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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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1.	6 Februari 2020	Pengiriman manuskrip Via OJS (bukti tersimpan di JITAA).
2.	11 Februari 2020	Manuskrip di terima oleh Pengelola JITAA, dengan komentar bahwa untuk dapat di proses lanjut JITAA menunggu pengiriman <i>Authors Declaration (AD)</i> dari
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3.	4 Maret 2020	Revisi 1: Revisi dari Pengelola JITAA, dengan komentar bahwa manuskrip belum mengikuti aturan penulisan yang di tetapkan JITAA, untuk itu perlu adanya perubahan guide of authors.
4.	8 Maret 2020	Pemberitahuan dari JITAA tentang perbaikan manuskrip dan <i>Authors Declaration (AD)</i> .
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7.	25 Maret 2020	Permintaan perbaikan manuskrip dari editor kepada penulis.
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9.	24 Mei 2020	Revisi dari Reviewer 2 dan di kirim ke author, dengan komentar: <i>Please revise your manuscript as provided</i> <i>comments and resubmit. Overall commets was provided in</i> <i>the last page.</i>
10.		Revisi 4: Final process of substantial review
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(Penulis: Edy Prasetyo, Titik Ekowati, dan Siwi Gayatri)

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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 income. The research were carried out in five regencies in Central java Province Indonesia (Blora, Rembang, Grobogan, Wonogiri, and Boyolali). Beef cattle fattening farming system was a unit elementer. Survey was used among 150 beef cattle farmers. Multi stage quota sampling was used as sampling method. Income analysis, paired t test and multiple linear regression were used for data analysis. Based on result analysis, it found that the average beef cattle ownership in Central Java Province were 2.31 head/farmer. Most of the farmers will raised their cattle for 6.32 month/periode with total income amounted to IDR 6,736,824.21 (or equal to IDR 1,065,953.20/month) and the income of farmers from non-beef cattle farm is IDR 29,401,533.00/year (equivalent to IDR 3,516,080.95/month). The contribution of beef cattle farm income to the total income of farmers is 30.32%. Moreover, the farmers income from non-beef catlle farming activities was IDR 31,201,533.00/year (IDR 2,600,127.75/month). Based on the paired t test analysis, the contribution of beef cattle farming activities had significant different to the contribution of non-beef cattle farming activities. The farmers' income from beef cattle farming activities was lower than non-beef cattle farming activities. Hence, it need more efforts from all stakeholders to work together to improve the condition of smallholder beef cattle farming system in Central Java Province. Based on multiple linear regression analysis, that variable production costs, and the number of livestock have a significant effect on beef cattle farm income, while the fixed production costs has no significant effect.

keywords: contribution, beef cattle farm, total farmers income

ABSTRAK

Usaha ternak sapi potong pola penggemukan banyak diusahakan oleh peternak rakyat di Jawa Tengah, namun orientasi usahanya belum mengarah ke profit. Tujuan penelitian ini adalah menganalisis pendapatan usaha ternak sapi potong pola penggemukan dan kontribusinya terhadap total pendapatan rumah tangga peternak, serta menganalisis faktor-faktor yang mempengaruhi pendapatanh usaha ternak sapi potong. Penelitian dilakukan pada lima wilayah kabupaten sentra produksi dan pengembangan sapi potong di Jawa Tengah (yaitu Kabupaten Blora, Rembang, Grobogan, Wonogiri, dan Kabupaten Boyolali), dan usaha ternak sapi potong rakyat pola penggemukan dibakukan sebagai elementer unit. Penelitian menggunakan metode survai, sedangkan penentuan sampel menggunakan metode Multi Stage Quota Sampling sebanyak 150 responden. Data dianalisis menggunakan Analisis Pendapatan Usaha Ternak, Paired t Test, dan Analisis Regresi Linier Berganda. Hasil penelitian menunjukkan, bahwa pendapatan peternak dari usaha ternak sapi potong pola penggemukan pada skala usaha ratarata 2,31 ekor selama satu periode penggemukan (6,32 bulan) adalah sebesar Rp 6.736.824,21 (setara dengan Rp 1.065.953,20/bulan), dan pendapatan peternak yang berasal dari luar usaha ternak sapi potong sebesar Rp 29.401.533,00/tahun (setara Rp 3.516.080,95/bulan). Kontribusi pendapatan usaha ternak sapi potong terhadap pendapatan total rumah tangga peternak sebesar 30,32%. Hasil uji statistik dengan *paired t test*, bahwa besarnya pendapatan peternak yang berasal dari usaha ternak sapi potong secara signifikan berbeda dengan pendapatan peternak yang berasal dari luar usaha ternak sapi potong, dimana pendapatan yang berasal dari luar usaha ternak sapi potong lebih besar dibandingkan pendapatan usaha ternak sapi potong. Berdasarkan analisis regresi linier berganda, bahwa biaya produksi variabel, dan jumlah ternak berpengaruh nyata terhadap pendapatan usaha ternak sapi potong, sedangkan biaya produksi tetap tidak berpengaruh nyata.

Kata kunci: kontribusi, usaha ternak sapi potong, pendapatan total rumah tangga.

I. 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.

II. METHODOLOGY

2.1. 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. Verschelde *et 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.

2.2. 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.

2.3. 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).

2.4. 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 through cross 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)
Hqi	: 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:

 $\begin{aligned} \pi_{lt} &= TR_{(1-n)} - TC_{(1-n)} \\ \text{where} \\ \pi_{lt} & : \text{Total income (IDR)} \\ TR_{(1-n)} & : \text{Total revenue (IDR)}. \\ TC_{(1-n)} & : \text{Total cost (IDR)}. \end{aligned}$

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

Κ	$= \{\pi : \pi_{\rm fh}\} \ge 100\%$
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:

 $Y = f (X_1, X_2, X_3, e)$ $Y = \alpha + b_1 X_1 + b_2 X_2 + b_3 X_3 + e$

Where :

Y : Beef cattle farm Income (IDR). α : *Intercept* b_i : Regression coeffisien. X₁ : Number of beef cattle (head) X₂ : Fixed production cost (IDR). X₃ : Variable production cost (IDR) E : Stochastic deviation

III. RESULT AND DISCUSSION

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 bread to raise (46%), it followed by Simmental - Ongole Crossbreed or simmentalperanakan ongole (SPO) (32.66%) and limousine-Ongole Crossbreed or limousineperanakan 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. Dzanja et 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.

Tabel 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 	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

The farmers income was higer than a research among PO cattle breed farmers in Eromoko District Wonogiri Regency by Prasetyo *et 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/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/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 IDR 29,401,533.00/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 were showed at Table 2.

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

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

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 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 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 developed in a more 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 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.

Model	<mark>Unstand</mark> Coeffi	lardized <mark>cients</mark>	<mark>Stand.</mark> Coef.	T	Sig.
	B	Std. Error	Beta		
Constant	<mark>3209032.736</mark>	<mark>2405928.063</mark>		<mark>1.334</mark>	<mark>0.184</mark>
Number of beef	<mark>13480847.551</mark>	1112147.862	<mark>0.781</mark>	<mark>12.121</mark>	<mark>0.000</mark>
<mark>cattle</mark>	<mark>-0.077</mark>	<mark>0.949</mark>	<mark>-0.005</mark>	<mark>-0.081</mark>	<mark>0.936</mark>
Fixed cost	<mark>-0.856</mark>	<mark>0.060</mark>	<mark>-0.915</mark>	<mark>-14.375</mark>	<mark>0.000</mark>
Variable cost					
Dependent Variable:	Beef cattle farm	ers income (IDI	<mark>R).</mark>		

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

The results of the regression analysis showed that coefficient of determination (\mathbb{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.

IV. CONCLUSION AND RECOMMENDATION

4.1. Conclusion:

- 1. Most of the farmers had 2.31 head/farmer and it was raised for 6.32 months and average daily gain equal to 0.64 kg/cattle/day.
- 2. Total income from beef cattle fattening activities was amounted to IDR 6,736,824.21 (or equal to IDR 1,065,953.20/month). Moreover, the farmers income from non-beef catlle farm activities was IDR 31,201,533.00/year (or equal to IDR 2,600,127.75/month). The income from beef cattle fattening farm was lower than farmers' income from non-beef catlle farming farm.
- The contribution of beef cattle farmingfarm to household income was 30.32%.
- 4. Variable production costs and the number of cattle being cultivated have a significant effect on beef cattle farm income, while the fixed costs have no significant effect.

4.2. Recommendation:

- 1. Efficient use of variable production costs and an increase in the number of cattle being cultivated have real potential to increase the income of smallholder beef cattle businesses.
- Increasing the productivity of small-scale beef cattle fattening farm, one of which can be done by changing the attitudes and skills of farmers from parttime livestock farm to businesses that are based on income orientation (profit oriented).

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1 2 3	Comments from Rev 1 was provided, please give your concern to revise as provided comments.
4 5	The contribution of beef cattle income to total income of farmer household
5 6 7 8	The analysis of beef cattle fattening farm income and its contribution to the total income of farmer household in Central Java Province
9 10	
11 12	
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17	ABSTRAK
18	Usaha ternak sapi potong pola penggemukan banyak diusahakan oleh peternak
19	rakyat di Jawa Tengah, namun orientasi usahanya belum mengarah ke profit.
20	Tujuan penelitian adalah menganalisis kontribusi pendapatan usaha ternak sapi
21	potong pola penggemukan terhadap total pendapatan rumah tangga peternak, dan
22	menganalisis faktor-faktor yang mempengaruhi pendapatan usaha ternak sapi
23	potong. Penelitian dilakukan pada lima kabupaten sentra produksi sapi potong di
24	Jawa Tengah. Penelitian dilakukan dengan metode survai, 150 sampel responden
25	ditentukan dnegan metode Multi Stage Quota Sampling. Data dianalisis dengan
26	Analisis Pendapatan dan Regresi Linier Berganda. Hasil penelitian menunjukkan
27	bahwa pendapatan usaha ternak sapi potong sebesar Rp 6.736.824,21/ <mark>2,31</mark>
28	ekor/ <mark>6,32 bulan</mark> atau Rp 1.065.953,20/bulan, dan pendapatan peternak dari luar
29	usaha ternak sapi potong sebesar Rp 29.401.533,00/tahun atau Rp

30 3.516.080,95/bulan. Kontribusi pendapatan usaha ternak sapi potong terhadap 31 pendapatan total rumah tangga peternak sebesar 30,32%. Hasil uji paired t test, 32 pendapatan peternak dari usaha ternak sapi potong berbeda nyata lebih kecil 33 dibandingkan dengan pendapatan dari luar usaha ternak sapi potong. Hasil analisis 34 regresi linier berganda, bahwa biaya produksi tidak tetap dan jumlah ternak 35 berpengaruh terhadap pendapatan usaha ternak sapi potong, sedangkan biaya produksi tetap tidak berpengaruh terhadap pendapatan usaha ternak sapi potong. 36 37 Kata kunci: kontribusi, pendapatan total rumah tangga, usaha ternak sapi potong,. 38

39

ABSTRACT

40 Beef cattle fattening is cultivated by farmers in Central Java, but the orientation of 41 farm has not been profit yet. The aims of this research was to analyze beef cattle 42 fattening farm income and its contribution to the total income of farmer household 43 and analyze the factors that influence beef cattle farm income. Research was carried 44 out in five regencies in Central Java Province namely Blora, Rembang, Grobogan, Wonogiri and Boyolali. Survey was used among 150 beef cattle farmers, while 45 46 multistage quota sampling was used as sampling method. Income analysis and 47 multiple linear regression were used for data analysis. Research result showed that 48 income of beef cattle is IDR 6,736,824.21/2.31 head/6.32 month or IDR 49 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 50 51 income is 30.32%. Based on the t test, the contribution of beef cattle farming had 52 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.

- 56 keywords: beef cattle farm, contribution, total farmer income
- 57
- 58

INTRODUCTION

59

60 Program Kecukupan Daging (PKD) or beef self sufficiency program is one 61 of strategies from the government to align between demand and national supply of 62 meat. Beef cattle have been played as one of important income for villagers in 63 Indonesia as well as family nutrient sources. Meat consumption from beef product 64 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 65 66 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 67 demand of beef product (Mersyah, 2005; Setiyono et al., 2007). It need 68 69 collaboration efforts from all stakeholders to improve production, marketing and 70 distribution of beef production (Bamualim et al., 2008). 71 Beef cattle farming system have been raised by the farmers and their family 72 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

74 (2006) told that beef cattle smallholder farming system had low productivity with

75 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 76 77 cattle population in Central Java Province from 2011-2015 were 1,937,551 78 head/cattle, 2,052,407 head/cattle, 1,500,077 head/cattle, 1,592,638 head/cattle, and 79 1,628,093 head/cattle, respectively. It had average growth rate of -3.14%/year or 80 low growth rate (Dinas Peternakan dan Kesehatan Hewan Jawa Tengah, 2015). 81 Farmers' orientation in beef cattle production system was as secondary income with 82 poor management practices and resources allocation have not been optimally 83 allocated. Prasetyo et al. (2006) told that farmers have not been thinking about 84 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 85 agribusiness system. Schimmelpfennig *et al.* (2006) said that farmers faced problem 86 87 related to low access to production process (marketing, credit, genetics). This 88 condition gave effects on low income and economic efficiency of production. 89 The aims of this research was to analyze income from beef cattle fattening

90 farm and its contribution to the total income of the farmer household, and to analyze 91 the factors (the number of beef cattle, fixed production costs, variable production 92 costs) that influence the beef cattle farm income. The result of the study can be used 93 for decision makers to improve productivity of smallholder farming system and the 94 development of knowledge related with social economic agriculture.

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133	varied, such as the area of land, fertility and types of plants and their livestock breed.
134	This research have tried to give recommendation for development of smallholder
135	farming system in Central Java Province in order to improve income and farmers'
136 1 3 6	welfare.
137 1 3 7	
138	Research object
139	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.

- 143 1 4 3

144 Reseach Methodology and Sampling Determination

145 Survey method was used in this research. The respondents were choosen 146 based on Multi Stage Quota Sampling Methods among 30 farmers in each regency. 147 The five regencies was choosen based on five biggest beef cattle population in 148 Central Java Province. Moreover, quota samping is a sampling method without 149 having consideration a sampling frame (Wirartha, 2006). It is a method to decide 150 sampling based on special quota in a particular area. In total there were 150 2 151 1 5 1 152 1

resp ondents (5 regencies x 30 respondents).

153 Data Collection and Data Analysis

- 154 Data collection is an activity to gather data and measure information based
- 155 on research variables in order to analyze research objective and hipothesis (Daniel,

156	2002). The p	rimary data were collected through cross section data and interview
157	method using	g questionnaire. The secondary data was used to improve data analysis.
158	Data were an	nalyzed through editing, koding, dan tabulating. Moreover, data were
159	analyzed usin	ng Income Analysis, the Paired t Test and Multiple Linear Regression
160	<mark>analysis.</mark>	
161	1. Beef cattle	e farmers income analysis
162	TC	= TVC + TFC (Ekowati <i>et al.</i> , 2014)
163	where	
164 165 166 167 168 169 170 171	TC TVC TFC TR TR Qi Hq _i	 Total cost (IDR) Total variable cost (IDR) Total fixed cost (IDR) Σ (Q_i. Hq_i) Total revenue (IDR) product quantity (kg) Price (IDR)
172	$\pi = T$	R – TC
173 174 175 176	where π TR TC	 : Income (IDR) : Total Revenue (IDR) : Total Cost (IDR)
177	2. Income fr	om Non-Beef cattle farming activities:
178 179 180 181 182 183	$\pi_{lt} = T$ where π_{lt} TR(1-n) TC(1-n)	<pre>TR(1-n) - TC(1-n) : Total income (IDR) : Total revenue (IDR). : Total cost (IDR).</pre>
184	3. The cont	ribution of beef catlle farming activites to household income.:
185 186 187 188 189 190 191	$ m K$ where $ m K$ $ m \pi$ $ m \pi_{fh}$	 = {π : π_{fh}} x 100% : the contribution of beef catlle farming activities to household income.(%) : Total income from beef cattle farming activities (IDR) : Total income of the farmer household(IDR)

192	4.	The effect of the number of beef cattle, fixed production costs and variable
193		production costs on beef cattle farm income is analyzed using Multiple Linear
194		Regression, with the formulation:
195		$Y = f(X_1, X_2, X_3, e)$
196		$Y = \alpha + b_1 X_1 + b_2 X_2 + b_3 X_3 + e$
197 198 <i>199</i> 200 201 202 203 204 205		 Where : Y : Beef cattle farm Income (IDR). A : <i>Intercept</i> b_i : Regression coeffisien. X₁ : Number of beef cattle (head) X₂ : Fixed production cost (IDR). X₃ : Variable production cost (IDR) E : Stochastic deviation
206 207		RESULTS AND DISCUSSION
208		Data analysis found that there were three types of cattle breeds to raised in
209	Cei	ntral Java. Ongole Crossbreed or peranakan ongole (PO) was the biggest cattle
210	bre	ad to raise (46%), it followed by Simmental – Ongole Crossbreed or simmental-
211	per	anakan ongole (SPO) (32.66%) and limousine-Ongole Crossbreed or limousine-
212	per	canakan ongole (LPO) (21.34%). Most of the farmers had 2.31 head/cattle and it
213	was	s raised for 6.32 months and average daily gain equal to 0.648 kg/cattle/day. The
214	ave	rage daily gain was lower than two researchs by Daryanti et al. (2002) and
215	Suł	biharta et al. (2000). Daryanti et al. (2002) stated that the average daily gain of
216	On	gole Crossbreed (PO) was 0.72 kg/cattle/day when the cows were fed by the
217	am	moniated rice straw and feed concentrat of 4 kg/cattle/day.In his research,
218	Suł	biharta et al. (2000) concluded that average daily gain was amounted to 1.18
219	kg/	cattle/day for LPO and 0.90 kg/cattle/day of SPO. This condition is also partly
220	due	to the fact that the management of beef cattle farm has not been based on a

commercial orientation. Dzanja *et 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).

227 The income or profit of the fattening beef cattle farm with an average scale 228 of 2.31 head per production period (an average of 6.32 months) is IDR 6,736,824.21 229 (equivalent to IDR 1,065,953.20/month). The ability of livestock capital to 230 generate income (profitability) is 19.29 percent. The profitability value when 231 compared to the interest rate of small-scale farmer loans, for example: Food and 232 Energy Security Credit (KKPE), People's Business Credit (KUR) with interest rates 233 of 6.00 percent, then beef cattle farm is feasible to be undertaken. Total Cost, total 234 revenue and income shows in Table 1.

235 The farmers income was higher than a research among PO cattle breed farmers in Eromoko District Wonogiri Regency by Prasetyo et al. (2005). The 236 237 research in 2005 told that (i) The cows had 100% ad libitum of forage and mixed 238 with three times feed concentrate per day would gained 0.785 kg/day with famers' 239 income amounted to IDR 637,230.95/head/3 months; (ii) The cows had 100% ad 240 libitum of forage and mixed with twice feed concentrate per day day would gained 241 0.629 kg/day with famers' income amounted to IDR 613,153.25/head/3 bulan; (iii) 242 The cows had twice feed resources per day day would gained 0.547 kg/day with 243 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 farm activities, salary as government institution or private sector, or as enterpreneurs were showed at Table 2.

253 Winarso and Basumo (2013) told that beef cattle farming system based on 254 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%.

259 The farmers income from non-beef cattle farming activities in these research 260 was higher than a research by Sugiarto and Syarifudin Nur (2015) in Banjarnegara. 261 It found that the farmers in Banjarnegara owned 3 head/cattle with farmers income 262 from beef cattle farming system were IDR 6,626,868.00/year; and non-beef cattle 263 farming system were IDR 19,891,410.00/year, respectively. The total income of the 264 farmer household that comes from the sum of beef cattle farm income and non-beef 265 catlle farm income, which is calculated on average in one month is IDR 266 3,516,080.95. Based on the value of the income it can be calculated that the beef

267 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 [(P<0.05)] to the contribution of nonbeef 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 that beef cattle fattening farming activities in Central Java Province was a secondary income. It need[s] efforts from

277 many stakeholders to develop strategies on how to improve the productivity.

278 According to Anggraini (2003), smallholder farming system need to intensively 279 developed in a more sustainable way in the future based on farmers income. Beef 280 cattle farm can be classified into four groups, namely: (i) side farm in addition to 281 the main farm (contribution of livestock farm revenue <30% of total income); (ii) 282 livestock farm as a branch of farm (livestock farm revenue contribution 30 - 70%) 283 of total income); (iii) livestock farm as the main farm (contribution of livestock 284 business income 70-100% of total income); (iv) livestock farm as an industry, 285 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 farmincome. It [is] presented on Table 3.

291 The results of the regression analysis showed that coefficient of determination (R^2) was 0.619, which means that the variation contained in the 292 293 dependent variable ie livestock farm income can be explained by variations in the 294 independent variables of 61.90 percent. The independent variable number of cattle 295 being cultivated and the variable production costs significantly influence the 296 dependent variable of farmer income, while the fixed costs have no significant 297 effect. The number of cattle has a positive correlation with beef cattle farm income, 298 while variable costs are negatively correlated. This shows that if the number of 299 cattle being cultivated is increased in number (assuming constant variable costs) it 300 will be able to increase the income of farmers, but if the variable costs are increased 301 in number (assuming the number of cattle being cultivated is fixed), then it will 302 actually reduce the income of farmers. Of the two independent factors that have 303 significant influence, reducing the amount of variable costs (efficiency of 304 production costs) is the main priority to increase farmers' income, then followed by 305 an increase in the number of cattle being cultivated.

306306 **307**

CONCLUSION

308308

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 nonbeef 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

313	compared to income from non-beef catlle farming farm. The contribution of beef
314	cattle farming farm to household income was 30.32%. Variable cost of production
315	and the number of beef cattle being cultivated have a significant effect on beef cattle
3163 1 6	farm income, while the fixed costs of production have no significant effect.
3173 1 7	
318	RECOMMENDATION
319	Efficient use of variable cost of production and an increase in the number of
320	beef cattle being cultivated have real potential to increase the income of smallholder
3213 2 1	beef cattle businesses.
3223 2 2	
3223 2 2 323	ACKNOWLEDGMENTS
3223 2 2 323 324	ACKNOWLEDGMENTS The source of funding for study (contract number and year of funding):
3223 2 2 323 324 325	ACKNOWLEDGMENTS The source of funding for study (contract number and year of funding): Direktorat Riset dan Pengabdian Masyarakat Direktorat Jenderal Penguatan Riset
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402	

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

405

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

406

407 Table 2. The Average of Non-Beef Cattle Farmers Income408

No	Source of Income	IDP /vear	Percentage
110.	Source of meome	IDK/yeai	(%)
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

409

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

411 the Beef Cattle Farmers Income.

<mark>Model</mark>	Unstand Coeffic	Unstandardized Coefficients		T	<mark>Sig.</mark>
	B	Std. Error	<mark>Beta</mark>		
Constant	<mark>3209032.736</mark>	<mark>2405928.063</mark>		<mark>1.334</mark>	<mark>0.184</mark>
Number of beef	13480847.551	1112147.862	<mark>0.781</mark>	<mark>12.121</mark>	<mark>0.000</mark>
<mark>cattle</mark>	<mark>-0.077</mark>	<mark>0.949</mark>	-0.005	<mark>-0.081</mark>	<mark>0.936</mark>

	Fixed cost	-0.856	<mark>0.060</mark>	<mark>-0.915</mark>	<mark>-14.375</mark>	<mark>0.000</mark>
	Variable cost Dependent Variable	e: Beef cattle farmers	income (IDI	<mark>?).</mark>		
413						
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418	Comment to author					
419	Please see our comm	ents carefully in the	manuscript			
420	Overall, this manusc	ript should be re-wri	tten and pleas	se change f	he proper	word
421	and proper english to	o expose your data				
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423	Detail comments:					
424	Komentar [.]					
425	Secara keseluruhan r	nakalah ini hanya "n	nelaporkan" k	condisi pet	ernakan sa	pi
426	potong di Jawa Teng	ah. Makalah ini akar	n lebih menar	ik bila dio	lah ke arah	
427	"model", sehingga al	kan muncul strategi y	yang dapat di	rekomenda	asikan untu	ı <mark>k</mark>
428	memperbaiki atau m	eningkatkan kondisi	peternakan ra	ı <mark>kyat.</mark>		
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430	1. Bahasa inggris ma	isih buruk. Pengguna	an kata "said	, told" unt	uk bahasa t	ulis.
431	sangat mengganggu,	demikian juga denga	an penggunaa	ın istilah "o	cattle, cow	and
432	etc"					
433	2. Uji paired t-test se	pertinya tidak tepat.	Uji paired t-t	est lazimn	ya digunak	an
434	untuk objek/materi y	ang sama yang mend	lapat perlaku	an (seperti	before vs a	after).
435	Sementara di penelit	ian ini, hal tersebut t	idak ada (tida	k tergamb	ar?)	
436	3. Diskusi sangat mi	skin (hanya melaporl	kan hasil dan	mengkonf	irmasi den	gan
437	referensi lain). Shari	ng knowledge "know	v-how" nya ti	dak ada.		_
438	4. Saran, dibongkar (dan ditulis ulang ke a	ran "modelin	ig", maka i	taktor2 per	Igarun
439	akan menjadi jelas d	an sangat dapat direk	comendasikar	i. Jumian s	атріе сик	up
440	untuk ke arak model	ling yang simple but	powerfull.			
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1 Please revise your manuscript as 2 provided comments and resubmit. Overal 3 comments was provided in the last page, 4 5 please see carefully. 6 7 8 9 10 The contribution of beef cattle income to total income of farmer household 11 (Prasetyo et al.) 12 13 The analysis of beef cattle fattening farm income 14 and its contribution to the total income of farmer household in Central Java Province 15 16 17 18 19 20 21 22 ABSTRAK 23 Usaha ternak sapi potong pola penggemukan banyak diusahakan oleh peternak 24 rakyat di Jawa Tengah, namun orientasi usahanya belum mengarah ke profit. 25 Tujuan penelitian adalah menganalisis kontribusi pendapatan usaha ternak sapi 26 potong pola penggemukan terhadap total pendapatan rumah tangga peternak, dan 27 menganalisis faktor-faktor yang mempengaruhi pendapatan usaha ternak sapi 28 potong. Penelitian dilakukan pada lima kabupaten sentra produksi sapi potong di 29 Jawa Tengah. Penelitian dilakukan dengan metode survai, 150 sampel responden 30 ditentukan dnegan metode Multi Stage Quota Sampling. Data dianalisis dengan 31 Analisis Pendapatan dan Regresi Linier Berganda. Hasil penelitian menunjukkan 32 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 33 34 usaha ternak sapi potong sebesar Rp 29.401.533,00/tahun atau Rp

35 3.516.080,95/bulan. Kontribusi pendapatan usaha ternak sapi potong terhadap 36 pendapatan total rumah tangga peternak sebesar 30,32%. Hasil uji paired t test, 37 pendapatan peternak dari usaha ternak sapi potong berbeda nyata lebih kecil 38 dibandingkan dengan pendapatan dari luar usaha ternak sapi potong. Hasil analisis 39 regresi linier berganda, bahwa biaya produksi tidak tetap dan jumlah ternak 40 berpengaruh terhadap pendapatan usaha ternak sapi potong, sedangkan biaya 41 produksi tetap tidak berpengaruh terhadap pendapatan usaha ternak sapi potong. 42 Kata kunci: kontribusi, pendapatan total rumah tangga, usaha ternak sapi potong,.

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ABSTRACT

45 Beef cattle fattening is cultivated by farmers in Central Java, but the orientation of 46 farm has not been profit yet. The aims of this research was to analyze beef cattle 47 fattening farm income and its contribution to the total income of farmer household 48 and analyze the factors that influence beef cattle farm income. Research was carried 49 out in five regencies in Central Java Province namely Blora, Rembang, Grobogan, Wonogiri and Boyolali. Survey was used among 150 beef cattle farmers, while 50 51 multistage quota sampling was used as sampling method. Income analysis and 52 multiple linear regression were used for data analysis. Research result showed that 53 income of beef cattle is IDR 6,736,824.21/2.31 head/6.32 month or IDR 54 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 55 56 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 57

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.

- 61 keywords: beef cattle farm, contribution, total farmer income
- 62
- 63

INTRODUCTION

64

65 Program Kecukupan Daging (PKD) or beef self sufficiency program is one 66 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 67 68 Indonesia as well as family nutrient sources. Meat consumption from beef product 69 have been increased, however national meat production have not been fulfil national 70 consumption. Widiati (2014) said that more than 90% of local beef supply comes 71 from less efficient community farms, so the growth of local beef production has not 72 been able to meet national demand. Hence, there was gab between supply and demand of beef product (Mersyah, 2005; Setiyonoet al., 2007). It need 73 74 collaboration efforts from all stakeholders to improve production, marketing and 75 distribution of beef production (Bamualim et al., 2008). 76 Beef cattle farming system have been raised by the farmers and their family 77 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
- 79 (2006) told that beef cattle smallholder farming system had low productivity with
- 80 2-4head/cattle. In adddition, it is based on traditional farming system relied on

81 family labour and have not been intensively developed to improve income. Beef 82 cattle population in Central Java Province from 2011-2015 were 1,937,551 83 head/cattle, 2,052,407 head/cattle, 1,500,077 head/cattle, 1,592,638 head/cattle, and 84 1,628,093 head/cattle, respectively. It had average growth rate of -3.14%/yearor 85 low growth rate (Dinas Peternakan dan Kesehatan Hewan Jawa Tengah, 2015). 86 Farmers' orientation in beef cattle production system was as secondary income with 87 poor management practices and resources allocation have not been optimally 88 allocated. Prasetyo et al. (2006) told that farmers have not been thingking about 89 commercial farming. Meanwhile Putriet al. (2014) stated that efforts to increase beef cattle business production and increase farmers' income can be done with the 90 91 agribusiness system. Schimmelpfennig et al. (2006) said that farmers faced problem 92 related to low access to production process (marketing, credit, genetics). This 93 condition gave effects on low income and economic efficiency of production. 94 The aims of this research was to analyze income from beef cattle fattening

95 farm and its contribution to the total income of the farmer household, and to analyze 96 the factors (the number of beef cattle, fixed production costs, variable production 97 costs)that influence the beef cattle farm income. The result of the study can be used 98 for decision makers to improve productivity of smallholder farming system and the 99 development of knowledge related with social economic agriculture.

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- 107



138	varied, such as the area of land, fertility and types of plants and their livestock breed.
139	This research have tried to give recommendation for development of smallholder
140	farming system in Central Java Province in order to improve income and farmers'
141 1 4 1	welfare.
142 1 4 2	
143	Research object
144	Beef cattle fattening farm system was a unit elementer in the reseach.
145	Research was carried out in May-August 2017 in five regencies in Central Java
146	Province (Blora, Rembang, Grobogan, Wonogiri, dan Boyolali). The location was

- 147 1 choosen because it has biggest population of beef cattle in Central Java Province.
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- 148 1 4 8

149 Reseach Methodology and Sampling Determination

150 Survey method was used in this research. The respondents were choosen 151 based on Multi Stage Quota Sampling Methods among 30 farmers in each regency. 152 The five regencies was choosen based on five biggest beef cattle population in 153 Central Java Province. Moreover, quota samping is a sampling method without 154 having consideration a sampling frame (Wirartha, 2006). It is a method to decide 155 sampling based on special quota in a particular area. In total there were 150 7 1561 5 6 157 1

resp ondents (5 regencies x 30 respondents).

158 Data Collection and Data Analysis

- 159 Data collection is an activity to gather data and measure information based
- 160 on research variables in order to analyze research objective and hipothesis (Daniel,

161	2002). The j	primary data were collected throughcross section data and interview			
162	method using questionnaire. The secondary data was used to improve data analysis.				
163	Data were an	nalyzed through editing, koding, dan tabulating. Moreover, data were			
164	analyzed usi	ng Income Analysis, the Paired t Test and Multiple Linear Regression			
165	analysis.				
166	1. Beef cattle	e farmers income analysis			
167	TC	= TVC + TFC (Ekowati <i>et al.</i> , 2014)			
168	where				
169	ТС	· Total cost (IDR)			
170	TVC	· Total variable cost (IDR)			
171	TFC	· Total fixed cost (IDR)			
172	TR	$\Sigma (O_i H q_i)$			
173	TR	· Total revenue (IDR)			
174	Oi	· product quantity (kg)			
175	Ha	· Price (IDR)			
176	IIq				
177	$\pi = T$	TR – TC			
178	where				
179	π	: Income (IDR)			
180	TR	: Total Revenue (IDR)			
181	TC	: Total Cost (IDR)			
182	2. Income fr	om Non-Beef cattle farming activities:			
183	$\pi_{\mathrm{lt}} = 7$	$TR_{(1-n)} - TC_{(1-n)}$			
184	where				
185	π_{lt}	: Total income (IDR)			
186	$TR_{(1-n)}$: Total revenue (IDR).			
187	$TC_{(1-n)}$: Total cost (IDR).			
188					
189	3. The cont	ribution of beef catlle farming activites to household income.:			
190	Κ	$= \{\pi : \pi_{\rm fh}\} \ge 100\%$			
191	where				
192	Κ	: the contribution of beef catlle farming activites to household			
193		income.(%)			
194	π	: Total income from beef cattle farming activities (IDR)			
195	π_{fh}	: Total income of the farmer household(IDR)			
196					

197	4.	The effect of the number of beef cattle, fixed production costs and variable
198		production costs on beef cattle farm income is analyzed using Multiple Linear
199		Regression, with the formulation:
200		$Y = f(X_1, X_2, X_3, e)$
201		$Y = \alpha + b_1 X_1 + b_2 X_2 + b_3 X_3 + e$
202 203 204 205 206 207 208 209 210		 Where : Y : Beef cattle farm Income (IDR). A : <i>Intercept</i> b_i : Regression coeffisien. X₁ : Number of beef cattle (head) X₂ : Fixed production cost (IDR). X₃ : Variable production cost (IDR) E : Stochastic deviation
211 212		RESULTS AND DISCUSSION
213		Data analysis found that there were three types of cattle breeds to raised in
214	Cei	ntral Java. Ongole Crossbreed or peranakanongole(PO)was the biggest cattle
215	bre	ad to raise (46%), it followed by Simmental – Ongole Crossbreed or simmental-
216	per	canakanongole (SPO) (32.66%) and limousine-Ongole Crossbreed or limousine-
217	per	vanakan ongole (LPO) (21.34%). Most of the farmers had 2.31 head/cattle and it
218	was	s raised for 6.32 months and average daily gain equal to 0.648 kg/cattle/day. The
219	ave	brage daily gain was lower than two researchs by Daryanti et al. (2002) and
220	Sub	pihartaet al. (2000). Daryanti et al. (2002) stated that the average daily gain of
221	On	gole Crossbreed (PO) was 0.72 kg/cattle/day when the cows were fed bythe
222	am	moniated rice straw and feed concentrat of 4 kg/cattle/day.In his research,
223	Suł	pihartaet al. (2000) concluded that average daily gain was amounted to1.18
224	kg/	cattle/day for LPO and 0.90 kg/cattle/day of SPO. This condition is also partly
225	due	e to the fact that the management of beef cattle farm has not been based on a

commercial orientation. Dzanja*et 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).

232 The income or profit of the fattening beef cattle farm with an average scale 233 of 2.31 head per production period (an average of 6.32 months) is IDR 6,736,824.21 234 (equivalent to IDR 1,065,953.20/month). The ability of livestock capital to 235 generate income (profitability) is 19.29 percent. The profitability value when 236 compared to the interest rate of small-scale farmer loans, for example: Food and 237 Energy Security Credit (KKPE), People's Business Credit (KUR) with interest rates 238 of 6.00 percent, then beef cattle farm is feasible to be undertaken. Total Cost, total 239 revenue and income shows in Table 1.

240 The farmers income was higer than a research among PO cattle breed 241 farmers in Eromoko District Wonogiri Regency by Prasetyoet al. (2005). The 242 research in 2005 told that (i) The cows had 100% ad libitum of forage and mixed 243 with three times feed concentrate per day would gained 0.785 kg/day with famers' 244 income amounted to IDR 637,230.95/head/3months; (ii) The cows had 100% ad 245 libitum of forage and mixed with twice feed concentrate per day day would gained 246 0.629 kg/day with famers' income amounted to IDR 613,153.25/head/3 bulan; (iii) 247 The cows had twice feed resources per day day would gained 0.547 kg/day with 248 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%.

264 The farmers income from non-beef cattle farming activities in these research 265 was higher than a research by Sugiarto and Syarifudin Nur (2015) in Banjarnegara. 266 It found that the farmers in Banjarnegara owned 3 head/cattle with farmers income 267 from beef cattle farmingsystem were IDR 6,626,868.00/year; and non-beef cattle 268 farming system were IDR 19,891,410.00/year, respectively. The total income of the 269 farmer household that comes from the sum of beef cattle farm income and non-beef 270 catlle farm income, which is calculated on average in one month is IDR 271 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.

276 Based on t test analysis or paired t test, the contribution of beef cattle farming 277 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 278 279 was lower than non-beef cattle farming activities in smallholder farming system 280 level.It can be said thatbeef cattle fattening farming activities in Central Java 281 Province was a secondary income. It need efforts from many stakeholders to 282 develop strategies on how to improve the productivity. According to Anggraini 283 (2003), smallholder farming system need to intensively developed in amore 284 sustainable way in the future based on farmers income. Beef cattle farm can be 285 classified into four groups, namely: (i) side farm in addition to the main farm 286 (contribution of livestock farm revenue <30% of total income);(ii) livestock farm 287 as a branch of farm (livestock farm revenue contribution 30 - 70% of total income); 288 (iii) livestock farm as the main farm (contribution of livestock business income 70-289 100% of total income); (iv) livestock farm as an industry, where livestock are 290 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 farmincome. It presented on Table 3.

296 The results of the regression analysis showed that coefficient of determination (R^2) was 0.619, which means that the variation contained in the 297 298 dependent variable ie livestock farm income can be explained by variations in the 299 independent variables of 61.90 percent. The independent variable number of cattle 300 being cultivated and the variable production costs significantly influence the 301 dependent variable of farmer income, while the fixed costs have no significant 302 effect. The number of cattle has a positive correlation with beef cattle farm income, 303 while variable costs are negatively correlated. This shows that if the number of 304 cattle being cultivated is increased in number (assuming constant variable costs) it 305 will be able to increase the income of farmers, but if the variable costs are increased 306 in number (assuming the number of cattle being cultivated is fixed), then it will 307 actually reduce the income of farmers. Of the two independent factors that have 308 significant influence, reducing the amount of variable costs (efficiency of 309 production costs) is the main priority to increase farmers' income, then followed by 310 an increase in the number of cattle being cultivated.

311311

312 CONCLUSION

313313

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 nonbeef 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

318	compared to income from non-beef catlle farming farm. The contribution of beef
319	cattle farming farm to household income was 30.32%. Variable cost of production
320	and the number of beef cattle being cultivated have a significant effect on beef cattle
3213 2 1	farm income, while the fixed costs of production have no significant effect.
3223 2 2	
323	RECOMMENDATION
324	Efficient use of variable cost of production and an increase in the number of
325	beef cattle being cultivated have real potential to increase the income of smallholder
3263 2 6	beef cattle businesses.
3273 2 7	
3273 2 7 328	ACKNOWLEDGMENTS
3273 2 7 328 329	ACKNOWLEDGMENTS The source of funding for study (contract number and year of funding):
3273 2 7 328 329 330	ACKNOWLEDGMENTS The source of funding for study (contract number and year of funding): Direktorat Riset dan Pengabdian Masyarakat Direktorat Jenderal Penguatan Riset
3273 2 7 328 329 330 331	ACKNOWLEDGMENTS The source of funding for study (contract number and year of funding): Direktorat Riset dan Pengabdian Masyarakat Direktorat Jenderal Penguatan Riset dan Pengembangan Kementerian Riset, Teknologi, dan Pendidikan Tinggi Sesuai
3273 2 7 328 329 330 331 3323 2	ACKNOWLEDGMENTS The source of funding for study (contract number and year of funding): Direktorat Riset dan Pengabdian Masyarakat Direktorat Jenderal Penguatan Riset dan Pengembangan Kementerian Riset, Teknologi, dan Pendidikan Tinggi Sesuai dengan Kontrak Penelitian Nomor: 343-14/UN7.5.1/PP/2017.
3273 2 7 328 329 330 331 3323 3 2 3333 3 3 3	ACKNOWLEDGMENTS The source of funding for study (contract number and year of funding): Direktorat Riset dan Pengabdian Masyarakat Direktorat Jenderal Penguatan Riset dan Pengembangan Kementerian Riset, Teknologi, dan Pendidikan Tinggi Sesuai dengan Kontrak Penelitian Nomor: 343-14/UN7.5.1/PP/2017.
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340 bangan sapi potong di Indonesia. Prosiding Seminar Nasional Pengem-

341	bangan Sapi Potong untuk Mendukung Percepatan Pencapaian Swa-
342	sembada Daging Sapi 2008-2010. Palu, 24 November 2008. Hal. 4-12.
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407	

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

410

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

411

412 Table 2. The Average of Non-Beef Cattle Farmers Income413

No	Source of Income	IDP /vear	Percentage
110.	Source of income	IDK/yeai	(%)
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

414

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

Model	Unstandardized Coefficients		Stand. Coef.	Т	Sig.
	В	Std. Error	Beta		_
Constant	3209032.736	2405928.063		1.334	0.184
Number of beef	13480847.551	1112147.862	0.781	12.121	0.000
cattle	-0.077	0.949	-0.005	-0.081	0.936

	Fixed cost	-0.856	0.060	-0.915	-14.375	0.000
	Variable cost					
	Dependent Variables	Beef cattle farm	ers income (IDI	R).		
418						
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422	Comment from Rev	viewer				
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424	concerning with the background of study. The gap analyse and					
425	novelty of st	udy have to be	clearly stated			
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429	publications.					
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This is the final process of substantial review. 1 2 Editor will send this to the copy editor to do 3 the further process. However, the revision is 4 still required and please revise as our 5 6 comments. 7 8 9 10 The contribution of beef cattle income to total household income 11 12 An income analysis of beef cattle fattening system and its contribution 13 to the total household income in Central Java Province 14 15 16 E. Prasetvo¹, T. Ekowati¹, S. Gavatri¹ 17 ¹Faculty of Animal and Agricultural Sciences, Diponegoro University, 18 Tembalang Campus, Semarang 50275, Indonesia 19 *Corresponding E-mail: edyprsty@yahoo.com 20 21 22 ABSTRAK 23 24 Usaha ternak sapi potong pola penggemukan banyak diusahakan oleh peternak rakyat di 25 Jawa Tengah, namun orientasi usahanya belum mengarah ke profit. Tujuan penelitian 26 adalah menganalisis pendapatan usaha ternak sapi potong pola penggemukan dan 27 kontribusinya terhadap total pendapatan rumah tangga peternak, dan menganalisis 28 pengaruh biaya produksi dan jumlah ternak sapi potong yang diusahakan terhadap 29 pendapatan usaha ternak. Penelitian dilakukan pada lima kabupaten sentra produksi sapi 30 potong di Jawa Tengah. Penelitian dilakukan dengan metode survai sebanyak 150 31 responden, sedangkan penentuan responden menggunakan metode Multi Stage Quota 32 Sampling. Data dianalisis menggunakan analisis pendapatan, paired t-test dan regresi linier 33 berganda. Hasil penelitian menunjukkan, bahwa pendapatan peternak dari usaha ternak sapi 34 potong pola penggemukan pada skala usaha rata-rata 2,31 ekor selama satu periode 35 penggemukan (6,32 bulan) adalah sebesar Rp 6.736.824,21 (setara dengan Rp 36 1.065.953,20/bulan), dan pendapatan peternak yang berasal dari luar usaha ternak sapi 37 potong sebesar Rp 29.401.533,00/tahun (setara Rp 3.516.080,95/bulan). Kontribusi 38 pendapatan usaha ternak sapi potong terhadap pendapatan total rumah tangga peternak 39 sebesar 30,32%. Hasil uji statistik dengan *paired t test*, bahwa besarnya pendapatan 40 peternak yang berasal dari usaha ternak sapi potong secara signifikan berbeda dengan 41 pendapatan peternak yang berasal dari luar usaha ternak sapi potong, dimana pendapatan 42 yang berasal dari luar usaha ternak sapi potong lebih besar dibandingkan pendapatan usaha 43 ternak sapi potong. Biaya produksi variabel, dan jumlah ternak berpengaruh nyata terhadap 44 pendapatan usaha ternak sapi potong, sedangkan biaya produksi tetap tidak berpengaruh 45 nyata. 46 Kata kunci: kontribusi, pendapatan, usaha ternak sapi potong 47 48 ABSTRACT 49

50 Beef cattle fattening is raised by farmers in Central Java, however the farm orientation is 51 not economically viable. The aims of this research were to analyze the farmer' income of 52 beef cattle fattening system and its contribution to the total household income and to 53 analyze the influence of production costs and farm size toward beef cattle farm income.

54 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 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 average farm size was 2.31 head for fattening period of 6.32 month as well as income of beef cattle farmer was IDR 6,736,824.21 or equal to IDR

1,065,953.20/month. Moreover, average of net income of farm households from non-beef
cattle farm was IDR 29,401,533.00/year or equal to IDR 3,516,080.95/month. The

62 contribution of beef cattle farm to household farmer's income was 30.32%. Based on the 63 paired t test, the contribution of beef cattle farming had significant different to the 64 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 had a significant effect on beef cattle farm income, while the fixed cost had nosignificant effect.

68 keywords: beef cattle farm, contribution, farmer' income69

70

71

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 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

87 addition, it is based on traditional farming system relied on family labour and have not 88 been intensively developed to improve income. Beef cattle population in Central Java 89 Province from 2014-2018 were 1,937,551 head/cattle, 2,052,407 head/cattle, 1,500,077 90 head/cattle, 1,592,638 head/cattle, and 1,628,093 head/cattle, respectively. It had average 91 growth rate of -3.14%/year or low growth rate (Office of Animal Husbandry and Animal 92 Health, Central Java Province, 2015). Farmers' orientation in beef cattle production system 93 was as side income with poor management practices and resources allocation also have not 94 been optimally allocated. Farmers have not been thinking about commercial farming

94 been optimally anocated. Farmers have not been unifiling about commercial farming 95 (Prasetyo *et al.*, 2006). Meanwhile Putri *et al.* (2014) stated that efforts to increase beef

96 cattle business production and increase farmers' income can be done with the agribusiness

97 system. Farmers faced problem related to low access to production process (marketing,

98 credit, genetics) (Schimmelpfennig *et al.*, 2006). This condition gave effects on low income

99 and economic efficiency of production (Dzanja *et al.*, 2013).

100 The aims of this research were to analyze the farmer' income of beef cattle 101 fattening system and its contribution to the total household income and to analyze the 102 influence of production costs and farm size toward beef cattle farm income. The result of 103 the study can be used for decision makers to improve productivity of smallholder farming 104 system and the development of knowledge related with social economic factors. 105 105

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107107

MATERIALS AND METHODS

108 Theoretical Framework

109 Beef cattle farming activity is not a main source of income apart from other rural 110 farm activities and it is based on smallholder farming system. The beef cattle farming 111 system have not been intensively developed, hence it has led to farmers' difficulties to 112 increase income. Farmers' faces several problems such as low management in farming 113 system or adaptation new technology as well as bargaining position and bargaining power 114 (Setianto et al., 2014). Government have been developed policy to improve implementation 115 technology and optimization of resources allocation. Verschelde et al. (2013) described 116 that on-farm activities, the resources owned by farmers in developing countries are small 117 and the agricultural environment is limited and varied, such as scarcity of land, soil fertility 118 and low quality of forage as well as low input of breeding program. This research have 119 tried to give recommendation for development of smallholder farming system in Central 120 Java Province in order to improve income and farmers' welfare based on analyzing social 121 and economic factors, especially analyzing farmer' income.

122122

123 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.

128128

129 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

133 Province. Moreover, quota samping is a sampling method without having consideration a

134 sampling frame (Wirartha, 2006). It is a method to decide sampling based on special quota
135 in a particular area. In total there were 150 respondents (5 regencies x 30 respondents).

136136

137 Data Collection and Data Analysis

138 Data collection is an activity to gather data and measure information based on 139 research variables in order to analyze research objective and hipothesis. The primary data 140 were collected through cross section data and interview method using questionnaire. The 141 secondary data were used to improve data analysis. Data were analyzed through editing, 142 coding, dan tabulating. Moreover, data were analyzed using Income Analysis, the Paired t 143 Test and Multiple Linear Regression analysis.

144 1. Beef cattle farmers income analysis

145	TC	= TVC + TFC (Ekowati <i>et al.</i> , 2014)
146	where	
147	TC	: Total cost (IDR)
148	TVC	: Total variable cost (IDR)

149 TFC : Total fixed cost (IDR)

150	TR	$\Sigma (Q_i, Hq_i)$	
151	TR	: Total revenue (IDR)	
152	Qi	: product quantity (kg)	
153	Hqi	: Price (IDR)	
154	-		
155	$\pi = 1$	TR – TC	
156	where		
157	π	: Income (IDR)	
158	TR : Tota	al Revenue (IDR)	
159	TC	: Total Cost (IDR)	
160	2. Income fr	om Non-Beef cattle farming activities:	
161	$\pi_{ m lt}$ = '	$TR_{(1-n)} - TC_{(1-n)}$	
162	where		
163	$\pi_{ m lt}$: Total income (IDR)	
164	$TR_{(1-n)}$: Total revenue (IDR).	
165	$TC_{(1-n)}$: Total cost (IDR).	
166	()		
167	3. The cont	ribution of beef catlle farming activites to household income.:	
168	K	$= \{\pi : \pi_{\text{fh}}\} \ge 100\%$	
169	where		
170	Κ	: the contribution of beef catlle farming activites to household income.(%)	
171	π	: Total income from beef cattle farming activities (IDR)	
172	$\pi_{ m fh}$: Total income of the farmer household(IDR)	
173			
174	4. The effe	ct of the number of beef cattle, fixed production costs and variable production	
175	costs on beef cattle farm income was analyzed using Multiple Linear Regression, with		
176	the formulation:		
177	$\mathbf{Y} = \mathbf{f}$	$f(X_1, X_2, X_3, e)$	
178	$\mathbf{Y} = 0$	$a + b_1X_1 + b_2X_2 + b_3X_3 + e$	
179			
180	Y : Beef	cattle farm Income (IDR).	
181	A : Intercept		
182	b _i : Regression coeffisien.		
183	X_1 : Number of beef cattle (head)		
184	X_2 : Fixed production cost (IDR).		
185	X_3 : Variable production cost (IDR)		
186	E : Stocl	hastic deviation	
1871	87		
188		RESULTS AND DISCUSSION	
189	Cent	ral Java Province is one of the centers for beef cattle production in Indonesia.	
190	Beef cattle c	Beef cattle commodities from Central Java are needed to meet demand from other areas	
191	such as: Jakarta, West Java, Yogyakarta. Beef cattle sector is one of source of livelihood		
192	for people in Central Java. Based on the interview with respondents, farmer keep their beef		
193	cattle in order to overcome failure in crop production and as a source of investment for		
194	their family. In addition, beef cattle product has an important contribution for food supply		
195	for community. In order to meet the national demand, the Indonesian government in 2007		
196	launched the Beef Self-Sufficiency Program with a target to fulfill national demand of local		
197	beef cattle up to 90 - 95% in 2014. Beef cattle production in Central Java is not only raised		
198	for meat production, but also utilize as a genetic improvement of breeding program (Office		
199	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.

204 Data analysis found that there were three types of cattle breeds to raised in Central 205 Java. Ongole Crossbreed or *peranakan ongole* (PO) was the biggest cattle breed to raise 206 (46%), it followed by Simmental – Ongole Crossbreed or *simmental-peranakan ongole* 207 (SPO) (32.66%) and limousine-Ongole Crossbreed or *limousine-peranakan ongole* (LPO) 208 (21.34%). Most of the farmers had 2.31 head/cattle and it was raised for 6.32 months and 209 average daily gain equal to 0.65 kg/cattle/day. The average daily gain was lower than two 210 researchs by Daryanti et al. (2002) and Subiharta et al. (2000). Daryanti et al. (2002) 211 explained that the average daily gain of Ongole Crossbreed (PO) was 0.72 kg/cattle/day 212 when the cows were fed by the ammoniated rice straw and feed concentrate of 4 213 kg/cattle/day. In his research, Subiharta et al. (2000) concluded that average daily gain was 214 amounted to 1.18 kg/cattle/day for LPO and 0.90 kg/cattle/day of SPO. This condition is 215 also partly due to the fact that the management of beef cattle farm has not been based on a 216 commercial orientation. Farmers with low managerial ability could not utilize knowledge 217 in raising livestock, hence that farmers would get a small profit and economic conditions 218 would remain poor. The low productivity of fattening farming system in Central Java can 219 be explained by the low feed quality resources, limited access to high-quality genetics, and

220 feed efficiency.

221 The income or profit of the fattening beef cattle farm with an average scale of 2.31 222 head per production period (an average of 6.32 months) was IDR 6,736,824.21 (equivalent 223 to IDR 1,065,953.20/month). To determine of net income was based on subtracting 224 production costs from revenue generated by the farmer. Meanwhile, the ability of livestock 225 capital to generate income (profitability) was 19.29%. It means, farmer's expenses of 226 production costs in beef cattle fattening system for 6,32 months will earn net income of 227 19,29%. The profitability value when compared to the interest rate of small-scale farmer 228 loans, for example: Food and Energy Security Credit (Kredit Ketahanan Pangan dan 229 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 revenueand income are presented in Table 1.

232 The farmers' income was higher than that obtained in a research among PO cattle 233 breed farmers in Eromoko District Wonogiri Regency. A research in 2005 by Prasetyo et 234 al. (2005) explained that (i) The cows had 100% ad libitum of forage and mixed with three 235 times feed concentrate per day would gained 0.785 kg/day with famers' income amounted 236 to IDR 637,230.95/head/3 months; (ii) The cows had 100% ad libitum of forage and mixed 237 with twice feed concentrate per day day would gained 0.629 kg/day with famers' income 238 amounted to IDR 613,153.25/head/3months; (iii) The cows had twice feed resources per 239 day would gained 0.547 kg/day with famers income amounted to IDR 240 412,739.97/head/3months. The difference in the value of income is due to the difference in 241 research time, so it affects the price of production inputs and production output. However, 242 based on a comparison of body weight gain, it resulted a good productivity (average body 243 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 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.

253 Based on the result, the contribution of beef cattle farming system to household 254 income was 30.32%. The farmers income from non-beef cattle farming activities in these 255 research was higher than a research by Sugiarto and Syarifudin Nur (2015) in Banjarnegara. 256 It found that the farmers in Banjarnegara owned 3 head/cattle with farmers income from 257 beef cattle farming system were IDR 6,626,868.00/year; and non-beef cattle farming 258 system were IDR 19,891,410.00/year, respectively. The total income of the farmer 259 household that comes from the sum of beef cattle farm income and non-beef cattle farm 260 income, which is calculated on average in one month wasIDR 3,516,080.95. Based on the 261 value of the income it can be calculated that the beef cattle fattening farm contributes to the 262 total income of farmer household 30.32%. This condition is slightly higher than the results 263 of Hartono and Rohaeni's (2014), which states that the contribution of people's beef cattle 264 farm income to total family income ranges from 15-25%. It can be seen that there was 265 improvement in facilities and access provided by the government in Central Java Province 266 from 2014 (such as: access to credit, feed subsidies, breeding program), hence resulted for 267 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 develop, 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.

287 The results of the regression analysis showed that coefficient of determination 288 (R^2) was 0.619, which means that the variation contained in the dependent variable i.e 289 livestock farm income can be explained by variations in the independent variables of 290 61.90%. The independent variable number of cattle being cultivated and the variable 291 production costs significantly influence the dependent variable of farmer income, while the 292 fixed costs have no significant effect. The number of cattle has a positive correlation with 293 beef cattle farm income, while variable costs are negatively correlated. This shows that the 294 number of cattle being raised is increased in number (assuming constant variable costs) it 295 will be able to increase the income of farmers, but if the variable costs are increased in 296 number (assuming the number of cattle being raised is fixed), then it will actually reduce 297 the income of farmers. Based on two independent factors that had significant influence, 298 reducing the amount of variable costs (efficiency of production costs) is the main priority 299 to increase farmers' income, then followed by an increase in the number of cattle being

300 raised by farmers. Increasing number of farm size (number of cattle) will increase farmers' 301 income. It resulted efficiency of production costs, such as: feed cost, cost for breeding

302 program and labor cost.

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CONCLUSION

306 The income from beef cattle fattening activities was amounted to IDR 6,736,824.21 307 or IDR 1,065,953.20/month. Moreover, the farmers income from non-beef catlle farm was 308 IDR 31,201,533.00/year or IDR 2,600,127.75/month. The income from beef cattle 309 fattening farm was significantly different and smaller compared to income from non-beef 310 catlle farming farm. The contribution of beef cattle farming farm to household income was 311 30.32%. Variable cost of production and the number of beef cattle being raised had a 312 significant effect on beef cattle farm income, while the fixed costs of production had no 313 significant effect.

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RECOMMENDATION

316 Efficient use of variable cost of production and an increase in the number of beef 317 cattle being raised by farmers have potency to increase the income of smallholder beef cattle farming system. Developing strategy for beef cattle development program need to 318 319 consider technical and socio-economic dimensions. Firstly, with assistance from 320 government institution, farmers need to adapted to capital conditions and production 321 systems in order to improve their productivity based on on-farm interventions. Secondly, 322 it need improvement in institutional capability, including increasing support services 323 including research collaboration, increase the role of farmer group, as well as improve 324 access to training program, processing, marketing and credit.

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400	rann s	cale of 2.51 head/0.52 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
401 40	1			
402	Table 2	2. The Average of Non-Beef Cattle Farmers I	ncome	
	No.	Source of Income	IDR/year	Percentage
	1.	Food crop farming	12,749,866.	67 43.36

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

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

403 403

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

405 <u>Cattle Farmers Income.</u>

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

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408	Notification to author :
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410	however the manuscript should be written as guideline and please see further
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Tanggal 3 Desember 2020: pengiriman final perbaikan manuskrip untuk keperluan publikasi

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Tabel 1 dengan Judul Tabel " Composition of Basal Diet Added with Fermented Feed " adalah bukan hasil penelitian kami.

Tabel 1 dengan Judul Tabel "Total Cost, Total Revenue and Incorreof Beef Cattle Fattening on an Average Farm Scale of 2.31 head/6.32 monts in Central Java " adalah benar dan merupakan hasil penelitian kami.

2. Judul Tabel 1, Tabel 2, dan Tabel 3 sesuai dengan yang diberi notasi warna kuning, adalah :

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

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

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

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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 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

The Contribution of Beef Cattle Income to Total Household Income (E. Prasetyo et al.)

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 (Prasetvo 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 : Σ (Q_i. Hq_i) TR : Total revenue (IDR) Qi : Product quantity (kg) Hq_i : Price (IDR)

 $\pi = TR - TC$ where $\pi : Income (IDR)$ 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 activities 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:

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

$$Y = \alpha + b_1 X_1 + b_2 X_2 + b_3 X_3 + e$$

- Y : Beef cattle farm Income (IDR).
- A : Intercept
- b_i: Regression coeffisien.
- X_1 : Number of beef cattle (head)
- X₂: 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, Yogvakarta, 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)

The Contribution of Beef Cattle Income to Total Household Income (E. Prasetyo et al.)

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 limousineperanakan 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 production based subtracting was on 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 smallscale 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 famers' income amounted to IDR with 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 were IDR 19,891,410.00/year, system 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 states Rohaeni's (2014), which that the contribution of people's beef cattle farm income to total family income ranges from 15-25%. It can

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 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

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. 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

Model	Unstandardized Coefficients		Stand. Coefficient	Т	Sig.
	В	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

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

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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