Analysis Income and Household Expenses Based on Livelihood

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Abstract. The welfare of small farmer households has been essential; however, many of them who rely upon only on-farm find it difficult to cover their household expenses. The aims of the study were to identify various types of farmer household income sources and to analyze factors affecting farmer household income and expenditure. The study conducted in Boloh village, Toroh sub-district of Grobogan district from July to August 2018 analyzed data collected qualitatively, which referred to data reduction, data presentation, and withdrawal of conclusions using interactive analysis. The result showed that the average income of farmer households from on-farm was IDR. 18.987.000 per year, off-farm IDR. 14,825,000, and non-farm was IDR 25,925,000 per year; thus, the total of both was IDR 4,978,000 per month on average. Meanwhile, the average the total expenses was IDR 24,335,000 per year or IDR 2,028,000 per month consisting of food and transportation (61%), housing and appliances (6%), Household Facilities (13%), education and health (4%), agriculture (3%), and others (14%). Farmers depending only on agricultural activities without having non-farm jobs shall not be able to cover household expenses needed. Farmers should change their agricultural practices from traditional to modern. The government should have farmer provided supporting policy.

1 Introduction

In 2017, as agricultural sectors absorbed 31.86% of all employment in Indonesia, decreased from 40% in the past decade, it has been a vital sector to ensure livelihoods [1]. Livelihoods SFH is a system that combines capabilities, assets, and activities to meet all their needs [2]. They show togetherness and sometimes differ in their household decisions between men and women in carrying out production, business, and consumption activities [3]. In Central Java Province, the welfare of

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90% of small farmers households (SFH) [4] who rely their livelihoods on rice and secondary crops farming has decreased in terms of income and expenditure.

In Grobogan district, for example, lowland rice farming is the largest contributor (23.87%), followed by vegetables planted in irrigated fields (15.98%), and farm laborers (5.87%) to total household income; less than 100% [5]. Meanwhile, SFH must provide costs for food and non-food consumption, even though each household has a different consumption pattern depending on the increase in their income. Food consumption in rural areas is the largest part of their total budget (73.4 percent) and the remaining 26.6 percent is for non-food needs. Most people in Indonesia consume rice as their staple food, which is 97.6 kg per capita per year, apart from rice, another important commodity is soybeans as a source of protein [6]. Therefore, to achieve a balance between income and expenditure, FSH has to diversify their endeavors from both off-farm and non-farm.

Among activities to be carried out, diversification practiced by farmers might increase their income. [7] defines farmer innovators as those who can adopt new developed techniques, tools, or practices which are suit to the farming system or local condition and increase their income. Having opportunities to diversify businesses ensure their livelihoods against shocks, such as a long dry season endangering agricultural production that affects their income. Besides, farmer household consisting of 5-6 members can share roles to get sources of income.

In developing countries, including Indonesia, non-farm income contributes 32.35% - 54.97% of the total agricultural household income [8]. According to [9], agricultural sector in Central Java Province contributes 73% to household income, and the rest are generated from non-agricultural income. Revenues from rice farming contributes 59.5% and non-farm business income contributes 40.5% to the total household income of farmers household.

Different findings are reported by [10] who identifies that income contribution of rice farming is 8.88%, non-rice farming is 36.15%, and non-farming is 54.97% to the total income.

Given the descriptions and findings of the previous studies, the objectives of this study are (1) to identify various types of farmer household income sources, and (2) to analyze factors affecting farmer household income and expenditure.

2 Methodology

The research was conducted in Boloh Village, Toroh District, Grobogan Regency involving 35 heads of farmer household who were the members of Farmer Group Association (Gapoktan) as the main informant, and 3 key persons consisting of the chairperson and administrators of Gapoktan, as well as extension personnel as assistance involved in the AIAT of Central Java assessment activities. The location and respondents were purposively sampled.

Mixed-method, quantitative and qualitative, was chosen to analyze data collected from household surveys using questionnaire, in-depth interviews (focus group discussion conducted during field visits), monitoring, and evaluation of every activities. Data collected was the ones related to income and expenditure of SFH within one year. Expenditures variables were costs incurred for (1) food and transportation, (2) housing and household facilities, (3) goods and services, (4)

education and health, and (5) others. The method used to determine SFH income and expenditure is as follows [11]:

$$P_{rt} = P_1 + P_2 + P_3 \quad \ldots\ldots\ldots\ldots \quad (1)$$

Note:
P_{rt} = income of farmers household per year
P_1 = on-farm income (rice, maize, soybean)
P_2 = off-farm income (farm labor)
P_3 = income outside the agricultural sector (construction workers, services, etc.)

The farmer household expenditure was analyzed using an equation model of as follows:

$$C_t = C_a + C_b \ldots\ldots + C_n \quad \ldots\ldots\ldots\ldots \quad (2)$$

Note:
C_t = total household expenditure
C_a = food consumption expenditure
C_b = expenditure of non-food consumption
C_n = other expenses

In addition, to determine the contribution of rice, maize, and soybean to total farmer household income, the percentage formula was used as follows [12]:

$$\text{Contribution (\%)} = \frac{\text{Income from rice/maize/soybean}}{\text{Total Income}} \text{ X } 100\% \quad \ldots\ldots\ldots \quad (3)$$

The collected data were analyzed using the interactive analysis model of Miles and Huberman, which refers to (1) data reduction; only selected information is processed, and the selected population is a representative sample under study; (2) presentation of data, in the form of table; and (3) drawing conclusions/verification; on the basis of representative samples (Huberman, 1994), as shown in Figure 1.

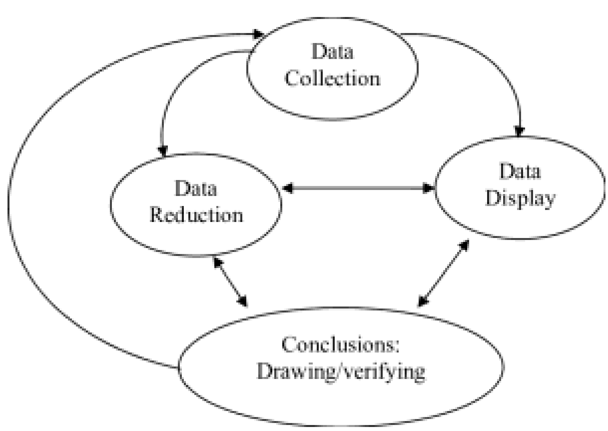


Figure 1. Component of Data Analysis: Interactive Model
(Miles & Huberman, 1994:12)

3 Results and discussions

3.1. Characteristic of Farmer Household

An overview of the social and economic characteristics of farmer households in Boloh Village, Toroh District, Grobogan Regency is presented in table 1.

Table 1. Socio-Economic Conditions of Farmers Household in Boloh Village, Toroh District, Grobogan Regency

Component	Unit	Average	Max	Min	Median	Modus
1. Age	Year	57	71	46	57	50
2. Years of Schooling	Years	7	9	6	6	6
3. Number of Family Members	Persons	4	6	2	4	4
4. Land tenure						
- Wet Rice Field	Hectares	0.47	1	0.18	0.4	0.25
- Garden	Hectares	0.30	0.8	0.02	0	0
- Back Yard	Hectares	0.10	0.11	0.1	0	0
5. Ownership of Livestock						
- Cows	Head	2.63	6	0	2	2
- Buffalo	Head	0.63	2	0	0.5	0
- Goat	Head	0.75	4	0	0	0
- Poultry	Head	15.00	100	0	8	20

Source: Primary data (2018), processed

Table 1 shows that the head of the household has an average age of 57 years, of productive age (15-64 years), but has a low level of education with 6-9 years of formal education. The head of the household is responsible to take care of 4-6 members of the family, owning small scale of land (<0.5 hectares) together with yearly tenancy land of 0.25 hectares and a maximum of no more than one hectare, which is used for growing rice, maize, and soybeans. Apart from paddy fields for farming, the farmers respondent have gardens and yards, although the area is very small; maximum 0.8 hectares for gardens and 0.1 hectares for yards. They also have livestock; a side business as additional family income, although the number is small, on average 2–6 cows/goats and around 15-20 heads of poultry, although there are respondents who have poultry of more than 100.

According to [13], in developing countries, the characteristic of a household model is not dependent on a nuclear household contributing a residence and daily consumption, although, in term of budget, it might be autonomous, and social life is distributed based on who has accessibility to sources and responsibility to carry put a predetermined activity. Agricultural census 2018 reported that the age group of the head of household doing farming in Grobogan Regency is dominated by farmers being 45-57 years old; the age group classified as productive age (15-64 years). However, the average age of the head of the household is 57 years old, belong to not young anymore, is increasing in number compared to younger farmers [14].

This fact suggested that if the younger generation who live in rural areas were not taking over and starting doing farming, the older people who were currently

working as farmers would find it difficult to think about how their farming would be sustainable because no one wanted to continue and inherit it. In this case, young villagers are more interested in leaving the village and working in the non-agricultural (industrial) sector to improve their livelihoods.

In addition to age, the level of education also affected the type of work and income a person earns. Farmers' formal education increases knowledge related to technical know-how and allocative efficiency, non-formal one improves farmer's skills, and informal learning provides farmers to be open-minded to newly technological input and share it among companions [1].

In addition, there were differences in behavior between highly educated farmers and farmers with low education, which could be identified from the aspects of production and social activities. Most of the farmer respondents' education was elementary school level (7 years). In fact, the length of formal education has a positive effect on the level of application of agricultural technology innovation; the higher the education, the higher their ability to absorb knowledge, access various information, and adopt technological innovations that can improve their performance in doing farming. Therefore, the role of education is not only to increase farmer's likelihood to get into new technology but also provide opportunities to access to market; all of which lead to improving productivity and income [1].

Data in table 1 also showed that land ownership as the source of income for farmers was relatively small (<0.47 hectares). On the other hand, the land of rice farming needed to be breakeven point (cost-production value = 0) is 0.51 hectares on average, while for maize and soybeans the breakeven points are 0.41 hectares and 0.46 hectares, respectively [9]. The minimum land area that farmers must cultivate so that they are able to meet their household needs is 1 Ha.

Therefore, it could be concluded that small ownership of land farmers had greatly influenced farming management. It might be that farming carried out by farmers was profitable, by considering all real costs incurred including land rent; however, the results of the analysis by [9] proved that the profit from lowland rice farming may reach 7.4 million/hectare/season with a value of /C=1.97, the profit of maize farming is 4 million/hectare/season with a value of R/C=2.46, and the profit of soybean farming reaches 3.6 million/hectare/season with R/C=2.18; all of which are calculated on one hectare basis. In fact, the average land area of the respondent farmers was only 0.25-0.47 hectares.

Responding to the relatively small land ownership that led to an obstacle of farmers doing feasibility of on-farm production, government intervention was needed to control ownership of land assets for farmers so that the number of smallholders and landless farmers might decrease. The expectation was that the pattern of land tenure should shift, especially from agricultural laborers or smallholders to farmers who controlled their own land, or from farmers who had only small size of land to farmers who possessed sufficient size land for production. In this case, policies of agricultural development from the government that had an impact on land tenure patterns for farmers, especially in paddy fields were essentially needed. The fact showed that farmers having land less than 0.5 hectares increased from 45.29% in 1993 to 56.41% in 2003.

3.2. Source of Income of Farmers Household

The household income structure of farmers is divided into 2 groups; income generated from agricultural sector (on-farm) and the one from non-agricultural sector (non-farm) (Table 2).

Table 2. Contribution of Farmer Household Income Sources (IDR 000)

No	Revenue Sources	Revenues Per Year	Revenues Per Month	Percentage (%)
I.	**FARM**			
	On-Farm			
1.	Rice	6.879	573	20%
2.	Maize	8.253	688	24%
3.	Soybean	3.856	321	11%
	Total on-farm:	18.987	1.582	56%
4.	Off-Farm/Farm Worker	14.825	1.235	44%
	Total on-farm + off-farm:	33.812	2.818	100%
II.	**NON-FARM**			
1.	Trade	13.000	1.083	13%
2.	Services	30.700	2.558	30%
3.	Government Employees	36.000	3.000	35%
4.	Private Employees	24.000	2.000	23%
	Total non-Farm	103.700	8.642	100%

Source: Primary data (2018), processed

Table 2 exhibits that the average income generated from on-farm (rice, maize, and soybean) is IDR 6,879,000/year, IDR 8,252,000/year, and 3,856,000/year, respectively, whereas the one from non-farm (trade, carpentry, civil servant/soldier/police, and private employees) is IDR 13,000,000/year, IDR 30,700,000/year, IDR 36,000,000/year, and IDR 24,000,000/year, respectively. Total household income is the total amount of income received by all family members. Furthermore, the contribution of income generating from off-farm (farm laborers) was higher (44%) than that of from on-farm; rice (20%), maize (24%), and soybeans (11 %) for one year.

The low income generated by farmers is not only caused by narrow land tenure but also unpredictably fluctuated selling price. In fact, reasonable and stable price is needed to avoid farmers' income losses as well as increase farmers' purchasing power [15]. Revenue from on-farm activities in relation to agriculture generated economy is used as an indicator to calculate the gross margins earned for crop and animal production, and the costs incurred for manure and fertilizers, assets, wage labor, and general costs. maintenance and agricultural administration costs [16]. Working as a farm laborer was usually done during planting and harvesting season; whenever they were not working on the fields.

In addition, maize, one of the commodities farmers in Toroh District, Grobogan Regency depended on, was the main source of income for farmers to surpass rice and soybean as a diversification of farming practices. However, income from off-farm diversification has been applied to anticipate production risks and to get steady income while avoiding price fluctuation of agricultural products [17].

Meanwhile, non-agricultural was able to cover or compensate household consumption needs. A study in China involving 7,041 households with agricultural and non-agricultural incomes shows that 72% of rural households rely upon on non-agricultural income [8]. Thus, non-agricultural employment had the potential to economically increase farm household income and reduce poverty in rural areas.

Table 2 also showed that the highest contribution of income sources comes from civil servant/army/police (35%) compared to other sources of income such as trade (13%), private employees/factory workers (23%), and services (30%). This condition due to government employees such civil servant/army/police had regular monthly income so that they were able to support the fulfillment of household needs, which were relatively constant compared to other sources of income that was unpredictable.

3.3. Combination of Farmer Household Income Sources

Table 3 shows farmer household income generated from a combination of agricultural and non-agricultural businesses. The highest source of income, which is IDR 69,812,000/year (29%), is obtained from a combination of cultivation (on-farm), farm labor (off-farm), and civil servant/soldier/police (non-farm), while the lowest source of income, which is IDR 46,812,000/year (20%), comes from a combination of cultivation (on-farm), farm labor (off-farm) and trading (non-farm).

Table 3. The Combination of Farmers Household Income from On-Farm, Off-Farm, and Non-Farm per Year (000)

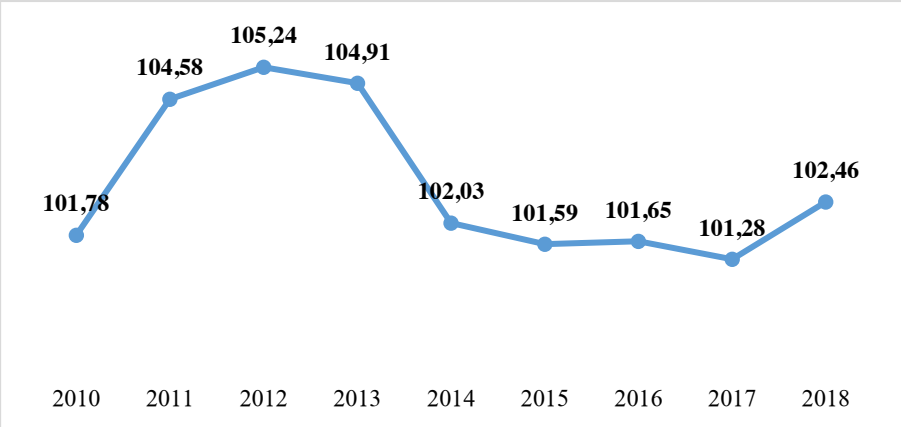
Combination	*On-Farm (P_1)*			Total	*Off-Farm (P_2)*	P_{rt}	%
	Rice	Maize	Soy				
Non-Farm (P_3)							
1. Traders	19.879	21.253	16.856	31.987	27.825	46.812	20
2. Construction Labors	37.579	38.953	34.556	49.687	45.525	64.512	27
3. Civil Servant/ Soldiers/Policemen	42.879	44.253	39.856	54.987	50.825	69.812	29
4. Industrial Labors	30.879	32.253	27.856	42.987	38.825	57.812	24
Max	42.879	44.253	39.856	54.987	50.825	69.812	
Min	19.879	21.253	16.856	31.987	27.825	46.812	
Average	32.804	34.178	29.781	44.912	40.750	59.737	

Source: Primary data (2018), processed

Table 3 reveals that the income sources of farmers household greatly vary. The average income farmer household received from on-farm only is IDR 44,912,000/year (IDR 3,743,000/ month) and farm laborers only is IDR 40,750,000/year (IDR 3,396,000/month). Those who are able to combine income sources from on-farm, off-farm, and non-farm generate IDR 59,737,000/year (IDR 4.978.000/month) on average.

As income functions to fulfill daily needs as well as support business activities, although the amount of it varied, its combination such as the one from non-farm affected farmers' household welfare (table 3). The indicator that could be used to measure farmer's welfare is Farmer's Terms of Trade (FTT). FTT is the ratio of the price index received by the farmer (IT) and the price index paid by the farmer (IB) [18]. In this context, this study defined the level of farmers' welfare as total income divided by total expenses. Therefore, the degree to which farmers' household generated subsidiary incomes and the amount of expenses farmers' household spent determined their well-being.

When the FTT is > 100, the income of farmers is higher than the expenses (welfare), when the FTT = 100, their welfare remains stable, and when the FTT < 100, meaning that their welfare decline in the previous period. From national perspective, the FTT fluctuates from time to time depending on the price of goods sold by farmers and that of consumed by farmers. Picture 1 describes the fluctuation of FTT at national level in 2010.



Source: BPS Indonesia (2019), processed
Fig. 1. Fluctuation of FTT at National Level in 2018 (2012=100)

Within the last 9 years, the FTT had been more than 100, meaning that the increased price of farmers' products was higher than the increased price of goods farmers consumed; as a result, farmers generated more income than expenses. Although in 2013 the FTT declined until the lowest in 2017, it started to climb up in 2018.

In addition, data on table 4 explain that in 2019, the FTT in Central Java Province was more than 100, meaning that the average price farmers received was higher than that of farmers paid in 2012. In January 2019, the FTT index was 103.77 and in December 2019 the FTT index was 106.00, meaning that the FTT increased by 2.27% compared to that of in December 2018, year on year. The highest increase was in August 2019 and the lowest was in February 2019 [19].

Table 4. FTT Fluctuation in 2019 (2012=100) in Central Java Province

Year	Month	FTT	Growth/Month (%)
2018	December	103.64	0.20
2019	January	103.77	0.12
	February	102.67	-1.06
	March	102.83	0.15
	April	102.17	-0.64
	Mei	103.57	1.37
	June	103.15	-0.41
	July	103.75	0.58
	August	104.95	1.16
	September	105.98	0.98
	October	106.3	0.31
	November	105.99	-0.29
	December	106.00	0.01
Y o Y December 2019 to December 2018			**2.27**
YoY December 2018 to December 2017			**0.16**

Source: BPS Jawa Tengah (2019)

3.4. Expenditure Spent by Farmer Household

In general, expenses spent by farmer household could be divided into routine and non-routine expenditure as shown in table 4.

Table 5. Expenditure of Farmer Household (Yearly and Monthly Basis in 000)

Type of Expenditure	Total (IDR000)	Percentage
1. Food and Transportation	14.808	61
2. Housing and Appliances	1.402	6
3. Household Facilities	3.196	13
4 Education and Health	896	4
5 Agriculture	640	3
6. Other	3.393	14
Mean	4.056	
Max	14.808	
Min	640	
Total Expenditure	24.335	

Source: Primary Data (2018)

The highest routine expenditure (61%) was food and transportation that consisted of (1) staple food, snacks, and drinks; (2) transportation; (3) tobacco and cigarettes; (4) transportation of people and tools to and from field; (5) transportation for children to school; and (5) pocket money for children for having launch; IDR 14,808,000 compared to the total that was IDR 24,335,000. Meanwhile, the non-

routine expenditure consisted of (1) housing and appliances; (2) goods and services; (3) health and education; (4) agricultural operation; others.

By comparing total revenue (table 2) and total expenditure (table 4), the status of farmer welfare could be determined from their purchasing power using exchange rate of farmer household income (ERFHI), as shown in table 5.

Table 6. Exchange Rate of Farmer Household Income

Income	IDR (000)	ERFHI
On-Farm	18.987	78,02
Off-Farm	14.825	60,92
On-Farm + Off Farm	33.812	138,94
On-Farm + Non-Farm:		
- Trade	31.987	131,44
- Construction Labor	49.687	204,18
- Civil Servant/ Soldiers/Policemen	54.987	225,96
- Industrial Labors	42.987	176,65
Total Expenditure	24.335	

Source: Primary Data (2018)

Table 5 explained that farmer depending only on on-farm or off-farm had exchange rate of farmer household income (ERFHI) of less than 100 (less welfare), as their score ERFHI was less than 100. However, when they were able to combine their sources of incomes (on-farm, off-farm, and non-farm), they were categorized as being welfare because their ERFHI was more than 100. According to [20], house hold expenditure spent for non-grain and animal-source food proved to reduced health problem, such as stunting among children aged 0-59 months

4. Conclusion

The main sources of income of farmer household vary depending on their capability and willingness to do income generating activities, either single job (on-farm) or combined businesses (on-farm, off-farm, and non-farm). Those who are able to have combination jobs are proven to be having higher welfare compared to those who are not. Further research would be suggested in doing in-depth study focusing on the economic impact of Corona-19 to farmer welfare.

Acknowledgements. We would like to extend our gratitude to the head office of Institute for Agricultural Technology Assessment, Agricultural Research and Development Agency for providing budget for this research. We also would like to deliver our appreciation to Kuscahyo BP for providing us constructive input as well as doing proofreading for this manuscript.

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