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An Analysis On Business Feasibility And Farmers Income In Semarang, Central Java, Indonesia

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Abstract: Agricultural sector plays an important role in absorbing employments and providing contributions to the Gross Regional Domestic Product of Semarang. However, farmers still experience various problems, such as low income. The purpose of this research is to figure out the farmers income and farming feasibility. The research object includes four agricultural sub-sectors, covering crops, horticultural plants, industrial raw material plants, and cattle breeding. This research employs a purposive sampling method which data are taken by observation, questionnaire, and interview. The results show that the average land areas owned by the crops farmers, horticultural plants and industrial raw material plants is 3,098m2. While the average ownership of dairy cattle, beef cattle, broilers, and laying hens is respectively by 9 and 11 cows as well as 7,970 and 1,900 chickens. The average farmers income of crops, industrial raw material plants, horticultural plants, and cattle breeders is Rp. 6,163,750/year, Rp. 10,886,610/year, Rp. 17,928,300/year, and Rp.71,346,250/year which are lower than Regional Minimum Wage of Rp. 2,315,000/month. However, different conditions are found for the laying hens and broilers breeders, whose monthly income are respectively by Rp. 2,773,878 per thousand broilers and Rp. 52,528,947 per thousand hens. To achieve the Regional Minimum Wage, the crops farmers, industrial raw material plants, and horticultural plants should ideally have the land areas of minimally around 14,500m2, 7.600m2, and 3,600m2. Meanwhile, the breeders of dairy cattle, beef cattle should minimally have the cattle number of respectively 18 and 2 to earn the monthly income equal to the Regional Minimum Wage.

Index Terms: income; business scale; farmer; semarang.

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1 INTRODUCTION

During the period of 2010-2014, agriculture was a sector with the largest employment segment in Indonesia. The employment in agricultural sectors in 2010 was approximately 38.69 million workers or about 35.76% of the total absorption of labors. In 2014, the employment decreased to 35.76 million workers or 30.27% (Central Bureau of Statistics, 2016). It is concerned that most Indonesian people working in agricultural sectors lived in poverty. In 2014, it was recorded that the number of poor people in Indonesia working in agricultural sector was 10.13 million people or about 35.82 percent of the total number of 28.28 million poor people. The research result conclude that the average income of crop, industrial raw material plant, horticultural plant, beef cattle, broiler, and laying hen farmers is respectively by Rp. 6,163,750/year Rp. 10,886,610/year, Rp. 17,928,300/year, Rp.71,346,250/year, Rp. 2,773,878 per one thousand chickens and Rp. 52,528,947 per one thousand laying hens. Semarang is one city in Central Java in which most Gross Regional Domestic Product (GRDP) is supported by the agricultural sectors which contributions are still considered relatively small. The large population of Semarang working in agricultural sectors may be seen in table 1.

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TABLE 1
POPULATION COMPOSITION OF SEMARANG PEOPLE BASED ON THEIR EMPLOYMENTS IN 2012-2015

Types of Employment	Year			
	2012	2013	2014	2015
Farmers	26,718	26,940	26,965	27,141
Farm workers	18,382	18,534	18,551	18,673
Fishermen	2,635	2,657	2,659	2,677
Entrepreneurs	52,723	53,160	53,209	53,557
Industrial Workers	175,185	176,635	176,801	177,956
Construction workers	82,087	82,766	82,844	83,385
Traders	85,468	86,175	86,256	86,820
Transportation	25,344	25,553	25,577	25,744
Public Service & Indonesian National Force /Police Officers	93,970	94,748	94,837	95,457
Retired workers	39,397	39,723	39,760	40,020
Others	81,031	81,702	81,779	82,313
Total	**682,940**	**688,593**	**689,238**	**693,743**

Source: Central Bureau of Statistics (2016)

Based on table 1, the population of Semarang people working in agricultural sector both as farmers and farm workers during the last 4 years continuously develop. The increasing number of people working in agricultural sector should also increase their contribution to Gross Regional Domestic Product as the production also experiences an increase. In facts, it is in the contrary that the agricultural contribution to Gross Regional Domestic Product of Semarang during the period of 2011-2015 tended to decrease. The contribution of agricultural sector to Gross Regional Domestic Product of Semarang may be seen in table 2.

TABLE 2

THE CONTRIBUTION OF GROSS REGIONAL DOMESTIC PRODUCT
BASEDON FIELD OF EMPLOYMENT (%) IN 2011 – 2015

Category	Category/Sub-Category	2011	2012	2013	2014	2015
A	Agriculture, Forestry, and Fisheries	1.03	1.00	1.04	1.01	1.01
B	Mining and excavation	0.19	0.19	0.18	0.19	0.20
C	Processing industry	26.70	27.15	27.11	27.62	27.55
D	Procurement of Electricity and Gas	0.12	0.11	0.11	0.10	0.09
E	Water Supply	0.11	0.10	0.09	0.09	0.08
F	Construction	26.46	26.71	26.68	26.88	27.03
G	Large and retail trade, repair and maintenance of cars and motorcycles	16.19	15.18	14.93	14.30	14.12
H	Transportation and Warehousing	3.26	3.27	3.48	3.64	3.72
I	Provision of Accommodation, Food and Drink	3.07	3.24	3.35	3.40	3.41
J	Information and Communication	7.93	7.66	7.35	7.16	7.07
K	Financial and Insurance Services	4.31	4.41	4.45	4.33	4.43
L	Real Estate	2.79	2.70	2.69	2.72	2.75
M,N	Company Services	0.55	0.55	0.59	0.59	0.62
O	Administration of Government, Defense and Required Social Security	3.46	3.53	3.48	3.35	3.34
P	Educational Services	2.07	2.46	2.68	2.75	2.74
Q	Health Services and Social Activities	0.64	0.69	0.72	0.74	0.76
R,S,T	Others	1.13	1.05	1.08	1.12	1.09
	Gross Regional Domestic Product	100.00	100.00	100.00	100.00	100.00

Source: Central Bureau of Statistics (2016)

In additional to its contributions to the decreasing GDRP, agricultural sectors in Semarang still experience various problems, covering farmers' low income due to the status of agricultural land ownership and non-economical business scale. The purpose of this research is to examine cost, income, and profit obtained by the farmers and to analyze the farming feasibility in Semarang. This research is expected to be beneficial in providing data as input and information material for local government in making and developing policies on agricultural sectors that the farmers' welfare may gradually increase.

2 LITERATURE REVIEW

According to Soekartawi (2006), farming science is a study on how an individual effectively and efficiently allocates resources to obtain higher profits at a certain period of time. It is considered effective when farmers are able to best allocate their resources and be efficient when the utilization of such resources makes the output more than the input. Farming income consists of gross income which is earned by a farmer from farming activities within a year resulted from sales or product exchanges, while net income is earned by a farmer within a year reduced by the production cost during the production processes. The production cost includes the workers' and production facilities' real cost. Two elements of farming income cover revenue and expenditure. Revenue is the multiplication result of the total number of products with the sales unit price, whereas expenditure or expense is the values of production facilities and others spent in the production processes. According to Hernanto (1991), factors which influence farming are: 1) Physical condition: topographic technical factors, altitude, climate, soil, water, and irrigation; (2) Biological conditions: pests, diseases, and weeds; (3) Economic conditions: market access, availability of production facilities, credit, transportation facilities/infrastructure; (4) Social conditions: norms, rules, traditions, customs, institutions; (5) Government policies; and (6) Technology. The result of a research conducted by Damanik (2014) shows that land areas and production cost have positive and significant influence on paddy farmers' income in Sragen regency, while the availability of labor forces has an influence but not

significant to their income. Furthermore, Fajri (2016) states that there is a correlation between business scale and number of workers to the dairy cattle breeder's income, while two variables simultaneously or partially have significant influence on the dairy cattle breeders' income. The greater the business scale, the better the welfare of the livestock farmers may be realized or the greater number of livestock raised in one husbandry period the higher the income may be earned by the cattle breeders. By raising livestock as many as three or four cows a year the livestock farmers may live better meeting the the Regional Minimum Wage. According to Mosher (1991), the benchmark to examine the farmers' welfare is through the household income as some aspects of welfare depend on the farmers' income level. The farmers' income may influence the basic needs to meet which cover food, clothing, house, health and employment. The farmers' household income sources are resulted from farming and livestock breeding activities, farm workers, land rent and shared profit, while those from non-agricultural sectors are such as home industry, trade, employees, services, non-agricultural workers and the other agricultural sub-sector workers. It is afraid that the development of industrial sector may threaten the existence of agricultural land, especially in crop agricultural areas. The condition is worsening by the existence of large number of micro-farmers having small-scale of business, low incomes, and production performance which are unable to compete in modern markets. According to Anggita (2013), farmers should make a revolution in business management which mutually brings the micro-farmers into a collective business. To merge into a collective business, a strong social capital support is required among farming communities, including social networking and trusting each other. Collectivity makes capacity, quality, and production continuity are expected to be able to compete in modern markets. The production cost may become efficient that the farmers' welfare may gradually increase. The intended collectivity here means is farmer institutions located in local areas (local institution), in the form of membership organizations or cooperatives. The existence of farmer institutions is based on the cooperatives made by the farmers in managing agricultural resources, covering: (a) processing, to become faster, efficient and cheaper; (b) marketing, to convince buyers regarding to the quality and to improve the farmers' bargaining position; (c) buying, in order to obtain cheaper prices; (d) the use of agricultural equipment (machine sharing), in order to lower the cost of the equipment purchase; (e) co-operative services, to provide services for the common good thus improving the welfare of the members, (f) co-operative banks, (g) co-operative farming, in order to obtain higher profits and uniformity of the products produced, and (h) multi-purpose co-operatives, developed under the farmers' similar interest. Farmers' group action or co-operation is believed by Mosher (1991) as a factor facilitating the agricultural development.

3 RESEARCH METHOD

The research on Analysis of Business Scale & Farmers' Income is conducted in Semarang with the object of crops, horticultural plant, industrial raw material plant, and livestock sub-sector farmers. This research employs a purposive sampling method while the number of samples are taken using Slovin Formula (Sevilla et al., 1960: 182).

$$n=N/1+Ne^2$$

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… .(3.1)

Where:

n = the number of samples in the research area
N = the number of population in the research area
e = error tolerance

Based on the number of population examined with a 10% error tolerance, the samples are obtained by

$$n = \frac{27{,}141}{1 + 27{,}141\,(0.01)} = \frac{27{,}141}{272.41}$$
$$= 99.63\,(100)$$

Research respondents are equally divided by the farming types and cultivation system in each sub-sector as shown in table 3

TABLE 3
THE DISTRIBUTION OF SAMPLES PER SUB-SECTOR

No	Farming Type	Full Farmers	Intercropping Farmers	Total
1	Crops	17	3	20
2	Horticultural plants	3	17	20
3	Industrial raw material plants	3	17	20
No	Farming Type	Beef	Egg(s) / milk	
4	Poultry Farming	10	10	20
5	Ruminant Farming	10	10	20
	Total			100

The researchers also consider that it is necessary to stratify the respondents based on their land ownership of less than 2,000 m2; 2,000-4,000 m2, and those of more than 4,000 m2. The farmers' stratification is presented based on the asset ownership. Meanwhile, the poultry breeders' stratification is based on the poultry ownership of less than 2,000; 2,000-5,000; and above 5,000. Furthermore, the ruminant breeders' stratification is based on the ownership of less than 10; between 10-20; and over 20 as presented in table 4.

TABLE 4
THE DISTRIBUTION OF SAMPLES PER SUB-SECTOR

No	Farming Type	Farmer < 2,000 m²	Farmer 2,000 – 4,000 m²	Farmer > 4,000 m²	Total
1	Crops	7	8	5	20
2	Horticultural plants	6	9	5	20
3	Industrial raw material plants	6	9	5	20
		< 2,000 chickens	2,000-5,000 chickens	> 5,000 chickens	
4.	Poultry Farming	6	6	8	20
		< 10 cows	10 -20 cows	> 20 cows	
5.	Ruminant Farming	8	6	6	20

This research is conducted using a quantitative approach. The data consist of primary and secondary data collected using observational, questionnaire, as well as interview techniques and then analyzed using:

1. Revenue Analysis
TR = Q x P
Where:
TR (Total Revenue) = Total revenue
Q (Quantity) = Product Quantity
P (Price) = Product Selling Price

2. Expense Analysis
TC = TFC + TVC
Where:
TC (Total Cost) = Total Cost
TFC (Total Fixed Cost) = Total Fixed Cost
TVC (Total Variable Cost) = Total Variable Cost

3. Profit Analysis
π = TR – TC
Where:
π = Income
TR (Total Revenue) = Total Revenue
TC (Total Cost) = Total Cost

4. Break Even Point (BEP) Analysis
break even point is a balance position in a business. There are two types of BEP calculations, namely BEP calculated by the production volume and that by the production price, formulated as follows:

$$\text{BEP by the production volume (ton)} = \frac{\text{Total Cost}}{\text{Sale Price}}$$

$$\text{BEP by the production price (Rp/ton)} = \frac{\text{Total Cost}}{\text{Total Production}}$$

5. R/C Ratio Analysis

$$\text{R/C ratio} = \frac{\text{Total Sale Revenue}}{\text{Total Cost}}$$

Business is considered profitable if the value of R/C ratio is greater than 1 (R/C ratio > 1).

4 RESULT AND DISCUSSION

The profiles of farmers and breeders used as the research samples are presented in Table 5 below.

TABLE 5
THE PROFILES OF FARMERS IN SEMARANG

No.	Farming Type	Average Age (year)	Average Learning Period at School (year)	Average Number of Asset Ownership
1.	Crops	58	6	3,515 m²
2.	Horticultural plants	53	9	2,540 m²
3.	Industrial raw material plants	52	8	3,238 m²
4.	Poultry Farming	49	9	
	a. Broilers			7,970 chickens
	b. Laying Hens			1,900 chickens
5.	Ruminant Farming	52	10	
	a. Beef cattle			11 cows
	b. Dairy cattle			9 cows

Farming and livestock businesses have special characteristics in which not all businesses may generate regular monthly income. The researchers make a conversion to reveal the annual and monthly income based on the obtained data during the harvest time and frequency within a year. The data of farmers' average annual and monthly income are presented as follows.

TABLE 6
THE AVERAGE INCOME OF FARMERS (RP)

No.	Commodity	Income/Year	Income/Month
1	Crops	6,163,750	513,646
2	Horticultural plants	17,928,300	1,494,025
3	Industrial raw material plants	10,886,610	907,218
4	Ruminant Farming	71,346,250	5,945,521
5	Poultry Farming	731,476,850	60,956,404

Source: Processed primary data

Based on the result of analysis, it shows that there is a large income disparity among farmers by the types of the cultivated commodities. Based on the annual income, the highest to the lowest income is obtained by the farmers of poultry, ruminant, horticultural plants, industrial raw material plants and crops respectively reach Rp. 731,476,850, Rp. 71,346,250, Rp. 17,928,300, Rp. 10,886,610 and Rp. 6,163,750. This condition clearly reflects the unequal welfare levels among farmers and breeders. When converted to the monthly-based income, the farmers of poultry, ruminant, horticultural plants, and industrial raw material plants may respectively reach Rp. 60,956,404, Rp. 5,945,521, Rp. 1,494,025, Rp 907,218, and Rp. 513,646. Thus, the income of crop farmers is generally considered the lowest. Due to the facts, the agricultural crops become unattractive to farmers. Thus, almost all paddy farmers only do the agricultural activities as a side job. They usually work in other sectors, such as trading, service and others to cover all their life necessities, when the plants no longer require more intensive treatments. The result also shows that the crop farmers' lowest monthly income is caused by four factors: (1) small agricultural land areas; (2) limited farming knowledge; (3) limited access to the production factors, such as seeds and fertilizers that the production results may not be maximized; (4) poor harvest yields and lower selling price due to the lack of information. The farmers' age may also influence their physical ability and response to the new knowledge and skills in cultivating their farms. The following table shows the farmers of crops, horticultural plants, and industrial raw material plants based on the cultivated land areas.

TABLE 7
THE AVERAGE INCOME OF CROP FARMERS (RP)

No.	Land area	Income/Year	Income/Harvest (2 times a year)	Income/Month
1	<2,000 m²	3,526,333	1,763,167	293,861
2	2,001-4,000 m²	5,747,667	2,873,833	478,972
3	>4,000 m²	9,764,600	4,882,300	813,717
4	Intercropping	6,269,333	3,134,667	522,444

TABLE 8
THE AVERAGE INCOME OF HORTICULTURAL PLANT FARMERS (RP)

No.	Land area	Income/Year	Income/Month
1	<2,000 m²	7,596,000	633,000
2	2,001-4,000 m²	20,800,000	1,733,333
3	>4,000 m²	27,738,000	2,311,500
4	Intercropping	16,500,000	1,375,000

Source: Processed primary data

TABLE 9
THE AVERAGE INCOME OF INDUSTRIAL RAW MATERIAL PLANT FARMERS (RP)

No.	Land area	Income/Year	Income/harvest (once in 8 years)	Income/Month
1	<2,000 m²	11,728,167	93,825,333	977,347
2	2,001-4,000 m²	4,138,667	33,109,333	344,889
3	>4,000 m²	17,429,600	139,436,800	1,452,467
4	Intercropping	11,794,400	94,355,200	982,867

Source: Processed primary data

The table above shows that the more the land areas are cultivated, the higher the income the farmers may earn. This is in line with the research conducted by Gupito, R et al., (2014) showing that sorghum farming only contributes 2% to the total farmers' income. Factors affecting the sorghum farmers' income level are positively the land areas and the seeds' price. Furthermore, Kusmantoro in his research related to the analysis on the diversity of household farming businesses states that the income generated from gogo paddy farming provides the highest contributions to the household income generated from the farming activities (on farm), while the livestock income has the highest contribution to the household income generated from the non-farming activities (off farm). In addition, the income earned by household farming from the entrepreneurship sectors significantly provide the highest contributions to the farmers' household income generated from the non-farming activities. Thus, the farmers are greatly required to be provided wider access to the capital resources. According to Rohma Dewi, the period in which the farmers are joined in group and farming land areas positively influence the farmers' micro-credit access. The farmer groups may form semi-formal institutions, such as cooperatives or gapoktan (farmer groups association). Since the farmers are joined as the institutional members, the administrative requirements may be easily facilitated with the lower interest rates. In Bogor areas, the amount of credits provided to the micro-credit ranges from Rp. 300,000 to Rp. 2,000,000. The payment system is made after the harvest period in which most credits are used to buy fertilizers and pay the workers' salary. The results also indicate that the income of dairy and beef cattle breeder groups based on the number of cows ownership is presented as follows;

TABLE 10
The Average Income of Ruminant and Poultry Farmers (Rp)

Livestock Types	Number of cows	Income / year	Income / year / number of livestock	Income / month
Dairy cows	<10		4,482,000	373,500
	10-20	12,778,500	42,825,000	3,568,750
	>20		-11,550,000	-962,500
Beef cattle	<10		4,710,000	392,500
	10-20	129,914,000	184,200,000	15,350,000
	>20		271,750,000	22,645,833
Broilers	< 2,000	265,293,700	58,557,333	4,879,778
	2,001-5,000		98,647,000	8,220,583
	>5,000		455,994,200	37,999,517
Hens	< 2,000	1,197,660,000	1,183,800,000	98,650,000
	2,001-5,000		1,211,520,000	100,960,000
	>5,000		-	-

Source: Processed primary data

The dairy farmers with the ownership of less than 10 cows averagely earn only Rp. 373,500 which is greatly unequal with the dairy farmers' income with the ownership of 10-20 cows in

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which their average monthly income may reach Rp. 3,568,750. Thus, it can be concluded that the number of livestock also influences the farmers' income. However, the farmers with the livestock ownership of more than 20 cows, in facts, experience losses since one time the price of milk drops to the lowest level accompanied with the higher purchasing of the cattle seeds. In line with the research conducted by Rahayu (2013), the costs of feed, forage, medicine, labors and dairy cattle purchases influence the dairy cattle farmers' income in which the purchasing cost of the dairy cattle seed has the greatest influence. In facts, chicken breeders earn the highest income when compared with that earned by the farmers and cattle breeders. The annual income of laying-hen breeders is five times greater than that of broiler breeders due to several factors, including the price of chicken eggs which tends to be more stable than that of the broilers; laying-hen breeding has a higher investment value; most broiler breeders run their breeding patterns in partnership scheme with large animal feed company that their bergainning position is poor. The factors which encourage breeders in partnership patterns are: the availability of livestock production facilities, experts, working capitals provided by the company, and markets are guaranteed. Supriyatna (2006) in the National Seminar of Teknologi Peternakan dan Veteriner explains that chicken breeders with the core of partnership patterns have a direct access to the modern and conventional markets, while the independent breeders typically sell their cattle through the collecting middlemen. To see the farmers' real income, the researchers compare it to the regional minimum wage (UMR) since the amount of salary is considered reflecting the average of people's properly daily needs and closely paying attention to the macro-economic assumptions. The calculation results show that the income/month/1,000 m2 of horticulture, industrial crop, and crop farmers is respectively 3.6, 7.6, and 14.5 times lower than the regional minimum wage of Semarang. Meanwhile, the income/month/cow of dairy cattle and beef cattle farmers is also respectively 18.3 and 2.1 times lower than the regional minimum wage of Semarang. The condition is slightly different from what experienced by the chicken farmers. The average income/ month/1,000 chicken of the broiler and lying hen breeders is respectively by Rp. 2,773,878 and Rp. 52,528,947 higher than the regional minimum wage of Semarang.

5   CONCLUSION AND RECOMENDATION
The research results conclude that: (1) the average land ownership of paddy, horticultural plants and industrial plants is 3,098 m2. The average ownership of dairy cattle is only by 9, beef cattle by 11, broilers by 7,970, and laying hens by 1,900; (2) the average income of crop, industrial raw material plant, horticultural plant, beef cattle, broiler, and laying hen farmers is respectively by Rp. 6,163,750/year Rp. 10,886,610/year, Rp. 17,928,300/year, Rp.71,346,250/year, Rp. 2,773,878 per one thousand chickens and Rp. 52,528,947 per one thousand laying hens. Based on the research results, it is recommended that: (1) to obtain equal income with that of the Regional Minimum Wage of Semarang, the farmers of paddy, industrial raw material plants, and horticultural plants should ideally have a land area of respectively 14,500 m2, 7.600 m2 and 3,600 m2. Meanwhile, the dairy farmers and beef cattle breeders should at least have 18 and 2 cows respectively; (2) horticultural farming requires further development through post-harvest processing. In this case, the groups of mutual

businesses between farmers and their wives may become the next targets; (3) it is necessary to encourage ecotourism as one part of multiplier effects in the development of agricultural sectors that the farmers may not only rely on agricultural but also service business sub-sectors.

6   ACKNOWLEDGEMENT

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