Bontang selected as

106 study areas because South Bontang, North Bontang, and West Bontang represented the high, medium, and low of  
107 harvested area of paddy, respectively.

108 There were 36,970 households of paddy farmers in 2009 resided in Kutai Kartanegara District, Penajam Paser Utara  
109 District, and Bontang City (Statistics East Kalimantan 2010). The number of population in this study was 36,970  
110 households of paddy farmers. According to Rea and Parker (1997), the minimum sample size for 20,000 population and  
111 50,000 population is 377 persons and 382 persons, respectively. The sample size (380 households of paddy farmers) in  
112 each study area was calculated proportionally based on harvested area of paddy. Respondents resided in Tenggarong  
113 Seberang (128 households), Loa Janan (17 households), Muara Muntai (4 households), Babulu (128 households), Penajam  
114 (84 households), Waru (16 households), South Bontang (2 households), North Bontang (1 household) and West Bontang  
115 (0 household). The purposive sampling was applied to select the households of paddy farmers that could be respondents.

## 116 Data analysis

117 This study analyzed the various sources of household income of paddy farmers by using descriptive statistics such as  
118 total, mean, maximum, minimum, standard deviation, percentage, range, and frequency distribution. Descriptive statistics,  
119 according to Coakes and Steed (2007), are used to explore, summarize, and describe data. Irianto (2004) mentioned that  
120 descriptive statistics provide limited information; they are only based on the collected data. However, descriptive statistics  
121 help the researcher to display the data in good and simple ways, therefore, the researcher can more easier explain the  
122 meaning of data. Numerous studies in the past also used descriptive statistics as tool to analyze income, such as Kuniyasu  
123 (2002), Kendawang et al. (2005), Ilham et al. (2007), Irawan et al. (2007), Lokollo et al. (2007), Kustiari et al. (2008), and  
124 Otsuka (2009).



125  
126 Figure 1. Study areas (☆) in East Kalimantan, Indonesia.

## 127 RESULTS AND DISCUSSION

### 128 Paddy Farm Income

129 The result of this research shows that the average amount of paddy farm income in East Kalimantan in 2013 was  
130 Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43 month<sup>-1</sup>. The minimum value of paddy farm income of respondents was  
131 Rp349,000.00 year<sup>-1</sup>. However, there was one paddy household that gained Rp98,058,333.33 year<sup>-1</sup>, the maximum income  
132 in this study. The standard deviation of Rp13,350,917.44 year<sup>-1</sup> showed that variable expressed as a deviation from its  
133 sample mean value. The 312 households (82.11% respondents) generated income the same with or less than  
134 Rp20,000,000.00 year<sup>-1</sup> from paddy farming. A small number of respondents (17.89%) in Babulu and Penajam obtained  
135 income more than Rp40,000,000.00 year<sup>-1</sup>. This meant, the wealth rates of paddy households are similar because the  
136 majority of respondents (96.32%) had paddy farm income the same with or lower than Rp40,000,000.00 year<sup>-1</sup> (Table 1).  
137

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

No.	City/Regency	<u>Paddy farm income (Rp million year<sup>-1</sup>)</u>					Total respondent (paddy household)
		0.00-20.00	20.10-40.00	40.10-60.00	60.10-80.00	80.00-100.00	
1.	Tenggarong Seberang	115	13				128
2.	Loa Janan	17					17
3.	Muara Muntai	3	1				4
4.	Babulu	80	32	10	4	2	128
5.	Penajam	81	2	1			84
6.	Waru	13	3				16
7.	South Bontang	2					2
8.	North Bontang	1					1
9.	West Bontang						
Total		312	51	11	4	2	380

Source: Primary data (analyzed) (2012).

**Non-Paddy Farm Income**

The results of this study show the average amount of non-paddy farm income in the study areas in 2013 was Rp20,920,464.31 year<sup>-1</sup> or Rp1,743,372.03 month<sup>-1</sup> with a standard deviation of Rp15,174,179.81 year<sup>-1</sup>. The minimum value of non-paddy farm income among respondents was Rp1,500,000.00 year<sup>-1</sup>. However, there was one paddy household that reached the maximum value of Rp86,700,000.00 year<sup>-1</sup>. The majority of respondents (89 households or 23.42% respondents) obtained income more than Rp21,000,000.00 year<sup>-1</sup> generated from non-paddy farming. The 34 households (8.95% respondents) had non-paddy farm income between Rp1,000,000.00 year<sup>-1</sup> and Rp7,000,000.00 year<sup>-1</sup>. The number of respondents who did not have non-paddy farm income was calculated to be as many as 128 households. As demonstrated in Table 2, paddy households in Tenggarong Seberang mainly had a higher income compared to 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 labour characteristics (for instance skills, training, education, experience, etc) and the degree of job difficulty (for instance dangerous, exciting, glamorous, difficulty, etc).

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

No.	City/Regency	<u>Non-paddy farm income (Rp million year<sup>-1</sup>)</u>					Total respondent (paddy household)
		1.00-7.00	7.10-14.00	14.10-21.00	>21.00	Others	
1.	Tenggarong Seberang	13	17	29	45	24	128
2.	Loa Janan	1	7		1	8	17
3.	Muara Muntai		2	1	1		4
4.	Babulu	12	16	20	18	62	128
5.	Penajam	4	20	10	19	31	84
6.	Waru	3	6		5	2	16
7.	South Bontang	1	1				2
8.	North Bontang					1	1
9.	West Bontang						
Total		34	69	60	89	128	380

Source: Primary data (analyzed) (2012).

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, labourer, and others as listed in Table 3. Annual crop farmer is someone who cultivates a plant that completes its life cycle (life cycle means the amount of time it takes a plant to grow from seed or the germination to the harvesting of its yield, in one growing season. Perennial crop farmer is someone who cultivates a plant that persists for many growing seasons. According to Ulyseas (2010), the informal sector contributes to the Gross National Product. Agriculture absorbs most of the total labour force in paddy households. Agricultural labourers 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 Indonesia 2011). The result of this study was in line with other 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 that obtained from all activities process that have direct relation with agricultural culture/agricultural cultivation or income from job at farm or farming (farming is growing crops or keeping animal to produce food and raw materials) for instance paddy farm income. Off-farm income is defined as income that gained from



173 activity at out farm land but it has relation with agricultural products or marketing of agricultural products for example rice  
 174 milling income. Definition of non-farm income is income that produced from non agricultural activity as income of  
 175 agricultural machine factory.  
 176

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

No.	Occupation	Number (person)	The average income (Rp month <sup>-1</sup> )	Range of income (Rp month <sup>-1</sup> )	Percentage of total household income (%)
1.	Annual crop farmer	46	1,860,000.00	500,000.00 - 2,000,000.00	14.37 – 71.86
2.	Perennial crop farmer	7	2,950,000.00	750,000.00 - 6,000,000.00	22.90 – 39.64
3.	Employer	47	2,366,489.36	500,000.00 - 3,000,000.00	21.06 - 70.13
4.	Seller	52	1,315,384.62	500,000.00 - 2,000,000.00	19.05 – 79.55
5.	Fisherman and livestock breeder	12	1,092,857.14	500,000.00 - 2,000,000.00	19.05 – 69.10
6.	Carpenter	39	1,196,153.85	450,000.00 - 2,000,000.00	20.30 – 62.54
7.	Labour	88	1,446,590.91	700,000.00 - 3,500,000.00	18.00 – 79.05
8.	Others	45	1,320,000.00	350,000.00 - 3,000,000.00	22.06 - 76.29
Total		336			

178 Source: Primary data (analyzed) (2012).  
 179

180 Small-scale farmers follow some farming existing practices such as intercropping, spatial diversification, and  
 181 sequential planting dates that aim to produce a greater yield, reduce farming risk, increase food security, raise efficiency,  
 182 and warrant continuously income. Definition of intercropping is a multiple cropping practice to cultivate two or more  
 183 crops at a farm land in proximity arrangement. Spatial diversification is defined as a cropping practice involves some  
 184 different plants with consideration how plants fit together in a farm land. Sequential planting dates is a cropping practice  
 185 which arranges planting time in a sequence/serial.

186 Farmers who could not produce enough rice had to seek fast-growing crops (such as cabbage, potato, chili, passion  
 187 fruit) immediately to earn income quickly for their livelihoods (Otsuka 2009). The 46 households utilized their dryland  
 188 for annual crops planting in the study areas in 2013 such as French bean (*Phaseolus vulgaris* L.), cowpea (*Vigna sinensis*  
 189 L.), cassava (*Manihot esculenta* Crantz), corn (*Zea mays* L.), cucumber (*Cucumis sativus* L.), and pumpkin (*Cucurbita*  
 190 *maxima* L.). The annual crops planting could generate income in the average amount of Rp1,860,000.00 month<sup>-1</sup>.  
 191 Hutabarat et al. (2008) found that the contribution of secondary crops (such as maize, cocoa, and banana) to family income  
 192 is less than 50.00%. However, the result of this study shows that annual crops planting gave contribution to household  
 193 income between Rp500,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup> or 14.37% to 71.86% of total household income.  
 194 According to Otsuka (2009), profits from non-paddy crops could be substituted by the paddy production.

195 Besides annual crops planting, perennial crops planting such as oil palm (*Elaeis guineensis* Jacq.), banana (*Musa* sp),  
 196 and cassava (*Manihot esculenta* Crantz.) are sources of non-paddy farm income and contribute to household income. The  
 197 average amount of perennial crops income obtained by paddy farmer households was Rp2,950,000.00 month<sup>-1</sup> (31.27% of  
 198 total household income) in East Kalimantan in 2013. However, there were only seven households that practiced perennial  
 199 crops planting. The number was small, mainly because of the high price of land, capital intensiveness, and the far distance  
 200 from the village. This is similar to studies by Barham and Chitemi (2009), Fu et al. (2009), Mestre-Sanchis and Feijoo-  
 201 Bello (2009), who mentioned that commodities contribute to generate household income and influence farmer's net  
 202 margin. Otsuka (2009) stated that perennial crops are supplementary to paddy in generating income. The result of this  
 203 study shows that perennial crops planting contributed to total household income of paddy farmers in the range of  
 204 Rp750,000.00 month<sup>-1</sup> to Rp6,000,000.00 month<sup>-1</sup> or 22.90% to 39.64%. Fu et al. (2009) mentioned that on-farm work for  
 205 instance rubber, tea, fruit (passion fruit, grapefruit), maize, vegetable capsicum, and off-farm work for instance collecting  
 206 mushrooms and bamboo shoots, have significant differences in gross annual income per household between Baka and  
 207 Daka villages in Xishuangbanna, Southwestern China, while rice has no significant influence on household income. It  
 208 could be caused by the contribution of paddy farm income to the household income was smaller than on-farm income and  
 209 off-farm income.

210 There are some economic advantages of crop diversification. Crops diversification contributes to increase the total  
 211 household income whereas the results of this study show as much as 14.37%-71.86% of annual crops and 22.90%-39.64%  
 212 of perennial crops. Practicing crop diversification as a farming system gives farmers income throughout the year, because  
 213 various crops have their life cycles, which means they can be harvested at different times. Another economic benefit  
 214 associated with crop diversification is its ability to smoothen out the impact of price fluctuation (Kasem and Thapa 2011).  
 215 The last advantage of crop diversification is that a farmer can more easily change crops combination on the same land  
 216 based on the market demand and the commodities price, which is quite impossible to do with paddy farming. It also  
 217 becomes easier for a farmer to adopt new technology. The different kinds of crop lead the different kinds of planting  
 218 methods and farm technologies. The adoption of new technology could be done through the usage of high variety seeds,  
 219 chemical and non chemical of fertilizers and pesticide, high technology machines, new methods of land preparation,  
 220 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). The 47 persons in this study areas work as employees in government institutions or companies as teachers, administrators, drivers, security officers, etc. They work approximately 8 hours day<sup>-1</sup>. Their wage was between Rp500,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 21.06% to 70.13% of total household income in East Kalimantan in 2013. They received monthly wages in the average of Rp2,366,489.36 month<sup>-1</sup>. The 52 persons worked as sellers and generated income in the range of Rp500,000.00 month<sup>-1</sup> to Rp2,000,000.00 month<sup>-1</sup> or 19.05% to 79.55% of total household income. They obtain income from the daily business profit of vegetables, foods, and goods selling and their income in the average of Rp1,315,384.62 month<sup>-1</sup> from. Both employees and sellers work approximately 8 hours day<sup>-1</sup>, they are mainly being employed as hired labourers or contract labourers to be engaged in paddy farming.

Livestock production is another source of household income in the study areas. The 12 persons work as fishermen and breeders of fish and livestock, chickens, and cows. They obtained income in the range of Rp500,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup> or 19.05% to 69.10% of total household income in East Kalimantan in 2013. Fishing and fish breeding is done in lakes and rivers located near their house. The 39 persons work as carpenters and they had an income ranging from 20.10% to 62.54% of total household income or between Rp450,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup>. People frequently need carpenters to build houses through contracts or the daily wage system and the average amount of carpenter income was Rp1,196,153.85 month<sup>-1</sup>.

Some members of paddy households (88 persons) have employment as labourers with income on average at Rp1,446,590.92 month<sup>-1</sup> in East Kalimantan in 2013. They are commonly working as agricultural labourers 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 total household income was in the range of 18.00% and 79.05% or Rp700,000.00 month<sup>-1</sup> to Rp3,500,000.00 month<sup>-1</sup>. Other jobs contributed to total household income in the range of Rp350,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 22.06% to 76.29%. In 2013, the 45 persons obtained income from other jobs in the average amount of Rp1,320,000.00 month<sup>-1</sup>.

#### 245 **Total Household Income of Paddy Farmers**

246 The average amount of total household income of paddy farmers in East Kalimantan in 2013 was Rp2,280,053.36  
 247 month<sup>-1</sup> or Rp27,360,640.28 year<sup>-1</sup>. The standard deviation value was Rp19,974,647.11 year<sup>-1</sup>. There was paddy  
 248 household in the study areas that had minimum household income as much as Rp997,333.33 year<sup>-1</sup>. However other paddy  
 249 household had a maximum household income among respondents as much as Rp103,302,000.00 year<sup>-1</sup>. The majority of  
 250 paddy households in Tenggarong Seberang, Loa Janan, Babulu Penajam, and Waru gained total household income less  
 251 than Rp25,000,000.00 year<sup>-1</sup>. The 123 respondents had total household incomes in the range of Rp25,000,000.00 month<sup>-1</sup>  
 252 to Rp50,000,000.00 year<sup>-1</sup>. A small number of respondents in Tenggarong Seberang, Babulu, Penajam, and Waru had total  
 253 household income more than Rp50,000,000.00 year<sup>-1</sup>. Table 4 shows the distribution of respondents in the study areas  
 254 based on total household income. Generally, the paddy households in East Kalimantan have various sources of income,  
 255 which are categorized into paddy farm income and non-paddy farm income.

256 The increase of paddy farm income forces the increase of total household income of paddy farmers. Data show that the  
 257 contribution of paddy farm income to household income was 49.29%. The average amount of paddy farm income in East  
 258 Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup>. Other income source of paddy households is from non-paddy farm  
 259 income. A large portion of total household income of paddy farmers (50.71%) was derived from non-paddy farm income  
 260 rather than from paddy farm income. The average amount of non-paddy farm income was Rp13,873,571.07 year<sup>-1</sup>. Some  
 261 non-paddy farm activity needs more skill and capital than paddy farm activities. However, those activities could produce  
 262 income throughout the year which is different from paddy farming which gives seasonal income. The increasing non-  
 263 paddy farm income relates to the increasing total household income of paddy farmers.

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

No.	City/Regency	Total household income of paddy farmers (Rp million year <sup>-1</sup> )					Total respondent (paddy household)
		< 25	25-50	51-75	76-100	>100	
1.	Tenggarong Seberang	63	45	13	6	1	128
2.	Loa Janan	12	5				17
3.	Muara Muntai	2	2				4
4.	Babulu	62	41	16	8	1	128
5.	Penajam	56	24	3	1		84
6.	Waru	9	6	1			16
7.	South Bontang	2					2
8.	North Bontang	1					1
9.	West Bontang						
	Total	206	123	33	15	2	380

266 Source: Primary data (analyzed) (2012).

268 The role of agricultural sector in the rural economy of Indonesia decreased in recent years. Lokollo et al. (2007) found  
269 that the contribution of the agricultural sector, non-agricultural sector, and other sectors to household income in West  
270 Sumatra, West Nusa Tenggara, West Kalimantan, and South Sulawesi in 2007 were 60.49%, 16.30%, and 23.21%,  
271 respectively. Kustiari et al. (2008) research showed that the contribution of agricultural sector to household income in  
272 Indonesia in 2008 was between 58.00% and 94.00%. The results of this study show that the contribution of paddy farm  
273 income to the household income of paddy farmers in East Kalimantan in 2013 was identified in the range of 39.20% to  
274 49.29% and the range of 50.71% and 60.80% for non-paddy farm income. If the role of agricultural sector decreases in  
275 the future, it is predicted that its role will be replaced by non-agricultural sectors. Therefore, there is an urgent need to  
276 increase its role in the rural economy as Suryahadi et al. (2009) mentioned that agriculture growth in rural areas still plays  
277 a major role in reducing poverty in Indonesia. The role of agriculture should be considered not only in terms of production,  
278 but also in the aspect of generating employment opportunities and rural development as a whole (Janssen 1993). This  
279 meant that there is still a possibility to enhance the role of agricultural sector in the development of rural economies in the  
280 future.

281 This study has identified the various sources of household income of paddy farmers. Households of paddy farmers in  
282 East Kalimantan, Indonesia, have the sources of income from paddy farm income and non-paddy farm income. Paddy  
283 farming is the main source of paddy households income. Besides that paddy households have the sources of income from  
284 various jobs as annual crops farmer, perennial crops farmer, employee, seller, fisher, breeder livestock, carpenter, labourer,  
285 and others. The average amount of paddy farm income, non-paddy farm income, and total household income of paddy  
286 farmers in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43 month<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup> or  
287 Rp1,743,372.03 month<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup> or Rp2,280,053.36 month<sup>-1</sup>, respectively. Paddy farm income  
288 contributed 49.29% to household income while non-paddy farm income contributed 50.71% to that.

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## 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: xxxx.* 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 Rp13,487,069.21 year<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup>, 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 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<sup>-1</sup>) than in the agricultural sector (29.04% work-days year<sup>-1</sup>).

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 location of this study was the Province of East Kalimantan, the Republic of Indonesia (the province was divided into two, East Kalimantan and North Kalimantan based on Law No. 20 of October 25, 2012) (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 Rp159,776.00 millions-Rp1,332,384.00 millions; Rp147,807.00 millions-Rp156,868.00 millions; and Rp18,778.00 millions-Rp126,252.00 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.

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).

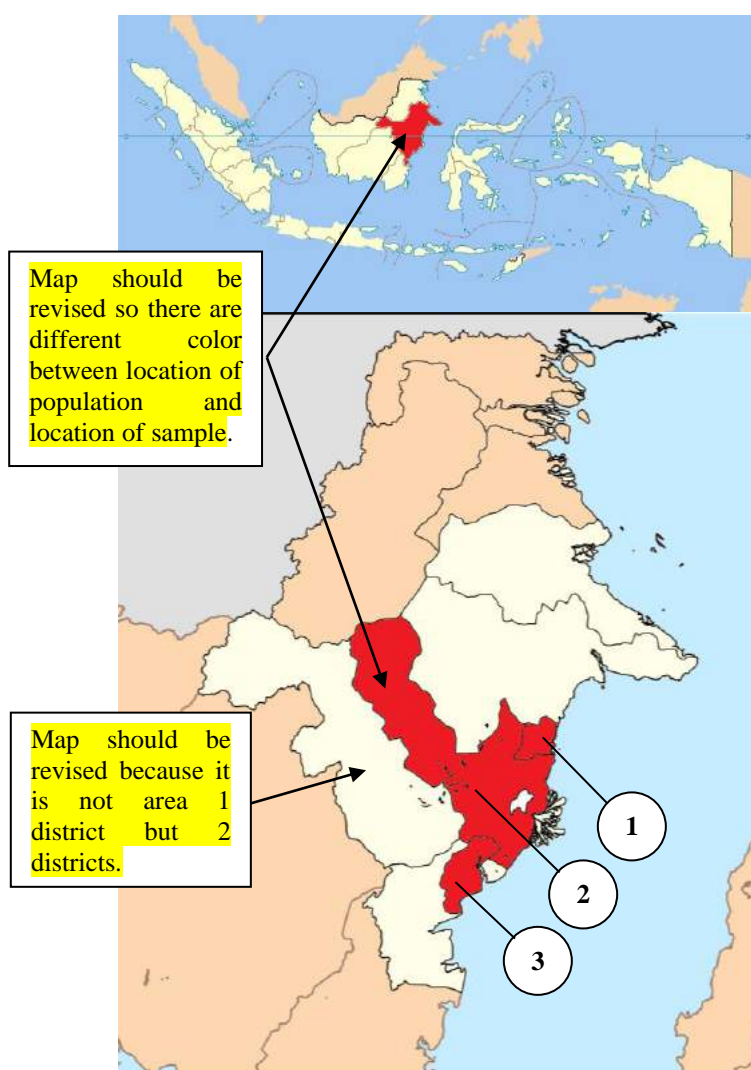
paddy households were similar because the majority of respondents (96.32%) had paddy farm income the same as or lower than Rp40,000,000.00 year<sup>-1</sup> (Table 1).

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 Rp20,920,464.31 year<sup>-1</sup> or Rp1,743,372.03 month<sup>-1</sup> with a standard deviation of Rp15,174,179.81 year<sup>-1</sup>. The minimum non-paddy farm income among respondents was Rp1,500,000.00 year<sup>-1</sup>. However, there was one paddy household that reached the maximum value of Rp86,700,000.00 year<sup>-1</sup>. The majority of respondents (89 households or 23.42% respondents) had income of more than Rp21,000,000.00 year<sup>-1</sup> generated from non-paddy farming. A total of 34 households (8.95% respondents) had non-paddy farm income between Rp1,000,000.00 year<sup>-1</sup> and Rp7,000,000.00 year<sup>-1</sup>. 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 Ulysea (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),



**Figure 1.** Study areas in Bontang City (1), Kutai Kartanegara District (2), and Penajam Paser Utara District (3), East Kalimantan Province, Indonesia

## RESULTS AND DISCUSSIONS

### Paddy farm income

The average income of paddy farm in East Kalimantan in 2013 was Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43 month<sup>-1</sup>. The minimum paddy farm income of respondents was Rp349,000.00 year<sup>-1</sup>. However, there was one paddy household that gained Rp98,058,333.33 year<sup>-1</sup>, the maximum income in this study. The standard deviation of Rp13,350,917.44 year<sup>-1</sup> 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 Rp20,000,000.00 year<sup>-1</sup> from paddy farming. A small number of respondents (17.89%) in Babulu and Penajam had income of more than Rp40,000,000.00 year<sup>-1</sup>. This means that the wealth rates of

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.

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

City/District	Sub-district	Paddy farm income (Rp million year <sup>-1</sup> )					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						
<b>Total</b>		<b>312</b>	<b>51</b>	<b>11</b>	<b>4</b>	<b>2</b>	<b>380</b>

Source: Primary data (2012).

**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 <sup>-1</sup> )					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						
<b>Total</b>		<b>34</b>	<b>69</b>	<b>60</b>	<b>89</b>	<b>128</b>	<b>380</b>

Source: Primary data (2012).

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

Occupation	Number (person)	The average income (Rp month <sup>-1</sup> )	Range of income (Rp month <sup>-1</sup> )	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
<b>Total</b>	<b>336</b>			

Source: Primary data (2012).

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 Rp11,019,000.00 ha<sup>-1</sup> cs<sup>-1</sup>; Rp3,500,000.00 ha<sup>-1</sup> cs<sup>-1</sup>; and Rp-7,519,000.00 ha<sup>-1</sup> cs<sup>-1</sup>, 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.

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 Rp1,860,000.00 month<sup>-1</sup>. 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 Rp500,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup> 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 Rp2,950,000.00 month<sup>-1</sup> (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 Rp750,000.00 month<sup>-1</sup> to Rp6,000,000.00 month<sup>-1</sup> 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<sup>-1</sup>. Their wage was between Rp500,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 21.06% to 70.13% of total household income in East Kalimantan in 2013. They received monthly wages in the average of Rp2,366,489.36 month<sup>-1</sup>. A total of 52 persons worked as sellers and generated income in the range of Rp500,000.00 month<sup>-1</sup> to Rp2,000,000.00 month<sup>-1</sup> 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 Rp1,315,384.62 month<sup>-1</sup> from. Both employees and sellers worked approximately 8 hours day<sup>-1</sup>; 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 Rp500,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup> 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 Rp450,000.00 month<sup>-1</sup> and Rp2,000,000.00 month<sup>-1</sup>. People frequently need carpenters to build houses through contracts or the daily wage system and the average carpenter income was Rp1,196,153.85 month<sup>-1</sup>.

Some members of paddy households (88 persons) had employment as laborers with average income of Rp1,446,590.92 month<sup>-1</sup> 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 Rp700,000.00 month<sup>-1</sup> to Rp3,500,000.00 month<sup>-1</sup>. Other jobs contributed to total household income in the range of Rp350,000.00 month<sup>-1</sup> and Rp3,000,000.00 month<sup>-1</sup> or 22.06% to 76.29%. In 2013, 45 persons got income from other jobs in the average of Rp1,320,000.00 month<sup>-1</sup>.

### Total household income of paddy farmers

The average total household income of paddy farmers in East Kalimantan in 2013 was Rp2,280,053.36 month<sup>-1</sup> or Rp27,360,640.28 year<sup>-1</sup>. The standard deviation value was Rp19,974,647.11 year<sup>-1</sup>. There was a paddy household in the study areas that had minimum household income as much as Rp997,333.33 year<sup>-1</sup>. However, another paddy household had a maximum household income as much as Rp103,302,000.00 year<sup>-1</sup>. The majority of paddy households in Tenggarong Seberang, Loa Janan, Babulu, Penajam, and Waru gained total household income of less

than Rp25,000,000.00 year<sup>-1</sup>. A total of 123 respondents had a total household income in the range of Rp25,000,000.00 month<sup>-1</sup> to Rp50,000,000.00 year<sup>-1</sup>. A small number of respondents in Tenggarong Seberang, Babulu, Penajam, and Waru had a total household income of more than Rp50,000,000.00 year<sup>-1</sup>. 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.

**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 <sup>-1</sup> )					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						
<b>Total</b>		<b>206</b>	<b>123</b>	<b>33</b>	<b>15</b>	<b>2</b>	<b>380</b>

Source: Primary data (2012).

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 Rp13,487,069.21 year<sup>-1</sup>. 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 Rp13,873,571.07 year<sup>-1</sup>. 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 (1) increasing tractor numbers, (2) creating on farm and off farm jobs, (3) increasing the number of family laborers, and (4) 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 Rp13,487,069.21 year<sup>-1</sup> or Rp1,123,922.43 month<sup>-1</sup>, Rp20,920,464.31 year<sup>-1</sup> or Rp1,743,372.03 month<sup>-1</sup>, and Rp27,360,640.28 year<sup>-1</sup> or Rp2,280,053.36 month<sup>-1</sup>, respectively. Paddy farm income and non-paddy farm income contributed 49.29% and 50.71% to household income, respectively.

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