BUKTI KOMUNIKASI PENULIS DENGAN PENGELOLA JURNAL

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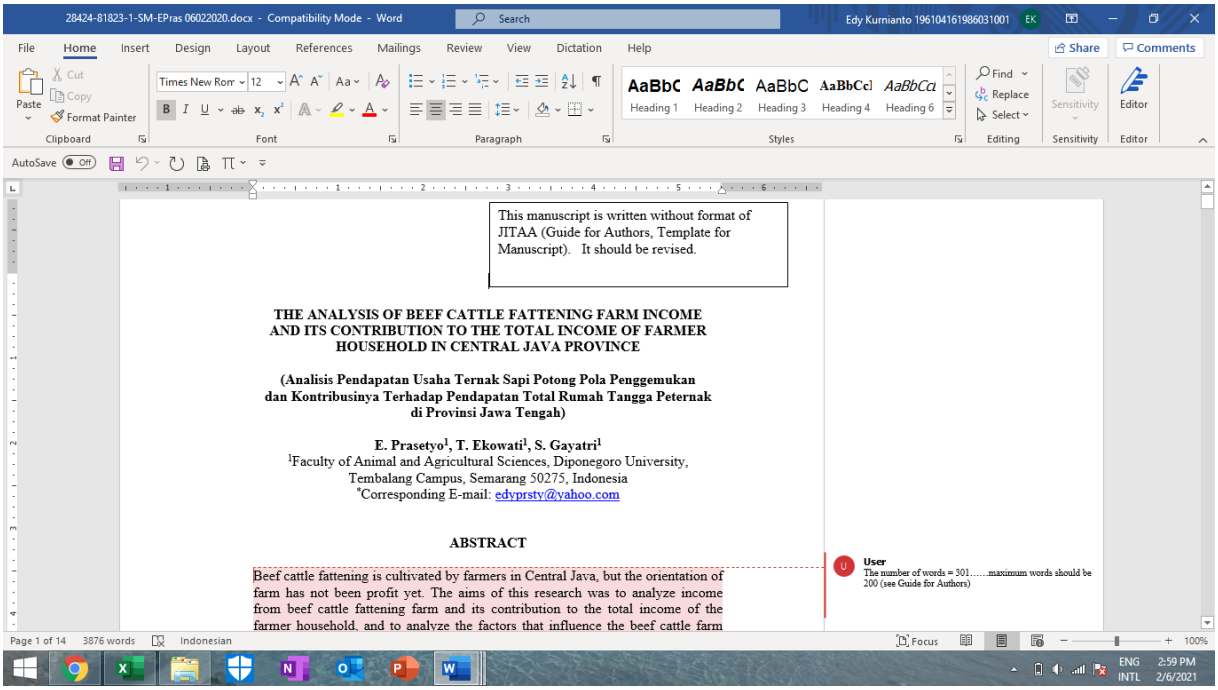
1. Tanggal 6 Februari: Pengiriman manuskrip via OJS (bukti tidak ada di OJS, sudah tersimpan di JITAA)

2. Tanggal 4 Maret 2020: Komentar editor terhadap manuskrip yang disubmisi.



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THE ANALYSIS OF BEEF CATTLE FATTENING FARM INCOME AND ITS CONTRIBUTION TO THE TOTAL INCOME OF FARMER HOUSEHOLD IN CENTRAL JAVA PROVINCE

(Analisis Pendapatan Usaha Ternak Sapi Potong Pola Penggemukan dan Kontribusinya Terhadap Pendapatan Total Rumah Tangga Peternak di Provinsi Jawa Tengah)

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ABSTRACT

Beef cattle fattening is cultivated by farmers in Central Java, but the orientation of farm has not been profit yet. The aims of this research was to analyze income from beef cattle fattening farm and its contribution to the total income of the farmer household, and to analyze the factors that influence the beef cattle farm

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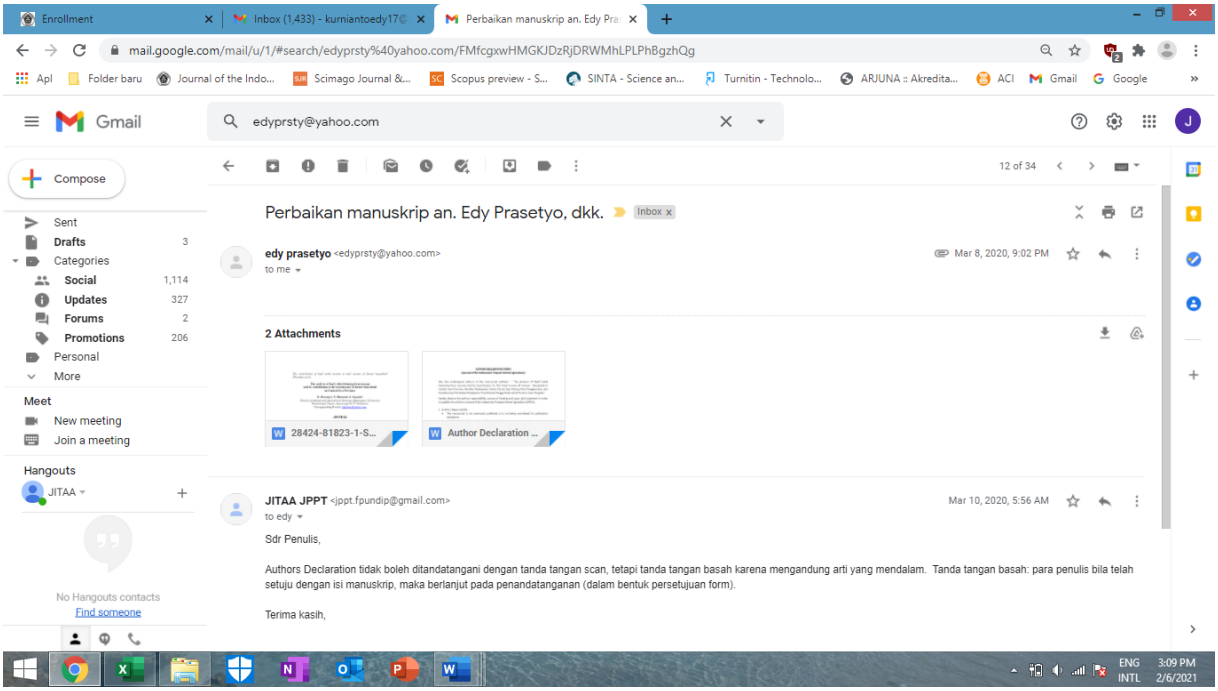

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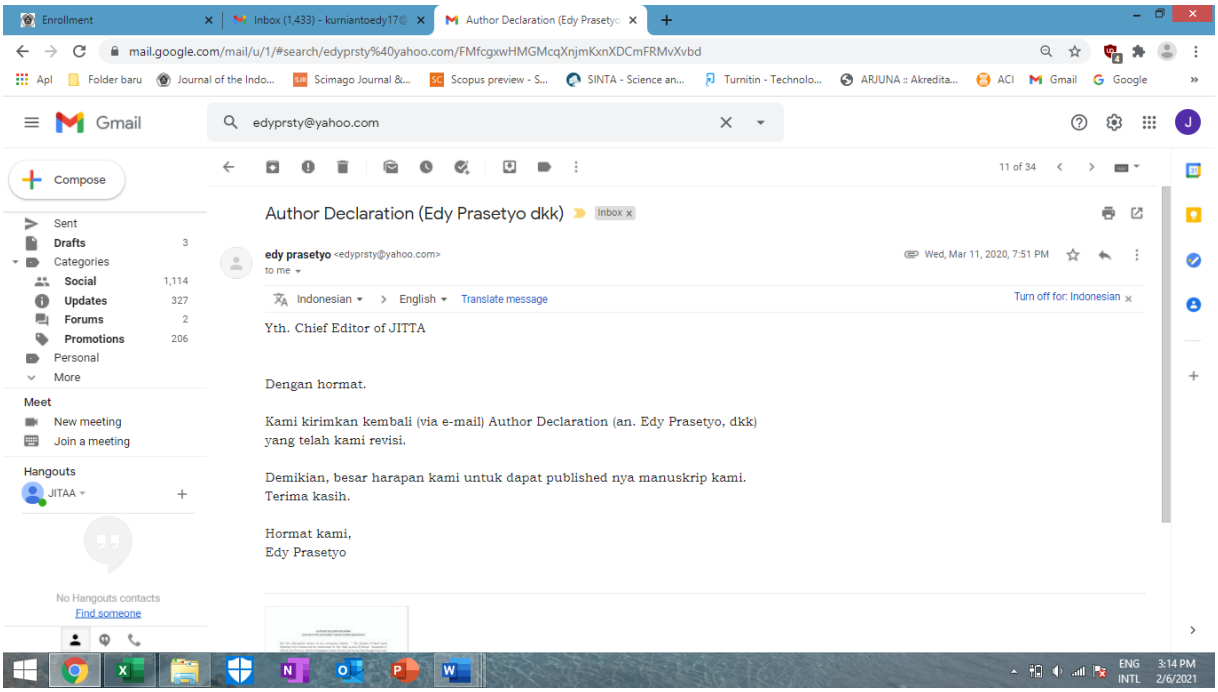

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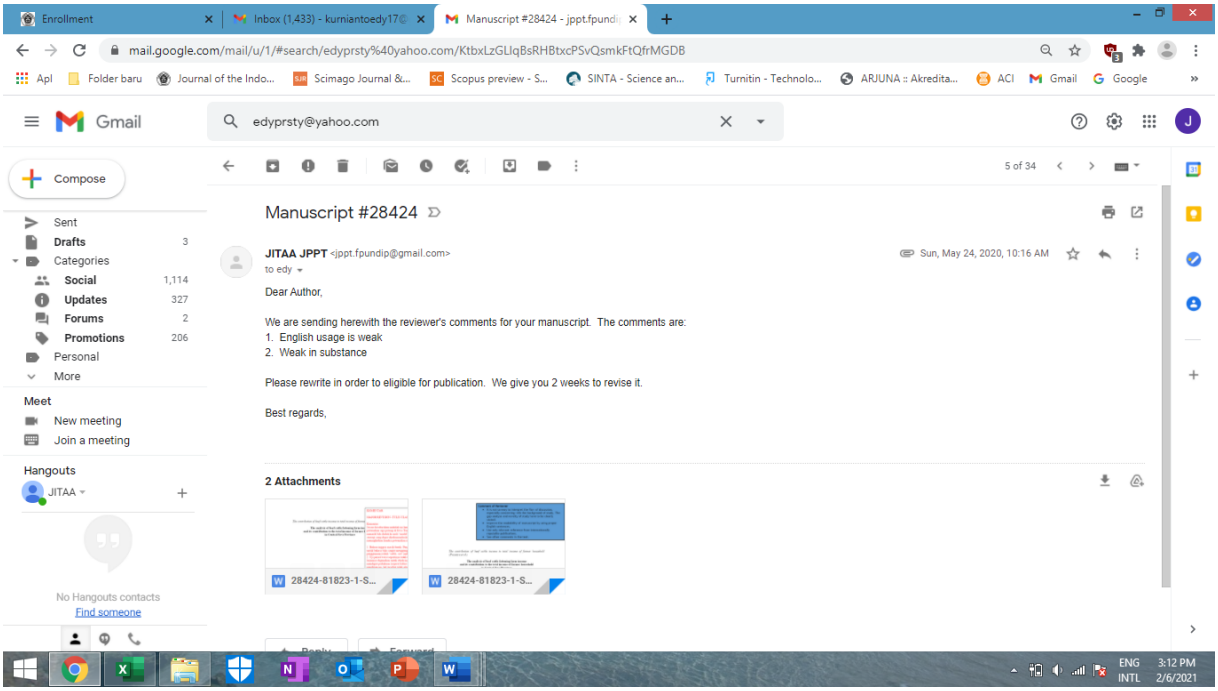

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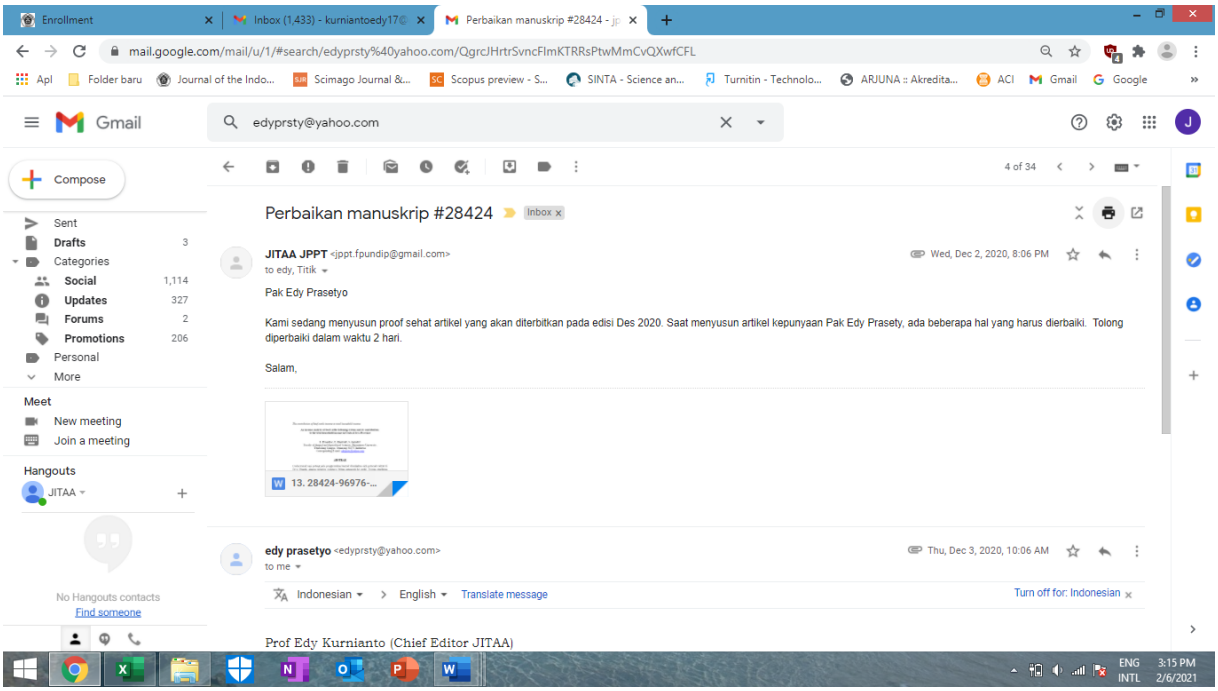

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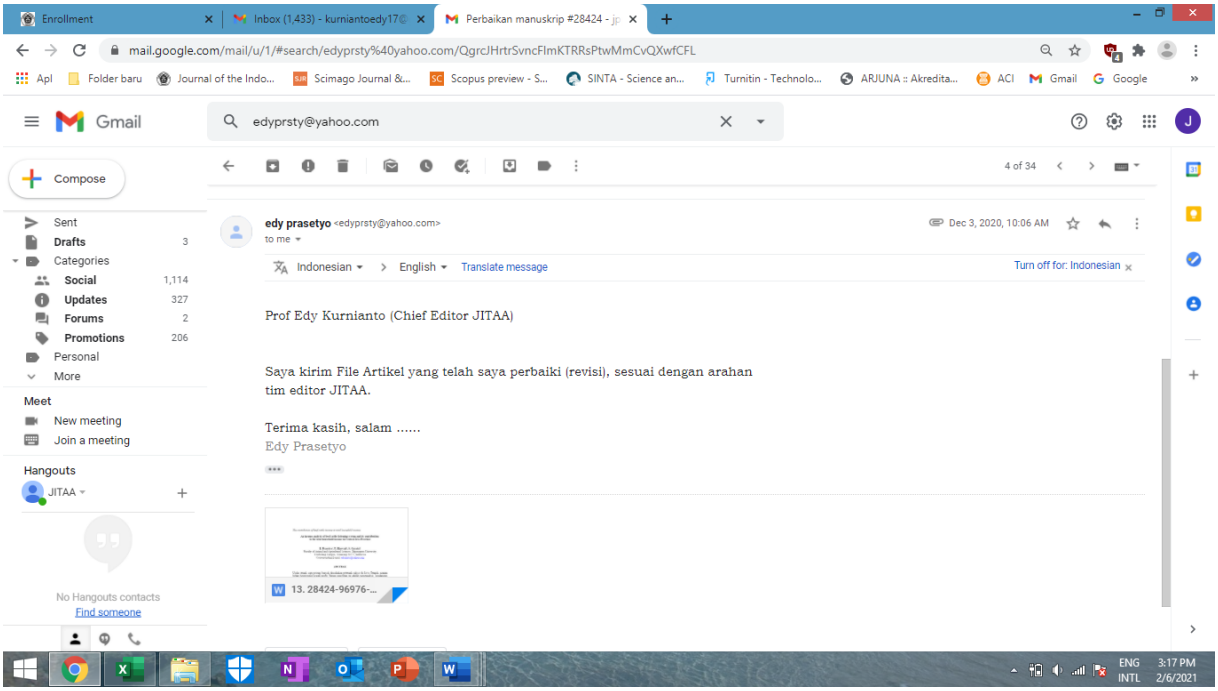

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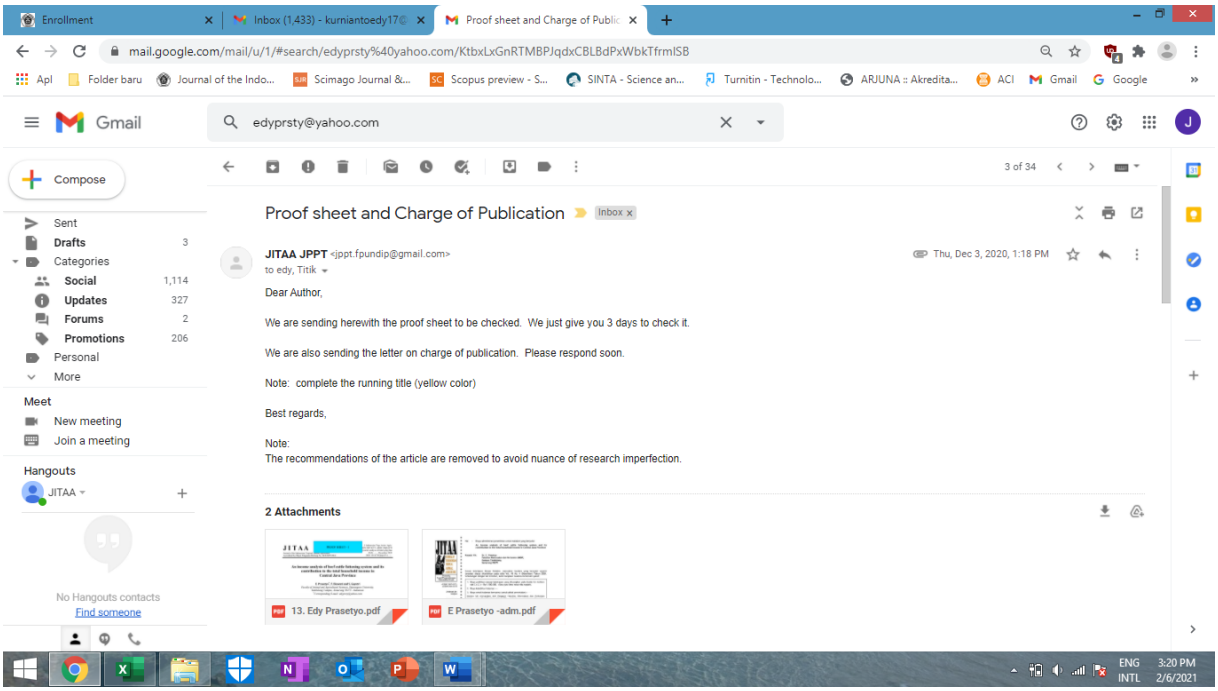


Comment of Reviewer

- It is not so easy to interpret the flow of discussion, especially concerning with the background of study. The gap analyse and novelty of study have to be clearly stated.
- Improve the readability of manuscript by using proper English sentences.
- Use only relevant reference from internationally reputable publications.
- See other comments in the text.

The contribution of beef cattle income to total income of farmer household (Prasetyo et al.)

The analysis of beef cattle fattening farm income and its contribution to the total income of farmer household in Central Java Province

ABSTRAK

Usaha ternak sapi potong pola penggemukan banyak diusahakan oleh peternak rakyat di Jawa Tengah, namun orientasi usahanya belum mengarah ke profit. Tujuan penelitian adalah menganalisis kontribusi pendapatan usaha ternak sapi potong pola penggemukan terhadap total pendapatan rumah tangga peternak, dan menganalisis faktor-faktor yang mempengaruhi pendapatan usaha ternak sapi potong. Penelitian dilakukan pada lima kabupaten sentra produksi sapi potong di Jawa Tengah. Penelitian dilakukan dengan metode survai, 150 sampel responden ditentukan dnegan metode *Multi Stage Quota Sampling.* Data dianalisis dengan Analisis Pendapatan dan Regresi Linier Berganda. Hasil penelitian menunjukkan bahwa pendapatan usaha ternak sapi potong sebesar Rp 6.736.824,21/2,31 ekor/6,32 bulan atau Rp 1.065.953,20/bulan, dan pendapatan peternak dari luar usaha ternak sapi potong sebesar Rp 29.401.533,00/tahun atau Rp

3.516.080,95/bulan. Kontribusi pendapatan usaha ternak sapi potong terhadap pendapatan total rumah tangga peternak sebesar 30,32%. Hasil uji *paired t test*, pendapatan peternak dari usaha ternak sapi potong berbeda nyata lebih kecil dibandingkan dengan pendapatan dari luar usaha ternak sapi potong. Hasil analisis regresi linier berganda, bahwa biaya produksi tidak tetap dan jumlah ternak berpengaruh terhadap pendapatan usaha ternak sapi potong, sedangkan biaya produksi tetap tidak berpengaruh terhadap pendapatan usaha ternak sapi potong.
Kata kunci: kontribusi, pendapatan total rumah tangga, usaha ternak sapi potong,.

ABSTRACT

Beef cattle fattening is cultivated by farmers in Central Java, but the orientation of farm has not been profit yet. The aims of this research was to analyze beef cattle fattening farm income and its contribution to the total income of farmer household and analyze the factors that influence beef cattle farm income. Research was carried out in five regencies in Central Java Province namely Blora, Rembang, Grobogan, Wonogiri and Boyolali. Survey was used among 150 beef cattle farmers, while multistage quota sampling was used as sampling method. Income analysis and multiple linear regression were used for data analysis. Research result showed that income of beef cattle is IDR 6,736,824.21/2.31 head/6.32 month or IDR 1,065,953.20/month and income of non-beef cattle farm is IDR 29,401,533.00/year or IDR 3,516,080.95/month. The contribution of beef cattle farm to farmer's income is 30.32%. Based on the t test, the contribution of beef cattle farming had significant different to the contribution of non-beef cattle

farming and the income from beef cattle was lower than non-beef cattle. Multiple linear regression analysis showed that variable cost and number of livestock have a significant effect on beef cattle farm income, while the fixed cost has no significant effect.
keywords: beef cattle farm, contribution, total farmer income

INTRODUCTION

Program Kecukupan Daging (PKD)or beef self sufficiency program is one of strategies from the government to align between demand and national supply of meat. Beef cattle have been played as one of important income for villagers in Indonesia as well as family nutrient sources. Meat consumption from beef product have been increased, however national meat production have not been fulfil national consumption. Widiati (2014) said that more than 90% of local beef supply comes from less efficient community farms, so the growth of local beef production has not been able to meet national demand.Hence, there was gab between supply and demand of beef product (Mersyah, 2005; Setiyono*et al.*, 2007). It need collaboration efforts from all stakeholders to improve production, marketing and distribution of beef production (Bamualim *et al.*, 2008).

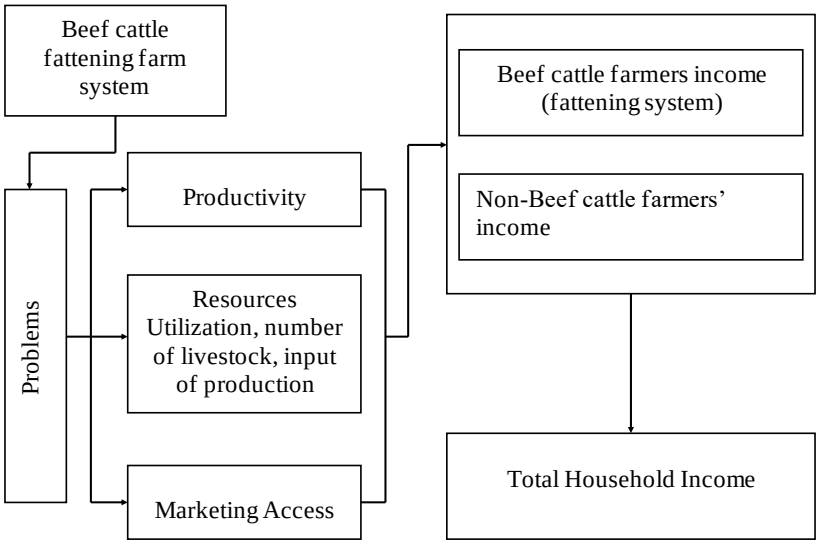
Beef cattle farming system have been raised by the farmers and their family in Central Java, and it occupied both lowland and highland with most of the farmers had average of 3.49 head/cattle (Prasetyo *et al.*, 2012). Tawaf and Kuswaryan (2006) told that beef cattle smallholder farming system had low

productivity with 2-4head/cattle. In adddition, it is based on traditional farming system relied on family labour and have not been intensively developed to improve income. Beef cattle population in Central Java Province from 2011-2015 were 1,937,551 head/cattle, 2,052,407 head/cattle, 1,500,077 head/cattle, 1,592,638 head/cattle, and 1,628,093 head/cattle, respectively. It had average growth rate of -3.14%/yearor low growth rate (Dinas Peternakan dan Kesehatan Hewan Jawa Tengah, 2015). Farmers' orientation in beef cattle production system was as secondary income with poor management practices and resources allocation have not been optimally allocated. Prasetyo *et al.* (2006) told that farmers have not been thingking about commercial farming. Meanwhile Putri*et al.* (2014) stated that efforts to increase beef cattle business production and increase farmers' income can be done with the agribusiness system.Schimmelpfennig *et al.* (2006) said that farmers faced problem related to low access to production process (marketing, credit, genetics). This condition gave effects on low income and economic efficiency of production.

The aims of this research was to analyze income from beef cattle fattening farm and its contribution to the total income of the farmer household, and to analyze the factors (the number of beef cattle, fixed production costs, variable production costs)that influence the beef cattle farm income. The result of the study can be used for decision makers to improve productivity of smallholder farming system and the development of knowledge related with social economic agriculture.

MATERIALS AND METHODS

Theoretical Framework



Ilustration1. Theoretical Framework

Beef cattle farming activity is a secondary source of income apart from other rural farm activities and it is based on smallholder farming system. The beef cattle farming system have not been intensively developed, hence it has led to farmers' difficulties to increase income. Farmers' faces several problems such as low management in farming system or new technonogy as well as bargaining position dan bargaining power. Government have been developed policy to

improve implementation technology and optimization of resources allocation. Verscheldeet *al*. (2013) describe that on on farm activities, the resources owned by farmers in developing countries are small and the agricultural environment is limited and varied, such as the area of land, fertility and types of plants and their livestock breed. This research have tried to give recommendation for development of smallholder farming system in Central Java Province in order to improve income and farmers' welfare.

Research object

Beef cattle fattening farm system was a unit elementer in the reseach. Research was carried out in May-August 2017 in five regencies in Central Java Province (Blora, Rembang, Grobogan, Wonogiri, dan Boyolali).The location was choosen because it has biggest population of beef cattle in Central Java Province.

Reseach Methodology and Sampling Determination

Survey method was used in this research. The respondents were choosen based on Multi Stage Quota Sampling Methods among 30 farmers in each regency. The five regencies was choosen based on five biggest beef cattle population in Central Java Province. Moreover, quota samping is a sampling method without having consideration a sampling frame (Wirartha, 2006). It is a method to decide sampling based on special quota in a particular area. In total there were 150 respondents (5 regencies x 30 respondents).

Data Collection and Data Analysis

Data collection is an activity to gather data and measure information based on research variables in order to analyze research objective and hipothesis (Daniel, 2002). The primary data were collected throughcross section data and interview method using questionnaire. The secondary data was used to improve data analysis. Data were analyzed through editing, koding, dan tabulating. Moreover, data were analyzed using Income Analysis, the Paired t Test and Multiple Linear Regression analysis.

1. Beef cattle farmers income analysis

$TC = TVC + TFC$ (Ekowati*et al.*, 2014)

where

TC : Total cost (IDR)
TVC : Total variable cost (IDR)
TFC : Total fixed cost (IDR)
TR : $\Sigma (Q_i . Hq_i)$
TR : Total revenue (IDR)
Qi : product quantity (kg)
Hq_i : Price (IDR)

$\pi = TR - TC$

where

π : Income (IDR)
TR : Total Revenue (IDR)
TC : Total Cost (IDR)

2. Income from Non-Beef cattle farming activities:

$\pi_{lt} = TR_{(1-n)} - TC_{(1-n)}$

where

π_{lt} : Total income (IDR)
$TR_{(1-n)}$: Total revenue (IDR).
$TC_{(1-n)}$: Total cost (IDR).

3. The contribution of beef catlle farming activites to household income.:

$K = \{\pi : \pi_{fh}\} \times 100\%$

where

K : the contribution of beef catlle farming activites to household income.(%)
π : Total income from beef cattle farming activities (IDR)
π_{fh} : Total income of the farmer household(IDR)

4. The effect of the number of beef cattle, fixed production costs and variable production costs on beef cattle farm income is analyzed using Multiple Linear Regression, with the formulation:

$$Y = f(X_1, X_2, X_3, e)$$

$$Y = \alpha + b_1X_1 + b_2X_2 + b_3X_3 + e$$

Where :
Y : Beef cattle farm Income (IDR).
A : *Intercept*
b_i : Regression coeffisien.
X_1 : Number of beef cattle (head)
X_2 : Fixed production cost (IDR).
X_3 : Variable production cost (IDR)
E : Stochastic deviation

RESULTS AND DISCUSSION

Data analysis found that there were three types of cattle breeds to raised in Central Java. Ongole Crossbreed or *peranakanongole*(PO)was the biggest cattle bread to raise (46%), it followed bySimmental – Ongole Crossbreed or *simmental-peranakanongole* (SPO) (32.66%) and limousine-Ongole Crossbreed or *limousine-peranakan ongole* (LPO) (21.34%).Most of the farmers had 2.31 head/cattle and it was raised for 6.32 months and average daily gain equal to 0.648 kg/cattle/day.The average daily gain was lower than two researchs by Daryanti *et al.* (2002) and Subiharta*et al.* (2000). Daryanti *et al.* (2002) stated that the average daily gain of Ongole Crossbreed (PO) was 0.72 kg/cattle/day when the cows were fed bythe ammoniated rice straw and feed concentrat of 4

kg/cattle/day.In his research, Subihartaet al. (2000) concluded that average daily gain was amounted to1.18 kg/cattle/day for LPO and 0.90 kg/cattle/day of SPO. This condition is also partly due to the fact that the management of beef cattle farm has not been based on a commercial orientation. Dzanjaet al. (2013) stated that farmers with low managerial ability could not utilize technology in raising livestock, so that farmers would get a small profit and economic conditions would remain poor. The low productivity of fattening farming system in Central Java can be explained by the low feed quality resources, limited access to high-quality genetics, cattel feed efficiency, and the age of cattle (Soeparno and Davies, 1987).

The income or profit of the fattening beef cattle farm with an average scale of 2.31 head per production period (an average of 6.32 months) is IDR 6,736,824.21 (equivalent to IDR 1,065,953.20/month). The ability of livestock capital to generate income (profitability) is 19.29 percent. The profitability value when compared to the interest rate of small-scale farmer loans, for example: Food and Energy Security Credit (KKPE), People's Business Credit (KUR) with interest rates of 6.00 percent, then beef cattle farm is feasible to be undertaken.Total Cost, total revenue and income shows in Table 1.

The farmers income was higer than a research among PO cattle breed farmers in Eromoko District Wonogiri Regency by Prasetyoet al. (2005). The research in 2005 told that (i) The cows had 100% ad libitum of forage and mixed with three times feed concentrate per day would gained 0.785 kg/day with famers' income amounted to IDR 637,230.95/head/3months; (ii) The cows had 100% ad libitum of forage and mixed with twice feed concentrate per day day would gained

0.629 kg/day with famers' income amounted to IDR 613,153.25/head/3 bulan; (iii) The cows had twice feed resources per day day would gained 0.547 kg/day with famers income amounted to IDR 412,739.97/head/3 bulan.The difference in the value of income is of course due to the difference in research time, so it affects the price of production inputs and production output. However, if it is based on a comparison of body weight gain, beef cattle farm which in reality is not managed intensively is sufficient to provide good productivity (body weight gain 0.648 kg/head/day).

Meanwhile, the farmers income from non-beef cattle farming activities was IDR29,401,533.00/year (or equal to IDR 2,450,127.75/month). The main income were from crop production, goat or sheep farmactivities, salary as government institution or private sector, or as enterpreneurs were showed at Table 2.

Winarso and Basumo (2013) told that beef cattle farming system based on smallholder farming system and integrate wilth other farming system, crop production, for instance. Based on the result, the contribution of beef cattle farming system to household income was 30.32%. The research from Hartono dan Rohaeni (2014) found contribution of beef cattle farming system to household income will be equal 15-25%.

The farmers income from non-beef cattle farming activitiesin these research was higher than a research by Sugiarto and Syarifudin Nur (2015) in Banjarnegara. It found that the farmers in Banjarnegara owned 3 head/cattle with farmers income from beef cattle farmingsystem were IDR 6,626,868.00/year; and

non-beef cattle farming system were IDR 19,891,410.00/year, respectively.The total income of the farmer household that comes from the sum of beef cattle farm income and non-beef catlle farm income, which is calculated on average in one month is IDR 3,516,080.95. Based on the value of the income it can be calculated that the beef cattle fattening farm contributes to the total income of farmer household 30.32%. This condition is slightly higher than the results of Hartono and Rohaeni's (2014) research, which states that the contribution of people's beef cattle farm income to total family income ranges from 15-25 percent.

Based on t test analysis or paired t test,the contribution of beef cattle farming activities had significant different to the contribution of non-beef cattle farming activities ($P < 0.05$). It concluded that the income from beef cattle farming activities was lower than non-beef cattle farming activities in smallholder farming system level.It can be said thatbeef cattle fattening farming activities in Central Java Province was a secondary income. It need efforts from many stakeholders to develop strategies on how to improve the productivity.According to Anggraini (2003), smallholder farming system need to intensively developedin amore sustainable way in the future based on farmers income. Beef cattle farm can be classified into four groups, namely: (i) side farm in addition to the main farm (contribution of livestock farm revenue <30% of total income);(ii) livestock farm as a branch of farm (livestock farm revenue contribution 30 - 70% of total income); (iii) livestock farm as the main farm (contribution of livestock business income 70-100% of total income); (iv) livestock farm as an industry, where livestock are specifically cultivated.

The contribution of the beef cattle fattening farm to the total income of the farmer household is 30.32 percent, reflecting that the beef cattle farm has not yet started a main business. Efforts can be implemented to increase beef cattle farm income, one of which can be done by analyzing the factors that affect livestock farm income. It presented on Table 3.

The results of the regression analysis showed that coefficient of determination (R^2) was 0.619, which means that the variation contained in the dependent variable ie livestock farm income can be explained by variations in the independent variables of 61.90 percent. The independent variable number of cattle being cultivated and the variable production costs significantly influence the dependent variable of farmer income, while the fixed costs have no significant effect.The number of cattle has a positive correlation with beef cattle farm income, while variable costs are negatively correlated. This shows that if the number of cattle being cultivated is increased in number (assuming constant variable costs) it will be able to increase the income of farmers, but if the variable costs are increased in number (assuming the number of cattle being cultivated is fixed), then it will actually reduce the income of farmers. Of the two independent factors that have significant influence, reducing the amount of variable costs (efficiency of production costs) is the main priority to increase farmers' income, then followed by an increase in the number of cattle being cultivated.

CONCLUSION

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The income from beef cattle fattening activities was amounted to IDR 6,736,824.21 or IDR 1,065,953.20/month. Moreover, the farmers income from non-beef catlle farm was IDR 31,201,533.00/year or IDR 2,600,127.75/month. The income from beef cattle fattening farm was significantly different and smaller compared to income from non-beef catlle farming farm. The contribution of beef cattle farming farm to household income was 30.32%. Variable cost of production and the number of beef cattle being cultivated have a significant effect on beef cattle farm income, while the fixed costs of production have no significant effect.

RECOMMENDATION

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Efficient use of variable cost of production and an increase in the number of beef cattle being cultivated have real potential to increase the income of smallholder beef cattle businesses.

ACKNOWLEDGMENTS

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Tabel 1. Total Cost, Total Revenue and Income of Beef Cattle Fattening on an Average Farm Scale of 2.31 head/6.32 monts inCentral Java

No.	Detail	IDR	IDR
1.	Variables Cost:		33,962,495.83
	▪ Feeder cattle price	22,740,655.83	
	▪ Forage costs	2,015,519.00	
	▪ Feed concentrat cost	4,101,732.00	
	▪ Complete feed cost	1,534,459.00	
	▪ Cost to buy salt	414,46.00	
	▪ To buy medicine	42,036.00	
	▪ Labour cost	2,040,648.00	
	▪ Marketing cost	267,000.00	
	▪ Credit interest value	806,000.00	
2.	Fixed Cost		952,679.96
3.	Revenue:		41,652,000.00
	▪ Main product (the cows)	37,080,722.14	
	▪ Other product (manure)	419,273.46	
	▪ Labour (Cows)	4,152,004.40	
4.	Income		6,736,824.21

Table 2. The Average of Non-Beef Cattle Farmers Income

No.	Source of Income	IDR/year	Percentage (%)
1.	Food crop farming	12,749,866.67	43.36
2.	Farming plantations	3,866,000.00	13.15
3.	Livestock farm besides beef cattle	1,434,333.33	4.88
4.	State Civil	3,615,333.33	12.30
5.	Army and police	200,000.00	0.68
6.	Village officials	967,333.33	3.29
7.	Merchant	1,672,000.00	5.69
8.	Entrepreneur	4,896,666.67	16.65
	Amount	29,401,533.00	100.00

Table 3. The Effects of the Amount of Beef Cattle, Fixed Costand Variable Cost to the Beef Cattle Farmers Income.

Model	*Unstandardized Coefficients*		*Stand. Coef.*	*T*	*Sig.*
	B	Std. Error	Beta		
Constant	3209032.736	2405928.063		1.334	0.184
Number of beef cattle	13480847.551	1112147.862	0.781	12.121	0.000
Fixed cost	-0.077	0.949	-0.005	-0.081	0.936
Variable cost	-0.856	0.060	-0.915	-14.375	0.000
Dependent Variable: Beef cattle farmers income (IDR).					

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An income analysis of beef cattle fattening system and its contribution to the total household income in Central Java Province

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ABSTRAK

Usaha ternak sapi potong banyak diusahakan peternak rakyat di Jawa Tengah, namun belum berorientasi kearah profit. Tujuan penelitian ini adalah menganalisis pendapatan usaha ternak sapi potong pola penggemukan dan kotribusinya terhadap total pendapatan rumah tangga peternak, serta menganalisis pengaruh biaya produksi dan jumlah ternak sapi potong terhadap pendapatan usaha ternak. Penelitian menggunakan metode survei pada 150 responden yang ditentukan menggunakan metode *Multi Stage Quota Sampling*. Data dianalisis menggunakan analisis pendapatan, *paired t-test*, dan regresi linier berganda. Hasil penelitian menunjukkan, pendapatan peternak dari usaha ternak sapi potong sebesar Rp 6.736.824,21 per-periode penggemukan 6,32 bulan pada skala usaha rata-rata 2,31 ekor (setara Rp 1.065.953,20/bulan), pendapatan dari luar usaha ternak sapi potong Rp 3.516.080,95/bulan. Kontribusi pendapatan usaha ternak terhadap pendapatan total rumah tangga peternak sebesar 30,32%. Hasil *paired t-test*, pendapatan usaha ternak sapi potong secara signifikan berbeda dan lebih kecil dibandingkan dengan pendapatan dari luar usaha ternak sapi potong. Biaya variabel dan jumlah ternak berpengaruh nyata terhadap pendapatan usaha ternak, sedangkan biaya tetap tidak berpengaruh nyata.

Kata kunci : kontribusi, pendapatan, usaha ternak sapi potong

ABSTRACT

Beef cattle fattening is raised by farmers in Central Java, but not yet profit oriented. The aims of this research were to analyze the farmer income of beef cattle fattening farm and its contribution to the total household income and to analyze the influence of production costs and farm size toward beef cattle farm income. Survey was used among 150 beef cattle farmers, while multi stage cluster quota sampling was used as sampling method. Income analysis, paired t test, and multiple linear regression were used for data analysis. Research result showed that the farmer's income from beef cattle farm is IDR 6,736,824.21 per 6.32 month fattening period on an average farm scale was 2.31 heads (equal to IDR 1,065,953.20/month). While, average income of farm households from non-beef cattle farm was IDR 3,516,080.95/month. The contribution of beef cattle farm to household farmer's income was 30.32%. Based on the paired t test, beef cattle farm income is significantly different and smaller than the income from non-beef cattle farm. Multiple linear regression analysis showed that variable cost and number of beef cattle had a significant effect on beef cattle farm income, while the fixed cost had no significant effect.

Keywords: beef cattle farm, contribution, farmer's income

INTRODUCTION

Beef self sufficiency Program or *Program Kecukupan Daging* (PKD) is one of strategies from the government to align between demand and national supply of meat. Beef cattle have been played as one of important income for villagers in Indonesia as well as family nutrient sources. Meat consumption from beef product have been increased, however national meat production has not been fulfilling national consumption. A research by Widiati (2014) concluded that more than 90% of local beef supply comes from smallholder farming system who owned 1-5 head of cattle, so the growth of local beef production has not been able to meet national demand. Hence, there was gab between supply and demand of beef product (Gayatri and Vaarst, 2015). Hence, it need collaboration efforts from all stakeholders to improve production, marketing and distribution of beef production (Bamualim *et al.,* 2008).

Beef cattle farming system have been raised by the farmers and their family in Central Java, and it occupied both lowland and highland with most of the farmers had average of 2,95 head/cattle (Prasetyo *et al.,* 2012). Tawaf and Kuswaryan (2006) stated that beef cattle smallholder farming system had low productivity with 2-4head/cattle. In adddition, it is based on traditional farming system relied on family labour and have not been intensively developed to improve income. Beef cattle population in Central Java Province from 2014-2018 were 1,937,551 head/cattle, 2,052,407 head/cattle, 1,500,077 head/cattle, 1,592,638 head/cattle, and 1,628,093 head/cattle, respectively. It had average growth rate of -3.14%/year or low growth rate (Office of Animal Husbandry and Animal Health, Central Java Province, 2015). Farmers' orientation in beef cattle production system was as side income with poor management practices and resources allocation also have not been optimally allocated. Farmers have not been thinking about commercial farming (Prasetyo *et al.*, 2006). Meanwhile Putri *et al*. (2014) stated that efforts to increase beef cattle business production and increase farmers' income can be done with the agribusiness system. Farmers faced problem related to low access to production process (marketing, credit, genetics) (Schimmelpfennig *et al.*, 2006). This condition gave effects on low income and economic efficiency of production (Dzanja *et al*., 2013).

The aims of this research were to analyze the farmer' income of beef cattle fattening system and its contribution to the total household income and to analyze the influence of production costs and farm size toward beef cattle farm income. The result of the study can be used for decision makers to improve productivity of smallholder farming system and the development of knowledge related with social economic factors.

MATERIALS AND METHODS

Theoretical Framework

Beef cattle farming activity is not a main source of income apart from other rural farm activities and it is based on smallholder farming system. The beef cattle farming system have not been intensively developed, hence it has led to farmers' difficulties to increase income. Farmers' faces several problems such as low management in farming system or adaptation new technology as well as bargaining position and bargaining power (Setianto *et al.*, 2014). Government have been developed policy to improve implementation technology and optimization of resources allocation. Verschelde *et al*. (2013) described that on-farm activities, the resources owned by farmers in developing countries are small and the agricultural environment is limited and varied, such as scarcity of land, soil fertility and low quality of forage as well as low input of breeding program. This research have tried to give recommendation for development of smallholder farming system in Central Java Province in order to improve income and farmers' welfare based on analyzing social and economic factors, especially analyzing farmer' income.

Research Object

Beef cattle fattening farm system was a unit elementer in the reseach. Research was carried out in May-August 2017 in five regencies in Central Java Province (Blora, Rembang, Grobogan, Wonogiri, dan Boyolali). The location was choosen because it has biggest population of beef cattle in Central Java Province.

Reseach Methodology and Sampling Determination

Survey method was used in this research. The respondents were choosen based on Multi Stage Cluster Quota Sampling Methods among 30 farmers in each regency. The five regencies was choosen based on five biggest beef cattle population in Central Java Province. Moreover,

Table 1. Composition of Basal Diet Added with Fermented Feed

Items (%)	Starter			Finisher		
	T0	T1	T2	T0	T1	T2
Meat bone meal	4.7	4.7	4.7	2.35	2.35	2.35
Corn	54.8	50.8	47	58.5	54.55	50.66
Soybean Oil	1.55	1.25	0.8	3.25	2.9	2.5
Soybean meal	35.7	35	34.25	32.65	31.95	31.24
DL-methionine	0.3	0.3	0.3	0.3	0.3	0.3
L-Lysine	0.2	0.2	0.2	0.2	0.2	0.2
Limestone	0.5	0.5	0.5	0.5	0.5	0.5
Dicalcium phosphate	1.5	1.5	1.5	1.5	1.5	1.5
Premix[1]	0.5	0.5	0.5	0.5	0.5	0.5
NaCl	0.25	0.25	0.25	0.25	0.25	0.25
Fermented the used rice	0	5	10	0	5	10
Nutrient content						
Crude protein (%)	22.04	22.04	22.03	20.04	20.04	20.04
Crude fiber (%)	5.59	5.32	5.07	5.54	5.28	5.02
ME (kkal/kg)[2)]	2901	2907	2905	3063	3066	3066

[1]Premix contained (per kg of diet) of vitamin A 7,750 IU, vitamin D3 1,550 IU, vitamin E 1.88 mg, vitamin B1 1.25 mg, vitamin B2 3.13 mg, vitamin B6 1.88 mg, vitamin B12 0.01 mg, vitamin C 25 mg, folic acid 1.50 mg, Ca-d-pantothenate 7.5 mg, niacin 1.88 mg, biotin 0.13 mg, BHT 25 mg, Co 0.20 mg, Cu 4.35 mg, Fe 54 mg, I 0.45 mg, Mn 130 mg, Zn 86.5 mg, Se 0.25 mg, L-lysine 80 mg, Choline chloride 500 mg, DL-methionine 900 mg, CaCO3 641.5 mg, DCP 1500 mg

[2] Metabolizable energy was calculated according to formula (Bolton, 1967) as follows : 40.81 [0.87 crude protein +2.25 crude fat + nitrogen-free extract) + 2.5]

T0: chicks rcceiving basal diet without FF, T1 : chicks rcceiving basal diet contained 5% FF, T2 : chicks rcceiving basal diet contained 10% FF

quota samping is a sampling method without having consideration a sampling frame (Wirartha, 2006). It is a method to decide sampling based on special quota in a particular area. In total there were 150 respondents (5 regencies x 30 respondents).

Data Collection and Data Analysis

Data collection is an activity to gather data and measure information based on research variables in order to analyze research objective and hipothesis. The primary data were collected through cross section data and interview method using questionnaire. The secondary data were used to improve data analysis. Data were analyzed through editing, coding, dan tabulating. Moreover, data were analyzed using Income Analysis, the Paired t Test and Multiple Linear Regression analysis.

1. Beef cattle farmers income analysis

   TC = TVC + TFC (Ekowati *et al*., 2014)

   where

   TC : Total cost (IDR)

   TVC : Total variable cost (IDR)

   TFC : Total fixed cost (IDR)

   TR : $\Sigma (Q_i . Hq_i)$

   TR : Total revenue (IDR)

   Qi : Product quantity (kg)

   Hq_i : Price (IDR)

   $\pi = TR - TC$

where
π : Income (IDR)
TR : Total Revenue (IDR)
TC : Total Cost (IDR)

2. Income from Non-Beef cattle farming activities:
$\pi_{lt} = TR_{(1-n)} - TC_{(1-n)}$
where
π_{lt} : Total income (IDR)
$TR_{(1-n)}$: Total revenue (IDR).
$TC_{(1-n)}$: Total cost (IDR).

3. The contribution of beef catlle farming activites to household income.:
$K = \{\pi : \pi_{fh}\} \times 100\%$
where
K : the contribution of beef catlle farming activites to household income.(%)
π : Total income from beef cattle farming activities (IDR)
π_{fh} : Total income of the farmer household (IDR)

4. The effect of the number of beef cattle, fixed production costs and variable production costs on beef cattle farm income was analyzed using Multiple Linear Regression, with the formulation:
$Y = f(X_1, X_2, X_3, e)$
$Y = \alpha + b_1X_1 + b_2X_2 + b_3X_3 + e$

Y : Beef cattle farm Income (IDR).
A : *Intercept*
b_i : Regression coeffisien.
X_1 : Number of beef cattle (head)
X_2 : Fixed production cost (IDR).
X_3 : Variable production cost (IDR)
E : Stochastic deviation

RESULTS AND DISCUSSION

Central Java Province is one of the centers for beef cattle production in Indonesia. Beef cattle commodities from Central Java are needed to meet demand from other areas such as: Jakarta, West Java, Yogyakarta. Beef cattle sector is one of source of livelihood for people in Central Java. Based on the interview with respondents, farmer keep their beef cattle in order to overcome failure in crop production and as a source of investment for their family. In addition, beef cattle product has an important contribution for food supply for community. In order to meet the national demand, the Indonesian government in 2007 launched the Beef Self-Sufficiency Program with a target to fulfill national demand of local beef cattle up to 90 - 95% in 2014. Beef cattle production in Central Java is not only raised for meat production, but also utilize as a genetic improvement of breeding program (Office of Animal Husbandry and Animal Health, Central Java Province, 2015). It has opportunity for market development, hence beef cattle sector is very prospective to be developed in the future. In Central Java, beef cattle population is almost distributed throughout the region, however five districts were remaining highest population, namely Blora, Grobogan, Rembang, Wonogiri, and Boyolali Regencies.

Data analysis found that there were three types of cattle breeds to raised in Central Java. Ongole Crossbreed or *peranakan ongole* (PO) was the biggest cattle breed to raise (46%), it followed by Simmental – Ongole Crossbreed or *simmental-peranakan ongole* (SPO) (32.66%) and limousine-Ongole Crossbreed or *limousine-peranakan ongole* (LPO) (21.34%). Most of the farmers had 2.31 head/cattle and it was raised for 6.32 months and average daily gain equal to 0.65 kg/cattle/day. The average daily gain was lower than two researchs by Daryanti *et al.* (2002) and Subiharta *et al.* (2000). Daryanti *et al.* (2002) explained that the average daily gain of Ongole Crossbreed (PO) was 0.72 kg/cattle/day when the cows were fed by the ammoniated rice straw and feed concentrate of 4 kg/cattle/day. In his research, Subiharta *et al.* (2000) concluded that average daily gain was amounted to 1.18 kg/cattle/day for LPO and 0.90 kg/cattle/day of SPO. This condition is also partly due to the fact that the management of beef cattle farm has not been based on a commercial orientation. Farmers with low managerial ability could not utilize knowledge in raising livestock, hence that farmers would get a small profit and economic conditions would remain poor. The low productivity of fattening farming system in Central Java can be explained by the low feed quality resources, limited access to high-quality genetics, and feed efficiency.

The income or profit of the fattening beef cattle farm with an average scale of 2.31 head per production period (an average of 6.32 months)

was IDR 6,736,824.21 (equivalent to IDR 1,065,953.20/month). To determine of net income was based on subtracting production costs from revenue generated by the farmer. Meanwhile, the ability of livestock capital to generate income (profitability) was 19.29%. It means, farmer's expenses of production costs in beef cattle fattening system for 6,32 months will earn net income of 19,29%. The profitability value when compared to the interest rate of small-scale farmer loans, for example: Food and Energy Security Credit (*Kredit Ketahanan Pangan dan* Energi/KKPE), People's Business Credit (*Kredit Usaha* Rakyat/KUR) with interest rates of 6.00 percent, then beef cattle farm is feasible to be undertaken. Total cost, total revenue and income are presented in Table 1.

The farmers' income was higher than that obtained in a research among PO cattle breed farmers in Eromoko District Wonogiri Regency. A research in 2005 by Prasetyo *et al.* (2005) explained that (i) The cows had 100% ad libitum of forage and mixed with three times feed concentrate per day would gained 0.785 kg/day with famers' income amounted to IDR 637,230.95/head/3 months; (ii) The cows had 100% ad libitum of forage and mixed with twice feed concentrate per day day would gained 0.629 kg/day with famers' income amounted to IDR 613,153.25/head/3months; (iii) The cows had twice feed resources per day would gained 0.547 kg/day with famers income amounted to IDR 412,739.97/head/3months. The difference in the value of income is due to the difference in research time, so it affects the price of production inputs and production output. However, based on a comparison of body weight gain, it resulted a good productivity (average body weight gain of 0.648 kg/head/day). Meanwhile, the farmers' income from non-beef cattle farming activities was IDR29,401,533.00/year (or equal to IDR 2,450,127.75/month). The main income were from crop production, goat or sheep farm activities, salary as government institution or private sector, or as enterpreneurs. These data are showed at Table 2.

Based on Table 2., farmers' income from non-beef cattle farming activities was mostly from crop production. It means most of the farmers were implemented mix-farming system between

Table 1. Total Cost, Total Revenue and Income of Beef Cattle Fattening on an Average Farm Scale of 2.31 head/6.32 monts inCentral Java

No.	Detail	IDR	IDR
1.	Variables Cost:		33,962,495.83
	▪ Feeder cattle price (2.31 head)	22,740,655.83	
	▪ Forage costs (6.29 ton)	2,015,519.00	
	▪ Feed concentrate cost (1.52 ton)	4,101,732.00	
	▪ Complete feed cost (639 kg)	1,534,459.00	
	▪ Cost to buy salt	414,46.00	
	▪ To buy medicine	42,036.00	
	▪ Labour cost (47.02 hours)	2,040,648.00	
	▪ Marketing cost	267,000.00	
	▪ Credit interest value	806,000.00	
2.	Fixed Cost		952,679.96
3.	Revenue:		41,652,000.00
	▪ Main product (the cows)	37,080,722.14	
	▪ Other product (manure)	419,273.46	
	▪ Labour (Cows)	4,152,004.40	
4.	Income		6,736,824.21

Table 2. The Average of Non-Beef Cattle Farmers Income

No.	Source of Income	IDR/year	Percentage
1.	Food crop farming	12,749,866.67	43.36
2.	Farming plantations	3,866,000.00	13.15
3.	Livestock farm besides beef cattle	1,434,333.33	4.88
4.	State Civil	3,615,333.33	12.30
5.	Army and police	200,000.00	0.68
6.	Village officials	967,333.33	3.29
7.	Merchant	1,672,000.00	5.69
8.	Entrepreneur	4,896,666.67	16.65
	Amount	29,401,533.00	100.00

crop production and beef cattle farming system. Winarso and Basumo (2013) explained that beef cattle farming system based on smallholder farming system and integrate with other farming system, crop production, for instance.

Based on the result, the contribution of beef cattle farming system to household income was 30.32%. The farmers income from non-beef cattle farming activities in these research was higher than a research by Sugiarto and Syarifudin Nur (2015) in Banjarnegara. It found that the farmers in Banjarnegara owned 3 head/cattle with farmers income from beef cattle farming system were IDR 6,626,868.00/year; and non-beef cattle farming system were IDR 19,891,410.00/year, respectively. The total income of the farmer household that comes from the sum of beef cattle farm income and non-beef cattle farm income, which is calculated on average in one month was IDR 3,516,080.95. Based on the value of the income it can be calculated that the beef cattle fattening farm contributes to the total income of farmer household 30.32%. This condition is slightly higher than the results of Hartono and Rohaeni's (2014), which states that the contribution of people's beef cattle farm income to total family income ranges from 15-25%. It can be seen that there was improvement in facilities and access provided by the government in Central Java Province from 2014 (such as: access to credit, feed subsidies, breeding program), hence resulted for improving farming condition and increasing farmers' income.

Based on paired t test, the contribution of beef cattle farming activities had significant different ($P<0.05$) to the contribution of non-beef cattle farming activities. It concluded that the income from beef cattle farming activities was lower than non-beef cattle farming activities in smallholder farming system level. Beef cattle fattening farming activities in Central Java Province was a side job. The farmers keep their cattle in order to get cash whenever they need it. Farmers did not focus on the farming practices and management strategies that limit their profitability.

Gayatri *et al*., (2016) stated that smallholder farming system need to intensively developed in a more sustainable way in the future based on farmers income. In addition, it needs efforts from many stakeholders to develop strategies on how to improve the productivity. Several possible programmes and policy interventions need to be developed, for example: better utilization of available resources based on farmers' resources as well as optimize the allocation of government resources based on farmers' need or bottom up policy.

The contribution of the beef cattle fattening farm to the total income of the farmer household is 30.32%, reflecting that the beef cattle farm has not yet developed as a main business. Efforts can be implemented to increase beef cattle farm income, one of which can be done by analyzing the factors that affect livestock farm income. The result of the study can be used as a reference to improve farmers' income. It is presented on Table 3.

Table 3. The Effects of the Amount of Beef Cattle, Fixed Cost and Variable Cost to the Beef Cattle Farmers Income

Model	Unstandardized Coefficients		Stand. Coefficient	T	Sig.
	B	Std. Error	Beta		
Constant	3209032.736	2405928.063		1.334	0.184
Number of beef cattle	13480847.551	1112147.862	0.781	12.121	0.000
Fixed cost	-0.077	0.949	-0.005	-0.081	0.936
Variable cost	-0.856	0.060	-0.915	-14.375	0.000

Dependent Variable: Beef cattle farmers income (IDR).

The results of the regression analysis showed that coefficient of determination (R^2) was 0.619, which means that the variation contained in the dependent variable i.e livestock farm income can be explained by variations in the independent variables of 61.90%. The independent variable of number of fattened cattle and the variable production costs significantly influence the dependent variable of farmer income, while the fixed costs have no significant effect. The number of cattle has a positive correlation with beef cattle farm income, while variable costs are negatively correlated. This shows that the number of cattle being raised is increased in number (assuming constant variable costs) it will be able to increase the income of farmers, but if the variable costs are increased in number (assuming the number of cattle being raised is fixed), then it will actually reduce the income of farmers. Based on two independent factors that had significant influence, reducing the amount of variable costs (efficiency of production costs) is the main priority to increase farmers' income, then followed by an increase in the number of cattle being raised by farmers. Increasing number of farm size (number of cattle) will increase farmers' income. It resulted efficiency of production costs, such as: feed cost, cost for breeding program and labor cost.

CONCLUSION

The income from beef cattle fattening activities was amounted to IDR 6,736,824.21 or IDR 1,065,953.20/month. Moreover, the farmers income from non-beef catlle farm was IDR 31,201,533.00/year or IDR 2,600,127.75/month. The income from beef cattle fattening farm was significantly different and smaller compared to income from non-beef catlle farming farm. The contribution of beef cattle farming farm to household income was 30.32%. Variable cost of production and the number of beef cattle being raised had a significant effect on beef cattle farm income, while the fixed costs of production had no significant effect.

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An income analysis of beef cattle fattening system and its contribution to the total household income in Central Java Province

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ABSTRAK

Usaha ternak sapi potong banyak diusahakan peternak rakyat di Jawa Tengah, namun belum berorientasi kearah profit. Tujuan penelitian ini adalah menganalisis pendapatan usaha ternak sapi potong pola penggemukan dan kotribusinya terhadap total pendapatan rumah tangga peternak, serta menganalisis pengaruh biaya produksi dan jumlah ternak sapi potong terhadap pendapatan usaha ternak. Penelitian menggunakan metode survei pada 150 responden yang ditentukan menggunakan metode *Multi Stage Quota Sampling*. Data dianalisis menggunakan analisis pendapatan, *paired t-test*, dan regresi linier berganda. Hasil penelitian menunjukkan, pendapatan peternak dari usaha ternak sapi potong sebesar Rp 6.736.824,21 per-periode penggemukan 6,32 bulan pada skala usaha rata-rata 2,31 ekor (setara Rp 1.065.953,20/bulan), pendapatan dari luar usaha ternak sapi potong Rp 2.450.127,75/bulan. Kontribusi pendapatan usaha ternak terhadap pendapatan total rumah tangga peternak sebesar 30,32%. Hasil *paired t-test*, pendapatan usaha ternak sapi potong secara signifikan berbeda dan lebih kecil dibandingkan dengan pendapatan dari luar usaha ternak sapi potong. Biaya variabel dan jumlah ternak berpengaruh nyata terhadap pendapatan usaha ternak, sedangkan biaya tetap tidak berpengaruh nyata.

Kata kunci : kontribusi, pendapatan, usaha ternak sapi potong

ABSTRACT

Beef cattle fattening is raised by farmers in Central Java, but not yet profit oriented. The aims of this research were to analyze the farmer income of beef cattle fattening farm and its contribution to the total household income and to analyze the influence of production costs and farm size toward beef cattle farm income. Survey was used among 150 beef cattle farmers, while multi stage cluster quota sampling was used as sampling method. Income analysis, paired t test, and multiple linear regression were used for data analysis. Research result showed that the farmer's income from beef cattle farm is IDR 6,736,824.21 per 6.32 month fattening period on an average farm scale was 2.31 heads (equal to IDR 1,065,953.20/month). While, average income of farm households from non-beef cattle farm was IDR 2,450,127.75/month. The contribution of beef cattle farm to household farmer's income was 30.32%. Based on the paired t test, beef cattle farm income is significantly different and smaller than the income from non-beef cattle farm. Multiple linear regression analysis showed that variable cost and number of beef cattle had a significant effect on beef cattle farm income, while the fixed cost had no significant effect.

Keywords: beef cattle farm, contribution, farmer's income

INTRODUCTION

Beef self sufficiency Program or *Program Kecukupan Daging* (PKD) is one of strategies from the government to align between demand and national supply of meat. Beef cattle have been played as one of important income for villagers in Indonesia as well as family nutrient sources. Meat consumption from beef product have been increased, however national meat production has not been fulfilling national consumption. A research by Widiati (2014) concluded that more than 90% of local beef supply comes from smallholder farming system who owned 1-5 head of cattle, so the growth of local beef production has not been able to meet national demand. Hence, there was gab between supply and demand of beef product (Gayatri and Vaarst, 2015). Hence, it need collaboration efforts from all stakeholders to improve production, marketing and distribution of beef production (Bamualim *et al.,* 2008).

Beef cattle farming system have been raised by the farmers and their family in Central Java, and it occupied both lowland and highland with most of the farmers had average of 2,95 head/cattle (Prasetyo *et al.,* 2012). Tawaf and Kuswaryan (2006) stated that beef cattle smallholder farming system had low productivity with 2-4head/cattle. In adddition, it is based on traditional farming system relied on family labour and have not been intensively developed to improve income. Beef cattle population in Central Java Province from 2014-2018 were 1,937,551 head/cattle, 2,052,407 head/cattle, 1,500,077 head/cattle, 1,592,638 head/cattle, and 1,628,093 head/cattle, respectively. It had average growth rate of -3.14%/year or low growth rate (Office of Animal Husbandry and Animal Health, Central Java Province, 2015). Farmers' orientation in beef cattle production system was as side income with poor management practices and resources allocation also have not been optimally allocated. Farmers have not been thinking about commercial farming (Prasetyo *et al.*, 2006). Meanwhile Putri *et al*. (2014) stated that efforts to increase beef cattle business production and increase farmers' income can be done with the agribusiness system. Farmers faced problem related to low access to production process (marketing, credit, genetics) (Schimmelpfennig *et al.,* 2006). This condition gave effects on low income and economic efficiency of production (Dzanja *et al*., 2013).

The aims of this research were to analyze the farmer' income of beef cattle fattening system and its contribution to the total household income and to analyze the influence of production costs and farm size toward beef cattle farm income. The result of the study can be used for decision makers to improve productivity of smallholder farming system and the development of knowledge related with social economic factors.

MATERIALS AND METHODS

Theoretical Framework

Beef cattle farming activity is not a main source of income apart from other rural farm activities and it is based on smallholder farming system. The beef cattle farming system have not been intensively developed, hence it has led to farmers' difficulties to increase income. Farmers' faces several problems such as low management in farming system or adaptation new technology as well as bargaining position and bargaining power (Setianto *et al.,* 2014). Government have been developed policy to improve implementation technology and optimization of resources allocation. Verschelde *et al*. (2013) described that on-farm activities, the resources owned by farmers in developing countries are small and the agricultural environment is limited and varied, such as scarcity of land, soil fertility and low quality of forage as well as low input of breeding program. This research have tried to give recommendation for development of smallholder farming system in Central Java Province in order to improve income and farmers' welfare based on analyzing social and economic factors, especially analyzing farmer' income.

Research Object

Beef cattle fattening farm system was a unit elementer in the reseach. Research was carried out in May-August 2017 in five regencies in Central Java Province (Blora, Rembang, Grobogan, Wonogiri, dan Boyolali). The location was choosen because it has biggest population of beef cattle in Central Java Province.

Reseach Methodology and Sampling Determination

Survey method was used in this research. The respondents were choosen based on Multi Stage Cluster Quota Sampling Methods among 30 farmers in each regency. The five regencies was choosen based on five biggest beef cattle population in Central Java Province. Moreover,

quota samping is a sampling method without having consideration a sampling frame (Wirartha, 2006). It is a method to decide sampling based on special quota in a particular area. In total there were 150 respondents (5 regencies x 30 respondents).

Data Collection and Data Analysis

Data collection is an activity to gather data and measure information based on research variables in order to analyze research objective and hipothesis. The primary data were collected through cross section data and interview method using questionnaire. The secondary data were used to improve data analysis. Data were analyzed through editing, coding, dan tabulating. Moreover, data were analyzed using Income Analysis, the Paired t Test and Multiple Linear Regression analysis.

1. Beef cattle farmers income analysis

   TC = TVC + TFC (Ekowati *et al*., 2014)

   where

   TC : Total cost (IDR)

   TVC : Total variable cost (IDR)

   TFC : Total fixed cost (IDR)

   TR : $\Sigma (Q_i . Hq_i)$

   TR : Total revenue (IDR)

   Qi : Product quantity (kg)

   Hq_i : Price (IDR)

   $\pi = TR - TC$

   where

   π : Income (IDR)

   TR : Total Revenue (IDR)

   TC : Total Cost (IDR)

2. Income from Non-Beef cattle farming activities:

   $\pi_{lt} = TR_{(1-n)} - TC_{(1-n)}$

   where

   π_{lt} : Total income (IDR)

   $TR_{(1-n)}$: Total revenue (IDR).

   $TC_{(1-n)}$: Total cost (IDR).

3. The contribution of beef catlle farming activites to household income.:

   $K = \{\pi : \pi_{fh}\}$ x 100%

   where

   K : the contribution of beef catlle farming activites to household income.(%)

   π : Total income from beef cattle farming activities (IDR)

   π_{fh} : Total income of the farmer household (IDR)

4. The effect of the number of beef cattle, fixed production costs and variable production costs on beef cattle farm income was analyzed using Multiple Linear Regression, with the formulation:

   $Y = f (X_1, X_2, X_3, e)$

   $Y = \alpha + b_1X_1 + b_2X_2 + b_3X_3 + e$

   Y : Beef cattle farm Income (IDR).

   A : *Intercept*

   b_i : Regression coeffisien.

   X_1 : Number of beef cattle (head)

   X_2 : Fixed production cost (IDR).

   X_3 : Variable production cost (IDR)

   E : Stochastic deviation

RESULTS AND DISCUSSION

Central Java Province is one of the centers for beef cattle production in Indonesia. Beef cattle commodities from Central Java are needed to meet demand from other areas such as: Jakarta, West Java, Yogyakarta. Beef cattle sector is one of source of livelihood for people in Central Java. Based on the interview with respondents, farmer keep their beef cattle in order to overcome failure in crop production and as a source of investment for their family. In addition, beef cattle product has an important contribution for food supply for community. In order to meet the national demand, the Indonesian government in 2007 launched the Beef Self-Sufficiency Program with a target to fulfill national demand of local beef cattle up to 90 - 95% in 2014. Beef cattle production in Central Java is not only raised for meat production, but also utilize as a genetic improvement of breeding program (Office of Animal Husbandry and Animal Health, Central Java Province, 2015). It has opportunity for market development, hence beef cattle sector is very prospective to be developed in the future. In Central Java, beef cattle population is almost distributed throughout the region, however five districts were remaining highest population, namely Blora, Grobogan, Rembang, Wonogiri, and Boyolali Regencies.

Data analysis found that there were three types of cattle breeds to raised in Central Java. Ongole Crossbreed or *peranakan ongole* (PO)

was the biggest cattle breed to raise (46%), it followed by Simmental – Ongole Crossbreed or *simmental-peranakan ongole* (SPO) (32.66%) and limousine-Ongole Crossbreed or *limousine-peranakan ongole* (LPO) (21.34%). Most of the farmers had 2.31 head/cattle and it was raised for 6.32 months and average daily gain equal to 0.65 kg/cattle/day. The average daily gain was lower than two researchs by Daryanti *et al.* (2002) and Subiharta *et al.* (2000). Daryanti *et al.* (2002) explained that the average daily gain of Ongole Crossbreed (PO) was 0.72 kg/cattle/day when the cows were fed by the ammoniated rice straw and feed concentrate of 4 kg/cattle/day. In his research, Subiharta *et al.* (2000) concluded that average daily gain was amounted to 1.18 kg/cattle/day for LPO and 0.90 kg/cattle/day of SPO. This condition is also partly due to the fact that the management of beef cattle farm has not been based on a commercial orientation. Farmers with low managerial ability could not utilize knowledge in raising livestock, hence that farmers would get a small profit and economic conditions would remain poor. The low productivity of fattening farming system in Central Java can be explained by the low feed quality resources, limited access to high-quality genetics, and feed efficiency.

The income or profit of the fattening beef cattle farm with an average scale of 2.31 head per production period (an average of 6.32 months) was IDR 6,736,824.21 (equivalent to IDR 1,065,953.20/month). To determine of net income was based on subtracting production costs from revenue generated by the farmer. Meanwhile, the ability of livestock capital to generate income (profitability) was 19.29%. It means, farmer's expenses of production costs in beef cattle fattening system for 6,32 months will earn net income of 19,29%. The profitability value when compared to the interest rate of small- scale farmer loans, for example: Food and Energy Security Credit (*Kredit Ketahanan Pangan dan* Energi/KKPE), People's Business Credit (*Kredit Usaha* Rakyat/KUR) with interest rates of 6.00 percent, then beef cattle farm is feasible to be undertaken. Total cost, total revenue and income are presented in Table 1.

The farmers' income was higher than that obtained in a research among PO cattle breed farmers in Eromoko District Wonogiri Regency. A research in 2005 by Prasetyo *et al.* (2005) explained that (i) The cows had 100% ad libitum of forage and mixed with three times feed concentrate per day would gained 0.785 kg/day with famers' income amounted to IDR 637,230.95/head/3 months; (ii) The cows had 100% ad libitum of forage and mixed with twice feed concentrate per day day would gained 0.629 kg/day with famers' income amounted to IDR 613,153.25/head/3months; (iii) The cows had twice feed resources per day would gained 0.547 kg/day with famers income amounted to IDR 412,739.97/head/3months. The difference in the value of income is due to the difference in research time, so it affects the price of production inputs and production output. However, based on a comparison of body weight gain, it resulted a good productivity (average body weight gain of 0.648 kg/head/day). Meanwhile, the farmers' income from non-beef cattle farming activities was IDR29,401,533.00/year (or equal to IDR 2,450,127.75/month). The main income were from crop production, goat or sheep farm activities, salary as government institution or private sector, or as enterpreneurs. These data are presented in Table 2.

Based on Table 2., farmers' income from non-beef cattle farming activities was mostly from crop production. It means most of the farmers were implemented mix-farming system between crop production and beef cattle farming system. Winarso and Basumo (2013) explained that beef cattle farming system based on smallholder farming system and integrate with other farming system, crop production, for instance.

Based on the result, the contribution of beef cattle farming system to household income was 30.32%. The farmers income from non-beef cattle farming activities in these research was higher than a research by Sugiarto and Syarifudin Nur (2015) in Banjarnegara. It found that the farmers in Banjarnegara owned 3 head/cattle with farmers income from beef cattle farming system were IDR 6,626,868.00/year; and non-beef cattle farming system were IDR 19,891,410.00/year, respectively. The total income of the farmer household that comes from the sum of beef cattle farm income and non-beef cattle farm income, which is calculated on average in one month was IDR 3,516,080.95. Based on the value of the income it can be calculated that the beef cattle fattening farm contributes to the total income of farmer household 30.32%. This condition is slightly higher than the results of Hartono and Rohaeni's (2014), which states that the contribution of people's beef cattle farm income to total family income ranges from 15-25%. It can

Table 1. Total Cost, Total Revenue and Income of Beef Cattle Fattening on an Average Farm Scale of 2.31 Head/6.32 Monts in Central Java

No.	Detail	IDR	IDR
1.	Variables Cost:		33,962,495.83
	▪ Feeder cattle price (2.31 head)	22,740,655.83	
	▪ Forage costs (6.29 ton)	2,015,519.00	
	▪ Feed concentrate cost (1.52 ton)	4,101,732.00	
	▪ Complete feed cost (639 kg)	1,534,459.00	
	▪ Cost to buy salt	414,46.00	
	▪ To buy medicine	42,036.00	
	▪ Labour cost (47.02 hours)	2,040,648.00	
	▪ Marketing cost	267,000.00	
	▪ Credit interest value	806,000.00	
2.	Fixed Cost		952,679.96
3.	Revenue:		41,652,000.00
	▪ Main product (the cows)	37,080,722.14	
	▪ Other product (manure)	419,273.46	
	▪ Labour (Cows)	4,152,004.40	
4.	Income		6,736,824.21

Table 2. The Average of Non-Beef Cattle Farmers Income

No.	Source of Income	IDR/year	Percentage
1.	Food crop farming	12,749,866.67	43.36
2.	Farming plantations	3,866,000.00	13.15
3.	Livestock farm besides beef cattle	1,434,333.33	4.88
4.	State Civil	3,615,333.33	12.30
5.	Army and police	200,000.00	0.68
6.	Village officials	967,333.33	3.29
7.	Merchant	1,672,000.00	5.69
8.	Entrepreneur	4,896,666.67	16.65
	Amount	29,401,533.00	100.00

be seen that there was improvement in facilities and access provided by the government in Central Java Province from 2014 (such as: access to credit, feed subsidies, breeding program), hence resulted for improving farming condition and increasing farmers' income.

Based on paired t test, the contribution of beef cattle farming activities had significant

different (P<0.05) to the contribution of non-beef cattle farming activities. It concluded that the income from beef cattle farming activities was lower than non-beef cattle farming activities in smallholder farming system level. Beef cattle fattening farming activities in Central Java Province was a side job. The farmers keep their cattle in order to get cash whenever they need it. Farmers did not focus on the farming practices and management strategies that limit their profitability.

Gayatri *et al*., (2016) stated that smallholder farming system need to intensively developed in a more sustainable way in the future based on farmers income. In addition, it needs efforts from many stakeholders to develop strategies on how to improve the productivity. Several possible programmes and policy interventions need to be developed, for example: better utilization of available resources based on farmers' resources as well as optimize the allocation of government resources based on farmers' need or bottom up policy.

The contribution of the beef cattle fattening farm to the total income of the farmer household is 30.32%, reflecting that the beef cattle farm has not yet developed as a main business. Efforts can be implemented to increase beef cattle farm income, one of which can be done by analyzing the factors that affect livestock farm income. The result of the study can be used as a reference to improve farmers' income. It is presented in Table 3.

The results of the regression analysis showed that coefficient of determination (R^2) was 0.619, which means that the variation contained in the dependent variable i.e livestock farm income can be explained by variations in the independent variables of 61.90%. The independent variable of number of fattened cattle and the variable production costs significantly influence the dependent variable of farmer income, while the fixed costs have no significant effect. The number of cattle has a positive correlation with beef cattle farm income, while variable costs are negatively correlated. This shows that the number of cattle being raised is increased in number (assuming constant variable costs) it will be able to increase the income of farmers, but if the variable costs are increased in number (assuming the number of cattle being raised is fixed), then it will actually reduce the income of farmers. Based on two independent factors that had significant influence, reducing the amount of variable costs (efficiency of production costs) is the main priority to increase farmers' income, then followed by an increase in the number of cattle being raised by farmers. Increasing number of farm size (number of cattle) will increase farmers' income. Itresulted efficiency of production costs, such as: feed cost, cost for breeding program and labor cost.

CONCLUSION

The income from beef cattle fattening activities was amounted to IDR 6,736,824.21 or IDR 1,065,953.20/month. Moreover, the farmers income from non-beef catlle farm was IDR 29,401,533.00/year or IDR 2,450,127.75/month. The income from beef cattle fattening farm was significantly different and smaller compared to income from non-beef catlle farming farm. The contribution of beef cattle farming farm to

Table 3. The Effects of the Amount of Beef Cattle, Fixed Cost and Variable Cost to the Beef Cattle Farmers Income

Model	Unstandardized Coefficients		Stand. Coefficient	T	Sig.
	B	Std. Error	Beta		
Constant	3209032.736	2405928.063		1.334	0.184
Number of beef cattle	13480847.551	1112147.862	0.781	12.121	0.000
Fixed cost	-0.077	0.949	-0.005	-0.081	0.936
Variable cost	-0.856	0.060	-0.915	-14.375	0.000

Dependent Variable: Beef cattle farmers income (IDR).

household income was 30.32%. Variable cost of production and the number of beef cattle being raised had a significant effect on beef cattle farm income, while the fixed costs of production had no significant effect.

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